Grid status **Normal** Learn more about active alerts, warnings and emergencies

Current and forecasted demand AS OF 11:55

About demand

Current capacity* **39,258 MW**

Current demand **24,353 MW**

Available next 1 – 4 hours **9,590 MW – 14,905 MW**

Includes reserves **2,731 MW**

39,258 MW Current capacity*

24,353 MW Current demand

2,731 MW Current reserves

28,698 MW Forecasted peak (20:45)

26,749 MW Tomorrow's forecasted peak

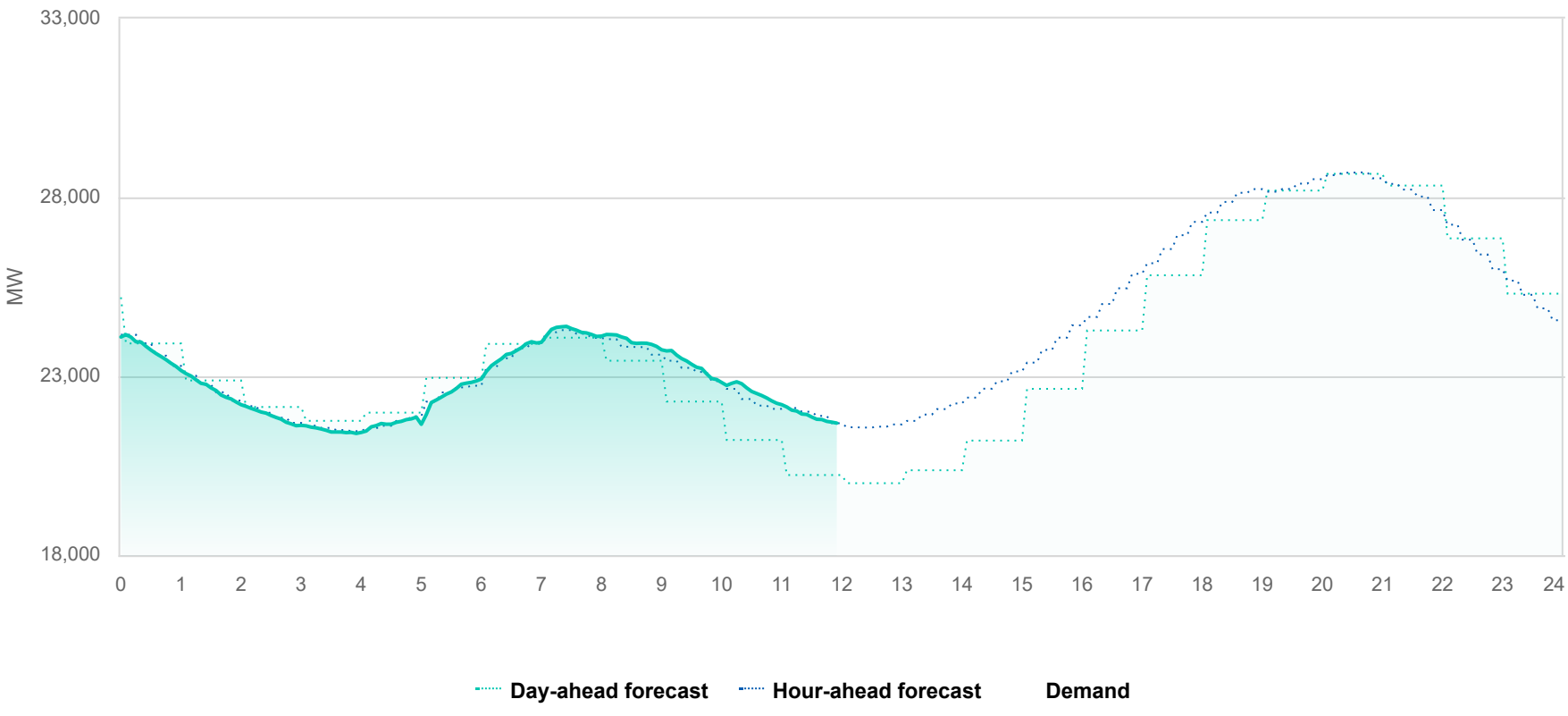
**Capacity varies due to startup, constraints, outages, congestion, and emergencies. Does not include solar and wind or Demand Response resources.*

View all outage reports.

Demand trend

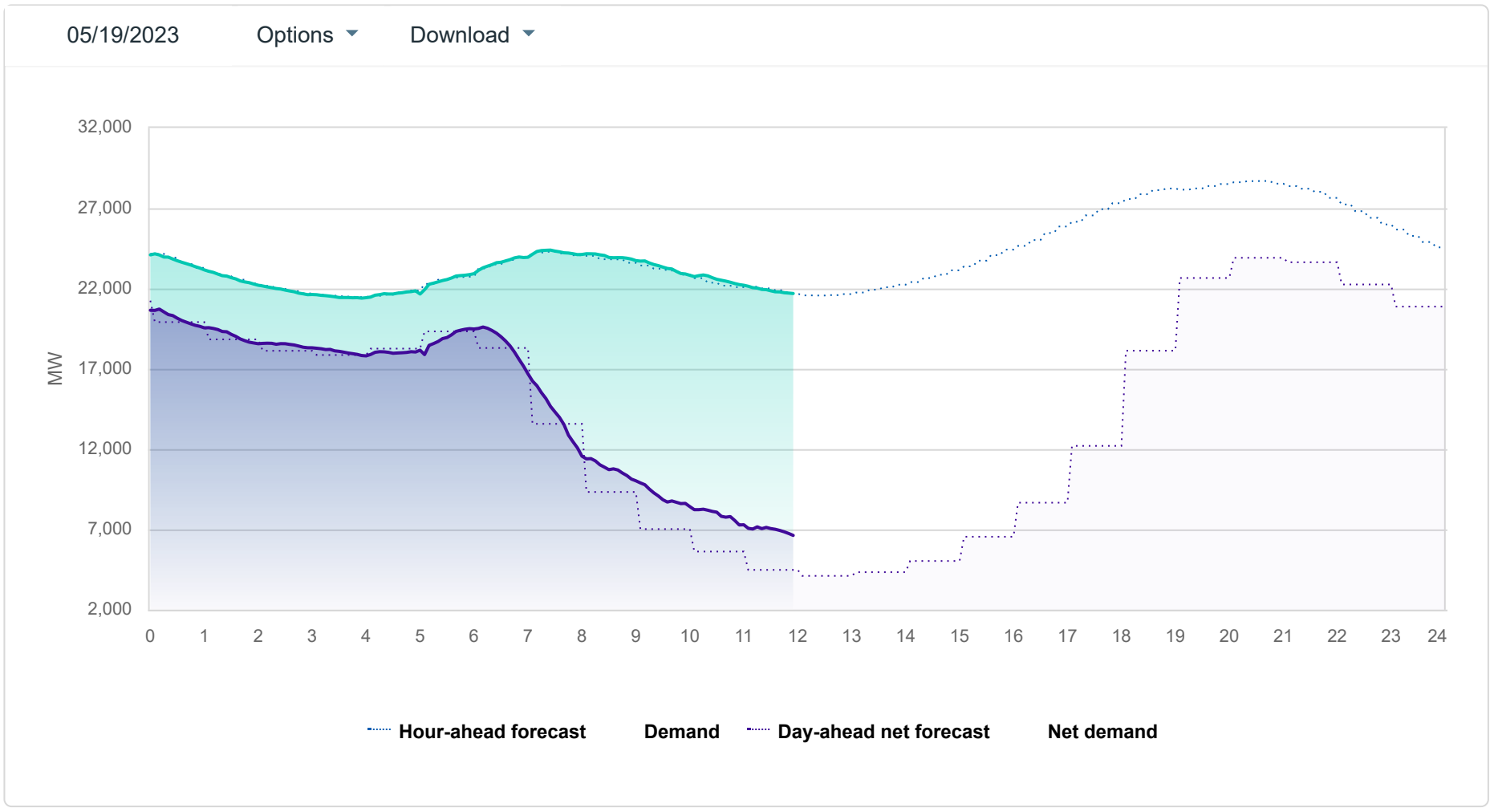
System demand, in megawatts, compared to the forecasted demand in 5-minute increments.

05/19/2023 Options Download



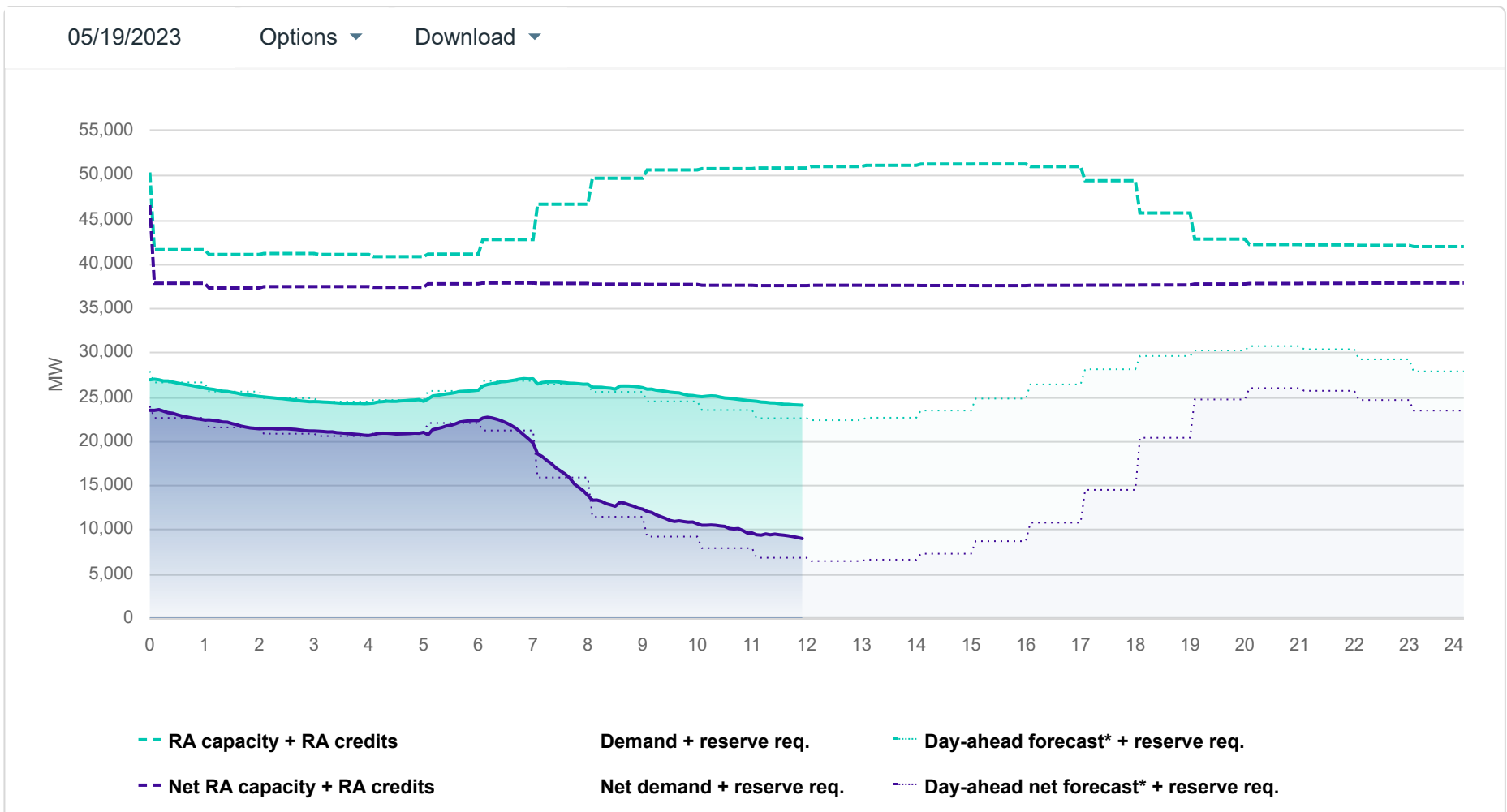
Net demand trend

System demand minus wind and solar, in 5-minute increments, compared to total system and forecasted demand.



Resource adequacy capacity trend

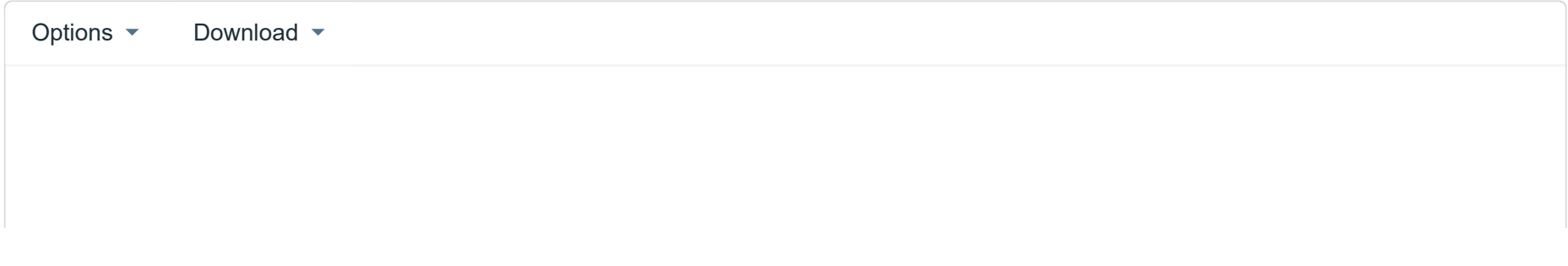
Resource adequacy (RA) is energy designated by the state to be bid into the market for the reliable operation of the power grid, minus the impacts of outage derates. Any energy needed over that designated amount has to be procured in the real-time market.

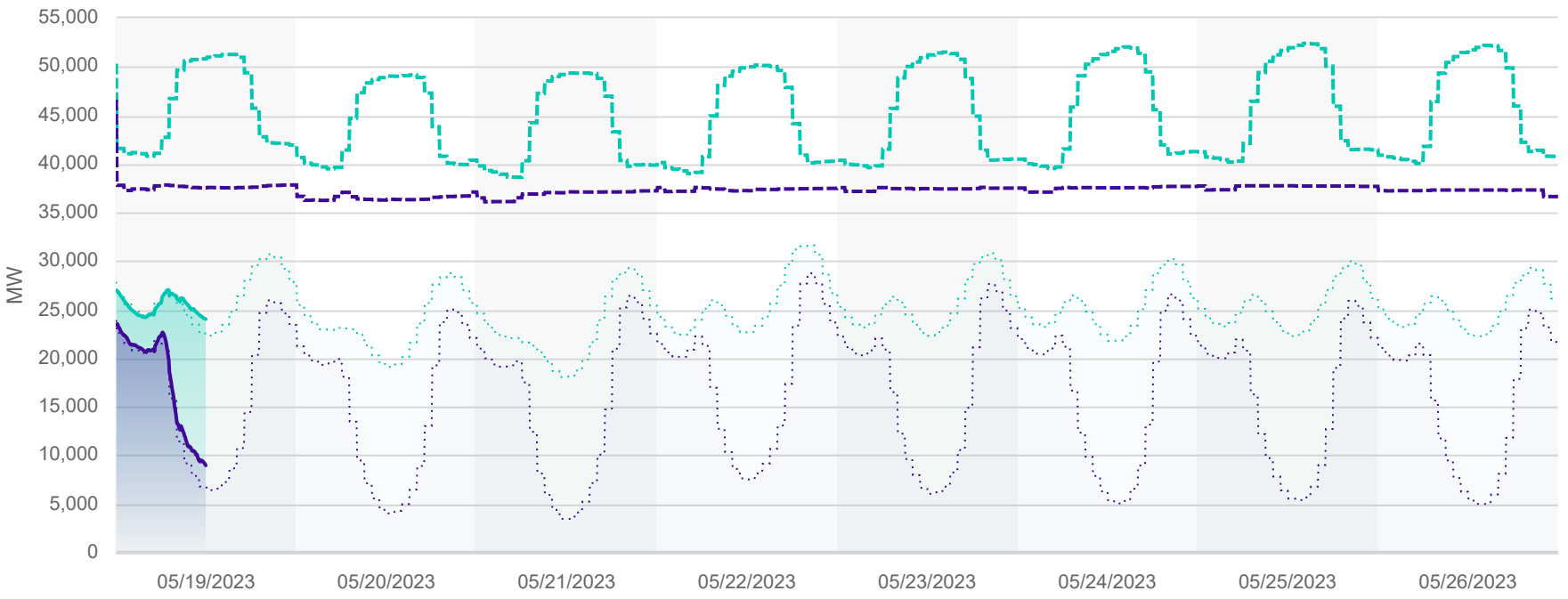


**Note: Values for the 7th day of the day-ahead forecasts will complete by 9:30 PT.*

7-day resource adequacy capacity trend

Resource adequacy capacity forecast for today plus the next 7 days, in megawatts, compared to demand forecast plus reserve requirements.





Note: Values for the 7th day of the day-ahead forecasts will complete by 9:30 PT.

Today's Outlook charts are designed to summarize forecasts and actual loads. The demand and net demand trend data do not include dispatchable pump loads or battery storage that is charging on the system. This data is for informational purposes only, and should not be used for determining actual billing values or operational planning.

Data is subject to change without notice.
For official data, visit OASIS. For official emissions data, visit CARB.

CalEEMod

California Air Pollution Control Officers Association

CalEEMod

California Emissions Estimator Model

Emissions Modeling • Climate Resilience • Health & Equity

CalEEMod quantifies ozone precursors, criteria pollutants, and greenhouse gas emissions from the construction and operation of new land use development and linear projects in California. The model integrates data from CalEnviroScreen®, Cal-Adapt®, and the Healthy Places Index (HPI)® to identify potential climate risks and environmental burdens within the project vicinity. Measures to reduce emissions, climate risks, and environmental burdens are available for user selection and analysis.

CalEnviroScreen cal-adapt HPI®

 Funding provided by California Department of Transportation (via Senate Bill 1 Adaptation Planning Grants), Bay

2022 SCOPING PLAN FOR ACHIEVING CARBON NEUTRALITY

NOVEMBER 16, 2022

Table of Contents

List of Figures

List of Tables

List of Appendices

Abbreviations

°F	Fahrenheit
°C	Celsius
AB	Assembly Bill
AQMD	Air Quality Management District
AR5	IPCC Fifth Assessment Report
BECCS	bioenergy with carbon capture and storage
CAISO	California Independent System Operator
CalEPA	California Environmental Protection Agency
CalGEM	California Geologic Energy Management Division
CalSTA	California State Transportation Agency
CAP	climate action plan
CARB	California Air Resources Board
CCR	California Code of Regulations
CCS	carbon capture and sequestration
CCUS	carbon capture, utilization, and storage
CDFA	California Department of Food and Agriculture
CDPH	California Department of Public Health
CDR	carbon dioxide removal
CE	common era
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CES	CalEnviroScreen
CH_4	methane
CMAQ	Community Multiscale Air Quality
CNRA	California Natural Resources Agency
CO_2	carbon dioxide
COPD	chronic obstructive pulmonary disease

CORE	Clean Off-Road Equipment
CPUC	California Public Utilities Commission
CVM	Climate Vulnerability Metric
DAC	direct air capture
DPR	Department of Pesticide Regulation
Draft EA	Draft Environmental Analysis for this Scoping Plan
EA	Environmental Analysis
ED	emergency department
EIA	U.S. Energy Information Administration
EJ	environmental justice
EJ Advisory Committee	Environmental Justice Advisory Committee
EO	executive order
EV	electric vehicle
F-gas	fluorinated gas
FCEV	fuel cell electric vehicle
GCF	Governors' Climate and Forests Task Force
GDP	gross domestic product
GHG	greenhouse gas
GSP	gross state product
GW	gigawatt
GWh	gigawatt-hour
GWP	global warming potential
HDV	heavy-duty vehicle
HD ZEV	heavy-duty zero-emission vehicle
HFC	hydrofluorocarbon
IBank	Infrastructure and Economic Development Bank
ICE	internal combustion engine
IPCC	Intergovernmental Panel on Climate Change

IPT	incidence-per-ton
IWG	Interagency Working Group
LCFS	low-carbon fuel standard
LDV	light-duty vehicle
MDV	medium-duty vehicle
MMT	million metric tons
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
MOU	memorandum of understanding
MRR	Mandatory Reporting of GHG Emissions
$MTCO_2e$	metric tons of carbon dioxide equivalent
MW	megawatt
N_2O	nitrous oxide
NEMS	National Energy Systems Model
NF_3	nitrogen trifluoride
NOAA	National Oceanic and Atmospheric Administration
NOx	nitrogen oxides
NRDC	National Resources Defense Council
NWL	Natural and Working Lands
OEHHA	Office of Environmental Health Hazard Assessment
OGV	Ocean-Going Vessel
OPR	Governor's Office of Planning and Research
OTC	once-through cooled
PFC	perfluorocarbon
PHMSA	Pipelines and Hazardous Materials Safety Administration
PM	particulate matter
$PM_{2.5}$	fine particulate matter
PPP	public-private partnership
RFS	renewable fuel standard

ROG	reactive organic gases
RPS	Renewables Portfolio Standard
SB	Senate Bill
SC-CH_4	social cost of methane
SC-CO_2	social cost of carbon
SC-GHG	social cost of greenhouse gases
SC-N_2O	social cost of nitrous oxide
SF_6	sulfur hexafluoride
SGIP	Self-Generation Incentive Program
SLCP	short-lived climate pollutant
TSD	Technical Support Document
UC	University of California
UCLA	University of California, Los Angeles
UNFCCC	United Nations Framework Convention on Climate Change
U.S. EPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
WUI	wildland-urban interface
ZEV	zero-emission vehicle

Executive Summary

This Scoping Plan lays out the sector-by-sector roadmap for California, the world's fifth[1] largest economy, to achieve carbon neutrality by 2045 or earlier, outlining a technologically feasible, cost-effective, and equity-focused path to achieve the state's climate target. This is a challenging but necessary goal to minimize the impacts of climate change. There have been three previous Scoping Plans. Previous plans have focused on specific greenhouse gas (GHG) reduction targets for our industrial, energy, and transportation sectors—first to meet 1990 levels by 2020, then to meet the more aggressive target of 40 percent below 1990 levels by 2030. This plan, addressing recent legislation and direction from Governor Newsom, extends and expands upon these earlier plans with a target of reducing anthropogenic emissions to 85 percent below 1990 levels by 2045. This plan also takes the unprecedented step of adding carbon neutrality as a science-based guide and touchstone for California's climate work. The plan outlines how carbon neutrality can be achieved by taking bold steps to reduce GHGs to meet the anthropogenic emissions target and by expanding actions to capture and store carbon through the state's natural and working lands and using a variety of mechanical approaches.

What this means for California is an ambitious and aggressive approach to decarbonize every sector of the economy, setting us on course for a more equitable and sustainable future in the face of humanity's greatest existential threat, and ensuring that those who benefit from this transformation include communities hardest hit by climate impacts and the ongoing pollution from the use of fossil fuels. The combustion of fossil fuels has polluted our air—particularly in low-income communities and communities of color—for far too long and is the root cause of climate change. This Scoping Plan helps us chart the path to a future where race and class are no longer predictors of disproportionate burdens from harmful air pollution and climate impacts.

The major element of this unprecedented transformation is the aggressive reduction of fossil fuels wherever they are currently used in California, building on and accelerating carbon reduction programs that have been in place for a decade and a half. That means rapidly moving to zero-emission transportation; electrifying the cars, buses, trains, and trucks that now constitute California's single largest source of planet-warming pollution. It also means phasing out the use of fossil gas used for heating our homes and buildings. It means clamping down on chemicals and refrigerants that are thousands of times more powerful at trapping heat than carbon dioxide (CO_2). It means providing our communities

[1] In October 2022, California was poised to become the world's fourth largest economy.

with sustainable options for walking, biking, and public transit to reduce reliance on cars and their associated expenses. It means continuing to build out the solar arrays, wind turbine capacity, and other resources that provide clean, renewable energy to displace fossil-fuel fired electrical generation. It also means scaling up new options such as renewable hydrogen for hard-to-electrify end uses and biomethane where needed. Successfully achieving the outcomes called for in this Scoping Plan would reduce demand for liquid petroleum by 94 percent and total fossil fuel by 86 percent in 2045 relative to 2022.[2] Despite these world-leading efforts, some amount of residual emissions will remain from hard-to-abate industries such as cement, internal combustion vehicles still on the road, and other sources of GHGs, including high global warming chemicals used as refrigerants.

The plan addresses these remaining emissions by re-envisioning our natural and working lands—forests, shrublands/chaparral, croplands, wetlands, and other lands—to ensure they play as robust a role as possible in incorporating and storing more carbon in the trees, plants, soil, and wetlands that cover 90 percent of the state's 105 million acres while also thriving as a healthy ecosystem. Modeling indicates that natural and working lands will not, on their own, provide enough sequestration and storage to address the residual emissions. For that reason, it is necessary to research, develop, and deploy additional methods of capturing CO_2 that include pulling it from the smokestacks of facilities, or drawing it out of the atmosphere itself and then safely and permanently utilizing and storing it, as called for in recent legislation. Carbon removal also will be necessary to achieve net negative emissions to address historical GHGs already in the atmosphere.

This is a plan that aims to shatter the carbon status quo and take action to achieve a vision of California with a cleaner, more sustainable environment and thriving economy for our children. This ambitious plan will serve as a model for other partners around the world as they consider how to make their transition. As we have so often in the past, California can continue to serve as a leader in innovation that has produced not only the fifth largest economy on the planet, but ultimately one of the most energy-efficient economies, with a track record of demonstrating the ability to decouple economic growth from carbon pollution. This plan also builds upon current and previous environmental justice efforts to integrate environmental justice directly into the plan, to ensure that all communities can reap the benefits of this transformational plan. Specifically, this plan:

[2] See *https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-PATHWAYS-data-E3.xlsx* for energy demand reductions.

- Identifies a path to keep California on track to meet its SB 32 GHG reduction target of at least 40 percent below 1990 emissions by 2030.
- Identifies a technologically feasible, cost-effective path to achieve carbon neutrality by 2045 and a reduction in anthropogenic emissions by 85 percent below 1990 levels.
- Focuses on strategies for reducing California's dependency on petroleum to provide consumers with clean energy options that address climate change, improve air quality, and support economic growth and clean sector jobs.
- Integrates equity and protecting California's most impacted communities as driving principles throughout the document.
- Incorporates the contribution of natural and working lands (NWL) to the state's GHG emissions, as well as their role in achieving carbon neutrality.
- Relies on the most up-to-date science, including the need to deploy all viable tools to address the existential threat that climate change presents, including carbon capture and sequestration, as well as direct air capture.
- Evaluates the substantial health and economic benefits of taking action.
- Identifies key implementation actions to ensure success.

The path forward is informed by robust science. The recent Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC) summarizes the latest scientific consensus on climate change. It finds that atmospheric concentrations of CO_2 have increased by 50 percent since the industrial revolution and continue to increase at a rate of two parts per million each year.[3] By the 2030s, and no later than 2040, the world will exceed 1.5°C warming unless there is drastic action. While every tenth of a degree matters—every incremental increase in warming brings additional negative impacts—climate-related risks to human health, livelihoods, and biodiversity are projected to increase further under 2°C warming, compared to 1.5°C.[4] For example, at 1.5°C of global warming, we would experience increasing heat waves, longer warm seasons, and shorter cold seasons, but at 2°C of global warming, heat extremes would more often reach critical tolerance thresholds for human health and agriculture.[5] We are already seeing unprecedented climate change impacts, such as continued sea level rise, that are

[3] IPCC. 2021. *Climate Change 2021: The Physical Science Basis.* Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press. https://www.ipcc.ch/report/ar6/wg1/.

[4] IPCC. 2018. *Global Warming of 1.5°C.* World Meteorological Organization. Geneva, Switzerland. 32 pp. https://www.ipcc.ch/sr15/.

[5] IPCC. 2021. Climate change widespread, rapid, and intensifying – IPCC. August. *https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/.*

"irreversible" for centuries to millennia, and we are dangerously close to hitting 1.5ºC in the near term.[6] To avoid climate catastrophe and remain below 1.5°C with limited or no overshoot of that threshold, global net anthropogenic CO_2 emissions need to reach net zero by 2050.

It has been 16 years since the Global Warming Solutions Act of 2006 was passed and signed into law. In 2017, the second update to the Assembly Bill (AB) 32 Climate Change Scoping Plan[7] (2017 Scoping Plan) laid out a cost-effective and technologically feasible path to achieve the 2030 GHG reduction target. At the time, many characterized the plan and the AB 32 target as unachievable, citing that it would lead to massive business and job loss, and excessive costs. Those predictions proved to be incorrect as California achieved its AB 32 target years ahead of schedule, all the while growing our economy, with the state distinguishing itself as a hub for green technology investment. This Scoping Plan draws on a decade and a half of proven successes and additional new approaches to provide a balanced and aggressive course of effective actions to achieve carbon neutrality in 2045, if not before, in addition to the 2030 goal.

California's economy is projected to grow vigorously in the coming years and decades. In 2045, under a Reference Scenario, the gross state product would be $5.1 trillion, nearly $2 trillion more than in 2021, and allow growth that would add hundreds of thousands of jobs. Under the Scoping Plan scenario, impacts to economic and job growth would be negligible in both 2035 and 2045, while delivering $199 billion of benefits in the form of reduced hospitalizations, asthma cases, and lost work and school days due to the cleaner air supported by this plan. This should come as no surprise given the tremendous growth of California's economy since the Great Recession of 2007–2009, even as the state has taken drastic measures to lower emissions. As noted, the savings associated with ambitious climate action are extensive, both in terms of avoided climate impacts and health costs. As described in Chapter 1, the health costs of climate and air pollution in the U.S. are well over $800 billion today and will continue to grow in the coming years[8] without robust action. Similarly, the costs of delayed or insufficient climate action could cost the

[6] United Nations. 2021. IPCC report: 'Code red' for human driven global heating, warns UN chief. August 9. *https://news.un.org/en/story/2021/08/1097362*.
[7] CARB. 2017. *California's 2017 Climate Change Scoping Plan.* *https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf.*
[8] Alwis, D. D., and V. S. Limaye. No date. *The Costs of Inaction: The Economic Burden of Fossil Fuels and Climate Change on Health in the United States.* NRDC, The Medical Society Consortium on Climate and Health, and WHPCA. https://www.nrdc.org/sites/default/files/costs-inaction-burden-health-report.pdf.

U.S. upwards of $14.5 trillion over the next 50 years.[9] We can either take action now or pay the cost of inaction, both now and later.

We cannot take on this unprecedented challenge alone. Collaboration with the federal government, other U.S. states, and other jurisdictions around the world will continue to be fundamental for California to succeed in achieving its climate targets, especially as the pace of our efforts increases in the coming years. We believe this collaboration and coordination also creates a race to the top, encouraging and enabling other jurisdictions to achieve climate and air quality goals as well, and often providing lessons for national action.

One example of fruitful collaboration is California's longstanding vehicle emissions standards programs, which have repeatedly been freely adopted by other states, consistent with the federal Clean Air Act. California's programs frequently pioneer more rigorous standards or new technologies—such as the now-standard catalytic converter and the rules that led directly to the nation-leading numbers of zero-emission vehicles on our roads today. From initial standards for cars and trucks decades ago to the world-leading Advanced Clean Trucks program currently helping to electrify heavy-duty vehicles, this partnership continues to offer regulatory options and spread innovative technologies. A major example of future work is the Advanced Clean Cars II program, which lays out California's legally binding path to achieving 100 percent zero emission vehicle (ZEV) sales in 2035.[10] The California Air Resources Board (CARB) continues to work closely with many other states that also see zero-emission vehicles as critical to their climate and public health goals and expects many states to choose to adopt this regulation as well. This partnership with other states also creates market certainty for automakers, which in turn helps to ensure that California consumers have access to a variety of ZEVs at multiple price points.

The Scoping Plan Process

Four scenarios were extensively modeled to develop this Scoping Plan, with the objective of informing the most viable path to remain on track to achieve our 2030 GHG reduction target: a reduction in anthropogenic emissions by 85% below 1990 levels and carbon neutrality by 2045. All four have their merits and are informed by stakeholder input. The scenario ultimately chosen as the basis of this Scoping Plan is the alternative that most

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[9] Deloitte. 2022. *The Turning Point: A New Economic Climate in the United States.* https://www2.deloitte.com/content/dam/Deloitte/us/Documents/about-deloitte/us-the-turning-point-a-new-economic-climate-in-the-united-states-january-2022.pdf?id=us:2el:3dp:wsjspon:awa:WSJSBJ:2021:WSJFY22.

[10] Executive Department. State of California. Executive Order N-79-20. *https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf*.

closely aligns with existing statute and Executive Orders. It was selected because it best achieves the balance of cost-effectiveness, health benefits, and technological feasibility.

For the first time, this Scoping Plan includes modeling and quantification of GHG emissions and carbon sequestration in natural and working lands (NWL). To date, the focus has been only on reducing the emissions of GHGs from our transportation, energy, and industrial sectors. The state's 2020 and 2030 GHG reductions targets only include these sources, as they are the primary drivers of climate change and disproportionate harmful air pollution in our vulnerable communities. This Scoping Plan, through the lens of carbon neutrality, expands the scope to more meaningfully consider how our NWL contribute to our long-term climate goals. For the first time, new and cutting-edge modeling tools allow us to estimate the quantitative ability of our forests and other landscapes to remove and store carbon under different scenarios. These cutting-edge tools were developed through a stakeholder process and in coordination with other agencies for the purpose of this update and will continue to be refined over time and made available to others seeking to do similar work.

As recent data and Scoping Plan modeling shows, our NWL also can act as a source of emissions, principally in the form of wildfires. California's forests are experiencing a deadly combination of drought and heat combined with a century of misguided fire suppression management. Scoping Plan modeling shows that, at this time and until our forests reach a balance through appropriate treatments, California's NWL will act as a net source of emissions, not a sink. As such, the Scoping Plan includes policy direction and actions intended to quickly move the sector toward being a net sink and a more natural state, where wildfires will continue to be an important part of the healthy forest cycle but not at the intensity and frequency observed in recent years.

Development of this Scoping Plan also includes careful consideration of, and coordination with, other state agencies, consistent with Governor Gavin Newsom's whole-of-government approach to tackling climate change. State agency plans and regulations, including the SB 100 Joint Agency Report,[11] State Implementation Plan, Climate Action Plan for Transportation Infrastructure,[12] AB 74 Studies on Vehicle Emissions and Fuel

[11] California Public Utilities Commission (CPUC), California Energy Commission (CEC), and CARB. 2021. *SB 100 Joint Agency Report.* https://www.energy.ca.gov/sb100.
[12] California State Transportation Agency (CalSTA). 2021. Climate Action Plan for Transportation Infrastructure. https://calsta.ca.gov/subject-areas/climate-action-plan.

Demand and Supply,[13,14,15] Short-Lived Climate Pollutant Strategy (SLCP Strategy),[16] CARB's Achieving Carbon Neutrality Report,[17] Climate Smart Lands Strategy,[18] Natural Working Land Implementation Plan,[19] and the California Climate Insurance Report: *Protecting Communities, Preserving Nature, and Building Resiliency,*[20] among others, provided critical inputs and data points for this plan. This Scoping Plan is the product of work by multiple agencies across the Administration, including dozens of public workshops and years of rigorous analysis and economic modeling by California's leading institutions. This cooperation on planning lays the foundation for even closer coordination among and between state agencies to put the plan into effect.

The plan is also the product of tireless efforts of, and recommendations from, the AB 32 Environmental Justice Advisory Committee (EJ Advisory Committee). The EJ Advisory Committee, created by statute, plays a critical role to inform the development of each Scoping Plan and helps to ensure environmental justice is integrated throughout the plan. CARB reconvened the EJ Advisory Committee in early 2021 to advise on the development of this Scoping Plan. In their advisory role, the EJ Advisory Committee has worked together to provide inputs to CARB to inform the development of scenarios and the associated modeling. And in April 2022, the EJ Advisory Committee provided draft preliminary recommendations in advance of the Draft 2022 Scoping Plan to help ensure the draft plan meaningfully addresses environmental justice. The CARB Board and EJ Advisory Committee held a joint board hearing on September 1, 2022, where the EJ Advisory Committee presented their final recommendations on the Scoping Plan. Over five dozen of the recommendations are reflected in the Scoping Plan. Going forward, as this plan is ultimately acted on by the Board, ongoing input from the EJ Advisory

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[13] California Environmental Protection Agency (CalEPA). 2021. Carbon Neutrality Studies. https://calepa.ca.gov/climate/carbon-neutrality-studies/.

[14] Brown, A. L., et. al. 2021. *Driving California's Transportation Emissions to Zero.* University of California Institute of Transportation Studies. https://escholarship.org/uc/item/3np3p2t0.

[15] Deschenes, O. 2021. *Enhancing equity while eliminating emissions in California's supply of transportation fuels.* University of California Santa Barbara. https://zenodo.org/record/4707966#.YKPiaKhKi73.

[16] CARB. Short-Lived Climate Pollutants. https://ww2.arb.ca.gov/our-work/programs/slcp.

[17] Energy and Environmental Economics, Inc. 2020. *Achieving Carbon Neutrality in California: PATHWAYS Scenarios Developed for the California Air Resources Board*. October. *https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_report_oct2020_0.pdf*.

[18] California Natural Resources Agency (CNRA). 2021. Draft Climate Smart Lands Strategy. *https://resources.ca.gov/Initiatives/Expanding-Nature-Based-Solutions*.

[19] CARB. 2019. *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan. https://ww2.arb.ca.gov/resources/documents/nwl-implementation-draft*.

[20] California Department of Insurance. 2021. *Protecting Communities, Preserving Nature, and Building Resiliency. climate-insurance-report.pdf (ca.gov)*.

Committee will be essential to address environmental justice and achieve the ambitious vision outlined in the plan throughout its implementation in the coming years.

Importantly, per legislative direction, the Scoping Plan development includes modeling and analyses of emissions, economics, air quality, health, jobs, and public health. This work is important to inform the discussion around trade-offs and how to balance the various legislative direction in identifying a path to achieve the state's climate goals. The technical work serves as a backdrop to what this means to Californian's daily lives—to how they will work, play, and live as we act to eliminate fossil fuel combustion and achieve the many public health and environmental benefits that will result from that action.

Ensuring Equity and Affordability

The state has a long history of public health and environmental protection. However racist and discriminatory practices such as redlining have resulted in low-income communities and communities of color being disproportionately exposed to health hazards and pollution burdens.[21] These communities are often located adjacent to major roadways and large stationary sources that not only emit GHGs, but also harmful localized air pollution. The plan delivers on the promise to transform the way we move, live, and work by nearly eliminating our dependence on fossil fuels. It includes effective actions to move with all possible speed to clean energy, zero-emission cars and trucks, energy-efficient homes, sustainable agriculture, and resilient NWL. And it prioritizes working with the communities most impacted to ensure that these strategies address their needs.

An important part of our equity consideration is ensuring the transition to a zero-emission economy is affordable and accessible, and that it uplifts disadvantaged, low-income communities and communities of color. Some aspects of the transition will have associated costs (e.g., escalating efforts to retrofit existing homes and businesses to support electric appliances and vehicles and increased costs of insurance). The state must ensure that these costs do not disproportionately burden consumers. In addition, the state has an important role to play in providing financial incentives, especially to low-income consumers, to allow for uptake of clean technologies. The Department of Community Services and Development's Low Income Weatherization Program is a prime example of this approach, enabling low-income Californians to be part of the zero-emission transition, all while lowering energy bills. The program provides low-income households with solar photovoltaic systems and energy efficiency upgrades at no cost to residents, helping cushion the impact of climate change on vulnerable communities.

[21] CalEPA. 2021. Pollution and Prejudice: Redlining and Environmental Injustice in California. August 16. *https://storymaps.arcgis.com/stories/f167b251809c43778a2f9f040f43d2f5*.

With this Scoping Plan, the state also adds another tool to help identify and close climate change impact gaps that will emerge over time. As California invests in climate mitigation and adaptation, it is essential to understand the relative impact of climate change across the state's diverse communities. We know not all communities are equally resilient in the face of climate impacts due to persisting health and opportunity gaps. We also know that a global metric such as the Social Cost of Carbon cannot adequately capture the incremental additional impact faced by overly burdened communities. The Climate Vulnerability Metric (CVM) is specifically focused on quantifying the community-level impacts of a warming climate on human welfare.

Energy and Technology Transitions

To support the transformation needed, we must build the clean energy production and distribution infrastructure for a carbon-neutral future. The solution will have to include transitioning existing energy production and transmission infrastructure to produce zero-carbon electricity and hydrogen, and utilizing biogas resulting from wildfire management or landfill and dairy operations, among other substitutes. In almost all sectors, electrification will play an important role. That means that the grid will need to grow at unprecedented rates and ensure reliability, affordability, and resiliency through the next two decades and beyond. It also means we need to keep all options on the table, as it will take time to fully grow the electricity grid to be the backbone for a decarbonized economy. We also know that electrification is not possible in all situations. As such, this plan systematically evaluates and identifies feasible clean energy and technology options that will bring both near-term air quality benefits and deliver on longer-term climate goals.

This transition will not happen overnight. It will take time and planning to ensure a smooth transition of existing energy infrastructure and deployment of new clean technology. And while this Scoping Plan has the longest planning horizon of any Scoping Plan to date, this 25-year horizon is still relatively short in terms of transforming California's economy. We must avoid making choices that will lead to stranded assets and incorporate new technologies that emerge over time. Importantly, given the pace at which we must transition away from fossil fuels, we absolutely must identify and address market and implementation barriers to be successful. The scale of transition includes adding four times the solar and wind capacity by 2045 and about 1,700 times the amount of current hydrogen supply.

As we transition our energy systems, we must also rapidly deploy the clean technologies that rely on a decarbonized grid. As called for in Executive Order N-79-20, all new passenger vehicles sold in California will be zero-emission by 2035, and all other fleets will have transitioned to zero-emission as fully possible by 2045. This means the percentage of fossil fuel combustion vehicles will continue to rapidly decrease, becoming a fading vision of the past. Successful implementation of this Executive Order (EO) and other zero-emission priorities will have to be attractive to consumers. As an example,

electric and hydrogen transportation refueling must be readily accessible, and active transportation and clean transit options must be cheaper and more convenient than driving.

Cost-Effective Solutions Available Today

Ultimately, to achieve our climate goals, urgent efforts are needed to slash GHG emissions. Fortunately, cost-effective solutions are available to do so in many cases. In short, this plan relies on existing technologies—it does not require major technological breakthroughs that are highly uncertain.

For example, targeted action to reduce methane emissions can be achieved at low or negative cost, and with significant near-term climate and public health benefits. In many cases, renewable energy and energy storage are cheaper than polluting alternatives, and are already firmly part of our business-as-usual approach; modeling related to the most recent integrated resource planning process at the California Public Utilities Commission (CPUC) has shown that scenarios associated with the best emissions outcomes had the lowest average rates. As another example, research from Energy Innovation shows that the U.S. can achieve 100 percent zero-carbon power by 2035 without increasing customer costs.[22]

The same is either already true, or soon to be true, for zero-emission vehicles as well. Myriad studies show cost parity for light-duty and heavy-duty ZEVs being achieved by mid-decade or shortly thereafter. A carbon neutrality study conducted by the University of California (UC) Institute of Transportation Studies and funded by the California Environmental Protection Agency (CalEPA) shows that achieving carbon neutrality in the transportation sector will *save* Californians $167 billion through 2045.[23] Similar research from the Goldman School of Public Policy at UC Berkeley finds that achieving 100 percent light-duty ZEV sales nationwide would save consumers $2.7 trillion through 2050; equivalent to $1,000 per household, per year, for 30 years.[24]

Many of these outcomes are a direct result of California's vision and policy development to advance clean energy and climate solutions, including through the Renewables Portfolio Standard, Advanced Clean Cars II regulations, SLCP Reduction Strategy, and

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[22] Phadke, A. et al. 2020. "Illustrative Pathways to 100 Percent Zero Carbon Power by 2035 Without Increasing Customer Costs, Energy Innovation." September. *https://energyinnovation.org/wp-content/uploads/2020/09/Pathways-to-100-Zero-Carbon-Power-by-2035-Without-Increasing-Customer-Costs.pdf*.

[23] Brown, A. L., et al. 2021. *Driving California's Transportation Emissions.* *http://dx.doi.org/10.7922/G2MC8X9X*. Retrieved from https://escholarship.org/uc/item/3np3p2t0.

[24] Goldman School of Public Policy. 2021. *2035: The Report: Transportation.* UC Berkeley. April. *https://www.2035report.com/transportation/*.

others. While the world collectively has not yet fully deployed clean energy and climate solutions at the scale needed to adequately address climate change, California has made tremendous progress—even since the last Scoping Plan update in 2017. Continued ambition, leadership, and climate policy development from California will help the state achieve the scale of emissions reductions needed from technologies and strategies that are already cost-effective or close to it today, and will move additional technologies and strategies to that point in the near future. Achieving those outcomes and reducing costs for the entire array of climate solutions needed to achieve carbon neutrality and then maintain net-negative emissions will prove the true measure of California's success. This will enable California to not just meet our own climate targets, but to ultimately develop the replicable solutions that can scale globally to address global warming.

Continue with a Portfolio Approach

Over the past decade and a half, the state has undertaken a successful three-pronged approach to reducing GHGs: incentives, regulations, and carbon pricing. The 2017 Scoping Plan leveraged existing programs such as the Renewables Portfolio Standard, Advanced Clean Cars, Low Carbon Fuel Standard, Short-lived Climate Pollutant Strategy, mobile source measures to achieve federal air quality targets, and a Cap-and-Trade Program, among others, to lay out a technologically feasible and cost-effective path to achieve the 2030 GHG reduction target. When looking toward the 2045 climate goals and the deeper GHG reductions needed across the AB 32 GHG Inventory sectors, all of the existing programs must be evaluated and, as necessary, strengthened to support the rapid production and deployment of clean technology and energy, as well as the increased pace and scale of actions on our natural and working lands.

The challenge before us requires us to keep all tools on the table. Given the climate mitigation co-benefits, critical actions to deliver near-term air quality benefits, such as those included in the State Implementation Plan to achieve the federal air quality standards, are incorporated into this Scoping Plan, as are new legislative mandates to decarbonize the electricity and cement sectors. And, if additional gaps are identified, new programs and policies must be developed and implemented to ensure all sectors are on track to reduce emissions. Opportunities to leverage these programs to address ongoing air quality disparities must also be considered, along with targeted environmental justice policies such as the AB 617 Community Air Protection Program and the investments made possible through the California Climate Investments Program.

Conclusion

California has never undertaken such a comprehensive, far-reaching, and transformative approach to fighting climate change as that called for in this plan. Once implemented, it will place every aspect of how we live, work, play, and travel in California on a more sustainable footing, with a focus on directly benefitting those communities already most burdened by pollution. This comprehensive approach reflects how climate change is

already changing life in California. We have all experienced the impacts of devastating wildfires, extreme heat, and drought. Despite much progress, California still has some of the worst air pollution in the nation, especially in the San Joaquin Valley and the Los Angeles Basin, which is driven by the continued use of fossil fuel-powered trucks and cars.

This Scoping Plan provides a solution; a way forward and a vision of a California where we can and will address those impacts. This plan is fundamentally based on hope. It is a hope grounded in experience and science that we can fundamentally improve the California we leave to future generations. The plan is built on the legacy of effective actions and on the conviction that we can effectively marshal the combined capabilities of California—from state, regional, tribal, and local governments to industry to our research institutions, and most importantly, to the nearly 40 million Californians who will benefit from the actions laid out in the plan. It addresses the challenge of our generation by laying out a pathway and guideposts for action across three decades. But the Scoping Plan is only that: a plan. The hard work—and hopeful work—is putting its recommendations into action. And there is no time to waste.

Post-adoption of the Scoping Plan

As with previous Scoping Plans, CARB Board approval is the beginning of the next phase of climate action. Specifically, approval of this plan catalyzes a number of efforts, including the development of new regulations as well as amendments to strengthen regulations and programs already in place, not just at CARB but across state agencies. The unprecedented rate of transition will also require the identification and removal of market and implementation barriers to the production and deployment of clean technology and energy. All of these actions and more will be needed if we are to achieve our climate goals.

Chapter 1: Introduction

"The debate is over around climate change. Just come to the state of California. Observe it with your own eyes."

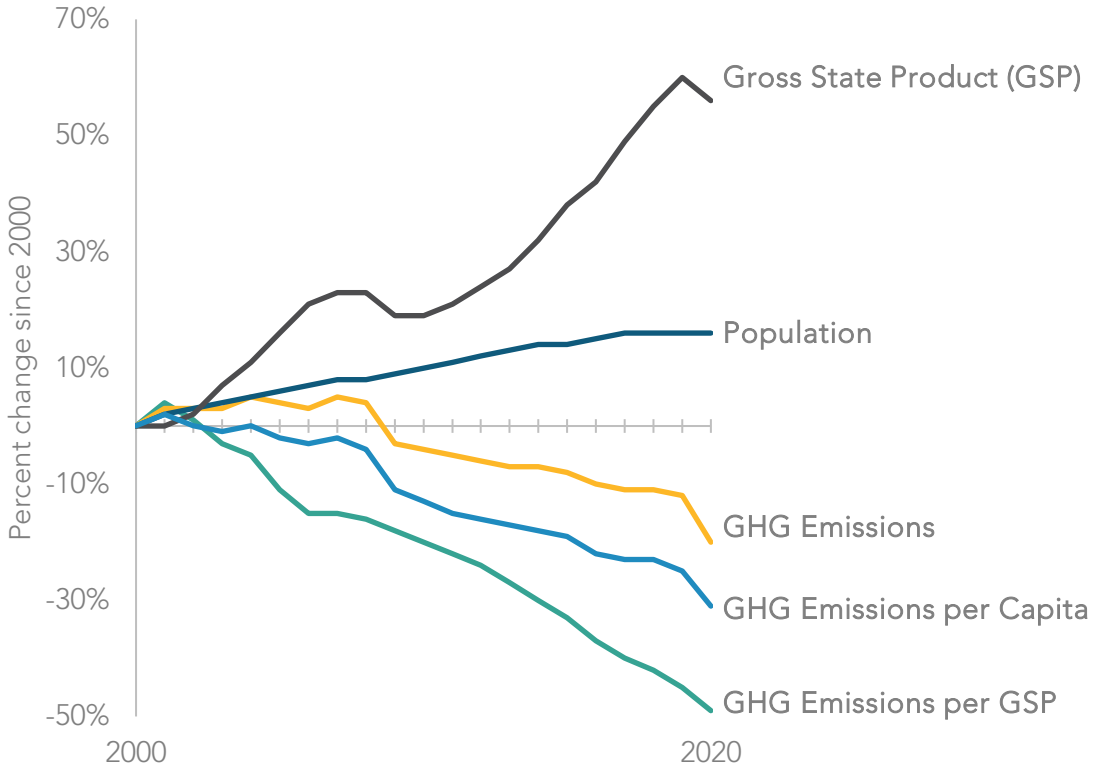
- California Governor Gavin Newsom in September 2020 after surveying the devastation caused by catastrophic wildfires

The impacts of climate change are no longer a distant threat on the horizon—they are right here, right now, with a growing intensity that is adversely affecting our communities and our environment, here in California and across the globe. The science that, decades ago, predicted the impacts we are currently experiencing is even stronger today and unambiguously tells us what we must do to limit irreversible damage: we must act with renewed commitment and focus to do more and do it sooner. That science is indisputable. Unless we increase ambition, we will be faced with more fire, more drought, more temperature extremes, and deadly, choking air pollution. The future of our state—our communities, economy, and ecosystems—is inextricably tied to the way we respond in this decade and the partnerships we forge along the way.

The impacts of climate change fall most heavily on frontline communities that bear the brunt of extreme heat, drought, wildfires, and other effects. Low-income communities and communities of color are also disproportionately impacted by fossil fuel combustion-related air pollution and related health problems. The continued phaseout of fossil fuel combustion will advance both climate and air quality goals and will deliver the greatest health benefits to the most impacted communities.

As it has responded to this climate crisis, California has established itself as a global leader in science-based, public health-focused climate change mitigation and air quality control. The California Legislature has worked with both Republican and Democratic governors to advance action on public health and environmental protections—and California has made progress on addressing climate change during periods of both Republican and Democratic federal administrations. Since the passage of Assembly Bill 32 (AB 32) (Núñez and Pavley, Chapter 488, Statutes of 2006), California has developed bold, creative, and durable policy solutions to protect our environment and public health, all while growing our economy. In fact, California met the target established in AB 32—a return of greenhouse gas (GHG) emissions to 1990 levels by 2020—years ahead of schedule, even as the state established itself as the one of the largest economies in the world. As Figure 1-1 below shows, California's emissions and economic growth have continued to decouple, and California is now the fifth largest economy in the world.

Figure 1-1: California total and per capita GHG emissions[25]



Recognizing both California's early successes in achieving GHG emissions reductions while growing the economy, as well as the worsening impacts of climate change, our governors and legislators have continued to enact ambitious goals. California's unwavering commitment to address climate change is based on indisputable science and data. This commitment is also informed by our collective efforts to address environmental justice and advance racial equity, such that race will no longer be a predictor for disproportionate environmental burdens faced by low-income communities and communities of color. As the Office of Environmental Health Hazard Assessment's

[25] Due to the global pandemic, 2020 is an outlier year and should not be considered indicative of a trend; emissions are likely to increase as economies recover from the impacts of the pandemic.

(OEHHA's) recent analysis of race/ethnicity and air pollution vulnerability and CalEnviroScreen 4.0 scores demonstrate, much work remains to be done.[26]

Many of California's environmental policies have served as models for similar policies in other U.S. states, and at national and international levels. Moving forward, California will continue its pursuit of collaborations and advocacy for action to address climate change at all levels of government. While California is responsible for just one percent of global GHG emissions, and we must do our part, we also play an important role in exporting both political will and technical solutions to address the climate crisis globally.

Today, we have a chance to re-envision California's future and set the state on a path to be carbon neutral no later than 2045 while advancing equity, addressing environmental justice, and continuing to grow our economy. This Scoping Plan provides a roadmap outlining key policies we can implement to achieve our climate goals while improving the health and welfare of Californians and addressing disparities in health outcomes to create a more equitable future. It will enable us to turn the corner in our efforts to protect and preserve our critical natural and public resources, all while providing unparalleled opportunities for clean, pollution-free economic growth.

Severity of Climate Change Impacts

With the increasing severity and frequency of drought, wildfire, extreme heat, and other impacts, Californians just have to look out their windows to know that climate change is real and rapidly getting worse. The impacts we thought we would see in the decades to come are happening now. We must act decisively to both reduce our GHG emissions and build resilience to these impacts for ourselves, future generations, and our iconic landscapes.

Wildfires

Of the twenty largest wildfires ever recorded in California, nine occurred in 2020 and 2021. The worst wildfire season in California's recorded history was in 2018, with over 24,226 structures damaged or destroyed and over 100 lives lost. The largest wildfire season ever recorded in state history was in 2020, where more than 4.3 million acres burned, albeit at different intensity and with varying ecological impacts, and over 112 million metric tons of

[26] OEHHA and CalEPA. 2021. Analysis of Race/Ethnicity and CalEnviroScreen 4.0 Scores. *https://oehha.ca.gov/media/downloads/calenviroscreen/document/calenviroscreen40raceanalysisf2021.pdf*.

carbon dioxide (CO_2) emitted into the atmosphere.[27] The economic damage of these fires was estimated to be over $10 billion in property damage and over $2 billion in fire suppression costs.[28] The Camp Fire, which destroyed much of Paradise, California, was the world's costliest natural disaster in 2018, with overall damages of $16.5 billion.[29] It was also the deadliest fire in California history, with 85 civilian fatalities. Wildfires have always been part of California's natural ecology and will continue to be. However, changes to the state's climate and precipitation expands the footprint of wildfire threat, severity, and intensity, with one quarter of California—more than 25 million acres—now classified as being under very high or extreme fire threat.[30]

The impacts of wildfire smoke have been linked to respiratory infections, cardiac arrests, low birth weight, mental health conditions, and exacerbated asthma and chronic obstructive pulmonary disease.[31] In 2020, with all of California covered by wildfire smoke for over 45 days—and 36 counties for at least 90 days—maximum fine particulate ($PM_{2.5}$) levels persisted in the "hazardous" range of the Air Quality Index for weeks in several areas of the state.[32,33]

Catastrophic wildfire damages extend beyond human health and the economy. The Castle Fire in 2020 and the KNP Complex and Windy Fires in 2021 led to the loss of an unprecedented number of giant sequoias: an estimated 13 to 19 percent of the giant

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[27] CARB. 2020. Public Comment Draft Greenhouse Gas Emissions of Contemporary Wildfire, Prescribed Fire, and Forest Management Activities. https://ww3.arb.ca.gov/cc/inventory/pubs/ca_ghg_wildfire_forestmanagement.pdf.

[28] News18. 2021. San Francisco Bay Area Receives its First Wildfire Warning of 2021, After California Concludes its Driest Year. https://www.news18.com/news/buzz/san-francisco-bay-area-receives-its-first-wildfire-warning-of-2021-after-california-concludes-its-driest-year-3722897.html.

[29] Munich RE. 2019. Extreme Storms, Wildfires and Droughts Cause Heavy Nat Cat Losses In 2018. https://www.munichre.com/en/company/media-relations/media-information-and-corporate-news/media-information/2019/2019-01-08-extreme-storms-wildfires-and-droughts-cause-heavy-nat-cat-losses-in-2018.html#-1808457171.

[30] CARB. No date. Wildfires. https://ww2.arb.ca.gov/our-work/programs/wildfires/about.

[31] Reid, C. E., M. Brauer, F. H. Johnston, M. Jerrett, J. R. Balmes, and C. T. Elliott. 2016. "Critical Review of Health Impacts of Wildfire Smoke Exposure." *Environmental Health Perspectives* http://dx.doi.org/10.1289/ehp.1409277.

[32] Vargo J. A. 2020 (updated in 2021 using the NOAA Hazard Mapping System). "Time Series of Potential US Wildland Fire Smoke Exposures." *Frontiers in Public Health* https://doi.org/10.3389/fpubh.2020.00126.

[33] CalFire. 2020 *Fire Siege Report.* https://www.fire.ca.gov/media/hsviuuv3/cal-fire-2020-fire-siege.pdf.

sequoia population in the Sierra Nevada. An iconic species, giant sequoias are the largest trees on earth, with exceptional longevity outside of climate extremes.[34,35]

It is clear that we must take drastic measures to prepare for future wildfires, which is why California invested $2.7 billion in wildfire resilience from fiscal years 2020 to 2023. The exponential increase in funding launched more than 552 wildfire resilience projects in less than a year, and CAL FIRE met its 2025 goal of treating 100,000 acres a full three years ahead of schedule. Since Fiscal Year 2019–20, treatment work has significantly increased, and CAL FIRE has averaged 100,000 acres treated each fiscal year.

Although we are making progress, we have a lot more work to do in order to achieve our goal of treating one million acres annually by 2025. The Governor's Wildfire and Forest Resilience Strategy details 99 actions needed to address the key drivers of catastrophic wildfires, ramp up the pace and scale of forest management, and make threatened communities more resilient to catastrophic fires. It is also important to note that natural wildfire cycles are a part of a sustainable forest ecosystem and will continue to play a role in a healthy forests' future. We should not expect wildfires to cease, but we must manage our lands to address catastrophic wildfires that result from buildup of carbon stocks due to our interventions to suppress wildfires and from climate change resulting from fossil fuel combustion.

Drought

Drought is a recurring feature of the California climate that has been intensified by increasingly warmer average temperatures. Anthropogenic climate trends have exacerbated drought conditions; human-caused climate change accounts for 19 percent of drought severity and 42 percent of the soil moisture deficit in this region since 2000. The governor declared a drought state of emergency in October 2021, and as of September 2022, 94 percent of California was in severe drought, and 99.8 percent[36] of the state was in at least moderate drought. The first three months of 2022 were the driest January, February, and March on record in California.[37] The harsh drought conditions affecting California are part of a larger megadrought—a drought lasting more than two

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[34] Shive, K., C. Brigham, T. Caprio, and P. Hardwick. 2021. 2021 Fire Season Impacts to Giant Sequoias. The Nature Conservancy and National Park Service. *https://www.nps.gov/articles/000/2021-fire-season-impacts-to-giant-sequoias.htm*.

[35] Shive, K. L., A. Wuenschel, L. J. Hardlund, S. Morris, M. D. Meyer, and S. M. Hood. 2022. "Ancient Trees and Modern Wildfires: Declining Resilience to Wildfire in the Highly Fire-adapted Giant Sequoia." *Forest Ecology and Management* 511, 120110. *https://doi.org/10.1016/j.foreco.2022.120110*.

[36] Drought.gov. California. National Oceanic and Atmospheric Administration (NOAA) and the National Integrated Drought Information System. *https://www.drought.gov/states/california*.

[37] Drought.ca.gov. September 26, 2022. California Drought Update. *https://drought.ca.gov/media/2022/09/Weekly-CA-Drought-Update-09262022-FINAL.pdf*.

decades—that has been ongoing in the Southwestern region of North America since 2000. The past 22 years have been the region's driest period since at least 800 CE.[38]

While large urban water districts with diversified sources of water supply have maintained water deliveries to customers through the drought, hundreds of individual well owners and some small water systems have suffered disruption. The state is providing funding for water system consolidation and modernization projects in small communities, emergency repairs and replacements for dry wells, and bottled and hauled water deliveries. A 2021 law requires small suppliers to create drought contingency plans. During the drought of the last three years the state has delivered emergency drinking water assistance to nearly 10,000 households and 150 water systems.

California agriculture is responsible for more than half of all U.S. domestic fruit and vegetable production, and in 2021 drought resulted in the fallowing of nearly 400,000 acres of fields.[39] Direct crop revenue losses were approximately $962 million, and total economic impacts were more than $1.7 billion, with over 14,000 full- and part-time job losses.[40] During the 2011–2017 drought, California's agricultural industry suffered at least $5 billion in losses.[41] The 2022–23 budget includes $100 million to support agricultural water conservation practices, provide on-farm technical assistance, and provide direct relief to small farm operators.

Though native California species are adapted to drought, human engineering has altered most streams and wetlands in the state, making drought increasingly stressful to fish and wildlife. The state has conducted hundreds of fish and amphibian rescues in this drought to move creatures from diminished habitat, upgraded hatcheries, and boosted hatchery production, and has hauled millions of young hatchery salmon to San Francisco Bay to avoid adverse river conditions. State biologists monitor dozens of streams statewide and have negotiated voluntary agreements with landowners and water users to improve stream flows and temperatures.

California has started to implement major policies to build resilience to combat drought—such as the Sustainable Groundwater Management Act of 2014, the governor's Water Resilience Portfolio (2020), the governor's Water and Supply Strategy (August 2022), and

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[38] Williams, A. P., B. I. Cook, and J. E. Smerdon. 2022. "Rapid Intensification of The Emerging Southwestern North American Megadrought in 2020–2021." *Nature Climate Change* https://doi.org/10.1038/s41558-022-01290-z.

[39] Medellín-Azuara, J. 2022. *Economic Impacts of the 2021 Drought on California Agriculture.* University of California Merced. https://wsm.ucmerced.edu/wp-content/uploads/2022/02/2021-Drought-Impact-Assessment_20210224.pdf.

[40] Medellín-Azuara. *Economic Impacts of the 2021 Drought*.

[41] National Resources Defense Council (NRDC). 2019. Climate Change and Health in California. Issue Brief. https://www.nrdc.org/sites/default/files/climate-change-health-impacts-california-ib.pdf.

new standards for indoor, outdoor, and industrial water use. However, it is crucial that we take further actions to minimize the impacts of drought in the years to come.

Extreme Heat

California's hottest summer on record was 2021.[42] Death Valley recorded the world's highest reliably measured temperature (130°F) in July 2021, breaking its own record (129°F) from summer 2020.[43] Meanwhile, Fresno also broke one of its own records, with 64 days over 100°F in 2021.[44] This is part of a trend: the daily maximum average temperature, an indicator of extreme temperature shifts, is expected to rise 4.4°F–5.8°F by 2050 and 5.6°F–8.8°F by 2100.[45] Heat waves that result in public health impacts are also projected to worsen throughout the state. By 2050, these heat-related health events are projected to last two weeks longer in the Central Valley and occur four to ten times more often in the Northern Sierra region.[46]

Heat ranks among the deadliest of all climate hazards in California, and heat waves in cities are projected to cause two to three times more heat-related deaths by mid-century.[47] Climate vulnerable communities[48] will experience the worst of these effects, as heat risk is associated and correlated with physical, social, political, and economic factors. Aging populations, infants and children, pregnant people, and people with chronic illness are especially sensitive to heat exposure.[49,50] Combining these characteristics and existing health inequities with additional factors such as poverty, linguistic isolation,

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[42] NOAA. 2022. Climate at a Glance. *https://www.ncdc.noaa.gov/cag/statewide/time-series/4/tavg/3/8/1895-2021?base_prd=true&firstbaseyear=1901&lastbaseyear=2000*.
[43] Masters, J. 2021. Death Valley, California, breaks the all-time world heat record for the second year in a row. Yale Climate Connections. *https://yaleclimateconnections.org/2021/07/death-valley-california-breaks-the-all-time-world-heat-record-for-the-second-year-in-a-row/*.
[44] NOAA. Climate Data Online Search. Accessed on 16 March 2022. *https://www.ncdc.noaa.gov/cdo-web/search*.
[45] Governor's Office of Planning and Research (OPR), CEC, and CNRA. 2018. *California's Fourth Climate Change Assessment*. Page 23. *https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf*.
[46] OPR, CEC, and CNRA. *California's Fourth Climate Change Assessment - Statewide Summary Report. https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf*.
[47] Ostro, B., S. Rauch, and S. Green. 2011. "Quantifying the health impacts of future changes in temperature in California." National Library of Medicine. *https://pubmed.ncbi.nlm.nih.gov/21975126/*.
[48] CARB. Priority Populations. California Climate Investments. *https://www.caclimateinvestments.ca.gov/priority-populations*.
[49] Basu, R. 2009. "High Ambient Temperature and Mortality: A Review of Epidemiologic Studies from 2001 to 2008." National Library of Medicine. *https://pubmed.ncbi.nlm.nih.gov/19758453/*.
[50] Basu, R., and B. Malig. 2011. "High Ambient Temperature and Mortality in California: Exploring the Roles of Age, Disease, and Mortality Displacement." National Library of Medicine. *https://pubmed.ncbi.nlm.nih.gov/21981982/*.

housing insecurity, and the legacy of racist redlining practices, can put individuals at a disproportionately high risk of heat-related illness and death.[51,52] Rising temperatures will also speed up smog-forming chemical reactions, leading to worse asthma, reduced lung function, cardiac arrest, and cognitive decline. African American, American Indian/Alaskan Native, and Puerto Rican Californians are particularly sensitive to smog, as they are between 28.6 and 132.5 percent more likely to be diagnosed with asthma than white Californians.[53]

In addition to the dangers to public health, California's September 2022 heat wave is particularly illustrative of how more frequent extreme heat strains the state's infrastructure we depend on to adapt to a changing climate. For example, as all-time high temperature records were broken in Sacramento, San Jose, Santa Rosa and Fairfield, electricity demand for air conditioning threatened to overwhelm the state power supply.[54]

California has taken major steps to protect communities from the impacts of extreme heat. Our recent budgets invest $800 million to cool our schools and neighborhoods, including projects to reduce urban overheating. The Extreme Heat Action Plan, released in April 2022, outlines the all-of-government approach California is taking to reduce urgent risks and build long-term resilience to the impacts of extreme heat. In September 2022, Governor Newsom signed multiple bills addressing extreme heat, including AB 2238 (Rivas, Chapter 264, Statutes of 2022), which will create the nation's first extreme heat advance warning and ranking system to better prepare communities ahead of heat waves. The Administration is committed to addressing extreme heat, but we still have a lot of work to do.

Wildfires, drought, and extreme heat are some of the most pronounced climate impacts California is experiencing, but they are not the only ones. Sea level rise, rising ocean temperatures, ocean acidification, and inland flooding are also already having devastating impacts on our communities, ecosystems, and economy, and will continue to do so in the years and decades to come. The decisions and actions that we take today will determine how strongly we will feel the impacts of climate change in the future.

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[51] Hoffman, J. S., V. Shandas, and N. Pendleton. 2020. "The Effects of Historical Housing Policies on Resident Exposure to Intra-Urban Heat: A Study of 108 US Urban Areas." MDPI. https://www.mdpi.com/2225-1154/8/1/12/htm.

[52] U.S. Climate Resilience Toolkit. No date. Heat and Social Inequity in the United States. https://toolkit.climate.gov/tool/heat-and-social-inequity-united-states.

[53] NRDC. 2019. Climate Change and Health. Issue Brief. https://www.nrdc.org/sites/default/files/climate-change-health-impacts-california-ib.pdf.

[54] Samenow, Jason. 2022. No September on record in the West has seen a heat wave like this. *The Washington Post.* September 9. https://www.washingtonpost.com/climate-environment/2022/09/08/western-heatwave-records-california-climate/.

Imperative To Act

Consequences of Further Warming

The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) found that it will not be possible to keep global warming within the threshold of 1.5°C to avoid the most severe impacts of climate change unless we make immediate and large-scale reductions in GHG emissions. It finds that atmospheric concentrations of CO_2 have increased by 50 percent since the industrial revolution, and that they continue to increase at a rate of two parts per million each year.[55] Without immediate action, the world will exceed 1.5°C (or 2.7°F) warming by the 2030s, and no later than 2040.

While every tenth of a degree matters—every incremental increase in warming brings additional negative impacts—climate-related risks to human health, livelihoods, and biodiversity are projected to increase further under 2°C (or 3.6°F) warming, compared to 1.5°C.[56] To remain below 1.5°C with limited or no overshoot of that threshold, global net anthropogenic CO_2 emissions need to be cut by about half by 2030 and reach net-zero by 2050.

If we fail to make rapid changes, we may not be able to limit global warming to 2°C,[57] and the consequences of inaction would be catastrophic. Our planet is already 1.2°C warmer than pre-industrial times due to human-induced warming, and many impacts we are already experiencing, such as sea level rise, are "irreversible" for centuries to millennia.[58] Californians with the fewest resources, who are disproportionately low-income communities and communities of color, are the most vulnerable to the impacts of climate change. While the human costs associated with health impacts can never be fully monetized, a recent report finds that the health costs of climate and air pollution in the U.S. are well over $800 billion today and will continue to grow in the coming years.[59]

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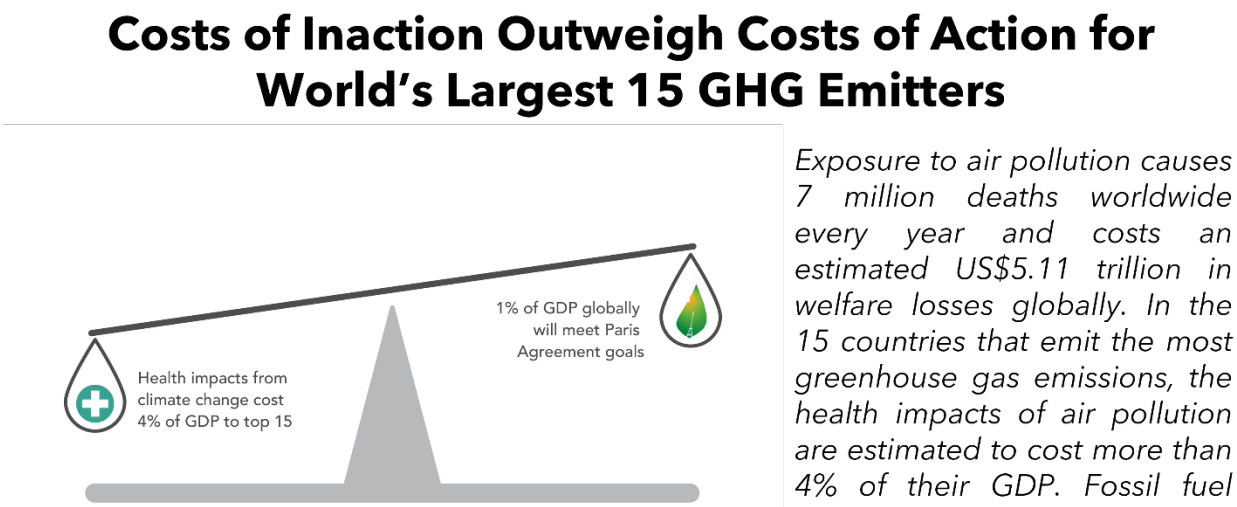
[55] IPCC. 2021. *Climate Change 2021: The Physical Science Basis.* https://www.ipcc.ch/report/ar6/wg1/.
[56] IPCC. 2018. *Special Report: Global Warming of 1.5°C.* World Meteorological Organization. https://www.ipcc.ch/sr15/.
[57] IPCC. 2021. Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis.* Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. In Press. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf.
[58] United Nations. 2021. IPCC report: 'Code red.' https://news.un.org/en/story/2021/08/1097362#:~:text=%27Code%20red%20for%20humanity%27&text=We%20are%20at%20imminent%20risk,%2C%20to%20keep%201.5%20alive.%22.
[59] Alwis, D. D., and V. S. Limaye. No date. *The Costs of Inaction*. https://www.nrdc.org/sites/default/files/costs-inaction-burden-health-report.pdf.

Any delays in action or insufficient action are a threat to public health and the environment. The impacts to our economy would be devastating as well. While not specific to California, a 2022 report from Deloitte Economics Institute finds that failing to take sufficient action to reduce emissions could result in economic losses to the U.S. of more than $14.5 trillion over the next 50 years.[60] On a hopeful note, however, the report finds that if the country invests now and in the coming years in a net-zero economy, $3 trillion could be added to the economy over the next 50 years. The U.S. annual gross domestic product (GDP) would be 2.5 percent higher in 2070 in this fast-action scenario than in the delayed action scenario. The lessons for California from these analyses are clear: invest now or pay the price later. As shown in Figure 1-2, inaction can lead to negative consequences for individuals, communities, the economy, and society as a whole. As discussed later, Governor Newsom and the Legislature have accepted this imperative and made significant investments in climate action. This Scoping Plan combined with the historic investments and policy direction from the governor and Legislature, will result in unprecedented action to address the climate crisis.

[60] Deloitte. 2022. *The Turning Point.* *https://www2.deloitte.com/content/dam/Deloitte/us/Documents/about-deloitte/us-the-turning-point-a-new-economic-climate-in-the-united-states-january-2022.pdf?id=us:2el:3dp:wsjspon:awa:WSJSBJ:2021:WSJFY22*.

Figure 1-2: The real costs of inaction[61]



Scoping Plan Overview

Previous Scoping Plans

The Scoping Plan is a strategy the California Air Resources Board (CARB) develops and updates at least one every five years, as required by AB 32. It lays out the transformations needed across our society and economy to reduce emissions and reach our climate targets. This Scoping Plan is the third update to the original plan that was adopted in 2008. The initial Scoping Plan laid out a path to achieve the AB 32 2020 limit of returning to 1990 levels of GHG emissions, a reduction of approximately 15 percent below business as usual.[62] The 2008 Scoping Plan included a mix of incentives, regulations, and carbon pricing, laying out the portfolio approach to addressing climate change and clearly making the case for using multiple tools to meet California's GHG targets. The 2013 Scoping Plan assessed progress toward achieving the 2020 limit and made the case for addressing

[61] Katowice, P. 2018. *Health benefits far outweigh the costs of meeting climate change goals.* WHO. https://www.who.int/news/item/05-12-2018-health-benefits-far-outweigh-the-costs-of-meeting-climate-change-goals.

[62] CARB. 2008. *Climate Change Scoping Plan.* https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/document/adopted_scoping_plan.pdf.

short-lived climate pollutants (SLCPs).[63] The most recent update, the 2017 Scoping Plan,[64] also assessed the progress toward achieving the 2020 limit and provided a technologically feasible and cost-effective path to achieving the Senate Bill 32 (SB 32, Pavley, Chapter 249, Statutes of 2016) target of reducing GHGs by at least 40 percent below 1990 levels by 2030.

Overview of this Scoping Plan

It is paramount that we continue to build on California's success by taking effective actions and doubling down on implementation of the strategies outlined here. As such, this Scoping Plan builds on and integrates efforts already underway to reduce the state's GHG, criteria pollutant, and toxic air contaminant emissions by identifying the clean technologies and fuels that should be phased in as the state transitions away from combustion of fossil fuels. By selecting and pursuing a sustainable and clean economic path, the state will continue to successfully execute existing programs, work to eliminate air pollution inequities, demonstrate the coupling of economic growth and environmental progress, and enhance new opportunities for engagement within the state to address and prepare for climate change.

The 2022 Scoping Plan for Achieving Carbon Neutrality (Scoping Plan) is the most comprehensive and far-reaching Scoping Plan developed to date. It identifies a technologically feasible and cost-effective path to achieve carbon neutrality by 2045 while also assessing the progress California is making toward reducing its GHG emissions by at least 40 percent below 1990 levels by 2030, as called for in SB 32 and laid out in the 2017 Scoping Plan.[65] The 2030 target is an interim but important stepping stone along the critical path to the broader goal of deep decarbonization by 2045. Modeling for this Scoping Plan shows that this decade must be one of transformation on a scale never seen before to set us up for success in 2045.

The relatively longer path assessed in this Scoping Plan incorporates, coordinates, and leverages many existing and ongoing efforts to reduce GHGs and air pollution, while identifying new clean technologies and energy. Given the focus on carbon neutrality, this Scoping Plan also includes discussion for the first time of the Natural and Working Lands (NWL) sectors as both sources of emissions and carbon sinks. Chapter 2 of this document

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[63] CARB. 2014. *First Update to the Climate Change Scoping Plan.* https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.
[64] CARB. 2017. *California's 2017 Climate Change Scoping Plan.* https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf.
[65] CARB. 2017. *California's 2017 Climate Change Scoping Plan.* https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf.

includes a description of a suite of specific actions to drastically reduce GHGs across all sectors. Chapter 3 provides the air quality and economic evaluations of the actions. Chapter 4 provides a broader description of the many actions needed across all sectors to achieve carbon neutrality. Chapter 5 provides an overview of the next steps and partnerships needed to implement this Scoping Plan. Guided by legislative direction, the actions identified in this Scoping Plan reduce overall GHG emissions in California and deliver policy signals that will continue to drive investment and certainty in a low carbon economy. This Scoping Plan builds upon the successful framework established by the Initial Scoping Plan and subsequent updates while identifying new, technologically feasible, and cost-effective strategies.

Principles That Inform Our Approach to Addressing the Climate Challenge

California has decades of experience addressing the climate challenge. Through this experience, and based on extensive engagement with stakeholders through our regulatory and program development processes, we have developed a set of principles to inform our approach.

Unprecedented Investments in a Sustainable Future

The scale of transformation needed over this decade to avoid the worst impacts of climate change and meet our ambitious climate goals is extraordinary. This is why Governor Newsom and the Legislature invested over $15 billion in climate action through the 2021–2022 California Comeback Plan, and why the 2022–2023 budget marks the beginning of the California Climate Commitment—the governor's multi-year plan to invest $54 billion in climate action. The enacted budgets (Figure 1-3) and the California Climate Commitment represent investments of a historic scale and will advance precisely the type of all-of-government approaches necessary to create the whole-of-society changes described in this Scoping Plan that will enable us to avert the worst impacts of climate change.

Figure 1-3: Comprehensive California climate change investments

The *California Climate Commitment* includes the following game-changing elements:

- $10 billion for zero-emission vehicles (ZEVs), including $1.5 billion for electric school buses to protect students' health and $3 billion to build an accessible charging network. ZEV investments will particularly focus on programs such as heavy-duty vehicle and port electrification that will reduce emissions and protect public health in low-income communities.
- $2.1 billion for clean energy investments, such as long duration storage, offshore wind, green hydrogen,[66] and industrial decarbonization.
- $13.8 billion for programs that reduce emissions from the transportation sector, such as improving public transportation while also funding walking, biking, and adaptation projects.
- Over $720 million for California's higher education institutions and research that will support the next generation of climate innovations.

[66] For the purposes of this Scoping Plan, "renewable hydrogen" and "green hydrogen" are interchangeable and are not limited to only electrolytic hydrogen produced from renewables.

- Nearly $1 billion to build sustainable, affordable housing and over $1 billion to help low-income Californians realize energy cost savings through building decarbonization.
- Nearly $9 billion for wildfire risk reduction, drought mitigation, extreme heat resilience, and nature-based solutions.

These investments are incredibly important in the context of this Scoping Plan in that they accompany and help support implementation of the many policies and regulations that will continue to be necessary to achieve our 2030 and carbon neutrality targets. In addition, these incentive programs jump-start emission reduction strategies for priority sectors, sources, and technologies, leveraging private-sector investment and building sustainable, growing markets for clean and efficient technologies. Many of California's incentive programs work in concert with federal and other state programs to drive emission reductions. As an example, as California pushes to move to 100% sales of new zero emission-vehicles, including plug-in hybrid vehicles, the Newsom Administration continues to invest heavily in incentive programs that allow families, communities, and businesses to choose zero-emission vehicles. This is done while simultaneously working with the federal government, other states, and jurisdictions around the world to align policies, regulations, and incentives, creating market certainty for the automakers that serve our markets.

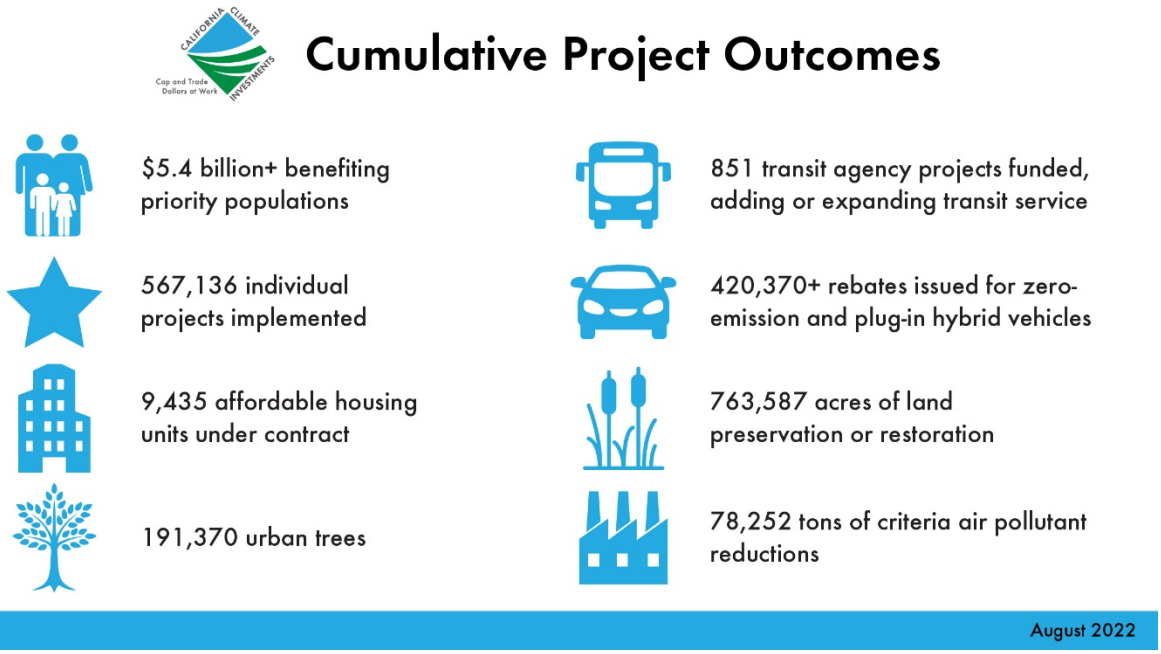
Centering Equity

Prioritizing equity is just as important as the magnitude of the climate investments California is making. Addressing climate change and advancing our equity and economic opportunity goals cannot be decoupled. In line with the governor's Executive Order[67] to take additional actions to embed equity analysis and considerations, this plan works to center equity by addressing disparities for historically underserved and marginalized communities. California strives to ensure that our climate and air research, regulations, investments, and plans include provisions that specifically address and advance equity. This includes reducing and eliminating air pollution disparities, removing barriers that can prevent frontline communities from accessing benefits, lowering costs for low-income Californians, and promoting high-quality jobs. CARB's incentive programs regularly surpass their mandated equity targets, and CARB has incorporated equity-focused provisions in our research, planning, and regulatory efforts. For instance, statute requires that a minimum of 35 percent of California Climate Investments benefit low-income households along with disadvantaged and low-income communities (referred to as *priority*

[67] Executive Department. State of California. 2022. Executive Order N-16-22. *GSS_9320_2-20220912152941 (ca.gov)*.

populations). However, 48 percent—over $5.4 billion—of implemented California Climate Investments project funding is benefiting priority populations, greatly exceeding the statutory minimums (see Figure 1-4). Senate Bill 535 (De León, Chapter 830, Statutes of 2012) and AB 1550 (Gomez, Chapter 369, Statutes of 2016) direct state and local agencies to make significant investments using auction proceeds to assist California's most vulnerable communities. Under these laws, a minimum of 25 percent of the total investments are required to be located within and provide benefits to disadvantaged communities, and at least 10 percent of the total investments must benefit low-income communities and households. Moving forward, the state will continue to devote a greater share of incentive funding to priority populations, with the light-duty vehicle incentive program as just one example. We can simultaneously confront the climate crisis and build a more resilient, just, and equitable future for all communities.

Figure 1-4: California climate investments cumulative outcomes[68,69]



Role of the Environmental Justice Advisory Committee

To inform the development of the Scoping Plan, AB 32 calls for the convening of an Environmental Justice Advisory Committee (EJ Advisory Committee) to advise CARB in developing the Scoping Plan, and any other pertinent matter in implementing AB 32. It requires that the Committee be comprised of representatives from communities with the most significant exposure to air pollution, including communities with minority populations and/or low-income populations. On January 25, 2007, CARB appointed the first

[68] CARB. 2022. California Climate Investments program implements $10.5 billion in greenhouse gas-reducing programs, expected to reduce 76 million metric tons of emissions. April 11. *https://ww2.arb.ca.gov/news/california-climate-investments-program-implements-105-billion-greenhouse-gas-reducing-projects*.

[69] SB 535 and AB 1550 require investments located in and benefiting low-income communities and households, which are termed *priority populations. Disadvantaged communities* are currently defined by CalEPA as the top 25 percent of communities experiencing disproportionate amounts of pollution, environmental degradation, and socioeconomic and public health conditions according to the Office of Environmental Health Hazard Assessment's *CalEnviroScreen tool,* plus certain additional communities including federally recognized Tribal Lands. Low-income communities and households are defined by statute as those with incomes either at or below 80 percent of the statewide median or below a threshold designated as low-income by the Department of Housing and Community Development.

Environmental Justice Advisory Committee to advise it on the Initial Scoping Plan and other climate change programs.

For this Scoping Plan, CARB reconvened the EJ Advisory Committee in May 2021. The committee is currently comprised of 14 environmental justice and disadvantaged community representatives, including the EJ Advisory Committee's first tribal representative, who was appointed in February 2022. In October 2021, the EJ Advisory Committee formally created eight workgroups. These workgroups are a space for EJ Advisory Committee members to better understand specific sectors of the Scoping Plan and to assist the EJ Advisory Committee in the development of recommendations on this Scoping Plan. In December 2021, the EJ Advisory Committee provided scenario input responses to help shape the modeling for this Scoping Plan. In February 2022, San Joaquin Valley EJ Advisory Committee members hosted their first community workshop, with over 100 attendees. In March 2022, the CARB Board held a joint public meeting with the EJ Advisory Committee to discuss their draft preliminary recommendations for this Scoping Plan. In June 2022, over 165 attendees participated in a statewide community workshop held by EJ Advisory Committee members. The full schedule of EJ Advisory Committee Meetings and meeting materials are available on CARB's website.[70] This Scoping Plan includes references where EJ Advisory Committee Final Recommendations[71] are included in the document. The final recommendations were discussed at a joint CARB and EJ Advisory Committee Hearing on September 1, 2022.

The integration of environmental justice is critical to ensure that certain communities are not left behind. The AB 32 EJ Advisory Committee provided recommendations on September 30 in advance of the final Scoping Plan. There are footnotes to indicate where there is alignment between the AB 32 EJ Advisory Committee's recommendations and this Scoping Plan. While the language in the text may not fully incorporate the specific EJ Advisory Committee's recommendation, the footnotes do acknowledge the places in the text where there is general alignment with the spirit of the EJ Advisory Committee's recommendation.

Partnering with Tribes

[70] CARB. Environmental Justice Advisory Committee Meetings and Events. *https://ww2.arb.ca.gov/environmental-justice-advisory-committee-meetings-and-events*.
[71] Environmental Justice Advisory Committee. September 30, 2022. 2022 Scoping Plan Recommendations. *https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2022/090122/finalejacrecs.pdf*.

There are 109 federally recognized tribes and over 60 non-federally recognized tribes in California.[72] In 2011, Governor Brown issued Executive Order B-10-11, recognizing and reaffirming the inherent right of tribes to exercise sovereign authority over their members and territory and directing state agencies to engage in government-to-government consultation with tribe and to work to develop partnerships and consensus.[73] In 2019, Governor Newsom issued Executive Order N-15-19, which acknowledges and apologizes on behalf of the state for the historical "violence, exploitation, dispossession and the attempted destruction of tribal communities."[74] Establishing partnerships with tribal leaders to incorporate their priorities, traditional expertise, and knowledge will be important to achieving California's climate goals. The Scoping Plan includes actions that tribal partners can voluntarily implement for sources under their jurisdiction (e.g., transitioning to zero emission fleets, installing infrastructure and control technologies, conducting climate smart land management). The Scoping Plan also uplifts the importance of having our tribal partners help guide actions that may impact tribal cultural resources and of benefitting from tribal input.

We also need alignment between state and local partners and tribes on actions related to land-use decisions. This means respecting and reinforcing tribal sovereignty and self-determination. As tribes do not always draw clear lines between the "natural" and "cultural" resources of a place, taking a holistic perspective will result in positive impacts in ability to address the complex issues of land management and regulatory undertakings.

Tribes have an intimate and historical knowledge of places and should be engaged early on to inform planning and future management related to activities that may impact tribal resources and areas including potential funding opportunities, technical assistance, and capacity building, where appropriate. Additionally, tribes should be involved in the identification of their own significant resources and areas of use. As decisions are made related to Scoping Plan undertakings, agencies should recognize and appropriately consider cultural resources and management from the beginning, not as an afterthought; and consider how the project could impact tribes.

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[72] These numbers are subject to change depending on determinations made by the Bureau of Indian Affairs (BIA) and the Native American Heritage Commission (NAHC). Please consult the most current Federal Register for a list of federally recognized tribes and the NAHC for a list of non-federally recognized tribes in California. As of the date of the Scoping Plan, the current list for federally recognized tribes is located at 87 Fed. Reg. 4636 (Jan. 28, 2022).

[73] Executive Order B-10-11. *https://www.ca.gov/archive/gov39/2011/09/19/news17223/index.html#:~:text=EXECUTIVE%20ORDER%20B-10-11%20Published%3A%20Sep%2019%2C%202011%20WHEREAS,and%20affirmed%20in%20state%20and%20federal%20law%3B%20and*.

[74] Executive Order N-15-19. *https://tribalaffairs.ca.gov/wp-content/uploads/sites/10/2020/02/Executive-Order-N-15-19.pdf*.

Finally, to the extent allowed by law, traditional ecological knowledge and culturally sensitive information should be protected, as this is information that may not be common knowledge and may not be known outside the tribe, as each tribe is unique and influenced by its local environment and cultural practices. Protection of this information will help foster productive relationships with tribes and should be included as part of the process. CARB and other agencies should continue to foster relationships with tribal partners.

Maximizing Air Quality and Health Benefits

The state has over 50 years of experience successfully cleaning the air in California by addressing criteria pollutants and toxic air contaminants from mobile and stationary sources. CARB has been a leader in measuring, evaluating, and reducing sources of air pollution that impact public health. Its air pollution programs have been adapted for national programs and emulated in other countries. Significant progress has been made in reducing diesel particulate matter (PM), which is a designated toxic air contaminant, and many other hazardous air pollutants. CARB partners with local air districts to address stationary source emissions and adopts and implements state-level regulations to address sources of criteria and toxic air pollution, including mobile sources. CARB also collaborates with federal agencies to address air pollution from sources primarily under federal jurisdiction. In many instances, actions to reduce fossil fuel combustion and achieve federal air quality standards also help to reduce GHG emissions.

However, air pollution disparities still exist, and more must be done to ensure the most vulnerable populations have safe air to breathe. California must continue to evaluate opportunities to harmonize our climate and air quality programs through innovative policymaking and by building on existing programs like the Low Carbon Fuel Standard (LCFS) and Community Air Protection Program. The LCFS includes a provision that allows electric utilities to opt-in and generate residential electric vehicle (EV) charging credits, where some of the revenues are invested back into rebate programs that address air quality and climate pollution.[75] The Community Air Protection Program[76] is the first of its kind in the country and brings together diverse stakeholders, including CARB, local air districts, and residents of environmental justice communities to increase local air monitoring and develop community-led plans to improve air quality in the communities most impacted by air pollution.

This Scoping Plan identifies actions that will deliver near-term air quality benefits to communities with the highest exposures and provide long-term GHG benefits. Many of the actions in this Scoping Plan are key elements of the 2022 State Strategy for the State

[75] CARB. LCFS Utility Rebate Programs. *https://ww2.arb.ca.gov/resources/documents/lcfs-utility-rebate-programs*.
[76] CARB. Community Air Protection Program. *https://ww2.arb.ca.gov/capp*.

Implementation Plan to meet federal air quality standards,[77] which has a primary focus of reducing harmful air pollution and achieving federal air quality targets. California's approach of leveraging air quality and GHG policies together has yielded results. A 2022 report by the Office of Environmental Health and Hazard Assessment (OEHHA)[78] that evaluated GHG and harmful air pollution emissions from the heavy-duty vehicle (HDV) and large stationary source sectors found declines in emissions in both sectors, with the greatest declines in disadvantaged communities. Both sectors are subject to state GHG and air quality policies, in addition to federal and local rules on harmful air pollution. Because of historically racist and discriminatory practices such as redlining, both types of sources are disproportionately located adjacent to vulnerable communities, which are predominantly communities of color.[79] The key findings from the OEHHA report are as follows:

- Both HDVs and facilities subject to the Cap-and-Trade Program have reduced emissions of co-pollutants, with HDVs showing a clearer downward trend when compared to stationary sources. These emission reductions have major health benefits, including a reduction in premature pollution-related deaths.
- The greatest beneficiaries of reduced emissions from both HDVs and facilities subject to the Cap-and-Trade Program have been in communities of color and in disadvantaged communities in California, as identified by CalEnviroScreen (CES). This has reduced the emission gap between disadvantaged and non-disadvantaged communities, but a wide gap still remains.
- The transition to zero-emission HDVs will expedite further emissions reductions.
- While the progress observed is encouraging, inequities persist, and federal, state, and local climate and air quality programs must do more to reduce emissions of GHGs and co-pollutants to reduce the burden of emissions on disadvantaged communities and communities of color.

It will take all tools at all levels of government, with robust enforcement, to ensure that vulnerable communities continue to see improvements in air quality until no disparities exist in air pollution across the state.

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[77] CARB. 2022 State Strategy for the State Implementation Plan. *https://ww2.arb.ca.gov/resources/documents/2022-state-strategy-state-implementation-plan-2022-state-sip-strategy*.
[78] OEHHA. 2022. *Impacts of Greenhouse Gas Emission Limits within Disadvantaged Communities: Progress Toward Reducing Inequities. https://oehha.ca.gov/environmental-justice/report/ab32-benefits*.
[79] CalEPA. 2021. Pollution and Prejudice. *https://storymaps.arcgis.com/stories/f167b251809c43778a2f9f040f43d2f5*.

Economic Resilience

The state's efforts to tackle the climate crisis will create economic and workforce development opportunities in the clean energy economy in communities across the state. Transitioning existing skills and expanding workforce training opportunities in climate-related fields are critical for reducing harmful emissions and supporting workers in transitioning to new, high-quality jobs. The Administration's recent budgets acknowledge the challenges facing workers in industries most affected by the state's response to climate change—especially those in the fossil fuel industry. It will invest $1 billion in regional partnerships and economic diversification to create new jobs and support a local tax base and workforce transition and development once opportunities are identified. It also will invest in safety nets to protect, and support impacted communities as part of the transition to a carbon neutral economy. Specifically, the Community Economic Resilience Fund Program[80] (CERF) supports communities and regional groups in producing regional roadmaps for economic recovery and transition that prioritize the creation of accessible, high-quality jobs in sustainable industries. The budget investments create the opportunity to future-proof and increase economic resilience in the face of more frequent climate impacts and shifting economic conditions. For these investments and implementation of the Scoping Plan to be successful in supporting the transition to a carbon neutral economy, workers and affected communities must be included in ongoing dialogue to ensure a high-road transition for regional economies.

That state also recognizes it can play a more direct role in supporting a sustainable work force through its incentive programs. In 2021, Assembly Bill 680 (AB 680) (Burke, Chapter 746, Statutes of 2021) was signed into law, requiring CARB to work with the California Labor and Workforce Development Agency to update the Funding Guidelines to include new workforce standards. CARB's Funding Guidelines currently include requirements for administering agencies to, wherever possible, foster job creation within California, provide employment opportunities or job training tied to employment, and target these opportunities to priority populations. The Funding Guidelines also recommend administering agencies prioritize investments in projects that directly support jobs or a job training and placement program, and that they report the estimated employment benefits and employment outcomes for projects that meet specified criteria. These new requirements apply to agencies administering certain California Climate Investments

[80] Office of Planning and Research. Community Economic Resilience Fund. *https://opr.ca.gov/economic-development/cerf/*.

programs that receive continuous appropriations from the Greenhouse Gas Reduction Fund and fall into the following six categories of standards:

- fair and responsible employer standards,
- inclusive procurement policies,
- prevailing wage for construction work,
- community workforce agreements for construction projects over one million dollars,
- preference for projects with educational institutions or training programs, and
- creation of high-quality jobs. CARB will be updating the Funding Guidelines through a public process over the next year to operationalize these new requirements.

Partnering Across Government

The Scoping Plan is an actionable plan to identify and align programs and policies to achieve California's climate targets. To realize the outcomes and deliver results in any Scoping Plan, action is critical. For this Scoping Plan, there are also actions that rely on our federal partners to take on sources primarily under their jurisdiction (such as aviation, and federally owned/managed lands) while they also continue to develop national programs for GHG reductions. The federal government is already taking major steps to advance these types of programs. The Inflation Reduction Act of 2022[81] includes $369 billion for domestic energy production and manufacturing and is expected to lead to U.S. GHG emission reductions of roughly 40 percent by 2030. Direct incentives will include those for clean vehicles and ENERGY STAR appliances, as well as improving transportation and clean energy in underserved communities.

We also need our local partners to align on actions related to land-use decisions that support sustainable, resilient, low-carbon communities and permitting for clean energy production facilities and infrastructure; diversion of organics from landfills; and other climate-related projects. State agencies also should use the Scoping Plan to review and update their own programs and policies to support the actions identified in this Scoping Plan. Importantly, the Scoping Plan also can serve as a resource as the Legislature considers new legislative direction and funding to support the state's path to carbon neutrality and continue action to address near-term air pollution disparities.

Partnering with the Private Sector

Government cannot achieve our climate targets alone. The scale of investment needed requires both private-sector investment and partnerships with philanthropies. Public

[81] Pub.L. No. 117-169 (August 16, 2022).

sector dollars, accompanied by strong and steady policy signals, must be a catalyst for deeper and broader investments by the private sector in both reducing emissions and building the resilience of our communities. Governor Newsom is committed to working collaboratively with businesses, including small businesses, to deploy the technologies, capital, and ingenuity that are hallmarks of the private sector.

California structures our climate policies and regulations to create market signals and certainty that spur private sector investment. For example, the Governor's Executive Order on Zero-Emission Vehicles[82] set 2035 as the target year for 100 percent zero-emission vehicle sales, creating a time horizon that allows automakers to scale up zero-emission fleets and sending a clear signal to the companies and utilities that would deploy charging infrastructure. The Executive Order has been followed by development and adoption of the Advanced Clean Cars II regulation. CARB convened auto manufacturers, environmental justice groups, labor organizations, and many other stakeholders to provide input into development of the regulation in a robust and transparent manner; again, with the aim of providing certainty for producers and consumers.

California also pursues public-private partnerships (PPP) as a mechanism to advance our collective climate goals. We know these vehicles can be effective at increasing the impact of public sector dollars and helpful in moving markets in a direction aligned with state policy. A new PPP the Administration is advancing is the Climate Catalyst Revolving Loan Fund, housed at the state's Infrastructure and Economic Development Bank (IBank). The fund offers a range of financial instruments—including flexible credit and credit support—to help bridge financing gaps currently preventing advanced climate solutions from scaling in the marketplace. The Catalyst Fund's initial areas of investment include forest biomass management and utilization (unlocking innovation to reduce wildfire threats), climate-smart agriculture, and clean energy transmission. The fund leverages public sector investments by mobilizing private finance for shovel-ready projects that are stuck in the deployment phase. As such, IBank is ideally positioned as the state's all-purpose "Green Bank," with increasing connection to federal financing programs such as US DOE's Loan Programs Office and the United States Environmental Protection Agency's (U.S. EPA) Greenhouse Gas Reduction Fund.

The Catalyst Fund builds from existing IBank financing programs that are themselves increasingly focused on the climate imperative. The IBank's Infrastructure State Revolving Fund provides supportive capital to climate-aligned projects promoted by local governments and certain nonprofit entities, and will be refining its criteria and market outreach strategies to increase its level of service. IBank's bonds program has supported

[82] Executive Department. State of California. Executive Order N-79-20. *https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf.*

multiple large environmental projects, including more than $2 billion in "green bonds," and is poised to help expand access to the state's deep and liquid bond capital market. Within IBank's Small Business Finance Center, the new Climate Tech Loan Guarantee program encourages commercial banks to back climate-focused small businesses, leveraging federal capital to insure a portion of the private bank's loan. And through IBank's Expanding Venture Capital Access Fund program, the state is promoting greater diversity in the venture capital community, including climate equity and climate justice.

All of these financing programs exist to leverage private capital in support of the state's climate goals, and to partner with state policy agencies driving the transition. IBank will also continue to collaborate closely with the State Treasurer's Office in its provision of capital support to climate solutions, ensuring that funding flows to programs best positioned to deliver success. This partnership of public and private capital, responsive to and in communication with the climate policy community, will ensure that California gets the maximum possible benefit from its allocation of scarce resources.

Supporting Innovation

Reaching our ambitious, deep decarbonization goals will require continued technological innovation. Investment in research, development, and deployment of clean technologies has never been more critical. Sending clear and sustained market and policy signals will encourage large and small companies alike to pursue innovation that can be scaled up and deployed here and beyond our borders. The full suite of AB 32 policies[83] has touched nearly every sector of California's economy and spurred technology innovation in the state, including the growth of technology developers, manufacturers, processors, and assemblers in many areas. Specifically, AB 32 policies and programs support both the supply side and the demand side to build new markets in California. On the supply side, AB 32 policies support businesses to demonstrate and refine technologies, and to help establish critical supply chains. On the demand side, AB 32 policies and programs provide outreach, education, and incentives—as well as disincentives—to motivate everyone from consumers to institutional purchasers to utility planners to adopt new, climate smart technologies. Innovations resulting directly from the state's climate policies include the following:

- In the past 10 years, a growing market for heavy-duty zero-emission vehicles (HD ZEVs) was established in California, and this market now represents the largest single share of North American supply and demand for HD ZEVs. Vehicle

[83] CARB. Climate Change Programs. *https://ww2.arb.ca.gov/our-work/topics/climate-change*.

and component manufacturers are making long-term investments to develop and produce HD ZEVs within California.

- Total consumption of renewable diesel in the California LCFS market has skyrocketed from approximately 1.8 million gallons in 2011 to nearly 589 million gallons in 2020. The LCFS is a key driver of market development for renewable diesel and its coproducts. While the federal renewable fuel standard (RFS) and blenders tax credit also benefit producers, an analysis of their respective contributions to market development, and interviews with industry representatives and independent experts, point to LCFS as a more important factor in market development, at least in recent years.
- In the past five years, a market for small-scale energy storage in California was created where none previously existed. As of 2020, 185 megawatts (MW) of small-scale energy storage projects have been interconnected to the grid. The significant increase in deployment in the last five years is a result of the Self-Generation Incentive Program (SGIP), which significantly reduces the upfront costs to purchase and install small-scale energy storage devices, and of growing customer interest in disaster resiliency in the face of increasing risk from wildfire and related utility outages. These systems have already provided disaster resiliency benefits for residential and non-residential customers.

We have seen how quickly market barriers can be overcome in response to strong policy signals, as occurred in the solar panel and electric vehicle battery space. Government-stated priorities have a significant role in guiding private and public research, development, and deployment. This Scoping Plan unequivocally puts the marker down on the need for innovation to continue in non-combustion technologies, clean energy, CO_2 removal options, and alternatives for SLCPs. The five-year update to the Scoping Plan allows for a periodic evaluation of new tools to add to the state's toolkit.

Engagement with Partners to Develop, Coordinate, and Export Policies

California works closely with other states, tribal governments, the federal government, and international jurisdictions to identify the most effective strategies and methods to reduce GHGs, manage GHG control programs, and facilitate the development of integrated and cost-effective regional, national, and international GHG reduction programs. For example, the state's Cap-and-Trade Program has been linked with Québec's since 2014, and CARB staff regularly engage with jurisdictions throughout the world on the design features of our Cap-and-Trade Program through memoranda of understanding (MOUs) and venues such as the International Climate Action

Partnership.[84] Low carbon fuel mandates similar to California's LCFS have been adopted by the U.S. EPA and by other jurisdictions, including Oregon, Washington, British Columbia, the European Union, and the United Kingdom. Many other jurisdictions from Japan to New Zealand, Australia, and the European Commission also continue to seek information and technical experience on our LCFS. California has and will continue to share information and encourage ambitious emissions reductions with interested jurisdictions, with a focus on China, India, Mexico, Canada, and the European Union. California's early action to reduce super-pollutants such as methane and other SLCPs was reaffirmed by the 2021 Global Methane Pledge signed by the U.S. and over 100 other countries at the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC).[85]

In addition, under the Clean Air Act, the federal government is authorized to allow California to set more stringent vehicle emissions regulations than federal standards. California's goals and regulations to transition to 100 percent sales of new zero-emission passenger vehicles by 2035 (including plug-in hybrid vehicles), to drayage trucks by 2035, and other trucks and buses where feasible by 2045 are being emulated by partner states across the U.S. and in jurisdictions around the world. CARB's Advanced Clean Cars II regulation, [86] which codifies these targets, was approved in August 2022, and already at least four other states have announced their plans to adopt this regulation. Earlier in June 2020 CARB adopted the Advanced Clean Truck regulation, which requires truck manufacturers to meet increasing sale targets of zero-emission trucks in California through 2035. Since adoption, at least five other states—20 percent of the U.S. truck market—have adopted this regulation. These kinds of coordinated policies help signal to vehicle manufacturers a widespread and growing demand for zero-emissions technology, which in turn helps scale production and lower costs for consumers.

With the Mexican Secretariat for Environment and Natural Resources (SEMARNAT), California has engaged in a technical exchange on clean vehicle policies and helped to establish Mexico's Emissions Trading System (being piloted in 2022). A 2019 MOU signed between California and Environment and Climate Change Canada enables in-depth collaboration on policies and programs to decarbonize vehicles, engines, and fuels. This partnership has led to tangible emissions reductions, from aligning vehicle emissions targets and policies to collaborating on emissions testing and research critical to enforcing

[84] International Carbon Action Partnership (ICAP). Homepage. *https://icapcarbonaction.com/en?msclkid=dac30cb7b4f511ec94ccd0f1ae323e98*.
[85] Global Methane Pledge. Homepage. *https://www.globalmethanepledge.org/*.
[86] Cal. Code Regs., tit. 13, §§ 1900,1961.2, 1961.3, 1962.2, 1962.3, 1962.4, 1962.5, 1962.6, 1962.7, 1962.8, 1965, 1968.2, 1969, 1976, 1978, 2037, 2038, 2112, 2139, 2140, 2147, and 2903; and Test Procedures located here: *https://ww2.arb.ca.gov/rulemaking/2022/advanced-clean-cars-ii*.

emissions limits for vehicle manufactures. At the national level, China has looked to California for cutting-edge requirements for car diagnostics and policies that promote zero-emissions vehicles. At a local level, Beijing has adopted California's vehicle emissions standards and several other progressive environmental regulations. California will continue and renew such efforts across China, including through a 2022 MOU signed with China's Ministry of Ecology and Environment.

Between 2021 and 2023, California also will serve as president of the Transport Decarbonisation Alliance, a global network of countries, regions, cities, and companies that come together to share experiences and technical expertise, and to increase the ambition and accelerate the deployment of targeted transportation decarbonization policies across freight, electric vehicle infrastructure, and active mobility. Throughout its presidency, California will focus its leadership on decarbonizing the cross-jurisdiction network of medium- and heavy-duty vehicles, both to ensure cleaner air in freight-adjacent communities and to stem the effects of climate change.

Over the years, California has also asserted the importance of and supported the ongoing efforts of state and local clean air and climate leadership. Through our participation in the Pacific Coast Collaborative alongside British Columbia, Washington, and Oregon,[87] the Under2 Coalition,[88] the U.S. Climate Alliance,[89] the International ZEV Alliance,[90] the Transportation Decarbonisation Alliance, and many more organizations, California has and will continue to build climate partnerships with state and local governments.

California also recognized the need to address the substantial emissions caused by the deforestation and degradation of tropical and other forests, and continues its work alongside other subnational governments as part of the Governors' Climate and Forests Task Force (GCF).[91] Founded in 2008, there are currently 39 GCF members, including states and provinces in Brazil, Colombia, Ecuador, Indonesia, Ivory Coast, Mexico, Nigeria, Peru, Spain, and the United States—all of whom are considering or operating programs to reduce emissions from deforestation, land-use, and rural development, and to benefit local and indigenous communities. CARB's California Tropical Forest Standard provides a rigorous methodology to assess jurisdiction-scale programs that reduce deforestation and to incentivize responsible action and investment.[92] The standard

[87] Pacific Coast Collaborative. Homepage. *https://pacificcoastcollaborative.org/*.
[88] Under2 Coalition. Homepage. *https://www.theclimategroup.org/under2-coalition*.
[89] United States Climate Alliance (USCA). Homepage. *https://www.usclimatealliance.org/*.
[90] ZEV Alliance. Homepage. Accelerating the Adoption of Zero-Emission Vehicles. *https://zevalliance.org/*.
[91] Governors' Climate and Forests Task Force. University of Colorado Boulder: Colorado Law. *https://www.gcftf.org/*.
[92] CARB. California Tropical Forest Standard. *https://ww2.arb.ca.gov/our-work/programs/california-tropical-forest-standard*.

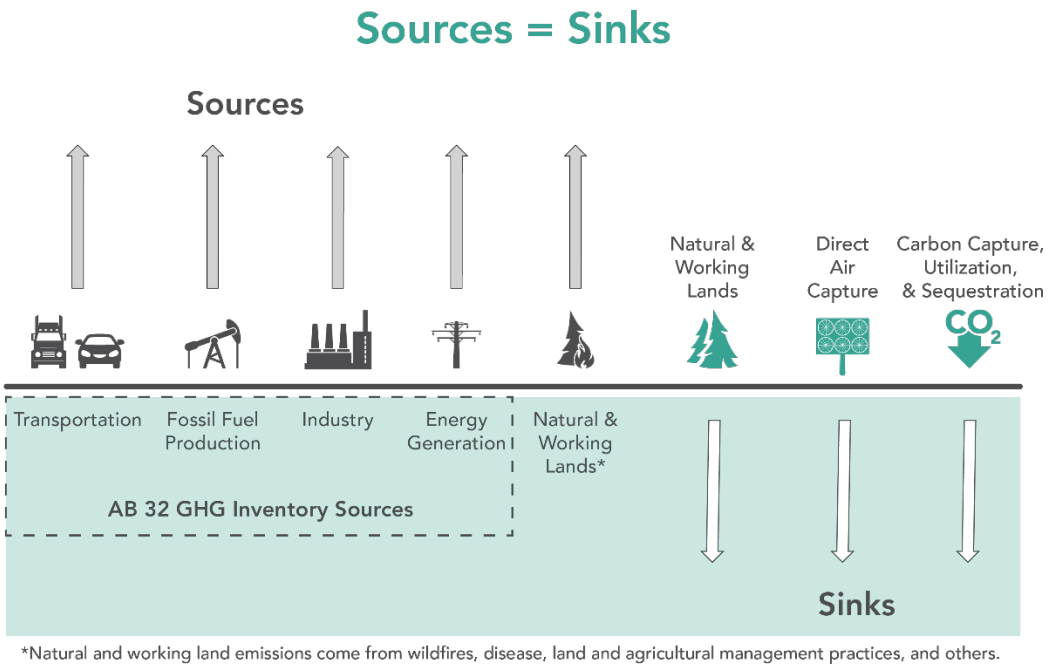
provides a strong signal to value the preservation of tropical forests over continued destructive activities such as oil exploration and extraction and ensures rigorous social and environmental safeguards for indigenous peoples and local communities.

Working Toward Carbon Neutrality

To date, California and many other regions have focused on reducing GHG emissions from the industrial, energy, and transportation sectors. As defined in statute, the state's 2020 and 2030 targets include all in-state sources of GHG emissions—and those emissions associated with imported power that is consumed in the state. By moving to a framework of carbon neutrality, the scope for accounting is expanded to include all sources and sinks. As such, carbon neutrality is achieved when the GHG fluxes are at equilibrium—when sources equal sinks. Figure 1-5 depicts the sources included in the AB 32 GHG Inventory and the new sources and sinks added in this Scoping Plan under the framework of carbon neutrality. Natural and working lands are able to sequester carbon and therefore play an increasingly important role in this framework. However, modeling for this plan shows that carbon sequestration in our natural and working lands alone will be insufficient to achieve carbon neutrality no later than 2045. Therefore, this plan also considers the role of carbon capture and sequestration, as well as biological and mechanical carbon sequestration processes that are included in the IPCC Sixth Assessment Report,[93] as necessary tools for climate change mitigation.

[93] IPCC. 2021. *Climate Change 2021: The Physical Science Basis*. https://www.ipcc.ch/report/ar6/wg1/.

Figure 1-5: Carbon neutrality: Balancing the net flux of GHG emissions from all sources and sinks



Supporting Healthy and Resilient Lands

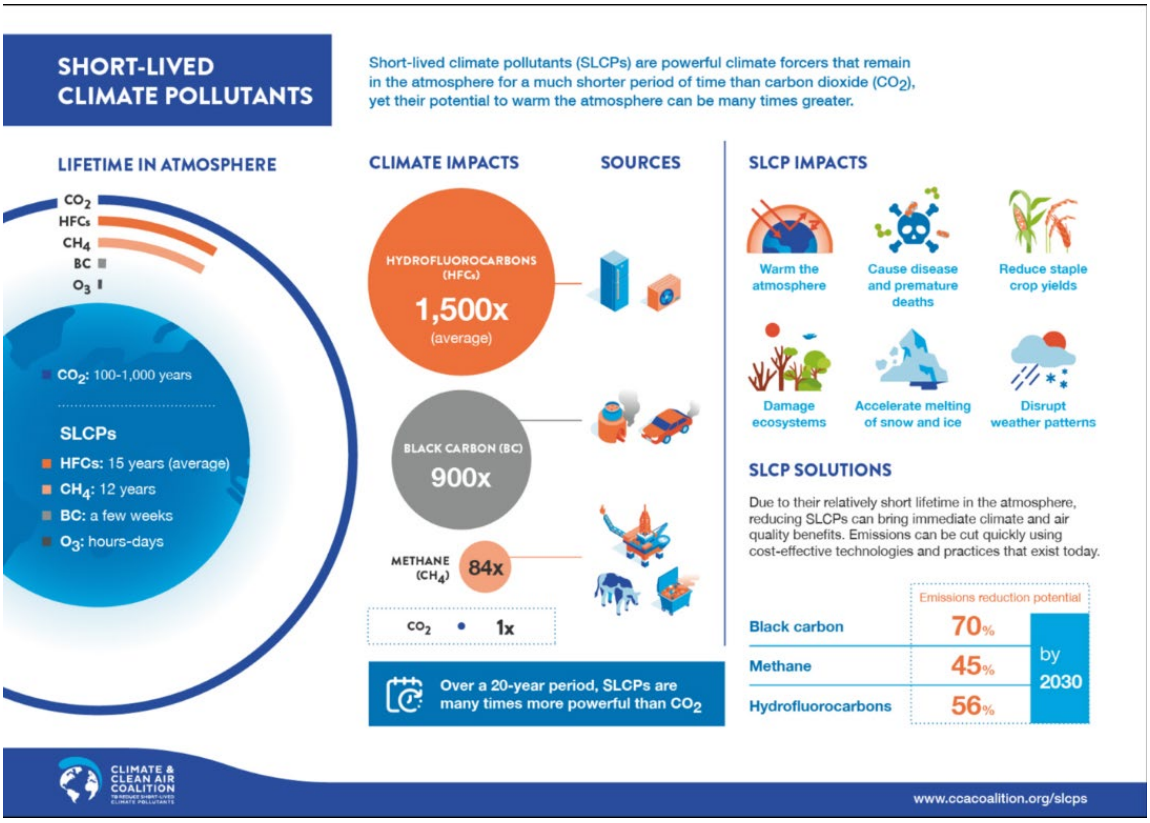
Our natural and working lands are an important piece in California's fight to achieve carbon neutrality and build resilience to the impacts of climate change. Healthy land can sequester and store atmospheric carbon dioxide in forests, grasslands, soils, and wetlands. Healthy lands can also reduce emissions of powerful short-lived climate pollutants, limit the release of future GHG emissions, protect people and nature from the impacts of climate change, and build our resilience to future climate risks. Unhealthy lands have the opposite effect—they release more GHGs than they store and are more vulnerable to future climate change impacts. Through climate smart land management that focuses on supporting healthy living systems, we can support our carbon neutrality goals, reduce emissions, advance sequestration, and support healthy and more climate-resilient lands.

Maintaining the Focus on Methane and Short-Lived Climate Pollutants

Given the urgency of climate change, the often-disproportional impacts already being felt by underserved populations across California and the world, and the need to rapidly decarbonize and avoid climate tipping points as identified in the most recent IPCC assessment, efforts to reduce short-lived climate pollutants are especially important. SLCPs include methane (CH_4), black carbon (soot), and fluorinated gases (F-gases,

including hydrofluorocarbons, or HFCs), and they are among the most harmful pollutants to both human health and the global climate. SLCPs are more potent than CO_2 in terms of their impact on climate change (and subsequently, global warming) and have a much shorter lifetime in the atmosphere than CO_2 does. That means they have an outsized impact on climate change in the near term—they are responsible for up to 45 percent of current climate forcing. It also means that targeted efforts to reduce short-lived climate pollutant emissions can provide outsized climate and health benefits, within weeks to about a decade (see Figure 1-6).

Figure 1-6: Short-lived climate pollutant impacts[94]



California has been a leader in addressing SLCP emissions. As part of the 2014 Scoping Plan,[95] CARB committed to developing a dedicated strategy to reduce SLCP emissions.

[94] Climate and Clean Air Coalition. Short-Lived Climate Pollutants (SLCPs). https://www.ccacoalition.org/en/content/short-lived-climate-pollutants-slcps.
[95] CARB. 2014. *First Update.* https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

The resulting SLCP Reduction Strategy,[96] adopted by CARB in 2017, implements targets codified in SB 1383 (Lara, Chapter 395, Statutes of 2016) to reduce methane and HFC emissions by 40 percent by 2030 and anthropogenic black carbon emissions by 50 percent. California worked with several other states through the U.S. Climate Alliance to establish a similar goal to reduce SLCP emissions in line with the requirements of the Paris Agreement,[97] identifying the potential to reduce SCLPs by 40 to 50 percent by 2030 across the U.S. Climate Alliance.[98]

Process for Developing the Scoping Plan

This Scoping Plan was developed in coordination with the Governor's Office and state agencies, in accordance with direction from the Chair and Members of CARB, through engagement with the Legislature, with advice from the EJ Advisory Committee, in consultation with tribes, and with open and transparent opportunities for stakeholders and the public to engage in workshops and other meetings. Appendix A (Public Process) includes details of the public workshops, and Chapter 5 includes details of the EJ Advisory Committee's role in the Scoping Plan update process.

Guidance from the Administration and Legislature

This Scoping Plan reflects existing and recent direction in the Governor's Executive Orders and Statutes. Table 1-1 provides a summary of major climate legislation and executive orders issued since the adoption of the 2017 Scoping Plan.

[96] CARB. 2017. *Short-Lived Climate Pollutant Reduction Strategy.* https://ww2.arb.ca.gov/sites/default/files/2020-07/final_SLCP_strategy.pdf.
[97] UNFCCC. 2015. Paris Agreement. https://unfccc.int/sites/default/files/english_paris_agreement.pdf.
[98] USCA. 2018. *From SLCP Challenge to Action: A Roadmap for Reducing Short-Lived Climate Pollutants to Meet the Goals of the Paris Agreement.* http://www.usclimatealliance.org/slcp-challenge-to-action.

Table 1-1: Major climate legislation and executive orders enacted since the 2017 Scoping Plan

Bill/Executive Order	Summary
Assembly Bill 1279 (AB 1279) (Muratsuchi, Chapter 337, Statutes of 2022) *The California Climate Crisis Act*	AB 1279 establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045; to maintain net negative GHG emissions thereafter; and to ensure that by 2045 statewide anthropogenic GHG emissions are reduced at least 85 percent below 1990 levels. The bill requires CARB to ensure that Scoping Plan updates identify and recommend measures to achieve carbon neutrality, and to identify and implement policies and strategies that enable CO_2 removal solutions and carbon capture, utilization, and storage (CCUS) technologies. This bill is reflected directly in this Scoping Plan.
Senate Bill 905 (SB 905) (Caballero, Chapter 359, Statutes of 2022) *Carbon Capture, Removal, Utilization, and Storage Program*	SB 905 requires CARB to create the Carbon Capture, Removal, Utilization, and Storage Program to evaluate, demonstrate, and regulate CCUS and carbon dioxide removal (CDR) projects and technology. The bill requires CARB, on or before January 1, 2025, to adopt regulations creating a unified state permitting application for approval of CCUS and CDR projects. The bill also requires the Secretary of the Natural Resources Agency to publish a framework for governing agreements for two or more tracts of land overlying the same geologic storage reservoir for the purposes of a carbon sequestration project. The Scoping Plan modeling reflects both CCUS and CDR contributions to achieve carbon neutrality.
Senate Bill 846 (SB 846) (Dodd, Chapter 239, Statutes of 2022) *Diablo Canyon Powerplant: Extension of Operations*	SB 846 extends the Diablo Canyon Power Plant's sunset date by up to five additional years for each of its two units and seeks to make the nuclear power plant eligible for federal loans. The bill requires that the California Public Utilities Commission (CPUC) not include and disallow a load-serving entity from including in their adopted resource plan, the energy, capacity, or any attribute from the Diablo Canyon power plant. The Scoping Plan explains the emissions impact of this legislation.
Senate Bill 1020 (SB 1020) (Laird,	SB 1020 adds interim renewable energy and zero carbon energy retail sales of electricity targets to California end-use customers set at 90 percent in 2035 and 95 percent in 2040.

Chapter 361, Statutes of 2022) *Clean Energy, Jobs, and Affordability Act of 2022*	It accelerates the timeline required to have 100 percent renewable energy and zero carbon energy procured to serve state agencies from the original target year of 2045 to 2035. This bill requires each state agency to individually achieve the 100 percent goal by 2035 with specified requirements. This bill requires the CPUC, California Energy Commission (CEC), and CARB, on or before December 1, 2023, and annually thereafter, to issue a joint reliability progress report that reviews system and local reliability. The bill also modifies the requirement for CARB to hold a portion of its Scoping Plan workshops in regions of the state with the most significant exposure to air pollutants by further specifying that this includes communities with minority populations or low-income communities in areas designated as being in extreme federal non-attainment. The Scoping Plan describes the implications of this legislation on emissions.
Senate Bill 1137 (SB 1137) (Gonzales, Chapter 365, Statutes of 2022) *Oil & Gas Operations: Location Restrictions: Notice of Intention: Health protection zone: Sensitive receptors*	SB 1137 prohibits the development of new oil and gas wells or infrastructure in health protection zones, as defined, except for purposes of public health and safety or other limited exceptions. The bill requires operators of existing oil and gas wells or infrastructure within health protection zones to undertake specified monitoring, public notice, and nuisance requirements. The bill requires CARB to consult and concur with the California Geologic Energy Management Division (CalGEM) on leak detection and repair plans for these facilities, adopt regulations as necessary to implement emission detection system standards, and collaborate with CalGEM on public access to emissions detection data.
Senate Bill 1075 (SB 1075) (Skinner, Chapter 363, Statutes of 2022) *Hydrogen: Green Hydrogen: Emissions of Greenhouse Gases*	SB 1075 requires CARB, by June 1, 2024, to prepare an evaluation that includes: policy recommendations regarding the use of hydrogen, and specifically the use of green hydrogen, in California; a description of strategies supporting hydrogen infrastructure, including identifying policies that promote the reduction of GHGs and short-lived climate pollutants; a description of other forms of hydrogen to achieve emission reductions; an analysis of curtailed electricity; an estimate of GHG and emission reductions that could be achieved through deployment of green hydrogen through a variety of scenarios; an analysis of the potential for opportunities to integrate hydrogen production and applications with drinking water supply treatment needs; policy recommendations for regulatory and permitting processes

	associated with transmitting and distributing hydrogen from production sites to end uses; an analysis of the life-cycle GHG emissions from various forms of hydrogen production; and an analysis of air pollution and other environmental impacts from hydrogen distribution and end uses. This bill would inform the production of hydrogen at the scale called for in this Scoping Plan.
Assembly Bill 1757 (AB 1757) (Garcia, Chapter 341, Statutes of 2022) *California Global Warming Solutions Act of 2006: Climate Goal: Natural and Working Lands*	AB 1757 requires the California Natural Resources Agency (CNRA), in collaboration with CARB, other state agencies, and an expert advisory committee, to determine a range of targets for natural carbon sequestration, and for nature-based climate solutions, that reduce GHG emissions in 2030, 2038, and 2045 by January 1, 2024. These targets must support state goals to achieve carbon neutrality and foster climate adaptation and resilience. This bill also requires CARB to develop standard methods for state agencies to consistently track GHG emissions and reductions, carbon sequestration, and additional benefits from natural and working lands over time. These methods will account for GHG emissions reductions of CO_2, methane, and nitrous oxide related to natural and working lands and the potential impacts of climate change on the ability to reduce GHG emissions and sequester carbon from natural and working lands, where feasible. This Scoping Plan describes the next steps and implications of this legislation for the natural and working lands sector.
Senate Bill 1206 (SB 1206) (Skinner, Chapter 884, Statutes of 2022) *Hydrofluorocarbon gases: sale or distribution*	SB 1206 mandates a stepped sales prohibition on newly produced high- global warming potential (GWP) HFCs to transition California's economy toward recycled and reclaimed HFCs for servicing existing HFC-based equipment. Additionally, SB 1206 also requires CARB to develop regulations to increase the adoption of very low-, i.e., GWP < 10, and no-GWP technologies in sectors that currently rely on higher-GWP HFCs.
Senate Bill 27 (SB 27) (Skinner, Chapter 237, Statutes of 2021)	SB 27 requires CNRA, in coordination with other state agencies, to establish the Natural and Working Lands Climate Smart Strategy by July 1, 2023. This bill also requires CARB to establish specified CO_2 removal targets for 2030 and beyond as part of its Scoping Plan. Under SB 27, CNRA is to establish and maintain a registry to identify projects in the state

Carbon Sequestration: State Goals: Natural and Working Lands: Registry of Projects	that drive climate action on natural and working lands and are seeking funding. CNRA also must track carbon removal and GHG emission reduction benefits derived from projects funded through the registry. This bill is reflected directly in this Scoping Plan as CO_2 removal targets for 2030 and 2045 in support of carbon neutrality.
Senate Bill 596 (SB 596) (Becker, Chapter 246, Statutes of 2021) *Greenhouse Gases: Cement Sector: Net-zero Emissions Strategy*	SB 596 requires CARB, by July 1, 2023, to develop a comprehensive strategy for the state's cement sector to achieve net-zero-emissions of GHGs associated with cement used within the state as soon as possible, but no later than December 31, 2045. The bill establishes an interim target of 40 percent below the 2019 average GHG intensity of cement by December 31, 2035. Under SB 596, CARB must: • Define a metric for GHG intensity and establish a baseline from which to measure GHG intensity reductions. • Evaluate the feasibility of the 2035 interim target (40 percent reduction in GHG intensity) by July 1, 2028. • Coordinate and consult with other state agencies. • Prioritize actions that leverage state and federal incentives. • Evaluate measures to support market demand and financial incentives to encourage the production and use of cement with low GHG intensity. The Scoping Plan modeling is designed to achieve these outcomes.
Executive Order N-82-20	Governor Newsom signed Executive Order N-82-20 in October 2020 to combat the climate and biodiversity crises by setting a statewide goal to conserve at least 30 percent of California's land and coastal waters by 2030. The Executive Order also instructed the CNRA, in consultation with other state agencies, to develop a Natural and Working Lands Climate Smart Strategy that serves as a framework to advance the state's carbon neutrality goal and build climate resilience. In addition to setting a statewide conservation goal, the Executive Order directed CARB to update the target for natural and working lands in support of carbon neutrality as part of this Scoping Plan, and to take into consideration the NWL Climate Smart Strategy.

	Executive Order N-82-20 also calls on the CNRA, in consultation with other state agencies, to establish the California Biodiversity Collaborative (Collaborative). The Collaborative shall be made up of governmental partners, California Native American tribes, experts, business and community leaders, and other stakeholders from across the state. State agencies will consult the Collaborative on efforts to: • Establish a baseline assessment of California's biodiversity that builds upon existing data and can be updated over time. • Analyze and project the impact of climate change and other stressors in California's biodiversity. • Inventory current biodiversity efforts across all sectors and highlight opportunities for additional action to preserve and enhance biodiversity. CNRA also is tasked with advancing efforts to conserve biodiversity through various actions, such as streamlining the state's process to approve and facilitate projects related to environmental restoration and land management. The California Department of Food and Agriculture (CDFA) is directed to advance efforts to conserve biodiversity through measures such as reinvigorating populations of pollinator insects, which restore biodiversity and improve agricultural production. The Natural and Working Lands Climate Smart Strategy informs this Scoping Plan.
Executive Order N-79-20	Governor Newsom signed Executive Order N-79-20 in September 2020 to establish targets for the transportation sector to support the state in its goal to achieve carbon neutrality by 2045. The targets established in this Executive Order are: • 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035. • 100 percent of medium- and heavy-duty vehicles will be zero-emission by 2045 for all operations where feasible, and by 2035 for drayage trucks. • 100 percent of off-road vehicles and equipment will be zero-emission by 2035 where feasible. The Executive Order also tasked CARB to develop and propose regulations that require increasing volumes of zero-electric passenger vehicles, medium- and heavy-duty

	vehicles, drayage trucks, and off-road vehicles toward their corresponding targets of 100 percent zero-emission by 2035 or 2045, as listed above. The Scoping Plan modeling reflects achieving these targets.
Executive Order N-19-19	Governor Newsom signed Executive Order N-19-19 in September 2019 to direct state government to redouble its efforts to reduce GHG emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy. This Executive Order instructs the Department of Finance to create a Climate Investment Framework that: • Includes a proactive strategy for the state's pension funds that reflects the increased risks to the economy and physical environment due to climate change. • Provides a timeline and criteria to shift investments to companies and industry sectors with greater growth potential based on their focus of reducing carbon emissions and adapting to the impacts of climate change. • Aligns with the fiduciary responsibilities of the California Public Employees' Retirement System, California State Teachers' Retirement System, and the University of California Retirement Program. Executive Order N-19-19 directs the State Transportation Agency to leverage more than $5 billion in annual state transportation spending to help reverse the trend of increased fuel consumption and reduce GHG emissions associated with the transportation sector. It also calls on the Department of General Services to leverage its management and ownership of the state's 19 million square feet in managed buildings, 51,000 vehicles, and other physical assets and goods to minimize state government's carbon footprint. Finally, it tasks CARB with accelerating progress toward California's goal of five million ZEV sales by 2030 by: • Developing new criteria for clean vehicle incentive programs to encourage manufacturers to produce clean, affordable cars. • Proposing new strategies to increase demand in the primary and secondary markets for ZEVs. • Considering strengthening existing regulations or adopting new ones to achieve the necessary GHG reductions from within the transportation sector.

	The Scoping Plan modeling reflects efforts to accelerate ZEV deployment.
Senate Bill 576 (SB 576) (Umberg, Chapter 374, Statutes of 2019) *Coastal Resources: Climate Ready Program and Coastal Climate Change Adaptation, Infrastructure and Readiness Program*	Sea level rise, combined with storm-driven waves, poses a direct risk to the state's coastal resources, including public and private real property and infrastructure. Rising marine waters threaten sensitive coastal areas, habitats, the survival of threatened and endangered species, beaches, other recreation areas, and urban waterfronts. SB 576 mandates that the Ocean Protection Council develop and implement a coastal climate adaptation, infrastructure, and readiness program to improve the climate change resiliency of California's coastal communities, infrastructure, and habitat. This bill also instructs the State Coastal Conservancy to administer the Climate Ready Program, which addresses the impacts and potential impacts of climate change on resources within the conservancy's jurisdiction.
Assembly Bill 65 (AB 65) (Petrie-Norris, Chapter 347, Statutes of 2019) *Coastal Protection: Climate Adaption: Project Prioritization: Natural Infrastructure: Local General Plans*	This bill requires the State Coastal Conservancy, when it allocates any funding appropriated pursuant to the California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access For All Act of 2018, to prioritize projects that use natural infrastructure in coastal communities to help adapt to climate change. The bill requires the conservancy to provide information to the Office of Planning and Research on any projects funded pursuant to the above provision to be considered for inclusion into the clearinghouse for climate adaption information. The bill authorizes the conservancy to provide technical assistance to coastal communities to better assist them with their projects that use natural infrastructure.
Executive Order B-55-18	Governor Brown signed Executive Order B-55-18 in September 2018 to establish a statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter. Policies and programs undertaken to achieve this goal shall: • Seek to improve air quality and support the health and economic resiliency of urban and rural communities, particularly low-income and disadvantaged communities. • Be implemented in a manner that supports climate adaptation and biodiversity, including protection of the state's water supply, water quality, and native plants and animals.

	This Executive Order also calls for CARB to: • Develop a framework for implementation and accounting that tracks progress toward this goal. • Ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal. This Scoping Plan is designed to achieve carbon neutrality no later than 2045 and the modeling includes technology and fuel transitions to achieve that outcome.
Senate Bill 100 (SB 100) (De León, Chapter 312, Statutes of 2018) *California Renewables Portfolio Standard Program: emissions of greenhouse gases*	SB 100 mandates that the CPUC, CEC, and CARB plan for 100 percent of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by December 31, 2045. This bill also updates the state's Renewables Portfolio Standard (RPS) to include the following interim targets: • 44% of retail sales procured from eligible renewable sources by December 31, 2024. • 52% of retail sales procured from eligible renewable sources by December 31, 2027. • 60% of retail sales procured from eligible renewable sources by December 31, 2030. Under SB 100, the CPUC, CEC, and CARB shall use programs under existing laws to achieve 100 percent clean electricity. The statute requires these agencies to issue a joint policy report on SB 100 every four years. The first of these reports was issued in 2021. This Scoping Plan reflects the SB 100 Core Scenario resource mix with a few minor updates.
Assembly Bill 2127 (AB 2127) (Ting, Chapter 365, Statutes of 2018) *Electric Vehicle Charging Infrastructure: Assessment*	This bill requires the CEC, working with CARB and the CPUC, to prepare and biennially update a statewide assessment of the electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption required for the state to meet its goals of putting at least 5 million zero-emission vehicles on California roads by 2030 and of reducing emissions of GHGs to 40% below 1990 levels by 2030. The bill requires the CEC to regularly seek data and input from stakeholders relating to electric vehicle charging infrastructure. This bill supports the deployment of ZEVs as modeled in this Scoping Plan.

Senate Bill 30 (SB 30) (Lara, Chapter 614, Statutes of 2018) *Insurance: Climate Change*	This bill requires the Insurance Commissioner to convene a working group to identify, assess, and recommend risk transfer market mechanisms that, among other things, promote investment in natural infrastructure to reduce the risks of climate change related to catastrophic events, create incentives for investment in natural infrastructure to reduce risks to communities, and provide mitigation incentives for private investment in natural lands to lessen exposure and reduce climate risks to public safety, property, utilities, and infrastructure. The bill requires the policies recommended to address specified questions.
Assembly Bill 2061 (AB 2061) (Frazier, Chapter 580, Statutes of 2018) *Near-zero-emission and Zero-emission Vehicles*	Existing state and federal law sets specified limits on the total gross weight imposed on the highway by a vehicle with any group of two or more consecutive axles. Under existing federal law, the maximum gross vehicle weight of that vehicle may not exceed 82,000 pounds. AB 2061 authorizes a near-zero-emission vehicle or a zero-emission vehicle to exceed the weight limits on the power unit by up to 2,000 pounds. This bill supports the deployment of cleaner trucks as modeled in this Scoping Plan.

Consideration of Relevant State Plans and Regulations

Development of this Scoping Plan also included careful consideration of, and coordination with, other state agency plans and regulations, including the SB 100 Joint Agency Report,[99] the 2022 State Strategy for the State Implementation Plan,[100] Climate Action Plan for Transportation Infrastructure,[101] AB 74 Studies on Vehicle Emissions and Fuel Demand and Supply,[102,103,104] Short-Lived Climate Pollutant Strategy (SLCP Strategy),[105]

[99] CPUC, CEC, and CARB. 2021. *SB 100 Joint Agency Report.* https://www.energy.ca.gov/sb100.
[100] CARB. January 31, 2022. Draft 2022 State Strategy for the State Implementation Plan. https://ww2.arb.ca.gov/sites/default/files/2022-01/Draft_2022_State_SIP_Strategy.pdf.
[101] CalSTA. 2021. *Climate Action Plan.* https://calsta.ca.gov/subject-areas/climate-action-plan.
[102] CalEPA. 2021. Carbon Neutrality Studies. https://calepa.ca.gov/climate/carbon-neutrality-studies/.
[103] Brown, A. L., et. al. 2021. *Driving California's Transportation Emissions.* https://escholarship.org/uc/item/3np3p2t0.
[104] Deschenes, O. 2021. *Enhancing equity*. https://zenodo.org/record/4707966#.YKPiaKhKi73.
[105] CARB. Short-Lived Climate Pollutants. https://ww2.arb.ca.gov/our-work/programs/slcp.

CARB's Achieving Carbon Neutrality Report,[106] Climate Smart Strategy,[107] and draft Natural and Working Lands Implementation Plan,[108] among others.

Input from Partners and Stakeholders

CARB also collaborated with other state agencies, held consultations with tribes, and solicited comments and feedback from affected stakeholders, including labor organizations and the public. The process to update the Scoping Plan began with kickoff workshops in early June 2021,[109] followed by over a dozen public workshops, including engagement with tribes,[110] and featured a series of EJ Advisory Committee and environmental justice community meetings.[111] The June 2021 workshop and several others were a joint agency effort, as there are many agencies with direct authority or jurisdiction over different sectors of the economy. Consultation with agencies also included bi-weekly, monthly, and weekly meetings.

During the summer of 2022 CARB held three community listening sessions, hosted by the CARB Chair and Board, in communities around the state, along with one virtual community listening session and one tribal listening session specifically for tribes. Many tribes provided written feedback, which was incorporated into this Scoping Plan. In addition, CARB respects tribal sovereignty and also engaged in a consultation campaign with tribes, which resulted in government-to-government consultations, and this Scoping Plan is reflective of this process.[112]

Emissions Data That Inform the Scoping Plan

Greenhouse Gas Emissions

AB 32 includes which GHGs are to be regulated, reduced, and included in the state's targets and goals. That list includes seven GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs),

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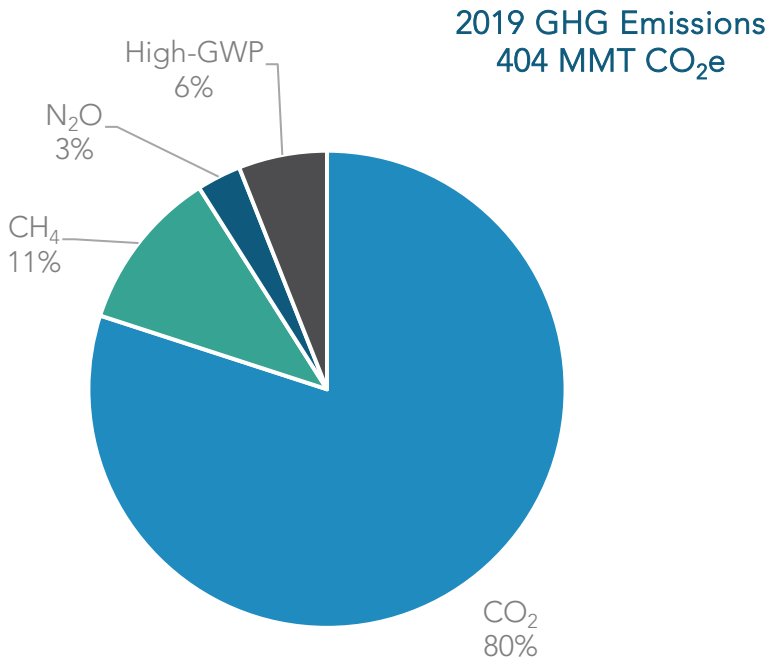
[106] Energy and Environmental Economics, Inc. 2020. *Achieving Carbon Neutrality.* https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_report_oct2020_0.pdf.
[107] CNRA. 2022. Natural and Working Lands Climate Smart Strategy. https://resources.ca.gov/Initiatives/Expanding-Nature-Based-Solutions.
[108] CARB. 2019. *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan.* https://ww2.arb.ca.gov/resources/documents/nwl-implementation-draft.
[109] Appendix A (Public Process).
[110] CARB. Scoping Plan Meetings & Workshops. https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/scoping-plan-meetings-workshops.
[111] CARB. Environmental Justice Advisory Committee Meetings and Events. https://ww2.arb.ca.gov/environmental-justice-advisory-committee-meetings-and-events.
[112] CARB. 2018. Tribal Consultation Policy. October. https://www.arb.ca.gov/regact/nonreg/2018/california_air_resources_board_tribal_consultation_policy.pdf.

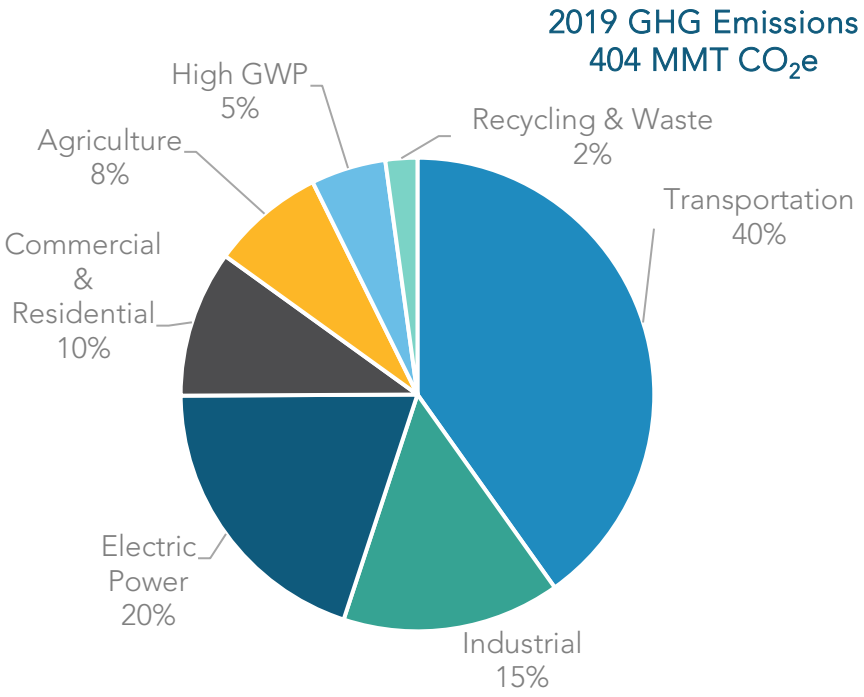
perfluorocarbons (PFCs), and nitrogen trifluoride (NF_3). Carbon dioxide is the primary GHG emitted in California, accounting for 83 percent of the total GHG emissions in 2019, as shown in Figure 1-7 below. Figure 1-8 illustrates that transportation (primarily on-road travel) is the single largest source of CO_2 emissions in the state. Upstream transportation emissions from the refinery and oil and gas sectors are categorized as CO_2 emissions from industrial sources and constitute about 50 percent of the industrial source emissions. When including these emissions, the transportation sector accounts for approximately half of statewide GHG emissions. Other significant sources of CO_2 include electricity production, industrial sources like refineries and cement plants, and residential sources like fossil gas. Figures 1-7 and 1-8 show state GHG emission contributions by GHG and sector based on the 2020 Greenhouse Gas Emission Inventory; GHG emissions for 2019 are shown because 2020 was an outlier due to the global pandemic. Emissions in Figure 1-8 are depicted by Scoping Plan sector, which includes separate categories for high-global warming potential (GWP) and recycling/waste emissions that are otherwise typically included within other economic sectors.

Figure 1-7: 2019 State GHG emission contributions by GHG[113]



[113] CARB. 2022. *California Greenhouse Gas Emissions for 2000 to 2020: Trends of Emissions and Other Indicators.* https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf.

Figure 1-8: 2019 State GHG emission contributions by Scoping Plan sector[114]



The scope of the AB 32 GHG Inventory encompasses emission sources within the state's borders, as well as imported electricity consumed in the state. This construct for the inventory is consistent with IPCC practices to allow for comparison of statewide GHG emissions with those at the national level and with other international GHG inventories. Statewide GHG emissions calculations use many data sources, including data from other state and federal agencies. However, a significant source of data comes from reports submitted to CARB through the Regulation for the Mandatory Reporting of GHG Emissions (MRR). The MRR requires facilities and entities with more than 10,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) of combustion and process emissions, all facilities belonging to certain industries, and all electric power entities to submit an annual GHG emissions data report directly to CARB. Furthermore, this regulation requires that reports from entities that emit more than 25,000 $MTCO_2e$ be verified by a CARB-

[114] The High GWP sector includes high global warming potential gas emissions from releases of ozone depleting substance (ODS) substitutes, SF_6 emissions from the electricity transmission and distribution system, and gases that are emitted in the semiconductor manufacturing process. ODS substitutes, which are primarily HFCs, are used in refrigeration and air conditioning equipment, solvent cleaning, foam production, fire retardants, and aerosols.

accredited third-party verification body. More information on MRR emissions reports can be found at CARB's Mandatory Greenhouse Gas Emissions Reporting website.[115]

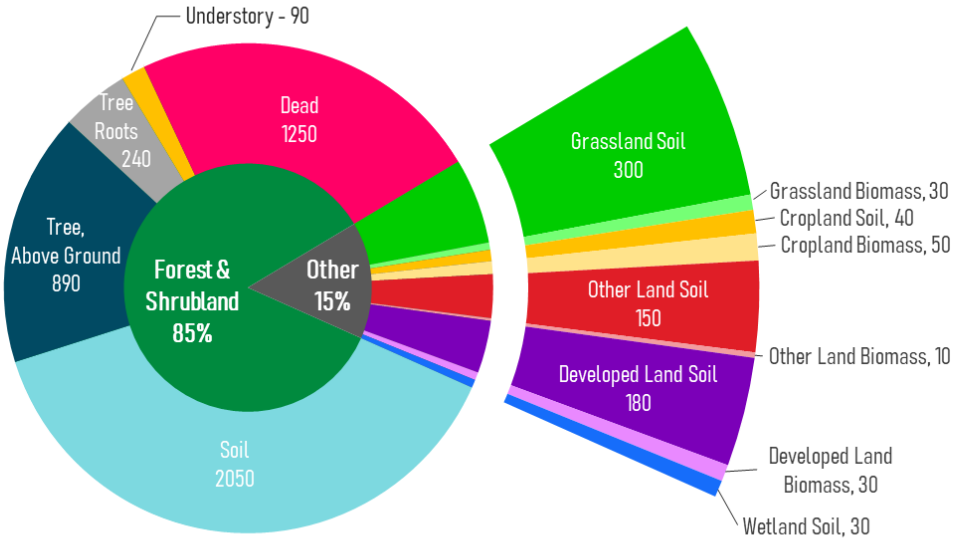
All data sources used to develop the GHG Emission Inventory are listed in CARB's inventory supporting documentation.[116]

Natural and Working Lands

For natural and working lands, the 2018 ecosystem carbon inventory (NWL Inventory)[117] shows there are approximately 5,340 million metric tons (MMT) of carbon in the carbon pools[118] (reservoirs of carbon that have the ability to both take in and release carbon) that CARB has quantified (see Figure 1-9). For purposes of comparison, 5,340 MMT of ecosystem carbon stock is equivalent to 19,600 MMT of atmospheric CO_2. Forests and shrublands contain the majority of California's carbon stock because they cover the majority of California's landscape and have the highest carbon density of any land cover type. All other land categories combined comprise over 35 percent of California's total acreage, but only 15 percent of carbon stocks. Roughly half of the 5,340 MMT of carbon resides in soils and half in plant biomass.

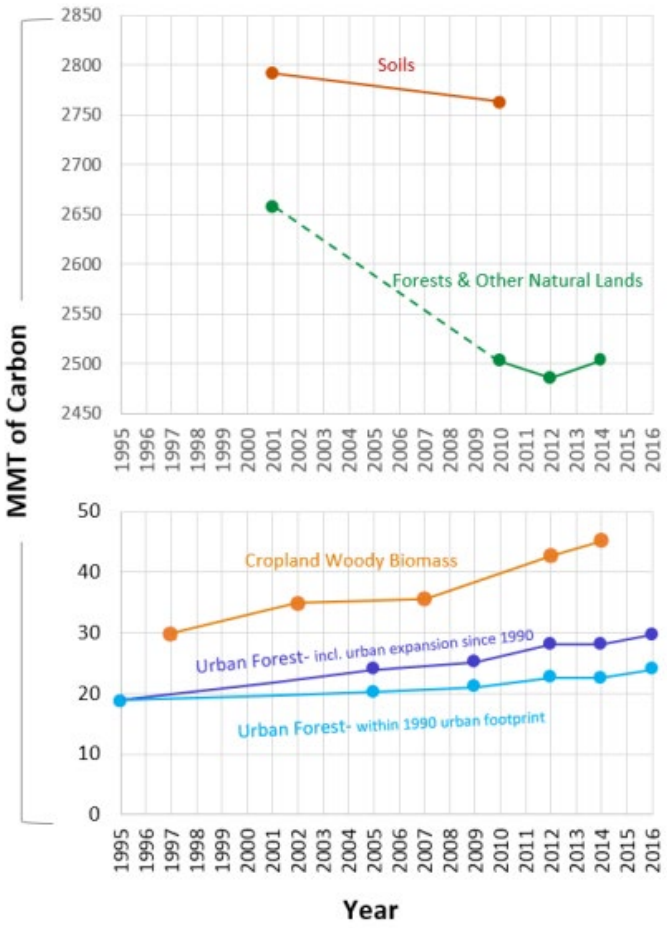
[115] CARB. Mandatory Greenhouse Gas Emissions Reporting. https://ww2.arb.ca.gov/our-work/programs/mandatory-greenhouse-gas-emissions-reporting.
[116] CARB. Current California GHG Emission Inventory Data. www.arb.ca.gov/cc/inventory/data/data.htm.
[117] CARB. 2018. *An Inventory of Ecosystem Carbon in California's Natural and Working Lands.* https://ww3.arb.ca.gov/cc/inventory/pubs/nwl_inventory.pdf.
[118] "Carbon pools" are Above-Ground Live Biomass (boles, stems, and foliage in shrubs, trees, grasses, and herbaceous vegetation), Below-Ground Live Biomass (roots in shrubs, trees, grasses, and herbaceous vegetation), Dead Organic Matter (standing or downed dead wood and litter), Harvested Wood Products (all wood and bark material that leaves harvest sites regardless of whether it is eventually incorporated into merchandisable products), and Soil Organic Matter (organic carbon in the top 30 centimeters of soil).

Figure 1-9: Carbon stocks in natural and working lands (MMT carbon)



In addition to providing an estimate of the ecosystem carbon that exists on California's landscape, the NWL Inventory also shows how those carbon stocks are changing (see Figure 1-10). The inventory attributes stock change to human activity, such as land use change, or to disturbances, such as wildfire. CARB's inventory shows these lands were a source of GHG emissions from 2001 to 2011, releasing more carbon than they stored, and then they returned to be a slight carbon sink from 2012 to 2014. These trends highlight the interannual and interdecadal variability of lands and their ability to be both a source and a sink of carbon.

Figure 1-10: Changes in carbon stock by landscape type



For natural and working lands, California's inventory is also based on IPCC methods for tracking ecosystem carbon over time, providing for comparability with other national and subnational inventories and carbon accounting. As such, the NWL Inventory is an important tool for tracking both carbon stock changes in California over time and the impacts that interventions such as those identified in this Scoping Plan, actions identified in the Climate Smart Land Strategy, and others have on NWL carbon stocks.

All data sources used to develop the NWL Inventory are listed in the technical support documentation at CARB's California Natural & Working Lands Inventory website.[119]

[119] CARB. California Natural & Working Lands Inventory. *https://ww2.arb.ca.gov/nwl-inventory*.

Black Carbon

In addition, CARB has developed a statewide emission inventory for black carbon in support of the SLCP Strategy. The inventory is reported in two categories: non-forestry (anthropogenic) sources and forestry sources.[120] The black carbon inventory is calculated using existing $PM_{2.5}$ emission inventories combined with speciation profiles that define the fraction of $PM_{2.5}$ that is black carbon. The black carbon inventory helps support implementation of the SLCP Strategy, but it is not part of California's GHG Inventory that tracks progress toward the state's climate targets under AB 32 or SB 32. The state's major anthropogenic sources of black carbon include off-road transportation, on-road transportation, residential wood burning, fuel combustion, and industrial processes. CARB estimated 2017 black carbon emissions to be approximately 8 $MTCO_2e$.[121] The majority of anthropogenic sources come from transportation—specifically, heavy-duty vehicles. The share of black carbon emissions from transportation is dropping rapidly and is expected to continue to do so between now and 2030 as a result of California's air quality programs. The remaining black carbon emissions will come largely from woodstoves/fireplaces, off-road applications, and industrial/commercial combustion. The forestry category includes non-agricultural prescribed burning and wildfire emissions.

Tracking Life-Cycle and Out-of-State Emissions

In recent years there has been increased interest in the embedded carbon in products, also known as *life-cycle emissions.* A life-cycle accounting framework refers to all of the GHG emissions generated from the sourcing, production, and transportation of products to an endpoint. In doing such assessments for a product, emissions may be associated with sourced materials and production activity outside a jurisdiction's borders. While life-cycle emissions can provide a more comprehensive picture of the emissions associated with the goods we consume and ongoing demand, life-cycle inventories are inconsistent with IPCC standards, as they would result in double counting of emissions across jurisdictions. Other countries and regions do produce their own inventory reports consistent with IPCC methods and are taking action to reduce emissions within their jurisdictions. In addition, jurisdictions often lack legal authority to regulate sources outside of their borders. Finally, it is difficult to obtain accurate data for sources and production activities outside of a region's border that would impact the accuracy of such an inventory. For these reasons, the inventory used in the Scoping Plan does not use a life-cycle

[120] SB 1383. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB1383.
[121] This is a preliminary estimate developed for this Scoping Plan. Official Black Carbon emissions estimates are provided in the SLCP inventory here: https://ww2.arb.ca.gov/ghg-slcp-inventory.

approach and remains consistent with international accounting standards and consistent with how other countries and regions track emissions within their jurisdictions.

However, GHG mitigation action may cross geographic borders as part of subnational and international collaboration, or as a natural result of implementation of regional policies. In addition to the state's existing GHG inventory, CARB will develop an accounting framework that reflects the benefits of our policies accruing outside of the state. This accounting framework will be important to better understand the true impact of the state's policies on what is emitted into the atmosphere. For example, the LCFS incentivizes GHG reductions along the entire supply chain for the production and delivery of transportation fuel imported for use in the state. However, our inventory only captures the change in emissions from the tailpipe of when that fuel is used in California and does not capture any GHG reductions that occur in the production process if the fuel is produced out of state.

Natural and working lands forestry actions are another example, where California's policies are inspiring forest management actions in other states that result in increased permanent carbon sequestration. California's NWL inventory does not capture the increased carbon stocks resulting from forestry projects happening outside of California, and the CO_2 removals resulting from these projects are not applied in either CARB's NWL inventory or CARB's AB 32 GHG Emissions Inventory. For GHG reductions outside of the state to be attributed to our programs, those reductions must be real, quantifiable, verifiable, and permanent.

It also will be important to avoid any double counting (including claims to those reductions by other jurisdictions) and to transparently indicate whether any extra-jurisdictional emissions reductions might be included in another region's inventory. CARB is collaborating with other jurisdictions to ensure GHG accounting rules are consistent with international best practices, as robust accounting rules instill confidence in the reductions claimed and maintain support for joint action across jurisdictions. The policy goals of consistency and transparency are critical as we work together with other jurisdictions on our parallel paths to achieve our GHG targets with real benefits to the atmosphere.

Tracking Progress

Historically, the AB 32 GHG Inventory has been the primary metric to track progress toward achieving climate targets.[122] However, we must now deploy clean technology at unprecedented rates. The emissions modeling underpinning this Scoping Plan and

[122] Starting with the 2022 Edition of the AB 32 GHG inventory, the inventory development now relies more directly on the annually reported and third-party verified emissions from the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions.

targets for clean technology in statute can serve as leading indicators across the economy on how our actions compare to the pace of action needed to be on track to achieve carbon neutrality. The California Climate Dashboard[123] was launched in 2022 and provides high-level metrics for clean energy production and technology deployment. Statistics such as the deployment of zero emission vehicles and clean electricity generation are just some of the examples of metrics across the economy that can be tracked, in addition to GHG emissions, to understand if the state is on track to meet its climate goals. A key indicator to track will be building of new energy infrastructure and deployment of clean technology as evaluated in the uncertainty analysis in Chapter 2. CARB will coordinate with state agencies to establish and make public similar metrics across all economic sectors to help provide transparency on the state's progress in deploying clean technology at the pace and scale needed to achieve carbon neutrality no later than 2045.

[123] CalEPA. California Climate Dashboard. *https://calepa.ca.gov/climate-dashboard/*.

Chapter 2: The Scoping Plan Scenario

This chapter describes the Scoping Plan Scenario, which for the first time includes sources in both the AB 32 GHG Inventory and Natural and Working Lands (NWL). It begins with a short description of the alternatives evaluated. Four scenarios for the AB 32 GHG Inventory and NWL were considered separately and helped to inform the Scoping Plan Scenario. Each of the alternatives were considered in terms of the important criteria and priorities that the state's comprehensive climate action must deliver, including the need for GHG reductions that are not only technologically feasible and cost-effective, but also can deliver health and economic benefits for the state. All the scenarios were set against what is called the *Reference Scenario*—that is, what the GHG emissions would look like if we did nothing at all beyond the existing policies that are required and already in place to achieve the 2030 target of at least 40 percent below 1990 levels, or those expected with no new actions in the NWL sector. For this Scoping Plan, two sets of modeling tools were used to evaluate the AB 32 GHG Inventory and NWL sectors because no single model can assess both AB 32 sectors and NWL together. As a result, two different sets of scenarios were developed for each sector type. While this chapter breaks out discussion separately for the two sector types, the Scoping Plan Scenario reflects the combined actions across both sectors by choosing an alternative from each sector type. The modeling provides point estimates; however, that does not imply precision. As discussed in the uncertainty section, several types of uncertainties are associated with any outcomes projected by the modeling results. There will be ranges of estimates associated with each point that are not shown in the graphs or results.

Scenarios for the AB 32 GHG Inventory Sectors

The Reference Scenario for the AB 32 GHG Inventory sectors shows continuing but modest GHG reductions beyond 2030 that level off toward mid-century. The comprehensive analysis of all four alternatives indicates that the Scoping Plan Scenario is the best choice to achieve California's climate and clean air goals while balancing the legislative direction on prioritizing direct emissions reductions, reducing anthropogenic emissions by at least 85 percent by 2045, being technologically feasible, and being cost-effective. It also protects public health, provides a solid foundation for continued economic growth, and drastically reduces the state's dependence on fossil fuel combustion and does not disproportionately impact disadvantaged communities. Each of the alternative scenarios was the product of a process of development informed by public input, the

governor,[124] CARB, legislative direction, and input by the EJ Advisory Committee.[125,126] Future updates to the Scoping Plan may consider new clean technologies and fuels beyond those included in this Scoping Plan.

The four scenarios evaluated shared many similarities. They each embodied the following characteristics:

- Drastic reduction in fossil fuel dependence, with some remaining in-state demand for fossil fuels for aviation, marine, and locomotion applications, and for fossil gas for buildings and industry
- Ambitious deployment of efficient non-combustion technologies such as zero emission vehicles and heat pumps
- Rapid growth in the production and distribution of clean energy such as zero carbon electricity and hydrogen
- Progressive phasedown of fossil fuel production and distribution activities as part of the transition to clean energy
- Remaining emissions of fugitive SLCPs such as refrigerants and fugitive methane
- Strong consumer adoption of clean technology and fuel options
- Removal of remaining CO_2 emissions to achieve carbon neutrality
- Some reliance on carbon capture and sequestration (CCS)

While the four scenarios had a lot in common, they also had some differences:

- Year in which carbon neutrality is achieved (2035 or 2045)
- Rate of deployment of clean technology and production and distribution of zero carbon energy
- Remaining amount of demand for fossil energy in the year carbon neutrality is achieved
- Constraints on technology and fuels deployed in certain sectors
- Consumer adoption rates of clean technologies and fuels
- Degree of reliance on CO_2 removal
- Degree of reliance on CCS

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[124] Newsom, Gavin. July 22, 2022. Letter from Governor Newsom to CARB Chair Liane Randolph. Retrieved from *https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf*.

[125] EJ Advisory Committee. December 2, 2021. EJ Advisory Committee Responses for the CARB Scenario Inputs. *https://ww2.arb.ca.gov/sites/default/files/2021-12/EJAC%20Final%20Responses%20to%20CARB%20Scenario%20Inputs_12_2_21.pdf*.

[126] CARB. January 25, 2022. Update on PATHWAYS Scenario Modeling Assumptions. *https://ww2.arb.ca.gov/sites/default/files/2022-01/Scenario%20Slides%20for%20Jan25%20EJAC%20Mtg_01242022.pdf*.

The summary below provides an overview of the alternatives designed and considered for the energy and industrial sectors in this update. Full details of each scenario considered can be found in the *Draft 2022 Scoping Plan Update*

Scoping Plan Scenario (modeling scenario Alternative 3 from the Draft): carbon neutrality by 2045, deploy a broad portfolio of existing and emerging fossil fuel alternatives and clean technologies, and align with statutes, Executive Orders, Board direction, and direction from the governor

Alternative 1: carbon neutrality by 2035, nearly complete phaseout of all combustion, limited reliance on carbon capture and sequestration and engineered carbon removal, and restricted applications for biomass-derived fuels

Alternative 2: carbon neutrality by 2035 and aggressive deployment of a full suite of technology and energy options, including engineered carbon removal

Alternative 4: carbon neutrality by 2045, deployment of a broad portfolio of existing and emerging fossil fuel alternatives, slower deployment and adoption rates than the Scoping Plan Scenario, and a higher reliance on CO_2 removal

Other considerations for the AB 32 GHG Inventory sectors include the following:

- To what extent does an alternative meet the statewide targets and any sector targets, and also deliver clean air benefits (especially in the near term) to address ongoing healthy air disparities, prioritize reductions for mobile and large stationary sources, and emphasize continued investment in disadvantaged communities?
- Does an alternative support California in building on efforts to collaborate with other jurisdictions and include exportable policies based on robust science?
- Does an alternative provide for compliance options and a cost-effective approach to reduce GHG emissions?
- Does the alternative present a realistic and ambitious path forward consistent with statute and science, and support economic opportunities, particularly in anticipated growth sectors?

Scenarios for Natural and Working Lands

For the natural and working lands sector, the Reference Scenario shows that NWL will continue to emit GHGs and lose carbon stocks into the future as the combined effects of past unhealthy management practices and climate change impact our lands. Relative to the Reference Scenario, the four NWL scenarios represent different scales of land management on seven landscapes (forests, shrublands/chaparral, grasslands, croplands, developed lands, wetlands, and sparsely vegetated lands) to support carbon neutrality.

The analysis of the four NWL scenarios shows that the Scoping Plan Scenario is the preferred choice because it prioritizes sustainable land management to sequester carbon over the long term, GHG and air pollution reductions, ecosystem health and resilience, and implementation and technological feasibility and cost-effectiveness. The Scoping Plan Scenario reduces catastrophic wildfire risk to the state; increases the health and resilience of California's forests, shrublands, and grasslands; increases soil health; and protects, restores, and enhances California's natural and working lands for future generations. The Scoping Plan Scenario takes into consideration the priority landscapes and nature-based strategies identified in California's Climate Smart Strategy[127] and reflects the state's priorities to manage lands in ways that support the multiple benefits they provide. The Scoping Plan Scenario, as well as each of the alternative NWL scenarios, were informed by input from other agencies, the public, and the EJ Advisory Committee. Additional landscapes and land management activities will be added and evaluated in future Scoping Plan updates and in response to AB 1757.

Each of the NWL scenarios have several similarities, including the following:

- Prioritizing NWL management actions on forests, shrublands, grasslands, croplands, developed lands, wetlands, and sparsely vegetated lands. These actions can reduce GHG emissions from these lands, protect ecosystems against future climate change, protect communities, and enhance the ecosystem benefits they provide to nature and society.
- Exploring the potential impacts of different levels of NWL management actions that are designed to achieve the objective associated with each scenario.
- Analyzing the carbon impacts of land management actions, climate change, wildfire, and water use on California's diverse natural and working lands through 2045.

There are also differences across the four NWL scenarios. These include:

- The level of NWL management actions taken on each landscape, such as varying the acres of healthy soils practices for croplands.
- The types of NWL management actions taken on each landscape, such as prescribed burning or thinning for forests, grasslands, and shrublands.

[127] CNRA. 2022. Natural and Working Lands Climate Smart Strategy. *https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Expanding-Nature-Based-Solutions/CNRA-Report-2022---Final_Accessible_Compressed.pdf*.

The summary below provides an overview of the alternatives designed and considered for the NWL sectors in this Scoping Plan. Full details of each scenario considered can be found in the *Draft 2022 Scoping Plan Update*.

Scoping Plan Scenario (NWL Alternative 3 from the Draft): land management activities that prioritize restoration and enhancement of ecosystem functions to improve resilience to climate change impacts, including more stable carbon stocks

NWL Alternative 1: land management activities that prioritize short term carbon stocks in our forests and through increased climate smart agricultural practices on croplands

NWL Alternative 2: land management activities representative of California's current commitments and plans

NWL Alternative 4: land management activities that prioritize reducing catastrophic wildfires in forests, shrublands, and grasslands

Evaluation of Scoping Plan Alternatives

CARB staff solicited feedback from topical experts, affected stakeholders, and the EJ Advisory Committee, including a tribal representative, at public meetings to assemble input assumptions for four carbon neutrality scenarios to model using PATHWAYS. Revisions to the Draft Scoping Plan were informed by direction in statute, the Governor's Executive Orders, public comments, and the recommendations of the EJ Advisory Committee. The three alternative scenarios were designed to explore the potential speed, magnitude, and impacts of transitioning California's energy demand away from fossil fuels. The modeling assumptions listed below identify the primary fossil fuel alternative that is commercially available and technically feasible for widespread use by 2045 for each sector. CARB assumes that any energy demand that remains after the alternative technology or fuel is applied—such as on-road internal combustion engines, industrial processes, and gas use in existing buildings that have not yet decarbonized—will continue to be met by fossil fuels, resulting in residual GHG emissions.

NWL Scoping Plan Alternatives

For the NWL sectors, staff significantly expanded the scale of the scientific analysis for NWL from previous Scoping Plan efforts. CARB staff utilized modeling tools for this expanded analysis to assess both the carbon and other ecological, public health, and economic outcomes of management actions on forests, shrublands, grasslands, croplands, developed lands, wetlands, and sparsely vegetated lands. CARB staff aligned the scenarios with both the landscape types and actions identified in other efforts called for in Governor Newsom's Executive Order N-82-20 (e.g., California's Climate Smart Strategy and Pathways to 30x30). As part of this Scoping Plan, CARB staff modeled as many of the management actions identified in the Natural and Working Lands Climate

Smart Strategy as were feasible. The management actions that were included in the model were selected because of the State of California's previous work to quantify these actions' impacts. It was not feasible to model every land management strategy for NWL, and so it is possible that larger volumes of sequestration (e.g., in soils or in oceans) could result from additional non-modeled activities. California's Natural and Working Lands Climate Smart Strategy includes a more comprehensive listing of priority nature-based solutions and management actions. It is important to note that the absence of a particular management action or its climate benefit in the modeling is not an indication of its importance or potential contributions toward meeting the target or toward supporting the carbon neutrality target for California.

Forests: Management strategies were modeled for forests: biological/chemical/ herbaceous treatments (e.g., herbicide application), clearcut, various timber harvests (e.g., variable retention, seed tree / shelterwood, selection harvesting), mastication, other mechanical treatments (e.g., piling of dead material, understory thinning), prescribed burning, and thinning. Avoided land conversion to another land use was also included in the modeling. Wildfire was modeled and is responsive to management strategies and climate conditions.

Shrublands and chaparral: Management strategies were modeled for shrublands and chaparral: biological/chemical/herbaceous treatments, prescribed burning, mechanical treatment (e.g., mastication, crushing, mowing, piling), and avoided conversion from shrubland to another land use. Wildfire was modeled and is responsive to management strategies and climate conditions.

Grasslands: Management strategies were modeled for grasslands: biological/chemical/herbaceous treatments, prescribed burning, and avoided land conversion from grasslands to another land use. Wildfire was modeled and is responsive to management strategies and climate conditions.

Croplands: Management strategies were modeled for row crops: cover cropping, no till, reduced till, compost amendment, transition to organic[128] farming, avoided conversion of annual crop agricultural land through easements, establishing riparian forest buffers, alley cropping, establishing windbreaks/shelterbelts, establishing tree and shrubs in croplands, and establishing hedgerows. For perennial crops, windbreaks/shelterbelts, hedgerows, conversion from annual crops to perennial crops, and avoided conversion to other land uses were modeled.

[128] Note: N_2O reductions from decreases in synthetic fertilizer application in organic farming were not modeled.

Developed lands: Management strategies were modeled for developed lands: Increasing tree canopy cover through planting trees and improved management of existing trees, and removing vegetation surrounding structures in accordance with the CAL FIRE Defensible Space PRC 4291.

Wetlands: Management strategies were modeled for wetlands: Restoring wetlands through submerging cultivated land in the Sacramento-San Joaquin Delta and avoided land conversion in the Sacramento-San Joaquin Delta.

Sparsely vegetated lands: Management strategies were modeled for sparsely vegetated lands: Avoided conversion of sparsely vegetated lands to another land use.

Scoping Plan Scenario

The Scoping Plan Scenario achieves GHG emission reductions that exceed the levels expected based on existing policies represented in the Reference Scenario, keeping California on track to achieve the SB 32 GHG reduction target for 2030 and become carbon neutral no later than 2045. Actions that reduce GHG emissions and transition AB 32 GHG Inventory sources away from fossil fuel combustion affect each economic sector. Actions that lead to improved carbon stocks affect each landscape.

AB 32 GHG Inventory Sectors

The AB 32 GHG Inventory Sector Reference scenario is the forecasted statewide GHG emissions through mid-century, with existing policies and programs but without any further action to reduce GHGs beyond those needed to achieve the 2030 limit. The Reference Scenario was developed based on other projections of business-as-usual conditions. Sources of data and policies included are:

- California Energy Demand Forecast[129]
- The two transportation carbon neutrality studies required by AB 74[130]
- The Mobile Source Strategy[131]
- SB 100 60 percent Renewables Portfolio Standard
- A Low Carbon Fuel Standard carbon intensity reduction target of 20 percent

Policies that are under study or design, such the Advanced Clean Fleets regulation, are not included. The Reference Scenario reflects current trends and expected performance of policies identified in the 2017 Scoping Plan—some of which are performing better (such as the RPS and LCFS) and others that may not meet expectations (such as vehicle miles traveled [VMT] reductions and methane capture). Figure 2-1 provides the modeling results for a Reference Scenario for the AB 32 GHG Inventory sectors compared to the Scoping Plan Scenario.

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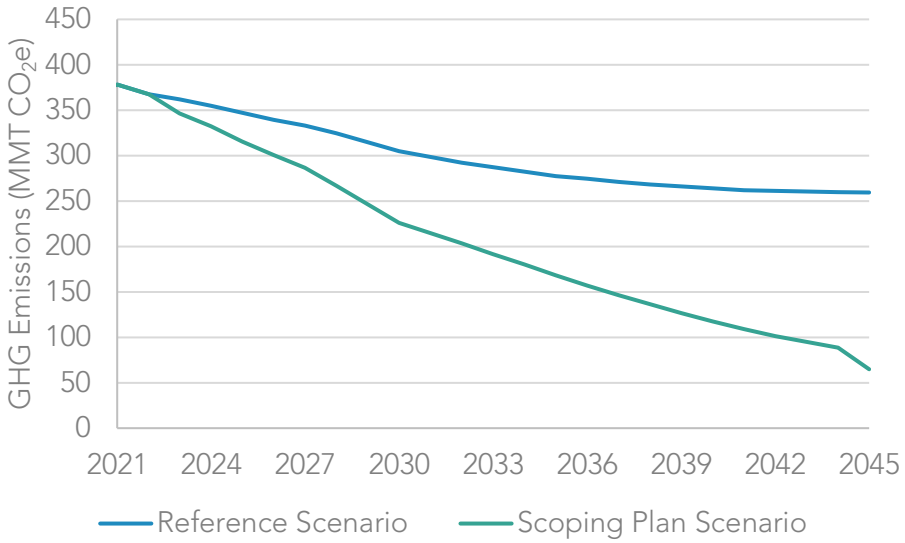
[129] California Energy Commission (CEC). 2020. *2019 Integrated Energy Policy Report.* https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2019-integrated-energy-policy-report.

[130] Brown et al. 2021. *Driving California's Transportation Emissions.* https://escholarship.org/uc/item/3np3p2t0 and Deschenes et al. 2021. *Enhancing equity.* https://zenodo.org/record/4707966#.YI72RNrMKUn.

[131] CARB. 2021. 2020 *Mobile Source Strategy.* https://ww2.arb.ca.gov/sites/default/files/2021-12/2020_Mobile_Source_Strategy.pdf.

Figure 2-1: Reference and Scoping Plan Scenario GHG emissions[132]



The Scoping Plan Scenario is summarized in Table 2-1. The table shows the types of technologies and energy needed to drastically reduce GHG emissions from the AB 32 Inventory sectors. It also includes references to relevant statutes and Executive Orders, although it is not comprehensive of all existing new authorities for directing or supporting the actions described. Each action is expected to both reduce GHGs and help improve air quality, primarily by transitioning away from combustion of fossil fuels. The Scoping Plan Scenario achieves the AB 1279 target of 85 percent below 1990 levels by 2045 and identifies a need to accelerate the 2030 target to 48 percent below 1990 levels.

[132] The drop in emissions in 2045 reflects both the need to achieve an 85% reduction below 1990 levels in anthropogenic emissions per AB 1279 and Governor Newsom's request for a 100 MMT CO2e carbon removal and capture target in 2045. This was modeled by extending CCS to electric sector emissions.

Table 2-1: Actions for the Scoping Plan Scenario: AB 32 GHG Inventory sectors

Sector	Action	Statutes, Executive Orders, Other Direction, Outcome
GHG Emissions Reductions Relative to the SB 32 Target[133]	40% below 1990 levels by 2030	SB 32: Reduce statewide GHG emissions. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory
Smart Growth / Vehicle Miles Traveled (VMT)	VMT per capita reduced 25% below 2019 levels by 2030, and 30% below 2019 levels by 2045	SB 375: Reduce demand for fossil transportation fuels and GHGs, and improve air quality. In response to Board direction and EJ Advisory Committee recommendations
Light-duty Vehicle (LDV) Zero Emission Vehicles (ZEVs)	100% of LDV sales are ZEV by 2035	EO N-79-20: Reduce demand for fossil transportation fuels and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory 2035 target aligns with the EJ Advisory Committee recommendation.

[133] While the SB 32 GHG emissions reduction target is not an Action that is analyzed independently, it is included in this table for reference.

Sector	Action	Statutes, Executive Orders, Other Direction, Outcome
Truck ZEVs	100% of medium-duty (MDV)/HDV sales are ZEV by 2040 (AB 74 University of California Institute of Transportation Studies [ITS] report)	EO N-79-20: Reduce demand for fossil transportation fuels and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory
Aviation	20% of aviation fuel demand is met by electricity (batteries) or hydrogen (fuel cells) in 2045. Sustainable aviation fuel meets most or the rest of the aviation fuel demand that has not already transitioned to hydrogen or batteries.	Reduce demand for petroleum aviation fuel and reduce GHGs. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory In response to Governor Newsom's July 2022 letter to CARB Chair Liane Randolph
Ocean-going Vessels (OGV)	2020 OGV At-Berth regulation fully implemented, with most OGVs utilizing shore power by 2027. 25% of OGVs utilize hydrogen fuel cell electric technology by 2045.	Reduce demand for petroleum fuels and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory
Port Operations	100% of cargo handling equipment is zero-emission by 2037. 100% of drayage trucks are zero emission by 2035.	Executive Order N-79-20: Reduce demand for petroleum fuels and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory

Sector	Action	Statutes, Executive Orders, Other Direction, Outcome
Freight and Passenger Rail	100% of passenger and other locomotive sales are ZEV by 2030. 100% of line haul locomotive sales are ZEV by 2035. Line haul and passenger rail rely primarily on hydrogen fuel cell technology, and others primarily utilize electricity.	Reduce demand for petroleum fuels and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory
Oil and Gas Extraction	Reduce oil and gas extraction operations in line with petroleum demand by 2045.	Reduce GHGs and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory
Petroleum Refining	CCS on majority of operations by 2030, beginning in 2028 Production reduced in line with petroleum demand.	Reduce GHGs and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory

Sector	Action	Statutes, Executive Orders, Other Direction, Outcome
Electricity Generation	Sector GHG target of 38 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) in 2030 and 30 $MMTCO_2e$ in 2035 Retail sales load coverage[134] 20 gigawatts (GW) of offshore wind by 2045 Meet increased demand for electrification without new fossil gas-fired resources.	SB 350 and SB 100: Reduce GHGs and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory In response to Governor Newsom's July 2022 letter, Board direction, and EJ Advisory Committee recommendation
New Residential and Commercial Buildings	All electric appliances beginning 2026 (residential) and 2029 (commercial), contributing to 6 million heat pumps installed statewide by 2030	Reduce demand for fossil gas and GHGs, and improve ambient and indoor air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory In response to Governor Newsom's July 2022 letter

[134] SB 100 speaks only to retail sales and state agency procurement of electricity. The *2021 SB 100 Joint Agency Report* reflects the agency authors' understanding that other loads—wholesale or non-retail sales and losses from storage and transmission and distribution lines—are not subject to the law.

Sector	Action	Statutes, Executive Orders, Other Direction, Outcome
Existing Residential Buildings	80% of appliance sales are electric by 2030 and 100% of appliance sales are electric by 2035. Appliances are replaced at end of life such that by 2030 there are 3 million all-electric and electric-ready homes—and by 2035, 7 million homes—as well as contributing to 6 million heat pumps installed statewide by 2030.	Reduce demand for fossil gas and GHGs, and improve ambient and indoor air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory In response to Governor Newsom's July 2022 letter
Existing Commercial Buildings	80% of appliance sales are electric by 2030, and 100% of appliance sales are electric by 2045. Appliances are replaced at end of life, contributing to 6 million heat pumps installed statewide by 2030.	Reduce demand for fossil gas and GHGs, and improve ambient and indoor air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory In response to Governor Newsom's July 2022 letter
Food Products	7.5% of energy demand electrified directly and/or indirectly by 2030; 75% by 2045	Reduce demand for fossil gas and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory

Sector	Action	Statutes, Executive Orders, Other Direction, Outcome
Construction Equipment	25% of energy demand electrified by 2030 and 75% electrified by 2045	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory
Chemicals and Allied Products; Pulp and Paper	Electrify 0% of boilers by 2030 and 100% of boilers by 2045. Hydrogen for 25% of process heat by 2035 and 100% by 2045 Electrify 100% of other energy demand by 2045.	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory
Stone, Clay, Glass, and Cement	CCS on 40% of operations by 2035 and on all facilities by 2045 Process emissions reduced through alternative materials and CCS	SB 596: Reduce demand for fossil energy, process emissions, and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory
Other Industrial Manufacturing	0% energy demand electrified by 2030 and 50% by 2045	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory

Sector	Action	Statutes, Executive Orders, Other Direction, Outcome
Combined Heat and Power	Facilities retire by 2040.	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory
Agriculture Energy Use	25% energy demand electrified by 2030 and 75% by 2045	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions
Low Carbon Fuels for Transportation	Biomass supply is used to produce conventional and advanced biofuels, as well as hydrogen.	Reduce demand for petroleum fuel and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory
Low Carbon Fuels for Buildings and Industry	In 2030s biomethane[135] blended in pipeline Renewable hydrogen blended in fossil gas pipeline at 7% energy (~20% by volume), ramping up between 2030 and 2040 In 2030s, dedicated hydrogen pipelines constructed to serve certain industrial clusters	Reduce demand for fossil energy and GHGs, and improve air quality. AB 197: direct emissions reductions for sources covered by the AB 32 Inventory

[135] *Biomethane* is also known as renewable natural gas (RNG).

Sector	Action	Statutes, Executive Orders, Other Direction, Outcome
Non-combustion Methane Emissions	Increase landfill and dairy digester methane capture. Some alternative manure management deployed for smaller dairies Moderate adoption of enteric strategies by 2030 Divert 75% of organic waste from landfills by 2025. Oil and gas fugitive methane emissions reduced 50% by 2030 and further reductions as infrastructure components retire in line with reduced fossil gas demand	SB 1383: Reduce short-lived climate pollutants.
High GWP Potential Emissions	Low GWP refrigerants introduced as building electrification increases, mitigating HFC emissions	SB 1383: Reduce short-lived climate pollutants.

Natural and Working Lands

The Reference Scenario for NWL represents the amount of land management that occurred between 2001 and 2014, and projects the outcomes from maintaining the 2001–2014 levels of land management until 2045. The management and land use practices that occur within the Reference Scenario were derived from empirical data used by staff. For forests, shrublands/chaparral, and grasslands, the Reference Scenario constitutes approximately 250,000 acres of annual statewide treatments. For croplands, the Reference Scenario represents no healthy soil practices because during this period the healthy soil program did not yet exist. For land use change within all land types that consider land use change, historical rates of land conversion from 2001–2014 also were taken from empirical data and modeled into the future for the Reference Scenario.

Table 2-2 summarizes the Scoping Plan Scenario. The table also includes references to relevant statutes and Executive Orders where available.

Table 2-2: Actions for the Scoping Plan Scenario: NWL sectors

Sector	Action	Statutes, Executive Orders, Outcome
Natural and Working Lands	Conserve 30% of the state's NWL and coastal waters by 2030. Implement near- and long-term actions to accelerate natural removal of carbon and build climate resilience in our forests, wetlands, urban greenspaces, agricultural soils, and land conservation activities in ways that serve all communities—and in particular low-income, disadvantaged, and vulnerable communities.	EO N-82-20 and SB 27: CARB to include an NWL target in the Scoping Plan. AB 1757: Establish targets for carbon sequestration and nature-based climate solutions. SB 1386: NWL are an important strategy in meeting GHG reduction goals.

Sector	Action	Statutes, Executive Orders, Outcome
Forests and Shrublands	At least 2.3 million acres[136] treated statewide annually in forests, shrublands/chaparral, and grasslands, comprised of regionally specific management strategies that include prescribed fire, thinning, harvesting, and other management actions. No land conversion of forests, shrublands/chaparral, or grasslands.	Restore health and resilience to overstocked forests and prevent carbon losses from severe wildfire, disease, and pests. Improve air quality and reduce health costs related to wildfire emissions. Improve water quantity and quality and improve rural economies. Provide forest biomass for resource utilization. EO B-52-18: CARB to increase the opportunity for using prescribed fire. AB 1504 (Skinner, Chapter 534, Statutes of 2010): CARB to recognize the role forests play in carbon sequestration and climate mitigation.

[136] The 2.3 million acre target is what the Scoping Plan modeling shows would be needed to realize the carbon stock target called for in this Scoping Plan by 2045.

Sector	Action	Statutes, Executive Orders, Outcome
Grasslands	At least 2.3 million acres[137] treated includes increased management of grasslands interspersed in forests to reduce fuels surrounding communities using management strategies appropriate for grasslands. No land conversion of forests, shrublands/chaparral, or grasslands.	Help to achieve climate targets, improve air quality, and reduce health costs.
Croplands	Implement climate smart practices for annual and perennial crops on ~80,000 acres annually. Land easements/ conservation on annual crops at ~5,500 acres annually. Increase organic agriculture to 20% of all cultivated acres by 2045 (~65,000 acres annually).	Reduce short-lived climate pollutants. Increase soil water holding capacity. Increase organic farming and reduce pesticide use. SB 859: Recognizes the ability of healthy soils practices to reduce GHG emissions from agricultural lands. Target increased in response to Governor Newsom's direction to prioritize sustainable land management.

[137] The 2.3 million acre target is what the Scoping Plan modeling shows would be needed to realize the carbon stock target called for in this Scoping Plan by 2045.

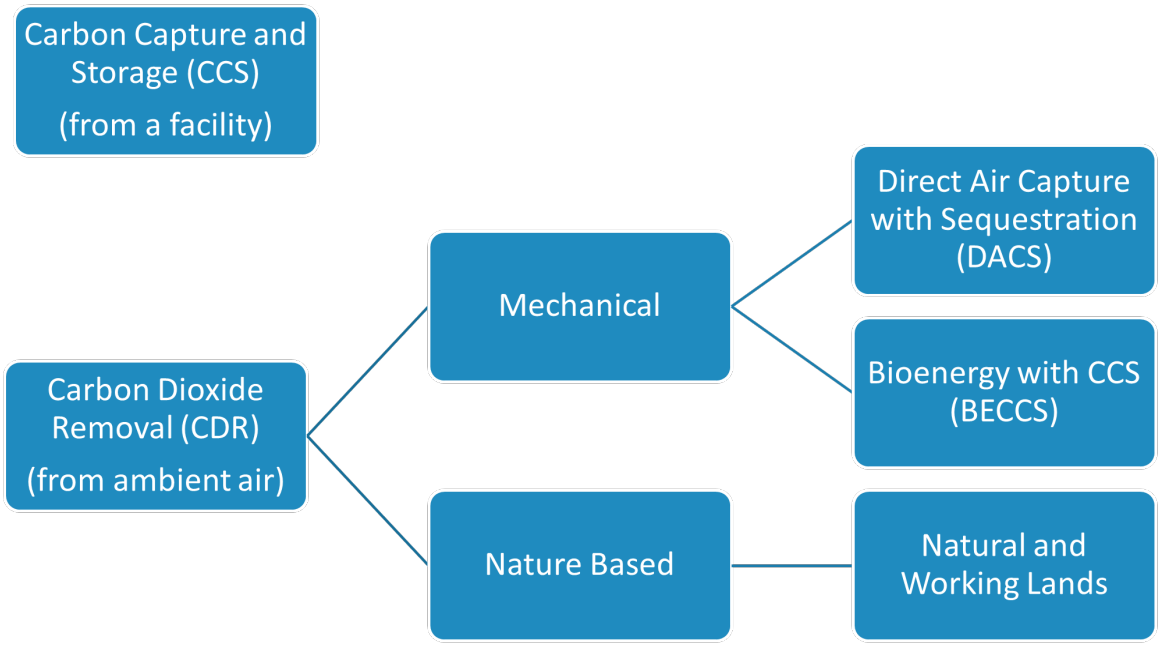
Sector	Action	Statutes, Executive Orders, Outcome
Developed Lands	Increase urban forestry investment by 200% above current levels and utilize tree watering that is 30% less sensitive to drought. Establish defensible space that accounts for property boundaries.	Increase urban tree canopy and shade cover. Reduce heat island effects and support water infrastructure. Reduce fire risk via defensible space. AB 2251 (Calderon, Chapter 186, Statutes of 2022): Increase urban tree canopy 10% by 2035. Target increased in response to AB 2251 and Governor Newsom's direction on CO_2 removal targets in his July 2022 letter.
Wetlands	Restore 60,000 acres of Delta wetlands.	Increase carbon sequestration and reduce short-lived climate pollutants. Helps to reverse land subsidence while improving flood protection and providing critical habitat.
Sparsely Vegetated Lands	Land conversion at 50% of the Reference Scenario land conversion rate.	Reduce the rate of land conversion to more GHG-intensive land uses.

Strategies for Carbon Removal and Sequestration

To achieve carbon neutrality, any remaining emissions must be compensated for using carbon removal and sequestration tools. The following discussion presents more detail

on the options available to capture and sequester carbon. Carbon removal and sequestration will be an essential tool to achieve carbon neutrality, and the modeling clearly shows there is no path to carbon neutrality without carbon removal and sequestration. Governor Newsom also recognized the importance of CO_2 removal strategies and directed CARB to establish CO_2 removal and carbon capture targets of 20 $MMTCO_2$ and 100 $MMTCO_2$ by 2030 and 2045, respectively, as well as signing 2022 legislation on carbon removal and sequestration, including: AB 1279, SB 905, SB 1137, and AB 1757. Carbon removal and sequestration can take different forms. Figure 2-2 illustrates the types of carbon removal and sequestration included in this Scoping Plan. There are numerous other carbon removal options undergoing research, development, and pilot deployment. As these options mature and new approaches emerge, they can be considered in future Scoping Plan updates.

Figure 2-2: Forms of carbon removal and sequestration considered in this Scoping Plan



The Role of Carbon Capture and Sequestration

Carbon capture and sequestration (CCS) will be a necessary tool to reduce GHG emissions and mitigate climate change while minimizing leakage and minimizing emissions where no technological alternatives may exist. CCS is a process by which large amounts of CO_2 are captured, compressed, transported, and sequestered. CCS projects are paired with a source of emissions, as the CCS project captures CO_2 as it leaves a facility's smokestack. CCS projects are often paired with large GHG-emitting facilities such as energy, manufacturing, or fuel production facilities. The sequestration component

of CCS includes CO_2 injection into geologic formations (such as depleted oil and gas reservoirs and saline formations), as well as use in industrial materials (e.g., concrete). CCS is distinct from biological sequestration, which is typically accomplished through NWL management and conservation practices that enhance the storage of carbon or reduce CO_2 emissions with nature-based approaches. CCS is also distinct from mechanical CO_2 removal technologies, where CO_2 is removed directly from the atmosphere using mechanical and/or chemical processes.

CARB adopted a CCS Protocol in 2018 as part of amendments to the Low Carbon Fuel Standard.[138] At this time, no CCS projects have been implemented or have generated any credits under that protocol. However, CCS projects have been implemented elsewhere since the 1970s, largely on coal-fired power plants, with over two dozen projects operational around the world. Over 100 are at the stages of advanced or early development and are expanding beyond coal-fired plants to fossil gas, fuel production, and electricity generation facilities.[139] CCS projects are in development for addressing emissions from fuel, gas, energy production, and chemical production. As of November 2019, more than half of global large-scale CCS facilities (representing approximately 22 $MMTCO_2$/yr in capacity[140]) were in the U.S., mostly as a result of sustained governmental support for these technologies.[141] This support includes the federal 45Q tax credit for CCS[142,143] and research and deployment grants from federal agencies.[144, 145] California's deep sedimentary rock formations in the Central Valley represent world-class

[138] CARB. 2022. Carbon Capture & Sequestration. *https://ww2.arb.ca.gov/our-work/programs/carbon-capture-sequestration*.
[139] Global CCS Institute. 2021. *Global Status of CCS 2021.* *https://www.globalccsinstitute.com/wp-content/uploads/2021/11/Global-Status-of-CCS-2021-Global-CCS-Institute-1121.pdf*.
[140] IHS Markit. August 2021. Carbon Removal Potential: An Overview. *https://ww2.arb.ca.gov/sites/default/files/2021-08/ihsmarkit_presentation_sp_engineeredcarbonremoval_august2021.pdf*.
[141] Beck, Lee. 2019. *Carbon capture and storage in the USA: The role of US innovation leadership in climate-technology commercialization.* *https://academic.oup.com/ce/article/4/1/2/5686277*.
[142] Congressional Research Service. 2021. Carbon Storage Requirements in the 45Q Tax Credit. IF11639. *https://crsreports.congress.gov/product/pdf/IF/IF11639*.
[143] The Inflation Reduction Act of August 2022 expands and enhances the 45 Q tax credit for CCS. Pub.L. No. 117-169 (August 16, 2022).
[144] U.S. Department of Energy. 2020. U.S. Department of Energy Announces $131 Million for CCUS Technologies. *https://www.energy.gov/articles/us-department-energy-announces-131-million-ccus-technologies*.
[145] U.S. Department of Energy. 2021. Funding Opportunity Announcement 2515, Carbon Capture R&D for Natural Gas and Industrial Point Sources, and Front-End Engineering Design Studies for Carbon Capture Systems at Industrial Facilities and Natural Gas Plants. *https://www.energy.gov/fecm/articles/funding-opportunity-announcement-2515-carbon-capture-rd-natural-gas-and-industrial*.

CO_2 storage sites that would meet the highest standards, with storage capacities of at least 17 billion tons of CO_2.[146,147]

In this Scoping Plan, CCS is included to address emissions from limited sectors, including electricity generation, cement production facilities, and refineries, to ensure anthropogenic emissions are reduced by at least 85 percent below 1990 levels in 2045, as directed in AB 1279. While the modeling outputs show CCS not being applied to the electricity sector until 2045, CCS could be implemented earlier on the electricity sector with a similar ramp up over time as that for refineries and cement plants. An earlier application of CCS in the electricity sector would yield additional reductions in years prior to 2045. In addition, CCS can support hydrogen production until such time as there is sufficient renewable power for electrolysis and an abundant water source.

Cement plants have emissions associated with combustion and process-related activities. Combustion emissions account for approximately 40 percent of the total emissions at cement plants. The remaining emissions are related to process-related activities. Due to the high heat content needed to produce cement, there is currently no technically feasible alternative to combustion. SB 596 calls for a 40 percent reduction in GHG intensity in cement emissions from 2019 levels by 2035, and then net zero emissions by 2045. To meet in-state demand, the state relies on cement both produced in state and imported. There are seven cement plants operating in California.[148] To minimize emissions leakage and address emissions from cement plants, the Scoping Plan Scenario includes CCS for cement plants. Additional reductions will need to be pursued and considered as part of implementation of SB 596, which calls for CARB to develop a comprehensive strategy by July 1, 2023, for the state's cement sector to achieve net-zero emissions of GHGs associated with cement used within the state as soon as possible, but no later than December 31, 2045. This effort began in the summer of 2022 and included sector specific workshops.

Even with implementation of EO N-79-20, and despite all of the ambitious efforts in the Scoping Plan Scenario, there will remain some demand for petroleum fuels for legacy vehicles on road applications, and in aviation, rail, and marine applications. Petroleum refineries will need to implement technology to decarbonize their operations and reduce their emissions. This Scoping Plan also assumes CCS at petroleum refineries as one of those potential strategies. Currently, there are seventeen petroleum refineries operating

[146] For comparison purposes, California's emitted 418.2 million metric tons of CO_2e in 2019.
[147] Lawrence Livermore National Laboratory. 2020. *Getting to Neutral: Options for Negative Carbon Emissions in California.* Revision 1. https://www-gs.llnl.gov/content/assets/docs/energy/Getting_to_Neutral.pdf.
[148] CARB. Mandatory GHG Reporting – Reported Emissions. https://ww2.arb.ca.gov/mrr-data

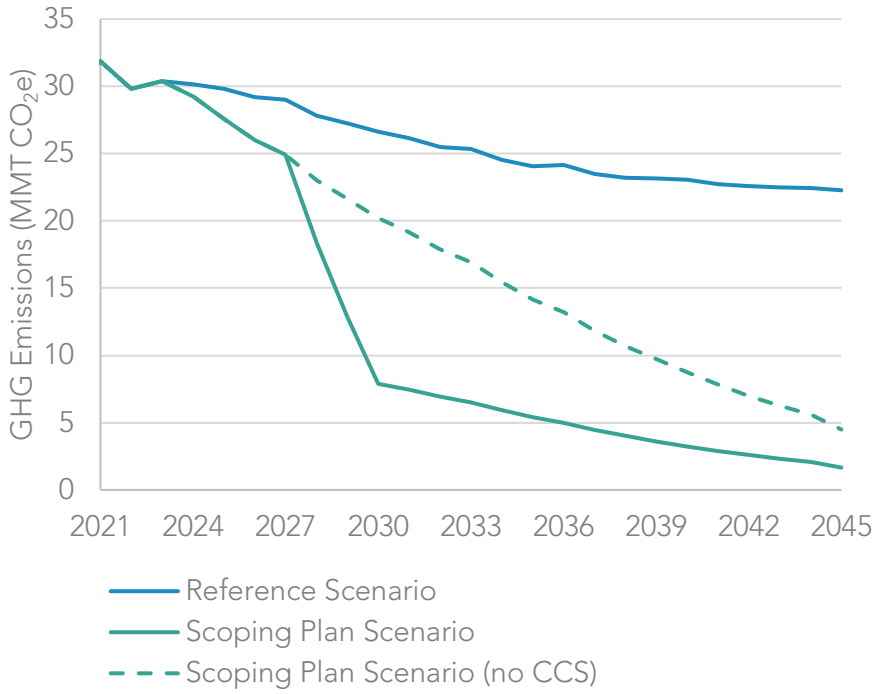
in the state.[149] On the supply side, the modeling assumes all in-state demand is met through some very limited refining activities in California. Figure 2-3 shows the emissions from the refining sector with and without CCS. If CCS is not deployed, the emissions would be directly emitted into the atmosphere, and CO_2 removal by NWL or direct air capture would need to increase to compensate for the sector's emissions.

Refineries can have a variety of point sources that emit CO_2—such as steam methane reformers for producing hydrogen, combined heat and power units, and catalytic crackers—that are best suited for CCS. Each configuration of a refinery can be unique to its footprint, onsite operations, and the types of crude oils processed. There are newer technologies with smaller footprints[150] that can be deployed in modular configurations to capture CO_2 in space-constrained and multiple-point-source facilities such as refineries. CCS can provide a path to reducing GHG emissions from these facilities to meet petroleum demand while avoiding leakage and until such time as some refineries can be transitioned to produce clean energy to support the transition away from fossil fuels.

While the Scoping Plan modeled deployment of CCS on refineries and identifies significant emissions reductions that can be achieved, the refineries in California are large and complex. The actual deployment of CCS at these facilities as modeled in the Scoping Plan is uncertain. It will be important to closely monitor the evolution of CCS deployment in the refinery sector and, in the next Scoping Plan update, to evaluate the progress toward use in this sector to determine whether the projected reductions will be achieved.

[149] CARB. Mandatory GHG Reporting. *https://ww2.arb.ca.gov/mrr-data*.
[150] Carbon Clean. Modular Carbon Capture Systems for Industry. https://www.carbonclean.com/modular-systems?hsLang=en.

Figure 2-3: Petroleum refining emissions with and without carbon capture and sequestration



This Scoping Plan also calls for accelerating the transition from combustion of fossil fuels to hydrogen. Hydrogen can be produced through electrolysis with renewable electricity or through steam methane reformation of biomethane. There is a high degree of uncertainty around the availability of solar to support both electrification of existing sectors and the production of hydrogen through electrolysis. Producing hydrogen required under the Scoping Plan Scenario with electrolysis would require about 10 gigawatts (GW)[151] of additional solar capacity. If steam methane reformation is paired with CCS, the hydrogen produced could potentially be low carbon. Additionally, the biomethane used to generate hydrogen could be sourced from gasification of forest or agricultural waste resulting from forest management and other NWL management practices, which could also lead to net negative carbon outcomes. Steam methane reformation paired with CCS can thus ensure a rapid transition to hydrogen and increase hydrogen availability until such time as

[151] The Draft Scoping Plan included an estimate for solar capacity (40 GW) to support only electrolysis to produce all hydrogen in the Proposed Scenario. The Scoping Plan now includes steam methane reformation of biomethane and biomass gasification with CCS to produce hydrogen, along with electrolysis from off-grid solar. See Appendix H (AB 32 GHG Inventory Sector Modeling) for additional details.

electrolysis with renewables can meet the ongoing need, assuming there is also sufficient water supply. Additional background and next steps for CCS can be found in Chapter 4.

The EJ Advisory Committee has raised multiple concerns related to the inclusion of CCS and mechanical CDR in the Scoping Plan. Concerns range from potential negative health and air quality impacts in communities from operation of facilities utilizing CCS that continue to emit other emissions, to safety concerns related to potential leaks, to the viability of the current technology. Additionally, the EJ Advisory Committee has policy concerns about the strategy and wants to ensure that engineered carbon removal is not used as a substitute for strategies to achieve emissions reductions onsite and that it does not result in delays in phasing out fossil fuel use. Given these and other concerns and the importance of building public awareness, CARB recognizes the need for a multi-stakeholder process including other state, federal, and local agencies; tribes; independent experts; and community residents to further understand and address community concerns related to CCS. CARB hosted a CCS Symposium with U.S. EPA Region 9 and the Stanford Doerr School of Sustainability to discuss some of these critical issues with community members and other participants. As CARB begins the process of implementing SB 905 in 2023, that will provide an opportunity for further engagement.

In the context of CCS deployment, the Council of Environmental Quality (CEQ) also highlighted the need to further assess and quantify potential impacts on local criteria air pollutants and other emissions resulting from carbon capture retrofits at industrial facilities in response to concerns regarding potential cumulative emissions from single and/or multiple sources.[152] An October 2020 Stanford report[153] discussed how the potential post-combustion capture for CO_2 could also reduce emissions of criteria air pollutant emissions from certain facilities. Exploring these potential outcomes will be important to ensure deployment of CCS does not exacerbate air pollution impacts in communities and maximizes any air pollution benefits. The need for these types of evaluations is also included in SB 905.

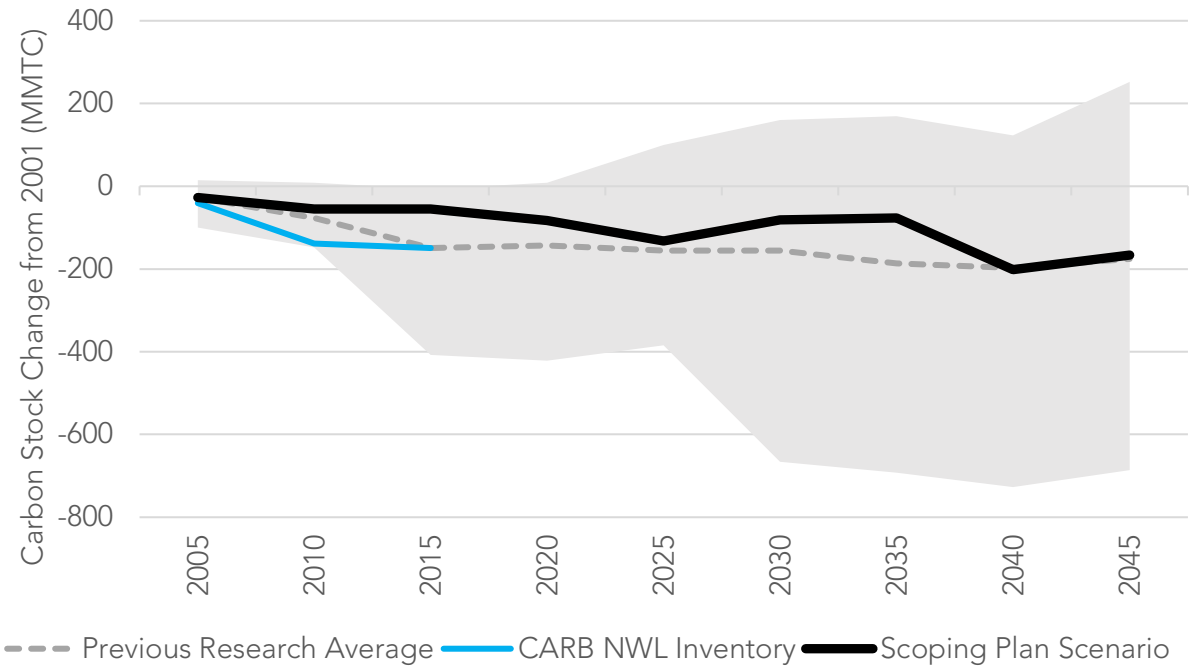
The Role of Natural and Working Lands Emissions and Sequestration

California's NWL assessments highlight the importance of increasing the pace and scale of NWL actions to ensure that our ecosystems are better equipped to withstand future climate change so they continue to provide the benefits that nature and society depend

[152] Carbon Capture, Utilization, and Sequestration Guidance. 87 Fed. Reg. 8808 (Feb. 16, 2022), *2022-03205.pdf (govinfo.gov)*.
[153] Stanford Center for Carbon Storage. 2020. *An Action Plan for Carbon Capture and Storage in California: Opportunities, Challenges, and Solutions.* October. *https://sccs.stanford.edu/ccs-in-ca/full-report-form?msclkid=6f9177f6c57811ecbebc473e75203b21*.

upon for survival. As climate change increases the likelihood of extreme wildfires, drought, heat, and other impacts, carbon stocks in California's NWL will face increased risks and impacts. We know from previous climate change and Scoping Plan work[154] that lands can be a net source of GHG emissions or a net sink, and that the magnitude of carbon stock changes and GHG emissions and sequestration from NWL are dependent on the effects of climate change and land management. The expanded modeling conducted for this Scoping Plan shows that NWL are projected to be a net source of emissions through 2045 and indicates a probable decrease of carbon stocks into the future. This projection is further corroborated by previous, independent research that has reached the same conclusion, showing a range of varying levels of carbon stock loss. Figure 2-4 shows the modeling results of the Scoping Plan Scenario overlaid with the NWL inventory and findings from independent research.

Figure 2-4: Comparison of the Scoping Plan Scenario (NWL) with existing research



The modeling indicates that immediate and aggressive climate action can reduce the environmental impacts that would occur in the absence of this action. The results of the modeling demonstrate that regular NWL management over the next two decades can

[154] CARB. 2019. January 2019. *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan*. https://ww2.arb.ca.gov/sites/default/files/2020-10/draft-nwl-ip-040419.pdf.

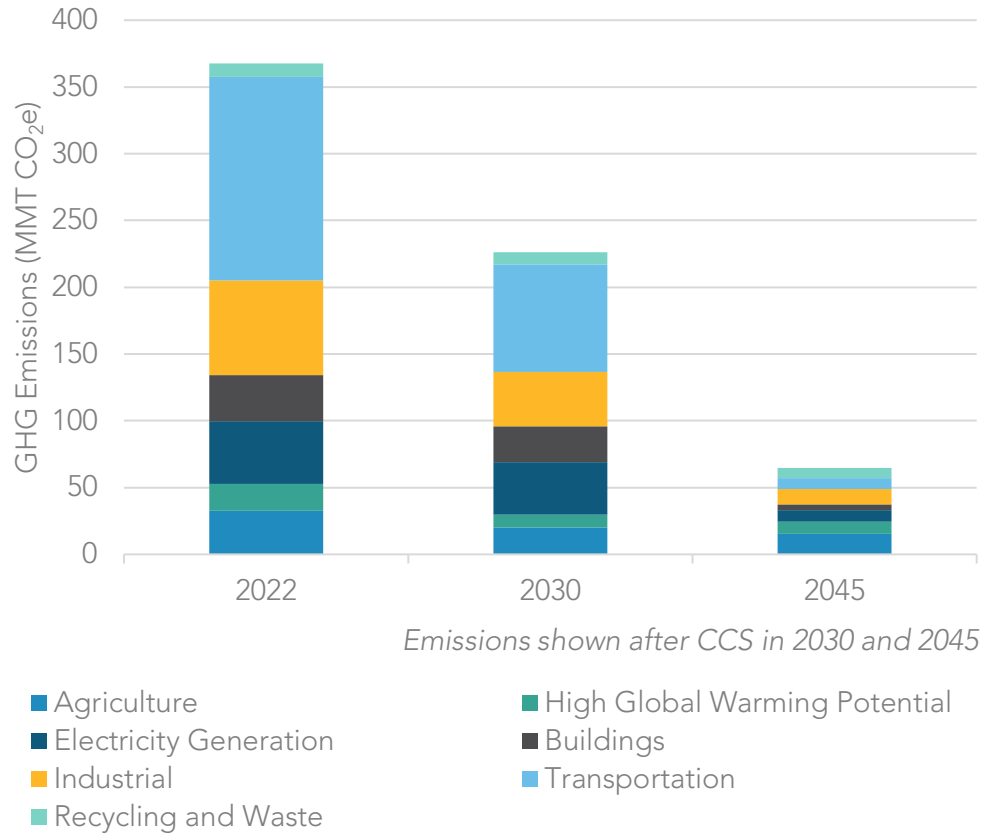
increase carbon stocks from the Reference Scenario trajectory, reduce GHG emissions from lands, and improve ecosystem and public health. This effort is the most comprehensive scientific effort taken by any government to include NWL within its overall climate strategy. Even so, we know that uncertainty exists about future climate and economic forces and the impacts they may have on our ecosystems, so it is important that the state take decisive and aggressive action to improve and diversify ecosystem structures and management.

The effects of climate change, including increased drought, wildfire, and extreme heat, play a significant role in determining the future of California's carbon stocks. And while management actions will help to reduce the impact that climate change will have on California, it is clear from the analysis that NWL sinks and sources are highly variable from year to year, and short time frames do not adequately demonstrate the impact that climate and management are having on ecosystems. For the purposes of climate planning, therefore, it is best to focus on carbon stock changes over longer periods rather than focusing on sequestration or emissions on shorter time frames. The Scoping Plan Scenario is estimated to result in additional NWL emissions of 7 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) annually from 2025–2045. The Reference Scenario is estimated to result in annual emissions of 9 $MMTCO_2e$ over the same time period, and so the Scoping Plan Scenario slows the rate of emissions and provides an approximate 2 $MMTCO_2e$ in additional annual sequestration relative to the Reference Scenario. Because NWL are projected to be a net emissions source, the annual NWL emissions of approximately 7 $MMTCO_2e$ from the Scoping Plan Scenario will need to be compensated by additional CO_2 removal approaches to ensure California can achieve carbon neutrality by 2045.

The Role for Carbon Dioxide Removal (Direct Air Capture)

Even if anthropogenic emissions are reduced to at least 85 percent below 1990 levels by 2045 as called for by AB 1279, there will still be residual emissions in the AB 32 GHG Inventory sectors in 2045 that must be addressed in order to achieve the California's carbon neutrality target. Figure 2-5 includes the emissions by sector for the AB 32 GHG Inventory Sectors in 2022, 2030, and 2045 for the Scoping Plan Scenario.

Figure 2-5: Residual emissions in 2022, 2030, and 2045 for the Scoping Plan Scenario[155]



To achieve carbon neutrality, mechanical CDR will therefore need to be deployed. Because NWL management is not estimated to be a significant carbon removal path in the near term, additional CDR options will be needed. *Mechanical CDR* refers to a range of technologies that capture and concentrate ambient CO_2. Direct air capture (DAC) is one available option that is under development today and could be widely deployed. Note that, unlike CCS, DAC technologies are not designed to be attached to a specific source or smokestack. These technologies include chemical scrubbing processes that capture CO_2 through absorption or adsorption separation processes. Another carbon removal

[155] The High GWP sector includes high global warming potential gas emissions from releases of ozone depleting substance (ODS) substitutes, SF_6 emissions from the electricity transmission and distribution system, and gases that are emitted in the semiconductor manufacturing process. ODS substitutes, which are primarily hydrofluorocarbons (HFCs), are used in refrigeration and air conditioning equipment, solvent cleaning, foam production, fire retardants, and aerosols.

option that involves rapid mineralization of CO_2 at the Earth's surface is called *mineral carbonation.*[156] As is the case with CCS, mechanical CDR technologies will need governmental or other incentive support to overcome technology and market barriers. In the United States, the U.S. Department of Energy announced financing specifically for DAC in March 2020[157] and March 2021.[158] Additionally, almost $9 billion in CCS support was included in the $ 1 trillion Infrastructure Investment and Jobs Act of 2021.[159] This includes funding to establish four DAC hubs. The Inflation Reduction Act of 2022[160] increases the value of the 45Q tax credit to USD 85 per metric ton of CO_2 captured and stored in geologic formations from some industrial applications and USD 180 per metric ton for DAC with storage in geologic formations. In 2021, there were approximately 19 DAC facilities globally.[161]

Ultimately, the role for mechanical CDR will depend on the success of reducing emissions directly at the source in the AB 32 GHG Inventory sectors and the ability of the NWL to sequester carbon. However, mechanical CDR also provides an opportunity to not just achieve carbon neutrality, but also remove legacy GHG emissions from the atmosphere. As such, increased deployment of DAC can help achieve net negative emissions. This would further help avoid the most damaging impacts of climate change. While the federal incentives for DAC provide some support for this technology, the only California program that recognizes this technology is the LCFS program. Permitting must also happen across different levels of government and across multiple state agencies. Energy availability must also be addressed if DAC is to be implemented in remote areas. Additional information and next steps on DAC can be found in Chapter 4.

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[156] The National Academies Press. 2018. Direct Air Capture and Mineral Carbonation Approaches for Carbon Dioxide Removal and Reliable Sequestration: Proceedings of a Workshop–in Brief. *https://nap.nationalacademies.org/catalog/25132/direct-air-capture-and-mineral-carbonation-approaches-for-carbon-dioxide-removal-and-reliable-sequestration#:~:text=National%20Academies%20of%20Sciences%2C%20Engineering%2C%20and%20Medicine%3B%20Division,concentrate%20carbon%20dioxide%20%28CO%202%29%20from%20ambient%20air*.

[157] U.S. Department of Energy. 2020. Department of Energy to Provide $22 Million for Research on Capturing Carbon Dioxide from Air*. https://www.energy.gov/articles/department-energy-provide-22-million-research-capturing-carbon-dioxide-air*.

[158] U.S. Department of Energy. 2021. DOE Invests $24 Million to Advance Transformational Air Pollution Capture. *https://www.energy.gov/articles/doe-invests-24-million-advance-transformational-air-pollution-capture*.

[159] Pub.L. No. 117-58 (November 15, 2021). *https://www.congress.gov/bill/117th-congress/house-bill/3684/text*.

[160] Pub.L. No. 117-169 (August 16, 2022). *https://www.congress.gov/bill/117th-congress/house-bill/5376/text*.

[161] International Energy Agency (IEA). 2022. Direct Air Capture – Analysis. *https://www.iea.org/reports/direct-air-capture*.

Carbon Dioxide Removal and Capture Targets for 2030 and 2045

Recognizing the importance of CO_2 removal, Governor Newsom and the Legislature identified the need for targets to send policy and regulatory signals to pilot, deploy, and scale action for those efforts. Governor Newsom requested that CARB set a CO_2 removal and capture target of 20 MMT for 2030 and 100 MMT for 2045, first prioritizing sequestration in NWL. And while this Scoping Plan prioritizes and recommends significant increased climate-smart action on all NWL to support carbon neutrality and healthy and resilient lands, the modeling indicates that, across all NWL, lands will be a net source of emissions when accounting for both carbon sequestration and GHG (CO_2, CH_4, and N_2O) emissions from lands.

Some landscapes, however, are projected to have a net increase in carbon stocks under the Scoping Plan Scenario between 2025 and 2045 relative to the reference case, indicating that NWL actions can help California achieve Governor Newsom's CO_2 removal targets. Carbon stocks in urban forests and grasslands are projected to increase relative to historical levels from implementation of the 2022 Scoping Plan. To support the governor's CO_2 removal targets, CARB estimates that lands would contribute an average of 1.5 MMT of CO_2 removals each year between 2025 and 2045. Any carbon sequestration contributions from lands need to reflect both long-term storage and an overall net increase in carbon stocks over time to ensure these NWL actions are contributing toward California's achievement and maintenance of carbon neutrality over time.

CARB will work to update and revise these estimates as part of implementation of AB 1757, which was signed by the governor in September 2022 and requires that CARB and the California Natural Resources Agency (CNRA) work with an expert advisory committee to determine an ambitious range of carbon sequestration targets by January 1, 2024, for the years 2030, 2038, and 2045.

For the AB 32 GHG Inventory sectors, the Scoping Plan Scenario modeling indicates that the scenario would meet or exceed the 2030 SB 32 target through GHG reduction policies without the need for CDR. CDR will, however, be necessary to increase ambition for an accelerated 2030 target and in increasing amounts over the following decades to achieve carbon neutrality by 2045.[162] Given the likelihood of NWL to be a net source of emissions, and the need for CDR to compensate for residual emissions to achieve carbon neutrality

[162] The modeled scenarios assume that residual emissions will be compensated using DAC technologies by including the direct cost in terms of dollars per ton CO_2 removed. The energy source for DAC is not modeled, but renewable electricity and/or hydrogen produced from electrolysis are zero carbon options consistent with the carbon neutrality targets in this Scoping Plan.

by 2045, California will need increasing deployment of mechanical CDR over the coming decades. In the immediate future, scaling nature-based CDR approaches also can help to provide some CO_2 removal quickly while mechanical CDR is scaled up between now and 2045. Table 2-3 provides estimates of CO_2 removal and capture needed in 2030[163] and 2045.

[163] As identified in Chapter 1, SB 27 (Skinner, Chapter 237, Statues of 2021) directed CARB to "establish carbon dioxide removal targets for 2030 and beyond" as part of this Scoping Plan. CARB is establishing these targets to satisfy both the requirements of SB 27 and the directive from Governor Newsom to establish CO_2 removal targets for 2030 and 2045.

Table 2-3: GHG emissions and removals needed to achieve carbon neutrality and meet the 20 $MMTCO_2$ removal and capture target in 2030 and the 100 $MMTCO_2$ removal and capture target in 2045.[164]

	2030 ($MMTCO_2e$)	2045 ($MMTCO_2e$)
GHG Emissions	233	72
AB 32 GHG Inventory Sector Emissions	226	65
Net NWL GHG Emissions Across All Landscapes (annual average from 2025–2045)	7	7
Carbon Capture and Sequestration (CCS): Avoided GHG Emissions from Industry and Electric Sectors	(13)	(25)
Carbon Dioxide Removal (CDR) including natural and working lands carbon sequestration,[165] Direct Air Capture, and Bioenergy with CCS (BECCS).	(7)	(75)
Net Emissions (GHG Emissions + CDR)	226	(3)

In 2030, the CO_2 removal and capture target is 20 MMT, but because the SB 32 target only encompasses the AB 32 GHG Inventory sectors, only CCS that reduces GHG emissions on AB 32 sources count toward achieving more ambitious GHG emission reductions in 2030. In 2045, the CO_2 removal and capture must compensate for any residual emissions from the AB 32 Inventory sectors and NWL emissions to support achieving carbon neutrality while also totaling at least 100 MMT. It is important to note that NWL, particularly forests, need a natural wildfire cycle to remain healthy. While the modeling projected wildfires, and implementing the Scoping Plan will result in a reduction in future wildfire emissions, getting to zero wildfires in the sector is not the goal, nor the

[164] Modeled estimates from the Scoping Plan Scenario indicate the relative quantity of emissions and removals to achieve carbon neutrality and meet carbon removal and capture targets. These estimates are not intended to imply precision, as the required policies are yet to be implemented and all models have some uncertainty in their forecasts.

[165] For the purposes of quantifying how to achieve the governor's 20 MMT and 100 MMT CO_2 removal and capture target, CARB included 1.5 $MMTCO_2e$ sequestration from NWL, which is the sequestration from urban forests. This is included as CO_2 removal because it is this sequestration that CARB can consider as having some permanence. Permanence is necessary for incorporating NWL into carbon neutrality. The net NWL emissions of 7 $MMTCO_2e$, identified in the second row of Table 2-3, includes *all* emissions and sinks from all NWL landscapes, which is inclusive of the 1.5 $MMTCO_2e$ sequestration. CARB will develop an accounting framework to accommodate NWL carbon stocks.

right approach to a sustainable forestry sector. In contrast in 2045, the reductions from programs and policies are estimated to reduce emissions by 169 $MMTCO_2e$ from business as usual.

The 2030 target for engineered CDR also provides a near term milestone for California and can serve as an important marker for progress in deploying CDR to support California's carbon neutrality goal. Preliminary estimates indicate that, globally, capacity from already announced projects will range from about 2 million metric tons per year ($MMTCO_2/y$) to 8 $MMTCO_2/y$ from bioenergy paired with CCS, and from about 2,000 metric tons per year ($MTCO_2/y$) to 1 $MMTCO_2/y$ from DACs by 2027,[166] which indicates that California's 2030 target is an ambitious, but achievable, goal.

Scenario Uncertainty

Greenhouse Gas Emissions Modeling

Several types of uncertainty are important to understand in both forecasting future emissions and estimating the benefits of emission reduction actions. In developing this Scoping Plan we forecasted a reference scenario and estimated the GHG emissions outcome of the AB 32 GHG Inventory sectors using the PATHWAYS[167] model. Inherent in the reference scenario modeling is the expectation that many of the existing programs will continue in their current form, and that the expected drivers for GHG emissions, such as energy demand, population growth, and economic growth, will match our current projections.

However, there is also the expectation that each of the policies included and implemented to achieve the 2030 target in the 2017 Scoping Plan will deliver their exact outcomes. It is unlikely the future will precisely match our projections, and this will lead to uncertainty in the forecast. For example, we never could have foreseen and forecasted economic and emissions impacts related to the extended disruptions from the COVID-19 pandemic. Thus, the single "reference" or "forecast" line should be understood to represent one possible future in a range of possible predictions. For this Scoping Plan, PATHWAYS utilized inputs that reflect technically feasible levels of deployment or adoption of low- or zero-carbon fuels and technologies. Each of the input assumptions provided to PATHWAYS has some uncertainty, which also contributes to uncertainty in the resulting reference scenario.

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[166] IHS Markit. August 2021. Carbon Removal Potential. *https://ww2.arb.ca.gov/sites/default/files/2021-08/ihsmarkit_presentation_sp_engineeredcarbonremoval_august2021.pdf*.
[167] See Appendix H (AB 32 GHG Inventory Sector Modeling).

Similarly, for the NWL modeling, CARB used a mix of individual modeling tools[168] to estimate the carbon and other ecological, public health, and economic outcomes. The Reference scenario assumes that the level of land management actions that occurred between 2001 and 2014 for forests, shrublands, grasslands, croplands, developed lands, wetlands, and sparsely vegetated lands continues into the future. Alternative scenarios assessed the effect of increasing levels of management actions from the reference scenario beginning in 2025. There is a great deal of uncertainty about exactly how lands are currently managed, and a larger uncertainty about how they may be managed in the future. For NWL, it is unlikely that the future will precisely match the carbon stock outcomes CARB has projected, particularly given the uncertainties around current and future land management and the effects climate change will have on our lands. For any modeling exercise these uncertainties exist; however, this modeling effort brings together the best available science, data, and models to quantify the impact our actions may have on the landscape under an unknown future.

Implementation

As this Scoping Plan is designed to chart a path to achieving carbon neutrality, additional work will be required to fully design and implement any policies and actions identified in this plan. During the subsequent development of policies, the Legislature, CARB, and other state agencies will learn more about the technologies and their costs, as well as how each industry works, as a more comprehensive evaluation is conducted in coordination with stakeholders, including community engagement. Significant areas of uncertainty include permitting wait times[169] and local ordinances that might limit or slow the build-out of utility scale renewables.[170,171] In another example, times to reach commercial operations for solar projects after securing an interconnection agreement also have increased in recent years, to 3.5 to 5.5 years.[172]

The level of natural and working lands climate action identified in this Scoping Plan is ambitious. Achieving the level of action needed to result in the quantified carbon,

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[168] See Appendix I (Natural and Working Lands Technical Support Document).
[169] CEC. 2021. *SB 100 Joint Agency Report.* https://www.energy.ca.gov/sb100#anchor_report.
[170] Roth, Sammy. 2019. "California's San Bernardino County slams the brakes on big solar projects." *Los Angeles Times.* https://www.latimes.com/business/la-fi-san-bernardino-solar-renewable-energy-20190228-story.html?fbclid=IwAR2qHGq3bahHme6SFErLsnyFi9UPIfBHIhvnOh3dU3OM7kUTMcEqYfN3pQA.
[171] Chediak, Mark. 2021. "California NIMBYs Threaten Biden's Clean Energy Goals." *BNN Bloomberg.* https://www.bnnbloomberg.ca/california-nimbys-threaten-biden-s-clean-energy-goals-1.1634351?msclkid=668c9ae9c11311ec92e34035ea157ad4.
[172] Rand, Joseph, et al. 2022. Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection as of the End of 2021. Power Point Presentation. Lawrence Berkeley National Laboratory. https://emp.lbl.gov/sites/default/files/queued_up_2021_04-13-2022.pdf.

emissions, health, and economic outcomes within this Scoping Plan requires coordination, investment, and partnerships across all levels of government and sectors of the economy. It is possible that not all of the actions at the identified level will begin in 2025. This uncertainty will result in diminished levels of beneficial outcomes quantified in the Scoping Plan Scenario. The levels of NWL action identified in this Scoping Plan represent CARB's assessment of the pace and scale of action needed to achieve the carbon stock targets and CO_2 removal targets identified in this Scoping Plan.

The Scoping Plan Scenario identifies that 2.3 million acres of forests, shrubland, and grassland management annually would achieve substantial levels of fire emissions reductions and the concomitant health and economics benefits. Currently, 1 million acres of forest treatment annually is the joint federal and state government goal (500,000 acres each). This target of one million acres annually by 2025 is for the purposes of increasing forest health and wildfire resilience in the near term, whereas the 2.3 million acre target is what the Scoping Plan modeling shows would be needed to realize the carbon stock target called for in this Scoping Plan by 2045. By identifying 2.3 million acres of climate action annually in forests, shrublands, and grasslands, this Scoping Plan emphasizes the importance of that 1 million acre annual goal as a milestone on the way to even more action and improved fire and air quality outcomes. The modeling indicates that substantial improvements to statewide fire emissions will occur at levels of action greater than 1 million acres per year. If these levels of action do not occur starting in 2025, the Scoping Plan has quantified climate benefits that will still occur, but to a lesser extent. In terms of fire emissions, compared to the Reference Scenario, 2.3 million acres of forest, shrubland and grassland management will result in a 10% reduction in wildfire emissions. At 1 million acres per year, this decreases to a 2.5% reduction. If 1 million acres per year is also not accomplished, then the emissions and health benefits are even lower.

Climate action in other NWL sectors also generates many co-benefits. Climate action identified in this Scoping Plan is aimed at not only fighting climate change but also improving air quality and public health. The climate action identified in the agricultural sector, for example, should result in decreased pesticide and synthetic fertilizer use. This decrease of synthetic chemical use in agriculture across California also should result in improved public health, especially for communities that work and live in and around agricultural lands. However, as with the forestry sector, the benefits of climate action in agricultural lands and in any other land are dependent on how much implementation takes place. Ramping up increased healthy soils practices and increasing organic agriculture in California will require continued and sustained implementation by private industry and public agencies. For example, achieving the carbon stock outcomes for the annual crops called for in this Scoping Plan would require deployment and maintenance of healthy soils practices on 80,000 additional acres of croplands in California every year between 2025 and 2045. For context, CDFA's Healthy Soils Program, which is an incentive program

supporting healthy soils practices, took almost four years of sustained funding to achieve approximately 50,000 acres total under healthy soils practices.[173]

Given the uncertainty around the modeling assumptions, and performance uncertainty as specific policies are fully designed and implemented, estimates associated with the Scoping Plan Scenario are certain to be different than what is ultimately implemented. One way to mitigate for this is to develop policies that can adapt and increase certainty in GHG emissions reductions. Periodic reviews of progress toward achieving the 2030 target and longer term deeper decarbonization, as well as performance of specific policies, also provide opportunities for the state to consider any changes to ensure we remain on course to achieve the 2030 target and carbon neutrality. The need for this periodic review process was anticipated in AB 32, as it calls for updates to the Scoping Plan at least once every five years. For this Scoping Plan, the metrics provided on the rate of deployment of clean fuels and technologies, along with the annual AB 32 GHG Inventory, provide additional information that can be used to assess progress on sectors and aggregate emissions. This is also true of CARB's NWL carbon inventory. An uncertainty analysis for achieving an accelerated 2030 target is provided toward the end of this chapter.

Targeted Evaluations for the Scoping Plan: Oil and Gas Extraction and Refining

To achieve California's air quality and climate goals, we must end our dependence on petroleum. This will not happen overnight. There are about 28 million combustion engine heavy- and light-duty trucks and passenger vehicles in California, and these are almost always replaced at their end of life. The ZEV Executive Order (EO N-79-20) calls for 100 percent new ZEV car sales beginning in 2035 and a 100 percent ZEV medium- and heavy-duty fleet sales by 2045 where feasible. The result is an ongoing, albeit shrinking, pool of vehicles that will continue to require petroleum fuels. To avoid leakage, as called for in AB 32, and to meet that remaining demand for petroleum fuel, a complete phaseout of oil and gas extraction and refining is not possible by 2045. This Scoping Plan assumes a phasedown in both oil and gas extraction as well as petroleum refining in line with the reduction in demand for in-state on-road petroleum fuel demand. Since the transportation sector is the largest source of GHG emissions and harmful local air pollution, we must continue to research and invest in efforts to deploy zero emissions technologies and clean fuels, and to reduce VMT. An assessment of ongoing progress and efforts to reduce

[173] California Department of Food and Agriculture. 2021. *Incentives Program 2017–2020 Summary by the Numbers.* https://www.cdfa.ca.gov/oefi/healthysoils/docs/HSP_Incentives_program_level_data_funded_projects.pdf.

demand for petroleum fuels and of opportunities to phase down oil and gas extraction and refining will be included in the next Scoping Plan update.

In addition to supplying in-state demand, California is a net exporter of gasoline, diesel, and jet fuel. California pipelines supply the Nevada and Arizona regions[174] with approximately 87 million barrels gasoline equivalent of refined products annually.[175] California pipelines deliver approximately 85% of Nevada's and 40% of Arizona's refined product. Most finished fuels flowing from California to Nevada and Arizona are currently produced by California refineries. To manage the phasedown of oil and gas extraction and petroleum refining in California, exports of finished fuels must be considered and factored into that process, in addition to the declining in-state demand. The authorities and considerations related to supply and demand of petroleum fuels span federal, state, and local agencies. If supply of fossil fuels is to decline along with demand, a multi-agency discussion is needed to systematically evaluate and plan for the transition to ensure that it is equitable.

This inter-agency work should also consider related topics, such as the following:

- Direct and indirect job and economic impacts
- Demand for other liquid fuel types such as renewable fuels, and expected volumes
- Legal considerations
- Public health benefits
- Demand and supply strategies for petroleum fuels, including how to avoid short term supply constraints that may impact low-income consumers

Some of these topics were also discussed as part of two studies[176] supported by the California Environmental Protection Agency, which can serve as a starting point for a working group to analyze these questions and develop policy recommendations.

Oil and Gas Extraction

On April 23, 2021,[177] Governor Newsom directed CARB to evaluate the phaseout of oil and gas extraction no later than 2045 as part of this Scoping Plan. As noted above, this Scoping Plan still has some California demand for finished fossil fuels (gasoline, diesel,

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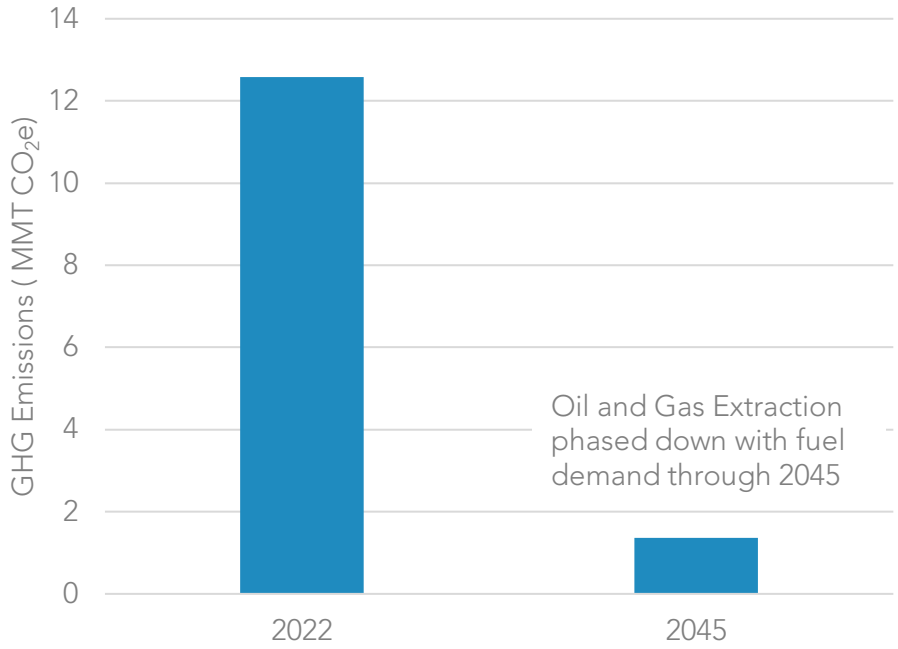
[174] CEC. August 2021. A Primer on California's Pipeline Infrastructure. *Petroleum Watch.* https://www.energy.ca.gov/sites/default/files/2021-08/August_Petroleum_Watch_ADA.pdf.
[175] CEC. March 2020. *Petroleum Watch.* https://www.energy.ca.gov/sites/default/files/2020-03/March_2020_Petroleum_Watch.pdf.
[176] CalEPA. 2021. Carbon Neutrality Studies: https://calepa.ca.gov/climate/carbon-neutrality-studies/.
[177] Governor Newsom. April 23, 2021. Governor Newsom Takes Action to Phase Out Oil Extraction in California. Press Release. https://www.gov.ca.gov/2021/04/23/governor-newsom-takes-action-to-phase-out-oil-extraction-in-california/.

and jet fuel) in 2045. This demand is primarily for transportation, including for sectors that are directly regulated by the state and some that are subject to federal jurisdiction, such as interstate locomotives, marine, and aviation. As discussed more fully below, while significant GHG reductions from oil and gas extraction could be achieved as demand for fossil fuels is reduced due to strategies in this Scoping Plan, it is not feasible to phase out oil and gas production fully by 2045 given this remaining demand.

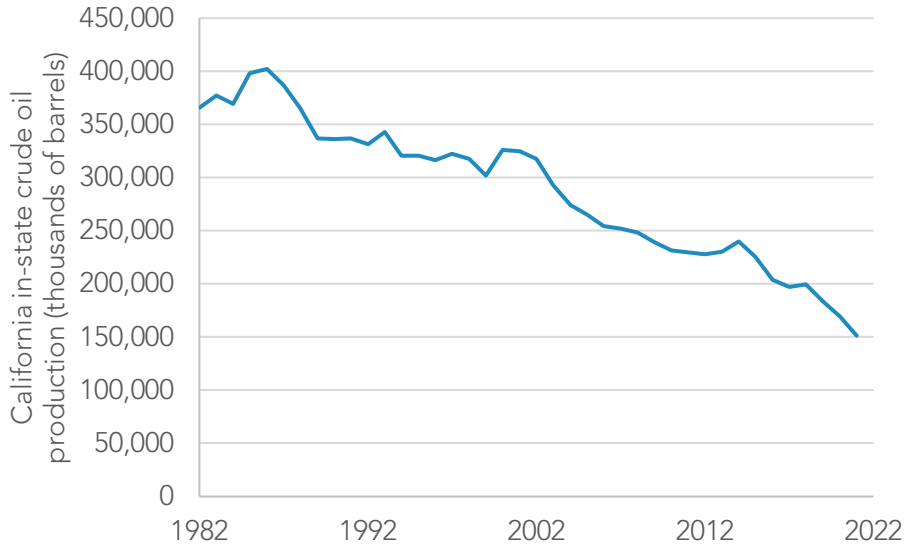
In the Scoping Plan Scenario, with successful deployment of zero carbon fuels and non-combustion technology to phase down petroleum demand, GHG emissions from oil and gas extraction could be reduced by approximately 89 percent in 2045 from 2022 levels if extraction decreases in line with in-state finished fuel demand. If in-state extraction were to be phased out fully, the future petroleum demand by in-state refineries would be met through increased crude imports to the state relative to the Scoping Plan Scenario. AB 32 defines leakage as, "a reduction in emissions in greenhouse gases within the state that is offset by an increase in emissions of greenhouse gases outside the state." AB 32 also requires any actions undertaken to reduce GHGs to "minimize leakage." Increases in imported crude could result in increased activity outside California to extract and transport crude into California. Therefore, our analysis indicates that a full phaseout of in-state extraction could result in GHG emissions leakage and in-state impacts to crude oil imported into the state. Figure 2-6 compares the 2022 emissions from this sector with the modeled results when the sector is phased down with in-state petroleum demand.

Figure 2-6: Oil and gas extraction sector GHG emissions in 2022 and 2045 when activity is phased down with in-state fuel demand



According to California Energy Commission (CEC) data used in Figure 2-7, the total oil extracted in California peaked at 402 million barrels in 1986. Since then, California crude oil production has decreased by an average of 6 million barrels per year, to about 200 million barrels in 2020. This steadily decreasing production of crude in California is expected to continue as the state's oil fields deplete.

Figure 2-7: California in-state crude oil production[178]



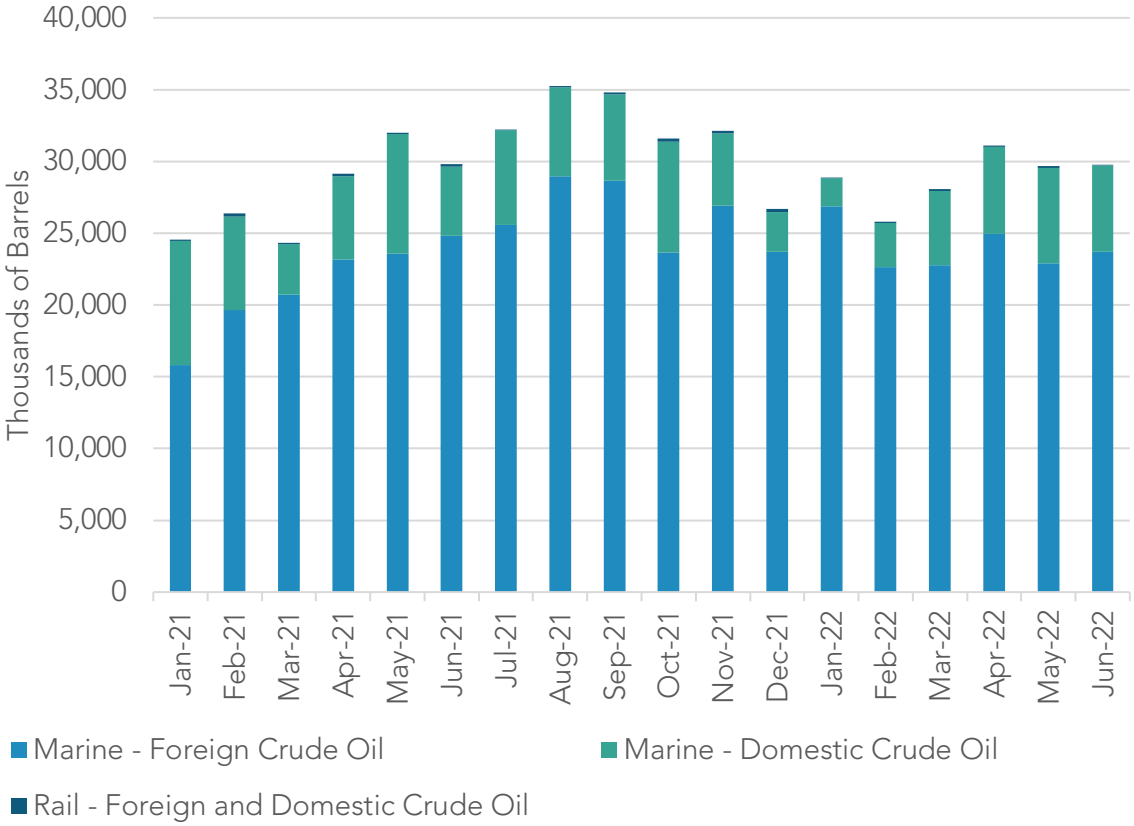
A UC Santa Barbara report estimated that, under business-as-usual conditions, California oil field production would decrease to 97 million barrels in 2045.[179] The business-as-usual model assumed no additional regulations limiting oil extraction in California.

Any crude oil demand by California refineries not met by California crude oil will be met by marine imports of Alaskan and foreign crude.[180] As shown in Figure 2-8, approximately 99 percent of crude imports into California are delivered by marine transportation. The

[178] CEC. No date. Oil Supply Sources to California Refineries. Accessed April 21, 2022. https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/oil-supply-sources-california-refineries.
[179] University of California, Santa Barbara. 2021. Enhancing Equity While Eliminating Emissions in California's Supply of Transportation Fuels.
[180] CEC. 2020. *Petroleum Watch: How Petroleum Products Move.* March. https://www.energy.ca.gov/sites/default/files/2020-03/March_2020_Petroleum_Watch.pdf, and CEC. 2020. *Petroleum Watch: What Types of Crude Oil Do California Refineries Process?* February. https://www.energy.ca.gov/sites/default/files/2020-02/2020-02_Petroleum_Watch_ADA_0.pdf.

remaining imports occur by rail.[181] There are no pipelines that bring crude oil into California from out of state.[182]

Figure 2-8: Crude oil imports by transportation type[183]



Crude oil delivered by marine tankers is delivered to onshore storage tanks and subsequently to refineries via pipeline. Most crude oil produced in California is delivered to California refineries by pipeline. Using historical trends, any increases in imported crude above historic levels would result in increased deliveries through the marine ports. This increased activity could require more infrastructure to store and move larger volumes of crude to the refineries in state.

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[181] CEC. June 2021. Crude Oil Imports by Transportation Type. Accessed March 16, 2022. https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/crude-oil-imports-source.
[182] CEC. 2020. *Petroleum Watch: How Petroleum Products Move.* March. https://www.energy.ca.gov/sites/default/files/2020-03/March_2020_Petroleum_Watch.pdf.
[183] CEC. June 2021. Crude Oil Imports. https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/crude-oil-imports-source.

California refineries import a variety of crude oils to meet refinery needs. California petroleum refineries are generally designed to process relatively heavy crude relative to other U.S. refineries. In 2018, crude inputs to California refineries had an average American Petroleum Institute (API) gravity of 26.18 and an average sulfur content of 1.64 percent. Processing significantly lighter or heavier crude blends would require significant changes to a refinery.[184] Most crude imported from Alaska and the Middle East is relatively light (API gravity > 30) compared to California crude (API gravity < 20).[185] If California crude production is insufficient to meet the demand at California refineries, then California refineries will need access to a similarly heavy source of crude so that the average API gravity of crude remains within their established operating window. South American crude oil imports into California are the heaviest relative to other regions, and therefore they may be the most likely to replace decreased California crude oil supply.[186]

In summary, the modeling indicates that demand for petroleum will persist due to legacy fleets that will not be replaced until end of life. The modeling also shows what the GHG emissions reductions would be if oil and gas extraction activities were phased down in line with the reduction of in-state petroleum demand. Trend data shows that oil and gas extraction already has been on the decline and will continue to decline. It is possible to anticipate the likely regions and types of crude that would be imported to meet in-state petroleum demand if in-state extraction was fully phased out by 2045. Importantly, activity at the ports would increase, and new infrastructure would be needed to store and deliver crude to in-state refineries. And while GHG emissions from this sector would go to zero in our AB 32 GHG Inventory with a full phaseout, emissions related to the production and transport of crude to California might increase elsewhere, resulting in emissions leakage.

As the state continues to reduce demand for petroleum, efforts to protect public health for communities located near oil and gas extraction sites must also continue. In October 2021, Governor Newsom directed action to prevent new oil drilling near communities and

[184] CEC. 2020. *Petroleum Watch: What Types of Crude?* February. https://www.energy.ca.gov/sites/default/files/2020-02/2020-02_Petroleum_Watch_ADA_0.pdf.
[185] CEC. 2020. *Petroleum Watch: What Types of Crude?* February. https://www.energy.ca.gov/sites/default/files/2020-02/2020-02_Petroleum_Watch_ADA_0.pdf.
[186] CEC. 2020. *Petroleum Watch: What Types of Crude?* February. https://www.energy.ca.gov/sites/default/files/2020-02/2020-02_Petroleum_Watch_ADA_0.pdf.

expand health protections.[187,188] In 2022, the Legislature passed, and the governor signed, SB 1137 to protect communities from existing and any new oil and gas extraction activities through 3,200 foot setbacks.

Petroleum Refining

In the Scoping Plan Scenario CARB modeled a phasedown of refining activity in line with petroleum demand. Meeting petroleum demand means sufficient availability of finished fuel (gasoline, diesel, and jet fuel). Crude is processed at in-state refineries to produce finished fuel. In response to stakeholder requests,[189] this evaluation focuses on the Scoping Plan Scenario, but with an evaluation of a complete phasedown of refinery operations in state.

The Scoping Plan Scenario results in California petroleum refining emissions of 4.5 $MMTCO_2e$ in 2045; a reduction of approximately 85 percent relative to 2022 levels, which is in line with the decline in in-state finished fuel demand.[190] Emissions from refining can be reduced further through the application of CCS technology, as shown in Figure 2-9. If in-state refining is phased down to zero and the demand for the finished fuels produced by that refining persists, imported finished fuels may be needed to meet the remaining in-state demand.[191] The current data shows unmet demand for liquid petroleum transportation fuels would most likely be met by marine imports. A CEC report notes, "The only way for California to receive large amounts of crude and refined products is by marine."[192]

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[187] Office of Governor Gavin Newsom. 2021. California Moves to Prevent New Oil Drilling Near Communities, Expand Health Protections. *https://www.gov.ca.gov/2021/10/21/california-moves-to-prevent-new-oil-drilling-near-communities-expand-health-protections-2/?msclkid=6c0da86bc58e11ecb81cf596d4d8a735*.

[188] California Department of Conservation Geologic Energy Management Division. October 2021. Draft Rule for Protection of Communities and Workers from Health and Safety Impacts from Oil and Gas Production Operations. *https://www.conservation.ca.gov/calgem/Pages/Public-Health.aspx?msclkid=45660232cf2511ecb1c56119097e3b0c*.

[189] California Environmental Justice Alliance. October 22, 2021. Comment on 2022 Scoping Plan Update - Scenario Inputs Technical Workshop. *https://www.arb.ca.gov/lists/com-attach/68-sp22-inputs-ws-WzhdPlI5AjACW1Qx.pdf*.

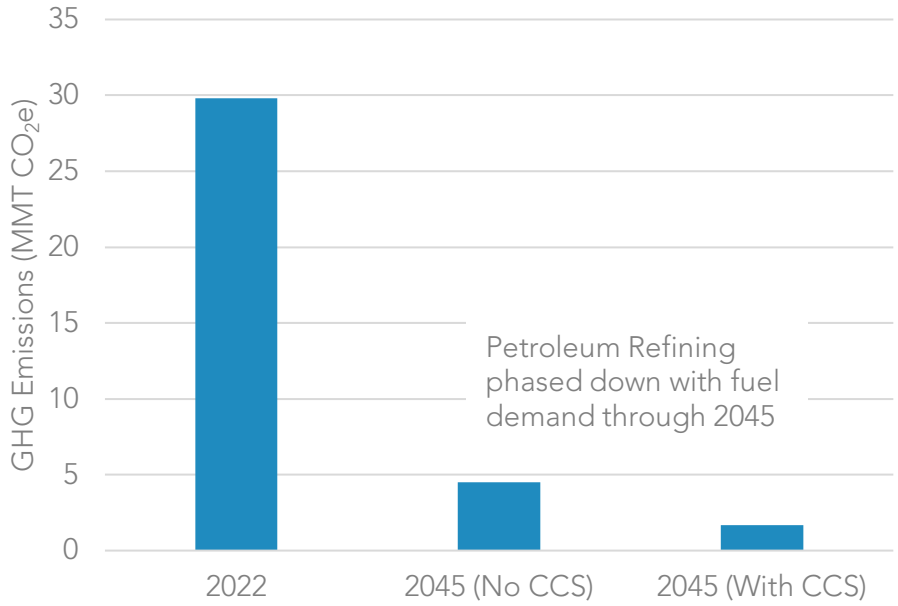
[190] This reduction in demand does not assume any need for ongoing operations to support exports to neighboring states.

[191] If demand assumes an ongoing need to support exports to neighboring states, the residual demand would require a five-fold increase in finished fuel imports.

[192] CEC. 2020. *Petroleum Watch: How Petroleum Products Move.* March. *https://www.energy.ca.gov/sites/default/files/2020-03/March_2020_Petroleum_Watch.pdf*.

There are currently no pipelines capable of bringing refined products to the state, and rail imports of refined products have historically made up less than 1 percent of all imports.[193] Significant increases in marine imports would likely require significant reconfiguring, retrofitting, or replacement of crude pipelines and storage tanks at current marine terminals, and possible reconfiguring of existing finished fuel infrastructure to account for changes in volumes and locations of supply points.

Figure 2-9: Petroleum refining sector GHG emissions in 2022 and 2045 (with and without CCS) when activity is phased down with fuel demand



If California's finished fuel demand is not met by continued refining activity in California, the state would need to import finished fuels to meet the ongoing demand. This would likely result in a two- to five-fold increase in the number of finished fuel ship deliveries to marine terminals. Marine tankers delivering refined products are often much smaller than crude oil tankers, so changes in fuel use and emissions cannot be easily estimated from the change in both the type and the number of ship deliveries.[194]

[193] CEC. 2020. *Petroleum Watch: How Petroleum Products Move.* March. https://www.energy.ca.gov/sites/default/files/2020-03/March_2020_Petroleum_Watch.pdf.
[194] Personal communication with CEC staff, March 2022; U.S EIA. 2017. *World Oil Transit Chokepoints*. 3. https://www.eia.gov/beta/international/regions-topics.php?RegionTopicID=WOTC.

If refining ceased in California, the rail and marine deliveries currently needed to support both refining processes and the export of waste products, such as petroleum coke, would cease.

In summary, the modeling indicates that demand for petroleum will persist through 2045. The modeling also shows what the GHG emissions reductions would be if refining activities were phased down in line with the reduction in in-state petroleum demand. CCS can further reduce emissions for this sector. Importantly, activity at the ports would increase, and new infrastructure would be needed to store and deliver finished fuel across the state, if in-state refining were fully phased down by 2045. And while GHG emissions from this sector would go to zero in our AB 32 GHG Inventory with a full phaseout, emissions related to the refining and transport of finished fuel to California might increase elsewhere, resulting in emissions leakage.

Progress Toward Achieving the Accelerated 2030 Target

The 2017 Scoping Plan laid out a path to achieving the SB 32 target of at least a 40 percent reduction of GHG emissions below 1990 levels by 2030 that focused on reducing emissions in the state and was technologically feasible and cost-effective, reflecting statutory direction. Many of the programs to achieve the 2030 target increased in stringency beginning January 1, 2021. However, the 2030 target must be increased to help achieve the deeper reductions needed to meet the state's statutory carbon neutrality target specified in AB 1279 and Executive Order B-55-18.

Starting in 2020 and extending into 2022, the COVID-19 pandemic impacts reverberated across the globe in a multitude of ways, including the devastating loss of millions of lives. The pandemic also had a significant impact on GHG emissions by virtue of its impact on global economies and lifestyle changes for Californians, with extended work and school disruptions. Thus, assessing our progress toward meeting our SB 32 target is confounded by the unprecedented nature of the pandemic. Nevertheless, an assessment of progress toward the 2030 target is critical, in particular the accelerated 2030 target called for in this Scoping Plan, since achieving the accelerated 2030 target would make the state well positioned to achieve its carbon neutrality goals and bring critical near-term air quality benefits to address historical and ongoing disparities in access to healthy air. Because there is only one year of data available for this decade, the analysis takes a prospective look using projected emissions over the remainder of this decade.

Estimating GHG emissions in 2030 requires projecting the effect of policies or measures that are currently deployed and undergoing implementation. Table 2-4 shows three distinct estimates of GHG emissions in 2030 that were created at different times and used different modeling approaches.

Table 2-4: Estimates of 2030 GHG emissions

Scenario Description	2030 GHG Emissions ($MMTCO_2e$)
2017 Scoping Plan: the projected outcome from implementing policies identified in the 2017 Scoping Plan that was approved by the CARB Board in December 2017.	320
Reference Scenario: the assessment of current trends and expected performance of policies identified in the 2017 Scoping Plan, as of February 2022, using the PATHWAYS model (E3).	305
Reference Scenario (Rhodium): the analysis of projected emissions from 2021 to 2030 from state and federal policies implemented as of July 2022, including the estimated impact of the Inflation Reduction Act and Advanced Clean Cars II using RHG-NEMS and other Rhodium Taking Stock 2022 methods (https://rhg.com/wp-content/uploads/2022/07/Taking-Stock-2022_US-Emissions-Outlook.pdf).	324

These three estimates of 2030 GHG emissions differ, which is expected. The estimates reflect different outcomes of the current and future impact of policies and measures. They also vary due to fundamental differences in the way these models work. For example, PATHWAYS is an economy-wide, scenario-based GHG accounting tool that tracks energy demands and supplies in line with scenario assumptions and is benchmarked to historical values. RHG-NEMS optimizes both the supply and demand sides of the energy system while factoring in consumer constraints and dynamic economic and energy systemwide feedback. Importantly, while these point estimates give the appearance of certainty and accuracy, there is significant uncertainty in future emissions projections that is documented thoroughly in each of the three emissions scenarios described above. No model can predict the future given unforeseen factors such as notable economic swings and implementation delays for programs. However, the range of emissions estimates provides a useful indication of possible outcomes from successful implementation of policies and measures.

An important source of uncertainty is the impact of delayed implementation of policy measures and market actions. The successful rate of deployment of clean technology and fuels—including consumer adoption patterns, economic recovery from the pandemic, and the permitting and build-out of necessary new assets and reuse of existing assets to produce and deliver clean energy—is essential to reach GHG emission reduction targets. Any delays will only increase GHG emissions in 2030.

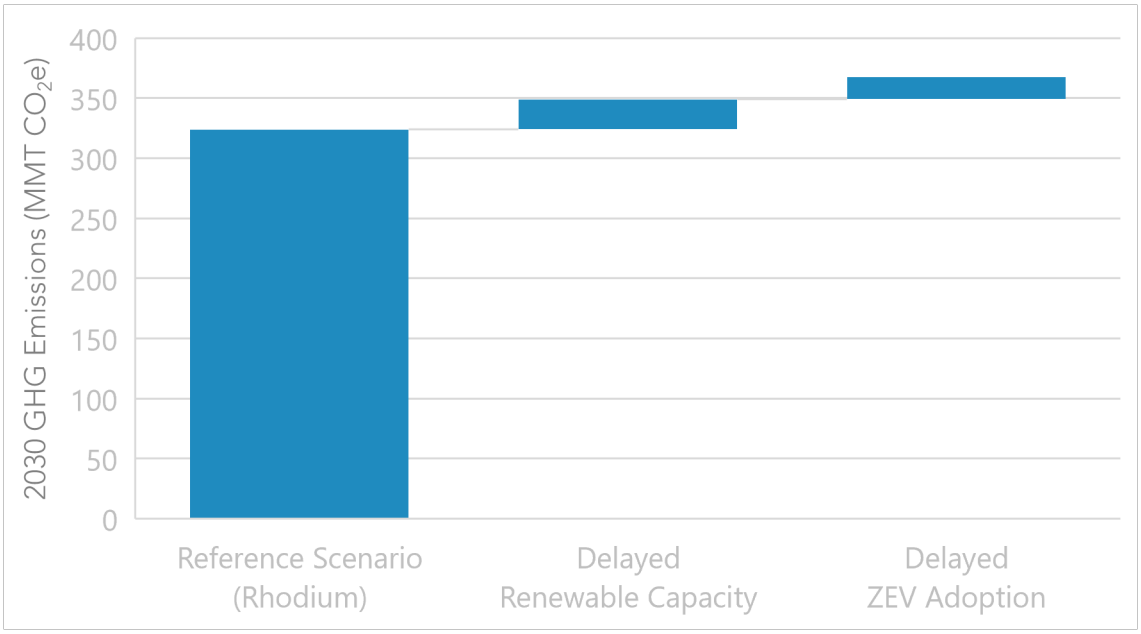
It is important to note that incentives, carbon pricing, and regulations all can result in similar types of responses including, but not limited to:

- Build-out of clean energy and infrastructure
- Deployment of clean technology
- Reduced demand for fossil energy
- Efficiency improvements

As such, the uncertainty analysis discussion focuses on implementation (technology and infrastructure deployment), and not any specific programs or policies. It is successful implementation that must ultimately happen for emissions reductions to be realized.

The uncertainty analysis described in Appendix J (Uncertainty Analysis) quantifies the impact of delayed permitting and building of renewable generation and transmission in the power sector and delayed adoption of ZEVs across all vehicle fleets in the transportation sector. The Reference Scenario (Rhodium) estimates emissions in 2030 to be 324 MMTCO2e. A five-year delay in renewable capacity would increase emissions by 8 percent in 2030 (25 MMTCO2e) relative to the Reference Scenario. If similar delays in clean energy production and deployment occur in other sectors, a larger increase in emissions relative to the reference scenario would be expected, jeopardizing the state's ability to achieve the 2030 target. Similarly, a delay in consumer adoption of zero emission vehicles (LDV, MDV, HDV) would increase emissions by 6 percent in 2030 (19 MMTCO2e) relative to the Reference Scenario. Delays in transitioning to electric equipment and appliances in homes and businesses would also lead to increased emissions in 2030. Figure 2-10 illustrates the impact on projected emissions in 2030 associated with delayed renewable capacity and delayed transportation vehicle electrification.

Figure 2-10: Impact of delayed implementation on 2030 GHG emissions[195]



Appendix J (Uncertainty Analysis) includes additional details on the assumptions and model used for the uncertainty analysis and the risks to achieve the emissions reductions from 2022 to 2030 that are anticipated in the Scoping Plan Reference Scenario. While the analysis focuses on renewable capacity and transportation, the analysis identifies a common set of themes that can impact emissions reductions across economic sectors, including permitting, technology availability, and consumer adoption. The impact of delayed emissions reductions will vary by sector and by the specific policy at risk of delay.

We give these quantitative examples of the impact implementation delays can have on GHG reductions, but almost every economic sector will have the need for permitting to enable at least a 40 percent reduction below 1990 levels. If we consider the increased ambition of the Scoping Plan Scenario, which identifies an accelerated 2030 target, the same types of uncertainty manifest themselves in successful implementation of the Scoping Plan Scenario, with the added need for CCS and CDR and a need to grow other energy sectors such as hydrogen.

[195] The implementation delay scenarios were modeled separately and do not necessarily reflect the combined impact of delayed renewable capacity and transportation vehicle electrification.

Cap-and-Trade Program Update

Since the adoption of the first Scoping Plan in 2008, carbon pricing in the form of a Cap-and-Trade Program has been part of the portfolio to achieve the state's GHG reduction targets, and it will remain critical as we work toward carbon neutrality. This section provides an update on the program and its role in achieving the 2030 target.

The Cap-and-Trade Program first came into effect in 2012, under AB 32, and included declining allowance caps through 2020. In 2017, AB 398[196] was passed by a supermajority in the Legislature and included prescriptive direction on the design of the program from 2021 through 2030. The AB 398 Cap-and-Trade Program came into effect on January 1, 2021, and it included the following changes:

- Doubling of stringency with an annual cap decline of 4 percent per year from 2021–2030
- AB 398 price ceiling
- AB 398 redesigned allowance price containment reserve with two tiers
- AB 398 100 percent leakage assistance factor for industry
- AB 398 lower offset limits: Usage limit cut from 8 percent to 4 percent, and half of offsets must provide direct benefits to California

The reduction in the role of offsets in the program was in recognition of ongoing concerns raised by environmental justice advocates regarding the ability of companies to use offsets for compliance instead of investing in actions on site to reduce GHG emissions that could also potentially reduce criteria or toxic emissions.[197,198] Note that data show the relationship between facility emissions of GHGs and co-pollutants is highly variable by sector and pollutant.[199] Changes to the allowance price containment reserve and the addition of the price ceiling were included to ensure protections against price spikes in the program, while the changes to the leakage assistance factors were to ensure the maximum protection against leakage in the program. The original design of the program included an auction floor price that increases by 5 percent plus inflation each year, and

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[196] Assembly Bill 398 (Garcia, Chapter 135, Stats. of 2017). California Global Warming Solutions Act of 2006: market-based compliance mechanisms: fire prevention fees: sales and use tax manufacturing exemption. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB398.

[197] OEHHA. 2022. *Impacts of Greenhouse Gas Emission Limits Within Disadvantaged Communities*. https://oehha.ca.gov/media/downloads/environmental-justice/impactsofghgpoliciesreport020322.pdf.

[198] The OEHHA report also found that companies that use the most offsets often own the facilities that contribute to local $PM_{2.5}$ exposure. However, there was no causal relationship found to indicate that implementation of the Cap-and-Trade Program was contributing to increases in local air pollution. Also see: CARB. FAQ Cap-and-Trade Program. https://ww2.arb.ca.gov/resources/documents/faq-cap-and-trade-program.

[199] OEHHA. 2022. *Impacts of Greenhouse Gas Emission Limits Within Disadvantaged Communities*. https://oehha.ca.gov/media/downloads/environmental-justice/impactsofghgpoliciesreport020322.pdf.

that escalation factor is retained in the post-2020 program and is also applied to the allowance price containment reserve and price ceiling. These features, combined with the self-ratcheting mechanism for unsold allowances at auctions,[200] help to ensure the program is able to handle periods of high and low demand for allowances while continuing to ensure a steadily increasing price signal for regulated entities to invest in GHG reduction technologies.

As a result of achieving the 2020 target several years earlier than mandated by law, there are unused allowances in circulation. CARB estimated the amount to be approximately 310 million allowances after the conclusion of the third compliance period (2018–2020).[201] AB 398 had also called for a similar analysis, which was completed in 2018.[202] This bank represents approximately 5 percent of the total number of vintage 2013–2030 allowances issued within the joint market. This bank of allowances can only remain banked if year-over-year the covered emissions are declining by 14 MMT. If the annual decline in actual emissions is less than 14 MMT, regulated entities will need to use the banked allowances to cover their compliance obligations. It is likely that the existing bank of 310 million allowances will be needed over the early part of this decade and will be exhausted by the end of the decade. During the same period, prices for allowances will continue to increase at least 5 percent plus inflation year-over-year, sending a steadily increasing price signal to spur investment in onsite reductions for covered entities.

With the passage of AB 1279, the state has a statutory target to achieve carbon neutrality no later than 2045. This Scoping Plan demonstrates that planning on a longer time frame for the new carbon neutrality target means we must accelerate our near-term ambition for 2030 in order to be on track to achieve our longer-term target. CARB will use the modeling for this Scoping Plan to assess what changes may be warranted to the Cap-and-Trade or other programs to ensure we are on track to achieve an accelerated 2030 target. Since the original adoption of the Cap-and-Trade regulation, the program has been amended eight times through a robust public process. Moreover, then-California Environmental Protection Agency Secretary Jared Blumenfeld testified at a Senate hearing in 2022 that CARB will report back to the Legislature by the end of 2023 on the status of the allowance supply with any suggestions on legislative changes to ensure the number of allowances

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[200] The self-ratcheting mechanism temporarily removes unsold allowances from the market until either sufficient demand manifests for two consecutive auctions and they are incrementally reintroduced at future auctions, or they are permanently removed from general circulation if demand remains low.
[201] CARB. 2022. BR 18-51 Cap-and-Trade Allowance Report. Attachment A. *https://ww2.arb.ca.gov/sites/default/files/cap-and-trade/Allowance%20Report_Reso18_51.pdf*.
[202] CARB. 2018. Staff Report: Initial Statement of Reasons: Proposed Amendments to the Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation. September 4. *https://www.arb.ca.gov/regact/2018/capandtrade18/ct18398.pdf?_ga=2.134288305.1735610122.1664813952-1100516233.1657841496*.

is appropriate to help the state achieve its 2030 target of at least 40% below 1990 levels. As part of that status update, CARB will also provide information on any potential program changes that may be needed to allowance supply to help achieve an accelerated target for 2030 identified in this Scoping Plan as necessary to achieve carbon neutrality no later than 2045. Engaging in this process in 2023 will allow for the consideration of this Scoping Plan, inclusion of additional data points for the second year of operation of the AB 398-designed program (which only came into force in January 2021), and an opportunity to hold public workshops.

It is also worth noting that the COVID-19 pandemic had significant impacts on economic activity in California and elsewhere.[203] Emissions were significantly lower in 2020 due to the impacts of the global pandemic. There is an expectation that emissions will increase as the economy recovers and behaviors continue to shift from the impacts of the ongoing pandemic. As a result, 2020 should be regarded as an outlier in the emissions trends. This scenario of increasing emissions is similar to what happened in the first compliance period for Cap-and-Trade, where the state economy was recovering from the Great Recession and does not correlate to a problem with the structure of this program or other programs that cover emissions related to the manufacturing or transportation sectors. In any assessment of this and other programs, it is essential to consider external factors such as economic activity and availability of zero carbon energy such as hydropower, among others.

To better understand the role of the Cap-and-Trade Program in achieving the 2030 target, Table 2-5 compares the 2030 GHG emissions estimates from the three reference scenarios described in Table 2-4. The 2017 Scoping Plan projection is from the PATHWAYS model for the Scoping Plan Scenario approved by the Board in late 2017. It excludes the contribution of the Cap-and-Trade Program, without any consideration of uncertainty factors (i.e., a characterization of the uncertainty that a given GHG reduction measure included in the 2017 Scoping Plan will actually achieve the GHG reductions it is projected to deliver). The Reference Scenario represents what GHG emissions would look like if we did nothing beyond the existing policies that are required and already in place to achieve the 2030 target; this scenario is based on the recent PATHWAYS modeling, excluding the contribution of the Cap-and-Trade Program, and without any consideration of uncertainty factors. It indicates that GHG emissions will be lower over this decade than originally projected when the 2017 Scoping Plan was approved. The

[203] CARB. November 4, 2021. Mandatory Greenhouse Gas Reporting - 2020 Emissions Year Frequently Asked Questions. *https://www.arb.ca.gov/cc/reporting/ghg-rep/reported-data/2020mrrfaqs.pdf?_ga=2.264251343.1760432228.1650736660-1644197524.1577749754*.

Reference Scenario (Rhodium) which also does not include uncertainty bounds, is the modeling used for the uncertainty analysis above.

Importantly, PATHWAYS is not able to explicitly model a carbon pricing policy, and therefore the Cap-and-Trade Program is not represented in the 2017 Scoping Plan or the Reference Scenario. Carbon pricing is included in RHG-NEMS, which reflects state and federal policies included in the U.S. Energy Information Administration (EIA) Annual Energy Outlook 2022 and the National Energy Systems Model (NEMS), which is the basis for RHG-NEMS.[204]

As detailed in EIA's documentation, California's Cap-and-Trade Program is represented through increased energy prices, which flow across economic sectors.[205] However, many of the emissions covered by the California Cap-and-Trade Program are not energy- and fuel-related emissions. Given that, the energy systems model RHG-NEMS was used to model the impact of California Cap-and-Trade on the energy system. However, RHG-NEMS does not explicitly model the entire program, which includes non-energy related emissions from the industrial, agricultural, waste, and transportation sectors.

[204] U.S. EIA. 2022. *Summary of Legislation and Regulations Included in the Annual Energy Outlook 2022.* March. *https://www.eia.gov/outlooks/aeo/assumptions/pdf/summary.pdf*.
[205] U.S. EIA. 2022. Electricity Market Module. *https://www.eia.gov/outlooks/aeo/assumptions/pdf/electricity.pdf*.

Table 2-5: Comparison of 2017 Scoping Plan and two Reference Scenarios

	2030 GHG Emissions ($MMTCO_2e$) (2017 Scoping Plan)	2030 GHG Emissions ($MMTCO_2e$) (Reference Scenario)	2030 GHG Emissions ($MMTCO_2e$) (Reference Scenario-Rhodium)
Reference Scenarios	320	305	324
Gap to Accelerated 2030 Target under the Scoping Plan Scenario (226)[206]	94	79	98

Under the Scoping Plan Scenario, in 2030 California emissions are anticipated to be 48% below 1990 levels. This represents an acceleration of the current SB 32 target of a 40% reduction below 1990 levels. Table 2-5 includes the gap between the different reference scenarios and the accelerated 2030 target achieved under the Scoping Plan Scenario. It also shows that depending on the modeling, there are a range of potential emissions levels in 2030 prior to accounting for the full impact of the Cap-and-Trade Program on emissions. That range is from 305 to 324 $MMTCO_2e$ in 2030. That represents a 19 $MMTCO_2e$ spread, or about 8.4 percent of the accelerated 2030 target of 226 $MMTCO_2e$. Importantly, none of these scenarios includes all of the actions identified in the Scoping Plan Scenario for this Scoping Plan; many of those actions, such as SB 596, CCS, and a more stringent LCFS program, will only begin to happen in this decade, and their contributions toward meeting the accelerated 2030 target are therefore not included in the reference scenarios. The actual emissions for the remainder of this decade will therefore likely be lower than in each of the scenarios in Table 2-5 once policies and regulations are in place to support an accelerated 2030 target. However, the degree of this difference between actual and projected emissions will differ across the modeled reference scenarios.

[206] Table 3 from the 2017 Scoping Plan included a range of 34 to 79 $MMTCO_2e$ for reductions needed from the Cap-and-Trade Program to achieve a 2030 target of 40 percent below 1990 levels.

Regardless of the uncertainty and differences in the models, it is clear additional GHG reductions must happen over this decade to achieve an accelerated 2030 target. This will require an evaluation of all major programs to assess the need to increase their stringency between now and 2030. As the actual reductions from non-Cap-and-Trade Program measures increase, California will be less reliant on the Cap-and-Trade Program to "fill the gap" to meet an accelerated 2030 reduction target. For example, CARB is developing a proposal to increase the stringency of the LCFS program for 2030, the recently adopted Advanced Clean Cars II regulation is more stringent than modeled for the 2030 40 percent target in the 2017 Scoping Plan, and SB 596 requires specific reductions in the cement sector over this decade and beyond. However, we also know we are not on track to achieve the VMT reduction called for in the 2017 Scoping Plan and will need to double down to achieve the even more ambitious target called for in the Scoping Plan Scenario. Also, we will need additional actions over the coming years to reduce short-lived climate pollutants to meet the emission reductions called for in SB 1383.

Collectively, any additional legislation or prescriptive policies for sectors, delays in successful implementation of non-Cap-and-Trade programs and policies, increases in incentive program funding, and delays in economic recovery from the pandemic will continue to affect the role the Cap-and-Trade Program will need to play over this decade to meet the state's GHG reduction obligations. In summary, the Cap-and-Trade Program must continue to be able to scale across a range of possibilities. With passage of AB 1279 and the need to accelerate the 2030 target, CARB will initiate a public process to utilize the modeling results from this Scoping Plan, specifically the Scoping Plan Scenario, to evaluate and potentially propose changes to the design of the Program, including the annual caps. This process will ensure that the Program supports an increased ambition for 2030 while retaining the ability to scale as other factors, such as changing economic conditions and implementation of non Cap-and-Trade programs, impact the actual emissions at the sources covered by the Program. Any changes to the Program must continue to support a well-designed system that continues to send a steadily increasing price signal, minimizes for leakage, reduces emissions in the covered sectors toward the state's targets, is cost-effective and technologically feasible, and avoids energy rate spikes. Importantly, the Program should support air quality benefits, especially in overly burdened communities, and not exacerbate existing air quality disparities.

Chapter 3: Economic and Health Evaluations

This chapter provides two approaches for quantifying the economic and health outcomes of the Scoping Plan Scenario. One approach is to consider the combined impact of all measures[207] in a scenario. The other approach is required by AB 197, where each measure within a scenario is evaluated independently. In addition to these two evaluation approaches, this chapter also includes a discussion of the Public Health implications for the Scoping Plan Scenario, an overview of the Climate Vulnerability Metric, and the Environmental Analysis conducted in accord with the California Environmental Quality Act (CEQA).

It is important to note that all of the analyses in this chapter use a variety of data sources, but because the modeling is economy-wide at the state level, none of them produce community specific detail outputs. The AB 32 GHG Inventory Sector analysis relies on PATHWAYS data at the state level that is proportionally applied across all regions of the state to translate changes in state level fuel combustion to local level changes. The NWL analysis similarly utilizes a variety of data sources and a suite of models that produce data that are scaled up to the statewide level. All of the models, except the Wildland Urban Interface (WUI) defensible space model, which is conducted at the county level, create aspatial projections that are not applicable at the community level.

Economic Analysis

As part of the process to develop this Scoping Plan, alternative scenarios that transition energy needs away from fossil fuels and achieve carbon neutrality no later than 2045 were developed. Alternative scenarios that assess the impact of different land management strategies on carbon stocks in NWL were also developed. These alternatives are described in Appendix C (AB 197 Measure Analysis). The following sections describe the Scoping Plan Scenario in terms of direct cost, the economy, employment, and health outcomes.[208]

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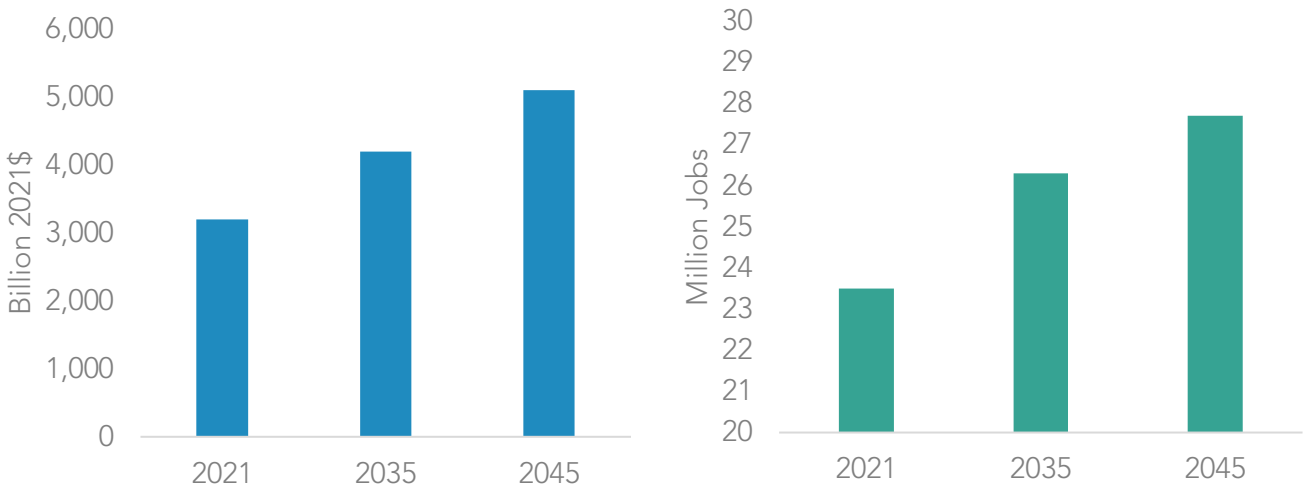
[207] AB 197 calls for the evaluation of "measures." This Scoping Plan treats each action and its variants on stringency as measures for the purposes of this chapter. Appendix C (AB 197 Measure Analysis) lists the measures and corresponding modeling assumptions for each alternative and the Scoping Plan Scenario. The modeling assumptions for the Scoping Plan Scenario are summarized in Table 2-1.

[208] For the Draft 2022 Scoping Plan Update, achieving carbon neutrality in 2035 and 2045 was evaluated. The AB 32 GHG Inventory sector direct cost, the economy, employment, and health outcomes were assessed in those years. Similarly, the Scoping Plan Scenario assessments that are presented in this chapter were made for years 2035 and 2045.

The California economy is growing, and it is projected to continue to grow about 2 percent each year, from $3.2 trillion in 2021 to $5.1 trillion in 2045, as shown in Figure 3-1. Similarly, employment in California is anticipated to grow 0.7 percent per year, from 23.5 million jobs in 2021 to 27.7 million jobs in 2045. It is in this context, termed the *Reference Scenario,* that CARB evaluates the Scoping Plan Scenario in terms of its impact on economic growth and employment. The projections shown in Figure 3-1 were produced by CARB to evaluate the incremental impact of regulations.

Figure 3-1: Projected California gross state product (left) and employment growth (right) from 2021 to 2035 and 2045



Source: California Air Resources Board

Transitioning away from fossil fuels to alternatives and increasing action on NWL will affect employment opportunities, household spending, businesses, and other economic aspects of our lives. Sectors expected to see growth include renewable electricity and hydrogen production, while other sectors may shrink. The deployment of clean technology may require higher upfront costs for things like heat pumps and induction stoves, but those could be offset by energy efficiency savings. Employment and economic development in NWL-related industries and sectors are expected to increase as land management actions increase, especially for the Forestry sector (in which a significant increase is called for under the Scoping Plan Scenario). The net impact of these actions on employment and jobs is presented in this chapter.

Estimated Direct Costs

One key metric is the direct cost, or net investment, reflecting any savings that result from actions. Similar approaches were used to estimate direct costs for the AB 32 GHG Inventory sectors and for the NWL, as described in this section.

AB 32 GHG Inventory Sectors

Transitioning away from fossil fuels requires investment in new equipment and infrastructure throughout the economy. It involves developing the capacity to produce fuels and electricity from renewable sources rather than producing fossil energy. This transition also takes time. One approach is to eliminate combustion of fossil fuels by replacing all equipment in a specified year. Another approach is to establish a future point at which all sales of new equipment rely on alternative energy sources and allow the transition to occur over time as equipment is replaced upon its end of life.

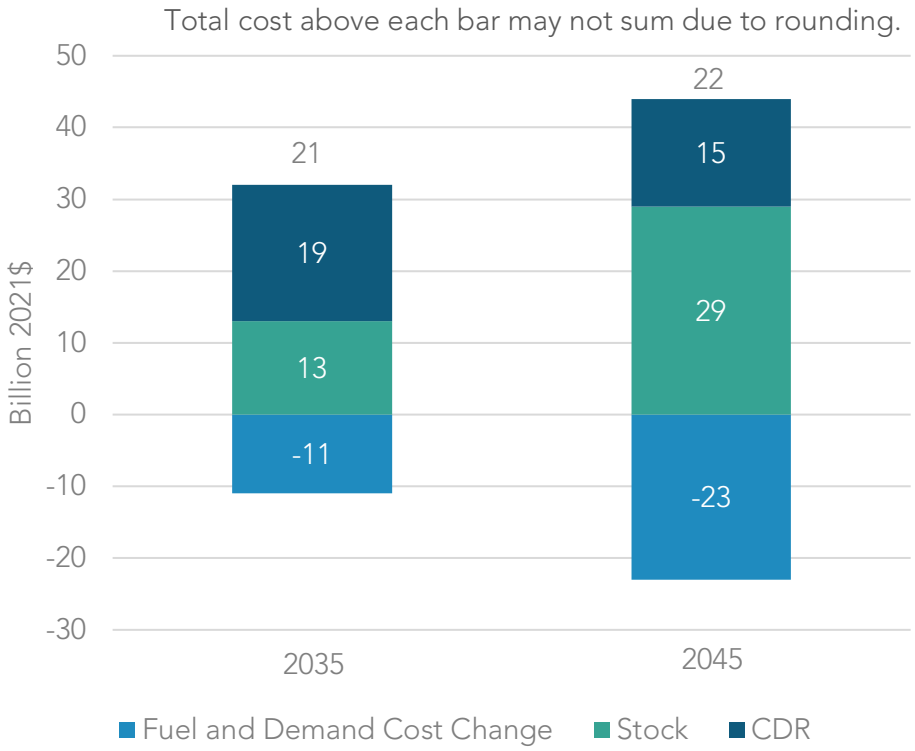
To evaluate the investment required through 2045, the PATHWAYS model was used to represent equipment stock and its turnover to non-fossil fuel alternatives over time. The annualized, incremental cost of infrastructure in excess of the annualized cost of the Reference Scenario[209] was computed for each year from 2022 through 2045. These costs were computed by first taking the absolute cost in each year—which includes both new equipment investment and also expenditures on energy, operations, and maintenance in each year—and then levelizing the costs (in the same way car or house payments are annualized or spread out over time) to arrive at an annualized cost. Fuel savings, and resulting cost savings, associated with changing energy demand—from gasoline to electricity for vehicles, for example—are included as a result of this methodology. Carbon dioxide removal includes DAC technology powered primarily by off-grid solar, BECCS to produce hydrogen or other fuels, and NWL sequestration, as discussed in Chapter 2.[210]

Figure 3-2 shows the stock investment cost, fuel/efficiency savings, and CDR cost. The Scoping Plan Scenario allows end-of-life transition of equipment. The cost of investing in new equipment is partially offset by savings associated with efficiency gains and reduced demand for fuels like gasoline. This is particularly relevant in the transportation sector, which leads to the majority of savings in 2045 in the Scoping Plan Scenario, which models near complete electrification of transport relying only on end-of-life replacement of vehicles. Appendix H (AB 32 GHG Inventory Sector Modeling) includes additional detail on direct costs in each sector and how costs change over time.

[209] The Reference Scenario described in Chapter 2 and in Appendix H (AB 32 GHG Inventory Sector Modeling) was the basis for the direct cost comparison.

[210] The energy source for DAC is not modeled, but renewable electricity and/or hydrogen produced from electrolysis are zero-carbon options consistent with the carbon neutrality targets in this Scoping Plan. The economic analysis associated the investment in DAC with the solar industry for consistency with the carbon neutrality targets.

Figure 3-2: Cost and savings relative to the growing California economy for the Scoping Plan Scenario in 2035 and 2045 (AB 32 GHG Inventory sectors)



Natural and Working Lands

For NWL, the direct costs of each management strategy were estimated using available academic literature, monitoring and reporting data, survey data, and cost data from existing subsidy programs on the per acre cost of implementing the management strategy. These cost data, in combination with the acreage of each management strategy under the scenarios, provided estimates of the overall direct cost to either the government or the private sector. The direct costs are independent of the policy lever used to implement the action and do not include many important benefits and externalities of the actions. They are assumed to be constant for each scenario and into the future. Avoided or secondary costs, such as those from reductions in wildfire suppression expenses, are not included. Appendix I (NWL Technical Support Document) includes additional direct cost details.

Table 3-1 includes the direct cost estimates for the Scoping Plan Scenario compared to the Reference Scenario.[211] Direct costs for the NWL sector are expected to be significant due to the ambitious level of action for each land type.

Table 3-1: Cost and savings relative to a growing California economy for the Scoping Plan Scenario (NWL)

Measure	Scoping Plan Scenario: Average Direct Annual Cost, 2025–2045 (millions $/year)
Forests / Shrublands / Grasslands	1,780
Annual Croplands	284
Perennial Croplands	4
Urban Forest	4,230
Wildland Urban Interface (WUI)	114
Wetlands	28
Sparsely Vegetated Lands	4
Totals	6,460
Note: Table values may not add to total due to rounding.	

CARB estimates that all jurisdictions, including private landowners, currently spend approximately $4 billion dollars annually on planting, maintenance, sidewalk repair, tree removal, and other expenses related to urban forests, and that reaching the theoretical maximum tree cover would require increasing that spending by a factor of 20. The cost of the Scoping Plan Scenario is predominantly a mix of urban forests and forests, shrubland, and grasslands spending.

[211] The Reference Scenario described in Chapter 2 and in Appendix I (NWL Technical Support Document) was the basis for the direct cost comparison.

Economy and Employment

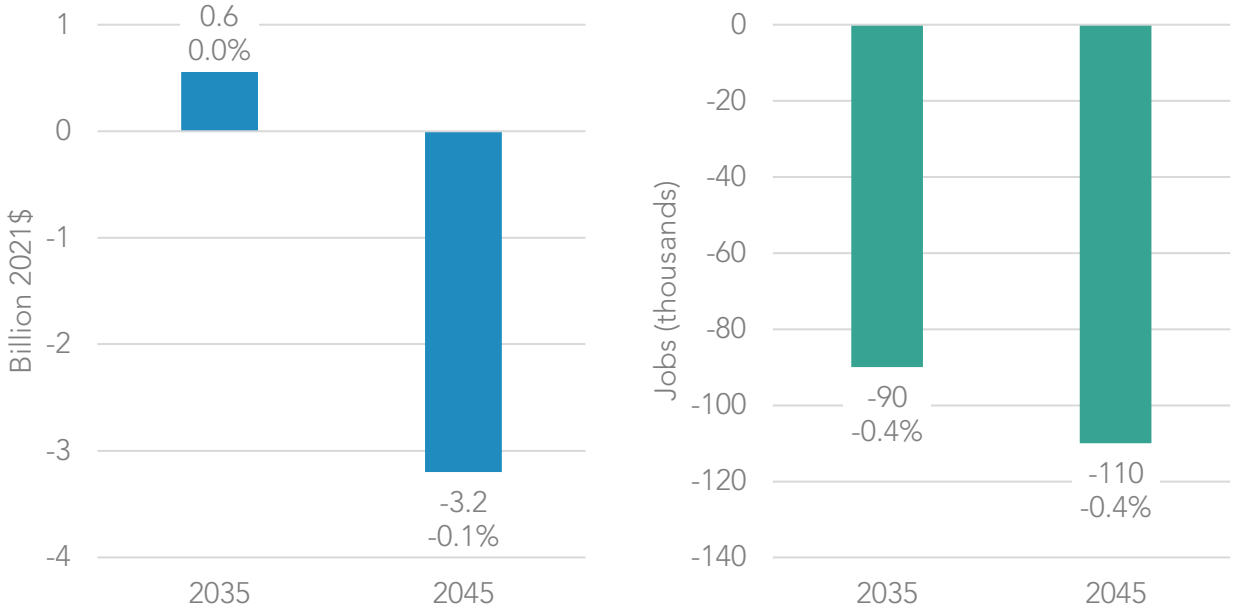
Two different models were used to estimate the overall impact that investing in a transition away from fossil fuels and in our NWL may have on the growing California economy. The transition away from fossil fuels was evaluated using the IMPLAN economic analysis model. The NWL investments were evaluated using the REMI PI+ economic model. These models provide similar outputs relative to the same economic and employment forecasts used to develop a Reference Scenario for use in each model.

AB 32 GHG Inventory Sectors

To estimate the overall impact that investing in a transition away from fossil fuels may have on the California economy, CARB used the IMPLAN model. Additional detail regarding the model, assumptions, and methodology are included in Appendix H (AB 32 GHG Inventory Sector Modeling). The IMPLAN model is a multisector representation of private industries in the U.S. economy that maps economic relationships across industries, households, and governments. This model translates direct costs and savings associated with transitioning away from fossil fuels with indirect effects such as wages, purchases of goods and services, business tax impacts, and supply chain effects. In addition, the induced effects of household purchases, local and import purchases, wages paid, and household tax impacts are estimated. This comprehensive assessment of the interactions between capital investment in fossil fuel alternatives and household purchases provides an indication of the response of the California economy to the Scoping Plan Scenario.

The Scoping Plan Scenario results in a small impact on the Gross State Product (GSP) and employment relative to the Reference Scenario, as shown in Figure 3-3. Economic growth is largely unaffected by the Scoping Plan Scenario in 2035 and slowed by 0.1 percent in 2045. Employment growth is also slowed a small amount, 0.4 percent in 2035 and in 2045, and employment still grows. Assuming annual growth rates of 0.7 percent means there would be more than 193,000 additional jobs in 2045.

Figure 3-3: Gross state product (left) and employment (right) relative to a growing California economy for the Scoping Plan Scenario in 2035 and 2045 (AB 32 GHG Inventory sectors)



California households will see increased costs from the purchase of new capital stock and savings from reduced spending on fuel, as shown in Figure 3-2. Households also will face increased costs associated with CDR, costs associated with energy efficiency measures, and commercial stock purchases—all of which are assumed to be passed directly to consumers. The impact to California households, however, is not limited to these direct costs, as changes in relative prices, employment, and wages can affect household well-being. Personal income, which captures the direct, indirect, and induced impacts, is a metric commonly used to evaluate the impact of policies on households.

Personal income in California is projected to grow from $2.7 trillion in 2021 to $3.6 trillion in 2035 and $4.4 trillion in 2045. Household projections are based on California Department of Finance population projections, which estimate the state's population to grow an average of 0.3 percent each year from 2021 to 2045.[212] California households are projected to increase from 13.3 million in 2020 to 14.6 million in 2035 and 15.0 million in 2045.

[212] California Department of Finance. Population Projections (Baseline 2019). https://dof.ca.gov/forecasting/demographics/projections/.

While the transition away from combustion of fossil fuels will improve air quality for all Californians (and even, more so in overly burdened communities), the economic impacts of the Scoping Plan Scenario are unlikely to be equal among Californians. Table 3-2 presents the change in income by household income group relative to the Reference Scenario in 2035 and 2045. While in 2035 there is a net decrease in personal income of $600 million, total income for households that make less than $100,000 per year is estimated to decline by $4.1 billion dollars, and the total income for households that make more than $100,000 per year will increase by $3.5 billion under the Scoping Plan Scenario. In 2045, although there is no net change in personal income across all California households, results vary by income level. Total income for households that make less than $100,000 per year are estimated to decline by $5.3 billion dollars, while the total income for households that make more than $100,000 per year will increase by $5.3 billion under the Scoping Plan Scenario.

Table 3-2: Income Impacts by California household income group in 2035 and 2045 for the Scoping Plan Scenario (AB 32 GHG Inventory Sectors)

Household Income Group ($2021)	Percentage of 2021 California Households[213]	Change in Income (Billion $2021)	
		2035	2045
Less than $50,000	30	-2.9	-3.9
$50,000 to $100,000	27	-1.2	-1.4
$100,000 to $200,000	28	2.5	4.0
More than $200,000	15	1.0	1.3
Total	100	-0.6	0.0

[213] U.S. Census Bureau. 2021. Household Income. California. https://data.census.gov/cedsci/table?q=california%20income.

In addition to income level, there is likely to be an impact to California personal income that varies based on race/ethnicity.[214] Table 3-3 shows the percentage of households within each income group based on eight race/ethnicity categories identified in the American Community Survey 2021. As shown in Table 3-2, households in lower income groups are anticipated to see negative impacts, while households in higher income groups are anticipated to see positive impacts from the Scoping Plan Scenario in both 2035 and 2045. Because more than 60% of households in the race/ethnicity categories of Hispanic, Black alone, Native Hawaiian (HI) or Pacific Islander, American Indian or Alaskan Native, Other, and Two or More make less than $100,000 per year, these populations generally are likely to experience reduced income. White and Asian households will generally experience both increased and decreased income because these households are distributed more evenly across all four income groups.

The state recognizes the need to ensure that accessibility to clean technology and energy do not further exacerbate health and opportunity gaps for low-income households and communities of color. The Climate Change Investments program exceeds the statutory minimums to invest in projects to benefit disadvantaged communities.[215] Utilities implement programs for reduced energy bills for qualifying low-income customers.[216] There are also resources for waste and water bills that leverage federal funds.[217] CARB also coordinated with the CPUC to ensure that the Climate Credit[218] funded from the sale of Cap-and-Trade allowances provided to utilities on behalf of ratepayers is credited equally to households and not based on how much energy is used. These are just a few examples of how the state is designing and implementing programs to avoid increasing existing disparities. The state must continue to find ways to relieve economic burdens on low-income households.

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[214] The number of households in each bracket and the race/ethnicity categories are from American Community Survey 2021 results. Population changes through 2035 and 2045 are not forecast. U.S. Census Bureau. 2021. Household Income. California. *https://data.census.gov/cedsci/table?q=california%20income*.
[215] CARB. Priority Populations — California Climate Investments. *https://www.caclimateinvestments.ca.gov/priority-populations*.
[216] CPUC. CARE/FERA Program. *https://www.cpuc.ca.gov/lowincomerates/*.
[217] California Department of Community Services and Development. Low Income Household Water Assistance Program. *https:/www.csd.ca.gov/lihwap*.
[218] CPUC. California Climate Credit - FAQ. *https://www.cpuc.ca.gov/industries-and-topics/natural-gas/greenhouse-gas-cap-and-trade-program/california-climate-credit/california-climate-credit---faq*.

Table 3-3: Percentage of households in each race/ethnicity category by household income group

Household Income Group ($2021)	Households in Income Group (%)							
	White Not Hispanic	Hispanic	Black Alone	Asian Alone	Native HI or Pacific Islander	American Indian or Alaskan Native	Other	Two or More
Less than $50,000	26	35	45	25	30	35	37	32
$50,000 to $100,000	25	32	27	21	31	33	33	30
$100,000 to $200,000	29	25	21	30	30	26	24	27
More than $200,000	19	7	7	24	9	7	5	11

Natural and Working Lands

The macroeconomic impact of the NWL scenario was evaluated separately in the REMI PI+ model. For the Scoping Plan Scenario, the macroeconomic impact was modeled by assuming that economic activity in the relevant industries grows in proportion to the proposed implementation spending in that industry. All funds for implementing the actions were assumed to be sourced from within the state. For urban forests, the funds were modeled as being sourced from a combination of state government and private property owners in proportion to the current estimated private/public spending ratio. For all other actions, funds were assumed to be sourced from the state government. In each modeled scenario, government spending and income to property owners were reduced relative to the Reference Scenario in proportion to the annual costs of implementation. None of the proposed spending was modeled as being sourced from increased taxes. Additional details on the methodology for evaluating macroeconomic impacts are in Appendix I (NWL Technical Support Document).

While the macroeconomic model does count the increased economic activity in the affected industries as part of GSP, it does not quantify many of the important economic, health, and environmental benefits that would occur if these actions were implemented. While these benefits—like the reduced use of pesticides, value of urban trees, and increased recreational opportunities—would be very significant, they are outside the scope of the macroeconomic model.

The macroeconomic model also makes projections about the total level of employment in the state. The model forecasts that the Scoping Plan Scenario, which greatly increases the level of NWL management actions, channels economic activity toward related industries and would lead to a slight increase in total employment. (Table 3-4). While the model does aim to accurately represent many labor market dynamics, including adjustments of wages and migration rates, it does not account for many costs that might be associated with dramatically scaling up employment in a particular industry, such as the cost of job training.

Table 3-4: Gross state product and employment relative to a growing California economy for the Scoping Plan Scenario in 2035 / 2045 (NWL)

	Scoping Plan Scenario (%)
Gross State Product	0.00 / 0.01
Employment	0.12 / 0.10
Personal Income	-0.04 / -0.04
Personal Income per Capita	-0.04 / -0.14

Health Analysis

Air quality is affected by pollutant emissions from various processes associated with energy systems, including the combustion of fossil fuels, as well as the combustion of vegetation biomass from NWL during wildfires. Pollutants that are important contributors to degraded air quality in California include nitrogen oxides (NO_x), particulate matter (PM), reactive organic gases (ROG), and others. Further, in the atmosphere these pollutants are transported away from the locations of the emissions by wind and other phenomena, and undergo chemical reactions that result in the formation of new pollutants such as ground-level ozone and fine particulate matter ($PM_{2.5}$). Both primary (emitted) and secondary (formed) pollutants are important from a public health standpoint and contribute to the incidence of air pollution-related mortality and disease within California populations. Measures focused on GHGs do not incorporate specific targets to reduce emissions of $PM_{2.5}$ or air toxics like benzene. These co-pollutants, which are emitted from many of the same pollution sources as GHGs, affect local air quality and pose known risks to public health, such as the risk of asthma and cardiovascular disease. Generally, for stationary sources, certain harmful pollutants are regulated via local rules and regulations that are reflected in permits for stationary sources and are enforced by local air districts, with CARB also regulating air toxics contaminants from stationary sources with the air districts.

AB 32 GHG Inventory Sectors

To assess health impacts for the AB 32 GHG Inventory sectors, an integrated modeling approach was used to quantify and value the air pollution-related public health benefits of the Scoping Plan Scenario relative to the Reference Scenario. Additional details about the models, assumptions, and methodology are included in Appendix H (AB 32 GHG Inventory Sector Modeling). Using output from the PATHWAYS model, projections of pollutant emissions to 2045 were developed for stationary, area, and mobile source emissions using a detailed base year CARB pollutant emissions inventory. Further, the emissions are processed, including for where and when they occur in California, using the Sparse Matrix Operator Kernels Emissions (SMOKE) model. For example, on-road vehicle emissions were allocated along existing roadways, and refining emissions were assigned to the locations of existing refineries. It should be noted that the emissions projections represent statewide average reductions associated with high-level assumptions about alternative fuels and technologies. For example, emissions occurring from refineries to produce liquid fuels are reduced in line with petroleum demand. This reduction is applied equally to all refineries in the Scoping Plan Scenario and does not specify individual facility responses to changing demand. Similarly, the Scoping Plan Scenario does not specify which refineries transition to biofuel production or where new electricity generation facilities are built.

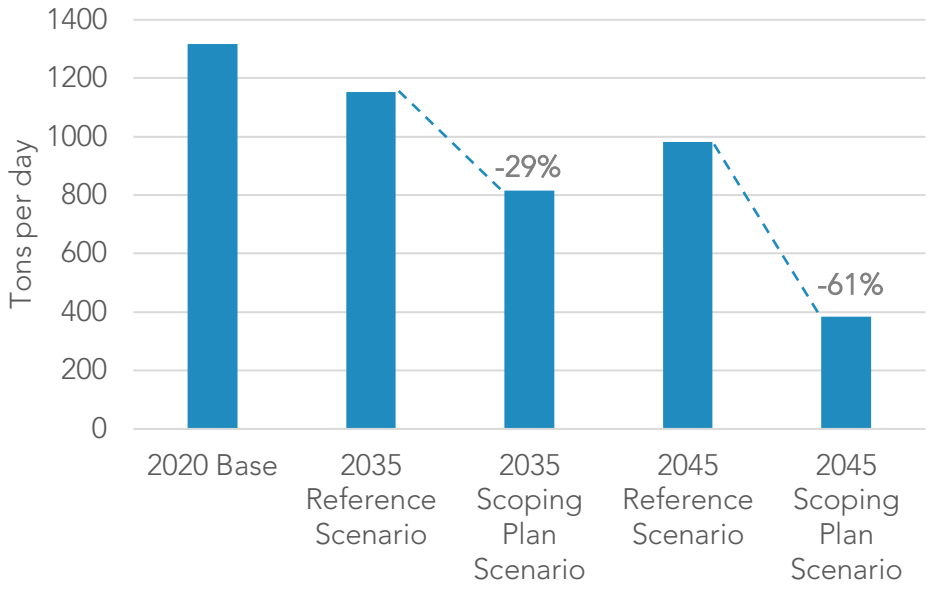
Next, emission changes were translated into impacts on atmospheric pollution levels, including ground-level ozone and $PM_{2.5}$, via an advanced photochemical air quality model called the Community Multiscale Air Quality (CMAQ) model, which accounts for atmospheric chemistry and transport. A comprehensive assessment of how pollutant concentrations are impacted throughout the year was achieved by simulating all months in 2035 and 2045 for the Scoping Plan Scenario.[219] Health benefits were estimated using the U.S. EPA's environmental Benefits Mapping and Analysis Program (BenMAP) model to translate pollutant changes into avoided incidence of mortality, hospital admissions, emergency room visits, and other outcomes as a result of reduced exposure to ozone and $PM_{2.5}$. These outcomes are associated with an economic value in order to aggregate health impacts.

The Scoping Plan Scenario shows a substantial reduction in pollutant emissions relative to the Reference Scenario, including NO_x, $PM_{2.5}$, and ROG. Reductions in NO_x are shown in Figure 3-4. Even under a business-as-usual trajectory, emissions are reduced from present levels by 26 percent in 2045 in the Reference Scenario, demonstrating the impact of current regulations and trends in energy sectors. The Scoping Plan Scenario further reduces NO_x

[219] This annual approach differs from the episodic modeling approach applied to the Proposed Scenario and Alternatives in the Draft 2022 Scoping Plan Update. Appendix H (AB 32 GHG Inventory Sector Modeling) describes both approaches.

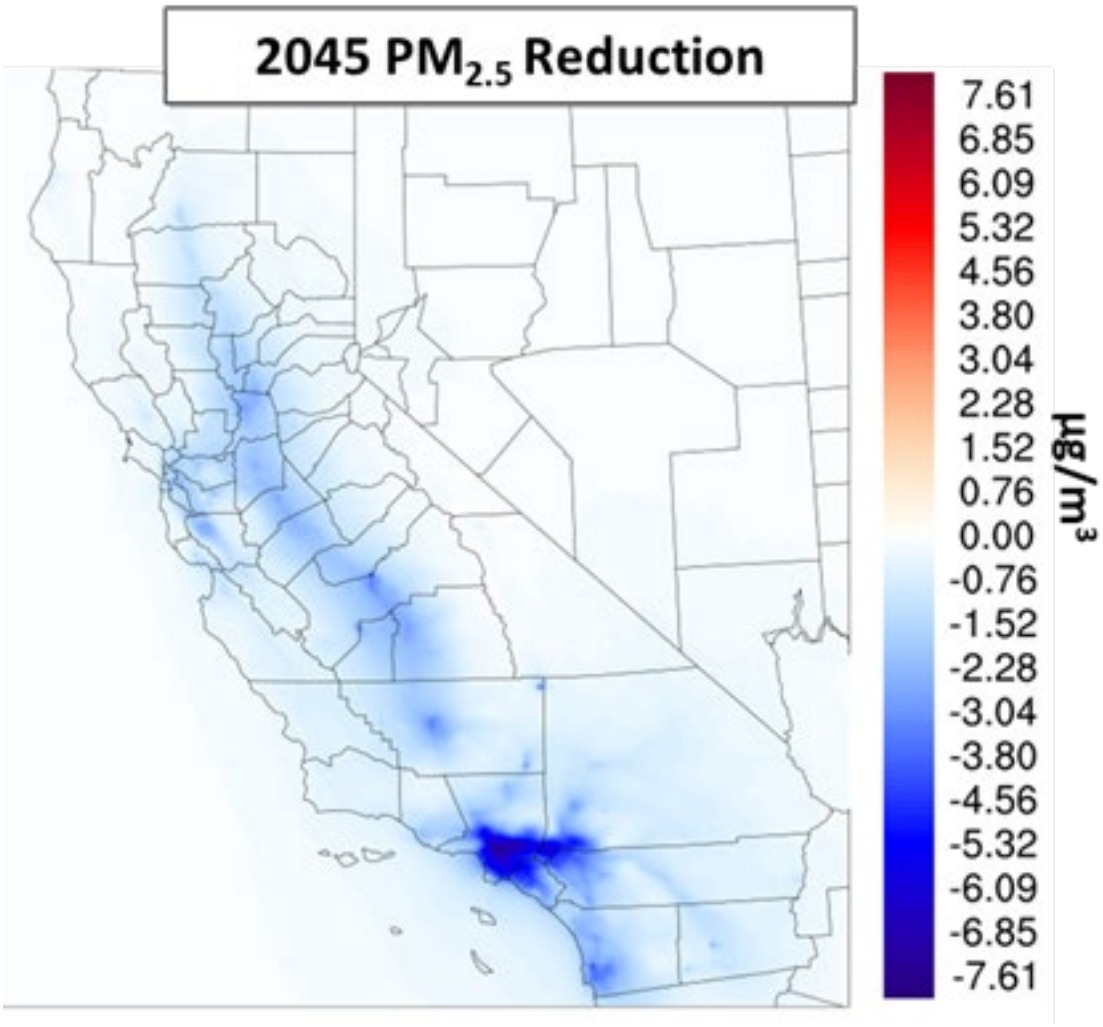
emissions from the Reference Scenario by 29% in 2035 and 61% in 2045. Emission reductions occur throughout the state with particular prominence in urban areas, including the South Coast Air Basin, due to the large presence and activity of emission sources. Appendix H (AB 32 GHG Inventory Sector Modeling) contains additional information about the pollutant emissions modeling and results.

Figure 3-4: Illustration of NOx emission reductions from current levels for the Reference Scenario and the Scoping Plan Scenario (AB 32 GHG Inventory sectors)



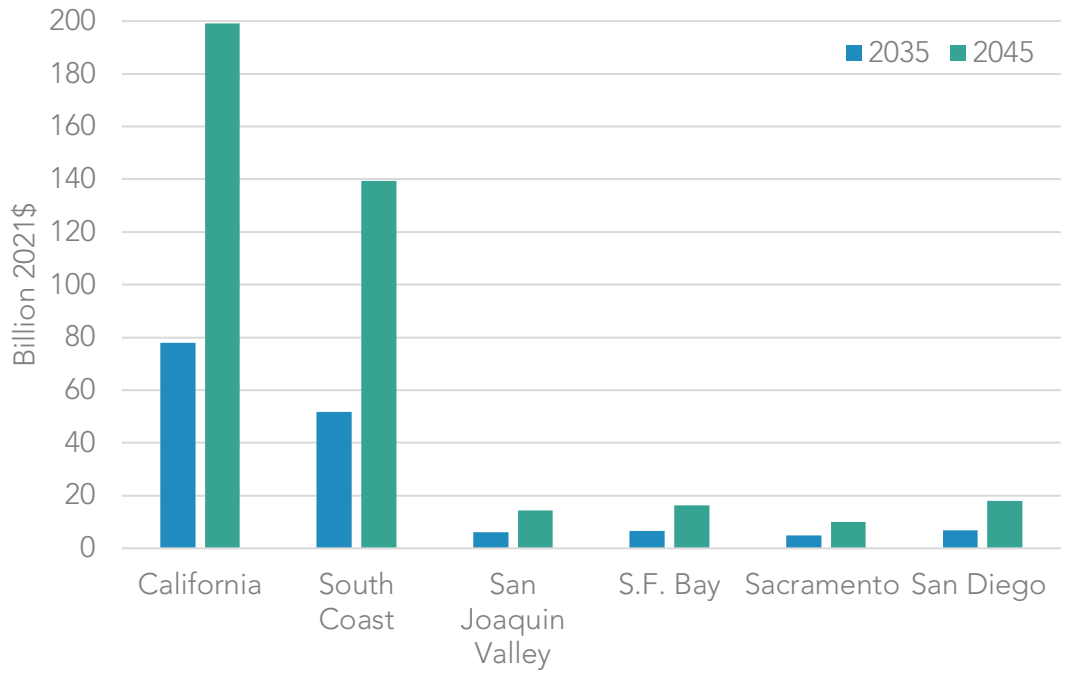
The emission reductions achieve important improvements in air quality throughout California, including reductions in the levels of ozone and $PM_{2.5}$. Reductions in annual $PM_{2.5}$ levels are shown in Figure 3-5. The greatest reductions are evident in Southern California, the San Joaquin Valley, the San Francisco Bay area, and the Greater Sacramento area due to the large presence and activity of emission sources, meteorology, topography, and others. To highlight the extent of the air quality improvements: reductions reach nearly 8 micrograms per cubic meter ($\mu g/m^3$) in 2045 and lead to 76% fewer exceedances of the health-based National Ambient Air Quality $PM_{2.5}$ standard of 12 $\mu g/m^3$. Similarly, ozone improvements reach 19 parts per billion (ppb) and yield 62% fewer exceedance events. Furthermore, the locations of improvements carry important implications for human health as these areas support large urban populations and generally experience the most degraded ozone and $PM_{2.5}$ pollution. Appendix H (AB 32 GHG Inventory Sector Modeling) provides details regarding the atmospheric modeling and results, including differences in ozone and $PM_{2.5}$.

Figure 3-5: Difference in annual average $PM_{2.5}$ (µg/m^3) in the Scoping Plan scenario relative to the Reference scenario in 2045 (AB 32 GHG Inventory sectors)



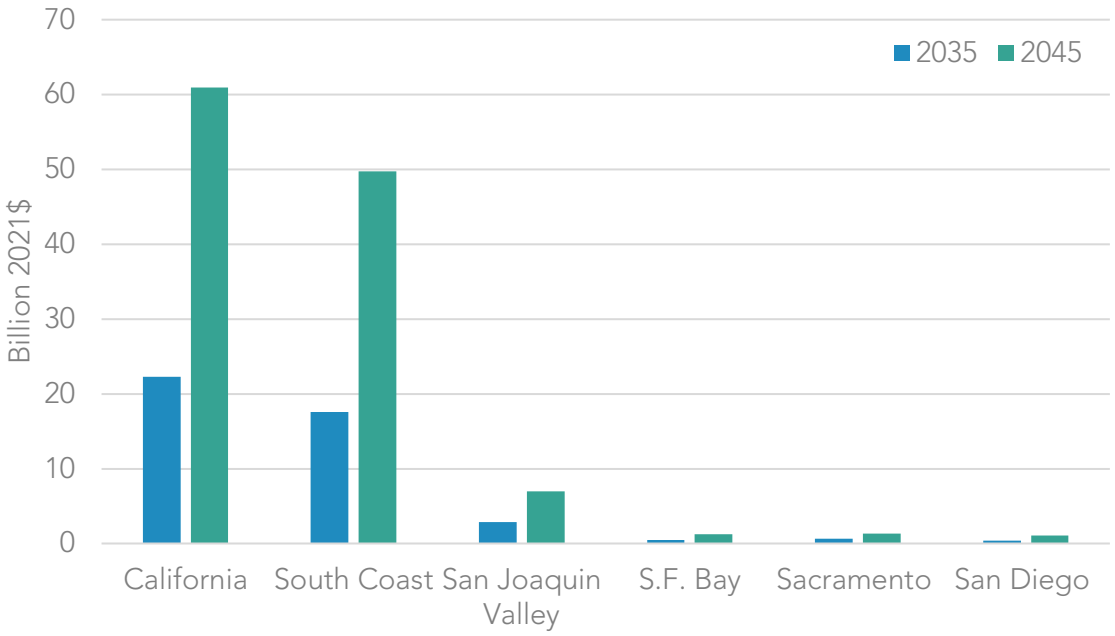
Notable health benefits representing the economic value of the avoided incidence of health effects are associated with the Scoping Plan Scenario. In total, the benefits reach $78 billion in 2035 and $199 billion in 2045, as shown in Figure 3-6. Populations in Southern California benefit the most due to preexisting air quality challenges, significant emission sources and activity, and the presence of a large, dense urban population. Additional details regarding the health impact assessment are provided in Appendix H (AB 32 GHG Inventory Sector Modeling).

Figure 3-6: Total health benefits estimated from air quality improvements in the Scoping Plan Scenario (AB 32 GHG Inventory sectors)



Furthermore, these benefits accrue within socially and economically disadvantaged communities identified by CalEnviroScreen, where they are most needed. Total health benefits within census tracts identified as disadvantaged communities using CalEnviroScreen 4.0 reach $22 billion in 2035 and $61 billion in 2045, as shown in Figure 3-7. Similarly to the statewide health benefits, the largest share of benefits occurs within disadvantaged communities in Southern California. Additional information on the health benefits within disadvantaged communities can be found in Appendix H (AB 32 GHG Inventory Sector Modeling).

Figure 3-7: Disadvantaged community health benefits relative to the Reference Scenario for the Scoping Plan Scenario (AB 32 GHG Inventory sectors)

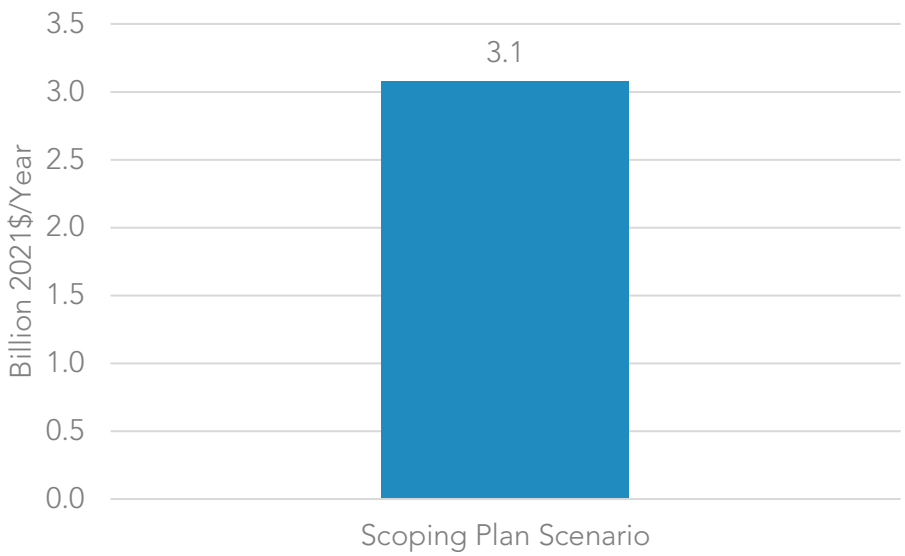


Natural and Working Lands

For NWL, health benefits were evaluated based on projected $PM_{2.5}$ wildfire emissions on forests, shrublands, and grasslands, discussed in the AB 197 Measure Analysis section of the chapter that follows.[220] The health endpoints for the Scoping Plan Scenario and in Appendix I (NWL Technical Support Document) for the alternative scenarios were the basis for the estimated health benefits shown in Figure 3-8. Health benefits were derived from the preliminary University of California, Los Angeles (UCLA) study that estimated annual health impacts and associated costs from California's wildfires from 2008–2018. Additional details are included in Appendix I (NWL Technical Support Document). These costs were applied to the health endpoints discussed in the AB 197 Measure Analysis section of the chapter.

[220] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N11, N14. *finalejacrecs.pdf (arb.ca.gov)*.

Figure 3-8: Total average annual health benefits relative to the Reference Scenario for the Scoping Plan Scenario (NWL)



As health impacts analyzed here are driven by wildfire emissions, the health benefits for the Scoping Plan Scenario are directly related to the amount of forest, shrubland, and grassland management action. These management actions reduce vegetation fuels and, as a result, wildfire activity. The Scoping Plan Scenario increases the amount of these management actions, reducing wildfire emissions and avoiding incidence of emission-related health effects. The health benefits, or economic value of the avoided incidence of health effects, correspondingly increase with an increasing management implementation rate. Additional details are included in Appendix I (NWL Technical Support Document).

Estimated health benefits do not include the direct impact of wildfires on injuries, deaths, or mental health, nor the indirect costs of lost ecosystem benefits to wildfire. Additional direct health costs may result from wildfire that would likely increase the health benefits from increased forest, shrubland, and grassland management to reduce wildfire activity. Nonetheless, the conservative health benefits under the Scoping Plan Scenario are estimated to be $3.1 billion per year relative to the Reference Scenario for all NWL actions identified in the Scoping Plan Scenario.

AB 197 Measure Analysis

This section provides estimates for information associated with GHG emissions reduction measures evaluated in this Scoping Plan.[221] These estimates, which were developed as part of the process for meeting the requirements of AB 197 (E. Garcia, Chapter 250, Statutes of 2016), provide information on the relative impacts of the evaluated measures when compared to each other. To support the design of a suite of policies that result in GHG reductions, air quality co-benefits, and cost-effective measures, it is important to understand if a measure will increase or reduce criteria pollutants or toxic air contaminant emissions, or if increasing stringency at additional costs yields few additional GHG reductions. To this end, AB 197 requires the following for each potential emissions reduction measure evaluated in any Scoping Plan update:

- The range of projected GHG emissions reductions that result from the measure;
- The range of projected criteria pollutant emission reductions that result from the measure; and
- The cost-effectiveness, including avoided social costs, of the measure.

The following sections describe the evaluation of measures for the AB 32 GHG Inventory sectors and NWL. For the purposes of this Scoping Plan, the identified emissions reduction measures for the analysis required by AB 197 are actions grouped by sectors where several policies and programs are expected to overlap. This approach reflects the most granular feasible analysis given the modeling tools available,[222] the overlap and interaction effects among policies and incentive programs, the longer planning horizon used for this Scoping Plan compared to previous efforts, and the scale of transition needed to achieve carbon neutrality. To implement this Scoping Plan, dozens of individual regulations, policies, and incentive programs are anticipated that work together to drive down emissions across all economic sectors and support actions. Every specific policy or incentive program that could contribute to the deployment of clean technology and energy called for in this plan may overlap in ways that make it infeasible to tease out those policies and programs' individual effects with any reasonable degree of certainty. For example, in the transportation sector, deploying ZEVs and reducing driving demand may be achieved through a combination of the implementation of new or existing regulations, fuels programs, incentive programs, and VMT reduction initiatives that can each contribute to reductions in emissions for the sector. It is not feasible to isolate each sub action from each other at this time in terms of the share of contribution to total reductions. The estimated emission

[221] AB 197 calls for the evaluation of "emission reduction measures." This Scoping Plan treats each action and its variants on stringency as emission reduction measures for the purposes of this chapter. Appendix C (AB 197 Measure Analysis) lists the measures and corresponding modeling assumptions for each alternative.
[222] See Appendix H (AB 32 GHG Inventory Sector Modeling and Appendix I (NWL Technical Support Document).

reductions, health endpoints, and costs by measure for the Scoping Plan Scenario are presented in this chapter, and the corresponding estimates for the Proposed Scenario and Alternatives 1, 2, and 4 are included in Appendix C (AB 197 Measure Analysis).

Because many of the measures and underlying assumptions interact with each other, isolating the GHG emission reductions, corresponding changes to fuel combustion, and associated cost of an individual measure is analytically challenging. Each measure is evaluated by examining the change in fuel combustion, cost, and emissions associated with just that measure using the PATHWAYS model. The difference between the Scoping Plan Scenario and the Reference Scenario is estimated for each measure. Starting from the Scoping Plan Scenario, the modeling assumptions for an individual measure are reverted to the Reference Scenario values, resulting in GHG reductions, changes to fuel combustion, and costs (or savings). This approach does not reflect interactions between sectors in PATHWAYS that influence the results for each complete alternative, presented earlier. As such, the values associated with each measure should not be added to obtain an overall scenario estimate.

To arrive at the 2045 target for NWL, CARB modeled the ecological impact that climate smart land-based management strategies (suites of on-the-ground actions, or *treatments,* that are used across the landscape to manipulate an ecosystem) will have on ecosystem carbon; and whenever possible, additional co-benefits from those actions. The Scoping Plan Scenario incorporates a set of land management actions at varying scales of implementation for each land type to achieve the GHG emission reductions. Each land type, and its associated management actions, was considered a measure for this analysis. For modeling individual landscapes and management actions, CARB used a suite of models. The complexity of these models varies by land type, depending on the existing science, data, and availability of existing models to use. Appendix I (NWL Technical Support Document) provides detailed modeling assumptions for each NWL type. The estimated emission reductions, health endpoints, and costs by measure under the Scoping Plan Scenario for each NWL type are presented in this chapter, and the corresponding estimates for the Proposed Scenario and NWL Alternatives 1, 2, and 4 are included in Appendix C (AB 197 Measure Analysis).

Estimated Emissions Reductions

Both GHG emissions reductions and emissions of criteria air pollutants were evaluated for the AB 32 GHG Inventory sectors and for NWL. The methods and results are described in this section.

AB 32 GHG Inventory Sectors

In the absence of having direct modeling results for criteria pollutant estimates from PATHWAYS, CARB estimated criteria pollutant emissions impacts by using changes in fuel combustion in units of exajoules from PATHWAYS and emission factors in units of tons per exajoule to estimate the change in emissions in tons per year. Emission factors from a variety

of sources for each sector were utilized, including but not limited to CARB's mobile source emissions models,[223] U.S. EPA's AP 42 Emissions Factors,[224] and the South Coast Air Quality Management District's (AQMD's) District Rules.[225] These emission factors were applied to fuel burn change by fuel type, sector, equipment type, and process, where applicable. Statewide annual average emissions were estimated for three criteria pollutants: NO_x, $PM_{2.5}$, and ROG.

Table 3-5 provides the estimated GHG and criteria pollutant emission reductions for the measures in the Scoping Plan Scenario in 2035 and 2045. The other alternatives are presented in Appendix C (AB 197 Measure Analysis). Based on the estimates below, these measures are expected to provide air quality benefits. The estimates provided in this chapter and Appendix C (AB 197 Measure Analysis) are appropriate for comparing across alternatives considered for the development of this Scoping Plan, but they are not precise estimates.

[223] CARB. MSEI - Modeling Tools. *https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools*.
[224] U.S EPA. AP-42: Compilation of Air Emissions Factors. *https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors*.
[225] South Coast AQMD. South Coast AQMD Rule Book. *https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book*.

Table 3-5: Estimated GHG and criteria pollutant emission reductions relative to the Reference Scenario for the Scoping Plan Scenario in 2035/2045 (AB 32 GHG Inventory sectors)

Measure	GHG Reductions ($MMTCO_2$)	NOx Reductions (Short Tons/Year)	$PM_{2.5}$ Reductions (Short Tons/ Year)	ROG Reductions (Short Tons/Year)
Deploy ZEVs and reduce driving demand	-46 / -84	-51,620 / -122,806	-2,008 / -6,506	-18,967 / -30,410
Coordinate supply of liquid fossil fuels with declining California fuel demand	-25 / -30	-1,601 / -2,707	-978 / -1,705	-747 / -1,323
Generate clean electricity	-8 / -31	-92 / -1,555	-177 / -1,382	-41 / -425
Measure	**GHG Reductions ($MMTCO_2$)**	**NOx Reductions (Short Tons/Year)**	**$PM_{2.5}$ Reductions (Short Tons/ Year)**	**ROG Reductions (Short Tons/Year)**
Decarbonize industrial energy supply	-9 / -22	-21,172 / -34,876	-1,188 / -2,527	-3,710 / -6,298
Decarbonize buildings	-14 / -35	-8,105 / -94,455	-826 / -6,877	-1,093 / -8,109
Reduce non-combustion emissions[a]	-0.41 / -0.52 ($MMTCH_4$)	N/A	N/A	N/A
Compensate for remaining emissions	-25 / -64	N/A	N/A	N/A

[a] Methane emissions reductions are reported for this measure.

The measures related to reducing non-combustion emissions and compensating for the remaining emissions do not include changes to fuel combustion, and therefore are not

associated with changes to air pollutants. Biomethane combustion is captured in measures that reduce combustion of fossil gas, such as decarbonizing industrial energy supply and buildings.

Natural and Working Lands

NWL ecosystems naturally vary between being a source and a sink for carbon over time. The NWL ecosystem carbon stock changes projected through mid-century by the suite of models were used to estimate net emissions or emissions reductions relative to the Reference Scenario. These changes in carbon stocks were affected by projected climate change, the implementation of management actions under the various scenarios, land conversion, and (for forests, shrublands, grasslands) wildfire. Each NWL type was evaluated, and an overview of all NWL is presented in Table 3-6. More detailed results for each NWL type can be found in Appendix C (AB 197 Measure Analysis).

Table 3-6: Estimated average annual GHG and criteria pollutant emission reductions relative to the Reference Scenario for the Scoping Plan Scenario from 2025–2045 (NWL)

Measure	GHG Reductions ($MMTCO_2e$/year)	$PM_{2.5}$ Reductions (MT/Year)
Forests/Shrublands/Grasslands	-0.12	-17,500
Annual Croplands	-0.25	N/A
Perennial Croplands	-0.01	N/A
Urban Forest	-1.29	N/A
Wildland Urban Interface (WUI)	0.75	N/A
Wetlands	-0.43	N/A
Sparsely Vegetated Lands	<-0.01	N/A

Fine particulate wildfire emissions were evaluated for forests, shrublands, and grasslands only. Wildfire emissions decreased under the Scoping Plan Scenario compared to the Reference Scenario. The Scoping Plan Scenario's higher level of management actions that reduce tree or shrub densities, protect large trees, reintroduce fire to the landscape, and diversify species and structures result in greater reductions in wildfire emissions.

Estimated Health Endpoints

Climate change mitigation will result in both environmental and health benefits. This section provides information about the potential health benefits of the Scoping Plan Scenario. Health benefits are primarily the result of reduced $PM_{2.5}$ pollution, both from stationary and mobile sources, as well as wildfire in forests, shrublands, and chaparral.

AB 32 GHG Inventory Sectors

CARB used the criteria pollutant emissions in Table 3-5 to understand potential health impacts. Similar to the air quality estimates, this information should be used to understand the relative health benefits of the various measures and should not be taken as absolute estimates of health outcomes. CARB used the incidence-per-ton (IPT) methodology to quantify the health benefits of emission reductions. The IPT methodology is based on a methodology developed by the U.S.

EPA.[226,227,228,229] Under the IPT methodology, changes in emissions are approximately proportional to the resulting changes in health outcomes. IPT factors are derived by calculating the number of health outcomes associated with exposure to $PM_{2.5}$ for a baseline scenario using measured ambient concentrations and dividing that number by the emissions of $PM_{2.5}$ or a precursor. To estimate the reduction in health outcomes, the emission reductions are multiplied by the IPT factor. For future years, the number of outcomes is adjusted to account for population growth. IPT factors were computed for the two types of $PM_{2.5}$: primary $PM_{2.5}$ and secondary $PM_{2.5}$ of ammonium nitrate aerosol formed from precursors.

For this AB 197 analysis, CARB calculated the health benefits associated with the five key measures that are represented by changes to fuel combustion. The health benefits associated with emission reductions for the Scoping Plan Scenario were estimated for each air basin and then aggregated for the entire state of California. CARB assumed that the statewide emission reductions distribution among the air basins is proportional to the baseline emissions in that air basin.

Calculated health endpoints include premature mortality, cardiovascular emergency department (ED) visits, acute myocardial infarction, respiratory ED visits, lung cancer incidence, asthma onset, asthma symptoms, work loss days, hospitalizations due to cardiopulmonary illnesses, hospitalizations due to respiratory illnesses, hospital admissions for Alzheimer's disease, and hospital admissions for Parkinson's disease.[230,231,232] These health endpoints were calculated using the IPT method for estimated emission reductions. Table 3-7 compares the health benefits of emission reductions associated with each measure for the Scoping Plan Scenario in the year

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[226] CARB. CARB's Methodology for Estimating the Health Effects of Air Pollution. Retrieved February 9, 2021. *https://ww2.arb.ca.gov/resources/documents/carbs-methodology-estimating-health-effects-air-pollution*.

[227] Fann, N., C. M. Fulcher, and B. J. Hubbell. 2019. "The influence of location, source, and emission type in estimates of the human health benefits of reducing a ton of air pollution." *Air Quality, Atmosphere & Health* 2:169–176. *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2770129/*.

[228] Fann, N., K. R. Baker, and C. M. Fulcher. 2012. "Characterizing the $PM_{2.5}$-related health benefits of emission reductions for 17 industrial, area and mobile emission sectors across the U.S." *Environ Int*. 49:141–51. November 15. *https://www.sciencedirect.com/science/article/pii/S0160412012001985*.

[229] Fann, N., K. Baker, E. Chan, A. Eyth, A. Macpherson, E. Miller, and J. Snyder. 2018. "Assessing Human Health $PM_{2.5}$ and Ozone Impacts from U.S. Oil and Natural Gas Sector Emissions in 2025." *Environ. Sci. Technol.* 52 (15), 8095–8103. *https://pubs.acs.org/doi/abs/10.1021/acs.est.8b02050*.

[230] CARB. CARB's Methodology. *https://ww2.arb.ca.gov/resources/documents/carbs-methodology-estimating-health-effects-air-pollution*.

[231] CARB. 2022. Updated Health Endpoints in CARB's Health Benefits Methodology. *Evaluating New Health Endpoints for Use in CARB's Health Analyses*.

[232] Cardio-pulmonary mortality, hospitalizations due to cardiopulmonary illnesses, and hospital admissions due to respiratory illnesses endpoints utilize studies documented in CARB's methodology document. For future assessments, CARB will use more recent studies to estimate cardiovascular hospital admissions and respiratory hospital admissions, as documented in CARB's updated health endpoints memo.

specified (2035 or 2045). The other alternatives are presented in Appendix C (AB 197 Measure Analysis).

Table 3-7: Estimated avoided incidence of mortality, cardiovascular and respiratory disease onset, work loss days and hospital admissions relative to the Reference Scenario for the Scoping Plan Scenario (AB 32 GHG Inventory sectors)

Measure	Mortality	Cardiovascular ED Visits	Acute Myocardial Infarction	Respiratory ED Visits	Lung Cancer Incidence	Asthma Onset	Asthma Symptoms	Work Loss Days	Hospital Admissions, Cardiovascular	Hospital Admissions, Respiratory	Hospital Admissions, Alzheimer's Disease	Hospital Admissions, Parkinson's Disease
Deploy ZEVs and reduce driving demand in 2035	635	170	70	400	45	1,475	128,930	92,510	95	115	245	40
Deploy ZEVs and reduce driving demand in 2045	1,820	475	200	1,115	135	3,995	343,095	255,800	295	350	745	125
Coordinate supply of liquid fossil fuels with declining CA fuel demand in 2035	115	30	15	70	10	275	23,530	16,880	20	20	50	10

Measure	Mortality	Cardiovascular ED Visits	Acute Myocardial Infarction	Respiratory ED Visits	Lung Cancer Incidence	Asthma Onset	Asthma Symptoms	Work Loss Days	Hospital Admissions, Cardiovascular	Hospital Admissions, Respiratory	Hospital Admissions, Alzheimer's Disease	Hospital Admissions, Parkinson's Disease
Coordinate supply of liquid fossil fuels with declining CA fuel demand in 2045	215	55	25	130	15	490	40,860	30,445	35	40	95	15
Generate clean electricity in 2035	20	5	0	10	0	45	3,930	2,820	5	5	10	0
Generate clean electricity in 2045	170	45	20	105	15	385	32,065	23,890	25	30	75	10
Decarbonize industrial energy supply in 2035	300	80	35	190	20	695	60,660	43,520	45	55	115	20
Decarbonize industrial energy supply in 2045	595	155	65	365	45	1,310	111,925	83,435	95	115	245	40

Measure	Mortality	Cardiovascular ED Visits	Acute Myocardial Infarction	Respiratory ED Visits	Lung Cancer Incidence	Asthma Onset	Asthma Symptoms	Work Loss Days	Hospital Admissions, Cardiovascular	Hospital Admissions, Respiratory	Hospital Admissions, Alzheimer's Disease	Hospital Admissions, Parkinson's Disease
Decarbonize buildings in 2035	155	40	15	95	10	360	31,130	22,335	25	30	60	10
Decarbonize buildings in 2045	1,610	420	175	985	120	3,550	303,830	226,500	260	310	665	115
Note: All values are rounded to the nearest 0 or 5.												

The measures related to reducing non-combustion emissions and compensating for remaining emissions do not include changes to fuel combustion and therefore are not associated with changes to air pollutants or health endpoints. Biomethane combustion is captured in measures that reduce combustion of fossil gas, such as decarbonizing industrial energy supply and buildings.

Although the estimated health outcomes presented are based on a well-established methodology, they are subject to uncertainty. For instance, future population estimates are subject to increasing uncertainty as they are projected further into the future, and baseline incidence rates can experience year-to-year variation. Also, the relationship between changes in pollutant concentrations and changes in pollutant or precursor emissions is assumed to be approximately proportional.

In addition, emissions are reported at an air basin level and do not capture local variations. These estimates also do not account for impacts from global climate change, such as temperature rise, and are only based on the scenarios in this Scoping Plan.

The fuel changes for each AB 197 measure are estimated based on the impact of each measure compared to the Reference Scenario for the years 2035 and 2045. Therefore, aggregating the effect of each measure would overestimate the impacts of the Scoping Plan Scenario because the implementation of each measure would affect the level of benefits of the other measures. This measure-by-measure analysis uses a different methodology for calculating health endpoints than does the health analysis for the complete Scoping Plan Scenario provided earlier.

Natural and Working Lands

Implementation of NWL management strategies to mitigate and adapt to climate change will result in both environmental and health benefits. This section provides information about the potential health benefits of measures evaluated for the Scoping Plan Scenario. For this analysis, health benefit estimates were focused on increases or decreases to $PM_{2.5}$ resulting from wildfire emissions on forests, shrublands, and grasslands.[233] Other health benefits resulting from NWL management actions in the Scoping Plan Scenario are not quantified here but are important for all Californians. This includes, but is not limited to, reductions in exposure to synthetic pesticides when switching to organic agricultural systems, improvements in shade availability and mental health with increasing urban forest cover, improved mental health from opportunities for recreation in resilient and healthy environments, and protection from floods and rising sea levels.

[233] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N11, N14. *finalejacrecs.pdf (arb.ca.gov)*.

These examples are by no means exhaustive, as our natural and working lands provide immense health benefits to everyone.

For this analysis, CARB used the $PM_{2.5}$ emissions in Table 3-6 to understand potential health impacts. This information should be used to understand the relative health endpoints of the various measures and should not be taken as absolute estimates of health outcomes of this Scoping Plan statewide or within a specific community. The IPT methodology was used to calculate health endpoints, similar to the AB 32 GHG Inventory Sector analysis. CARB calculated the annual health endpoints associated with the wildfire emissions changes resulting from the implementation of management strategies on forests, shrublands, and grasslands under each alternative. The annual health endpoints associated with emission reductions for the Scoping Plan Scenario were estimated for the entire state. Calculated health endpoints include emissions-caused mortality, hospital admittance, and emergency room visits from asthma; hospital admittance from chronic obstructive pulmonary disease; and emergency room visits from respiratory and cardiovascular outcomes. Table 3-8 compares the average annual health endpoints of wildfire emission reductions associated with the Scoping Plan Scenario over the period 2025–2045. The other alternatives are presented in Appendix C (AB 197 Measure Analysis).

Table 3-8: Estimated average annual avoided incidence of hospital admissions, emergency room visits, and mortality relative to the Reference Scenario for the Scoping Plan Scenario resulting from forest, shrubland, and grassland wildfire emissions (NWL)

Health Endpoints from Forest, Shrubland, and Grassland Wildfire Emissions	Average Annual Avoided Incidence
Hospital admissions from asthma	22
Hospital admissions from chronic obstructive pulmonary disease without asthma	19
Hospital admissions from all respiratory outcomes	63
Emergency room visits from asthma	155
Emergency room visits from all respiratory outcomes	419
Emergency room visits from all cardiovascular outcomes	156
All causes of mortality	394

Estimated Social Cost

Social costs are generally defined as the cost of an action on people, the environment, or society and are widely used to understand the impact of regulatory actions. One tool, the social cost of greenhouse gases (SC-GHG), is an estimate of the present value of the costs associated with the emission of GHGs in future years. It combines climate science and economics to help understand the benefits of reducing GHG emissions. The estimates of the social cost of carbon (SC-CO_2) and social cost of methane (SC-CH_4), two types of SC-GHGs presented here, estimate the value of the net harm to society associated with adding GHGs to the atmosphere in a given year; they do not represent the cost of actions taken to reduce GHG emissions (known as the *cost of abatement*) nor the cost of GHG emissions reductions. In principle, the SC-GHG includes the value of climate change impacts, including but not limited to, changes in net agricultural productivity, human health effects, property damage from increased flood risk and other natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. It reflects the societal value of reducing emissions

of the gas in question by one metric ton.[234] Many of these damages from GHG emissions today will affect economic outcomes throughout the next several centuries.

In 2008, federal agencies began incorporating SC-CO_2 estimates into the analysis of their regulatory actions. U.S. EPA has used various models and discount rates to determine the value of future impacts. Generally, these models begin with assumptions to predict economic activity over time, along with projected GHG emissions. The modeled emissions are input into a model of the global climate system, which then translates into estimates of surface temperature, sea level rise, and other impacts. These outputs are used to estimate economic damages per ton of GHG emitted in a given year in the future. Since the models are calculating the present value of future damages, a discount rate is applied. For example, the SC-CO_2 for the year 2045 represents the value of climate change damages from a release of CO_2 in 2045 discounted back to today. The present value is significantly affected by the discount rate used; a higher discount rate results in a lower present value. For example, in 2021 dollars the SC-CO_2 in 2045 is $31 using a 5 percent discount rate, $88 using a 3 percent discount rate, and $122 using a 2.5 percent discount rate. Additional detail is included in Appendix C (AB 197 Measure Analysis).

The 2017 Scoping Plan utilized SC-CO_2 and SC-CH_4 Obama Administration-era values developed by the Council of Economic Advisors and the Office of Management and Budget-convened Interagency Working Group on the Social Cost of Greenhouse Gases (IWG)[235] to consider the social costs of actions to reduce GHG emissions. The Biden Administration reinstated these values in February 2021,[236] after they had been rescinded and significantly revised by the Trump Administration. The reinstatement was considered an interim step, and the Biden Administration also reconvened the IWG to continue its work to evaluate and incorporate the latest climate science and economic research and

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[234] U.S. Government. Interagency Working Group on Social Cost of Greenhouse Gases. February 2021. Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide – Interim Estimates under Executive Order 13990. *https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf*

[235] Originally titled the "Interagency Working Group on the Social Cost of Carbon," the IWG was renamed in 2016. 82 Fed. Reg. 16093, 16095-96 (Mar. 28, 2017). *https://www.govinfo.gov/content/pkg/FR-2017-03-31/pdf/2017-06576.pdf*.

[236] Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, Executive Order 13990 (Jan. 20, 2021), 86 Fed. Reg. 7037 (Jan. 25, 2021). *https://www.energy.gov/sites/default/files/2021/02/f83/eo-13990-protecting-public-health-environment-restoring.pdf*. IWG, Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates Under Executive Order 13990 (February 2021), *https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf* See also, The White House. 2021. A Return to Science: Evidence-Based Estimates of the Benefits of Reducing Climate Pollution. *https://www.whitehouse.gov/cea/written-materials/2021/02/26/a-return-to-science-evidence-based-estimates-of-the-benefits-of-reducing-climate-pollution/*.

respond to the National Academies' recommendations from 2017 as it develops a more complete revision of the estimates.

It is important to note that the models used to produce SC-GHG estimates do not include all of the important physical, ecological, and economic impacts of climate change recognized in the climate literature. There are additional costs to society, including the costs associated with changes in co-pollutants and costs that cannot be included due to modeling and data limitations. The IWG has stated that the range of the interim SC-GHG estimates likely underestimates societal damages from GHG emissions.[237] The revised estimates were originally slated to be released in early 2022 but were stalled.[238] CARB staff is applying the interim values presented in the IWG February 2021 Technical Support Document (TSD), which reflect the best available science in the estimation of the socioeconomic impacts of GHGs.[239] This Scoping Plan utilizes the TSD standardized range of discount rates, from 2.5 to 5 percent, to represent varying valuation of future damages.

AB 32 GHG Inventory Sectors

Table 3-9 presents the estimated social cost, in terms of avoided economic damages, for each measure of the Scoping Plan Scenario. For each measure, Table 3-9 includes the range of the SC-CO_2 and SC-CH_4 that results from the GHG emissions reductions in 2035 and 2045 at 2.5 and 5 percent discount rates. Additional background on the SC-GHG and methodology for calculating the SC-CO_2 and SC-CH_4 estimates in this Scoping Plan, as well as estimates for the alternatives, are provided in Appendix C (AB 197 Measure Analysis).

[237] Interagency Working Group on Social Cost of Greenhouse Gases. 2021. Technical Support Document. https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

[238] See *Louisiana v. Biden* (W.D. La. 2022) 585 F.Supp.3d 840, stayed pending review (5th Cir. Mar. 16, 2022) 2022 WL 866282. A federal district court ruling issued in early February 2022 had granted a preliminary injunction blocking the Biden Administration from using the interim IWG SC-GHG estimates. However, a federal appeals court overturned the lower court's preliminary injunction in March 2022, which allows the Biden Administration to continue using the policy as legal proceedings continue. CARB will continue to monitor the litigation. However, the federal action does not prohibit CARB from using social cost of carbon and CARB will use the best available science regardless of politics. A separate federal appeals court upheld the Biden administration's use of the IWG SC-GHG estimates in October 2022. *Missouri v. Biden* (8th Cir. 2022) ____ F.4th ____.

[239] Interagency Working Group on Social Cost of Greenhouse Gases. 2021. Technical Support Document. https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

Table 3-9: Estimated social cost (avoided economic damages) of measures considered in the Scoping Plan Scenario (AB 32 GHG Inventory sectors)

Measure	Social Cost of Carbon in 2035, 5%–2.5% Discount Rate Billion USD (2021 dollars)	Social Cost of Carbon in 2045, 5%–2.5% Discount Rate Billion USD (2021 dollars)
Deploy ZEVs and reduce driving demand	1.12–4.87	2.64–10.23
Coordinate supply of liquid fossil fuels with declining California fuel demand	0.61–2.63	0.95–3.67
Generate clean electricity	0.20-0.88	0.97–3.75
Decarbonize industrial energy supply	0.23–1.01	0.69–2.67
Decarbonize buildings	0.35–1.52	1.11–4.32
Reduce non-combustion emissions	0.51–1.29 (SC-CH_4)	0.86–2.01 (SC-CH_4)
Compensate for remaining emissions	0.61–2.66	2.03–7.84
Scoping Plan Scenario SC-CO_2	2.4–10.4	5.6–21.9
Scoping Plan Scenario SC-CH_4	0.51–1.3	0.86–2.0
Scoping Plan Scenario (Total)[a]	2.9–11.7	6.5–23.9

[a] CARB staff could not precisely separate some CO_2 and CH_4 from other GHGs from PATHWAYS outputs, but the contribution is believed to be small for purposes of calculating the social cost of carbon. The approach used to estimate GHG emissions reductions for individual measures in PATHWAYS does not reflect cross-sector interactions. Therefore, the GHG values for each measure do not sum to the overall scenario total. The total GHG emissions reduction used in this calculation is 97 $MMTCO_2e$ in 2035 and 180 $MMTCO_2e$ in 2045.

Natural and Working Lands

The SC-CO_2 estimates for the NWL measures shown in Table 3-10, in terms of avoided economic damages, reflect 2021 IWG interim values, updated for inflation, similar to the AB 32 GHG Inventory Sector analysis. This analysis utilizes the 2.5 percent and 5 percent

discount rate and the average annual emissions reductions from each NWL type from 2025–2045. Estimates for all alternatives are included in Appendix C (AB 197 Measure Analysis).

Table 3-10: Estimated social cost (avoided economic damages) of measures considered in the Scoping Plan Scenario (NWL)

Measure	Social Cost of Carbon in 2035, 5%–2.5% Discount Rate Billion USD (2021 dollars)	Social Cost of Carbon in 2045, 5%–2.5% Discount Rate Billion USD (2021 dollars)
Forests/Shrublands/Grasslands	0.003–0.012	0.004–0.014
Annual Croplands	0.006–0.027	0.008–0.031
Perennial Croplands	<0.001–0.001	0.000–0.001
Urban Forest	0.032–0.138	0.041–0.157
Wildland Urban Interface (WUI)	(0.018) – (0.080)[a]	(0.023) – (0.090)
Wetlands	0.011–0.046	0.014–0.053
Sparsely Vegetated Lands	<0.001	<0.001

[a] Parentheses indicate an increase in estimated social cost, i.e., an increase in economic damages. This is only the case for WUI measures where emissions are increased, shown in Table 3-6. The estimated social cost does not account for the decrease in wildfire risk or decrease in wildfire damages resulting from the WUI measures.

Social Costs of GHGs in Relation to Cost-Effectiveness

AB 32 includes a requirement that rules and regulations "achieve the maximum technologically feasible and cost-effective" greenhouse gas emissions reductions.[240] Under AB 32, *cost-effectiveness* means the relative cost per metric ton of various GHG reduction strategies,[241] which is the traditional cost metric associated with emission control. In contrast, the SC-CO_2, SC-CH_4, and social cost of nitrous oxide (SC-N_2O), because they are estimates of the cost to society of additional GHG emissions, can be used to estimate of the economic benefits of reducing emissions, but do not take into account the cost of the actions that must be taken to achieve those GHG emissions reductions.

There may be technologies or policies that do not appear to be cost-effective when compared to the SC-CO_2, SC-CH_4, and SC-N_2O associated with GHG reductions. However, these technologies or policies may result in other benefits that are not reflected in the IWG social costs. Examples include the evaluation of social diversification of the portfolio of transportation fuels (a goal outlined in the Low Carbon Fuel Standard) and reductions in criteria pollutant emissions from power plants (as in the Renewables Portfolio Standard). Additionally, costs for new technology may be higher early on in a technology's development cycle and may drop over time as use of the technology is scaled up.

Estimated Cost per Metric Ton

AB 197 requires an estimation of the cost-effectiveness of the measures evaluated for this Scoping Plan. The cost (or savings)[242] per metric ton of CO_2e reduced for each measure is one metric for comparing the performance of the measures. Additional factors beyond the cost per metric ton that could be considered include continuity with existing laws and policies, implementation feasibility, contribution to fuel diversity and technology transformation goals, and health and other benefits to California. These considerations are not reflected in the cost per metric ton estimates presented below. It is important to understand the relative cost-effectiveness of individual measures as presented in this section. However, the economic analysis presented earlier in this chapter, in Appendix H

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[240] AB 32 Air pollution: greenhouse gases: California Global Warming Solutions Act of 2006. (AB 32, Nuñez, Chapter 488, Statutes of 2006). https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200520060AB32.

[241] Health & Saf. Code § 38505(d).

[242] Similarly, to the direct costs reported earlier, the cost per metric ton of a measure reflects the stock costs and any fuel or efficiency savings associated with a measure divided by the GHG emission reduction achieved by the measure. Costs are reported as positive values, and savings are reported as negative values.

(AB 32 GHG Inventory Sector Modeling), and in Appendix I (NWL Technical Support Document) provides a more comprehensive analysis of how the Scoping Plan Scenario and alternative scenarios affect the state's economy and jobs.

AB 32 GHG Inventory Sectors

The cost per metric ton for the AB 32 GHG Inventory sectors was computed for each measure independently relative to the Reference Scenario using the sensitivity calculations based on PATHWAYS and RESOLVE outputs. The difference in the annualized cost between the Scoping Plan Scenario and the Reference Scenario was computed for each measure in 2035 and in 2045. The incremental cost was divided by the incremental GHG emissions impact to calculate the cost per metric ton in each year. To capture the fuel and GHG impacts of investments made from 2022 through 2035, or from 2022 through 2045, CARB computed an average annual cost per metric ton. The incremental cost in each year was averaged over the period. This value is divided by the corresponding annual, incremental GHG impact averaged over the same period.

The cost metric includes the annualized incremental cost of energy infrastructure, such as zero-emission vehicles, electric appliances, and required revenue to support all electric assets. A residual value for equipment such as vehicles or appliances that are retired early is included. The annual fuel cost or avoided fuel cost that results from efficiency improvements or changes to demand for fuels associated with transitioning to alternative fuels is included. Not included in this cost metric are costs that represent transfers within the state, such as incentive payments for early retirement of equipment.

It is important to note that this cost per metric ton does not represent an expected market price value for carbon mitigation associated with these measures. In addition, the values do not capture fuel savings or GHG reductions associated with the full economic lifetime of measures that have been implemented by the target date of 2035 or 2045 but whose impacts extend beyond the target date.

Table 3-11 includes the cost per metric ton and annual average cost per metric ton estimates for the Scoping Plan Scenario. The other alternatives are presented in Appendix C (AB 197 Measure Analysis). Measures that are relatively less costly in 2035 or 2045 are also less costly over the extended period. As noted earlier, incremental costs of new vehicles are generally offset by gains in efficiency and avoided fuel consumption resulting in negative cost per metric ton.

Table 3-11: Estimated cost per metric ton of reduced CO_2e relative to the Reference Scenario for measures considered in the Scoping Plan Scenario (AB 32 GHG Inventory sectors)

Measure	Annual Cost, 2035 ($/ton)	Average Annual Cost, 2022–2035 ($/ton)	Annual Cost, 2045 ($/ton)	Average Annual Cost, 2022–2045 ($/ton)
Deploy ZEVs and reduce driving demand	-171	-99	-103	-122
Coordinate supply of liquid fossil fuels with declining CA fuel demand	60	109	-50	39
Generate clean electricity[a]	101	156	145	161
Decarbonize industrial energy supply	290	217	257	274
Decarbonize buildings	235	230	112	213
Reduce non-combustion emissions	93	94	106	99
Compensate for remaining emissions	745	823	236	485

[a] Note: The denominator of this calculation (2045) does not include GHG reductions occurring outside of California resulting from SB 100. If these reductions were included, this number would be lower.

Natural and Working Lands

The cost per metric ton for NWL measures were computed for the Scoping Plan Scenario relative to the Reference Scenario using the projected carbon stock/sequestration data from the NWL modeling and the direct cost estimates for each management action, described earlier. Direct costs represent the cost of implementing a certain management action. The projected emissions reductions take into account the loss of carbon that results from the management action, such as fuels reduction treatments in forests, as well as climate change effects on growth. The direct cost for each NWL measure was divided by the average annual emission reductions presented in Table 3-6 to produce the cost

per metric ton. The increasing effect of climate change on diminished future growth reduces the ability of the land to sequester or store carbon, driving up the cost per ton.

It is important to note that this cost per metric ton does not represent an expected market price value for carbon mitigation associated with these measures. In addition, emissions benefits of NWL management actions often take longer time periods to accrue, and these values only capture GHG reductions up to 2045.

Table 3-12 includes the average cost per metric ton estimates for the average annual CO_2e reductions from 2025 through 2045 for the Scoping Plan Scenario. The other alternatives are presented in Appendix C (AB 197 Measure Analysis).

Table 3-12: Estimated average cost per metric ton of reduced CO_2e relative to the Reference Scenario for measures considered in the Scoping Plan Scenario (NWL)

Measure	Average Cost per Reduced Ton CO_2e ($/Ton)
Forests/Shrublands/Grasslands	15,500
Annual Croplands	1,100
Perennial Croplands	412
Urban Forest	3,270
Wildland Urban Interface (WUI)	N/A
Wetlands	64
Sparsely Vegetated Lands	451,000

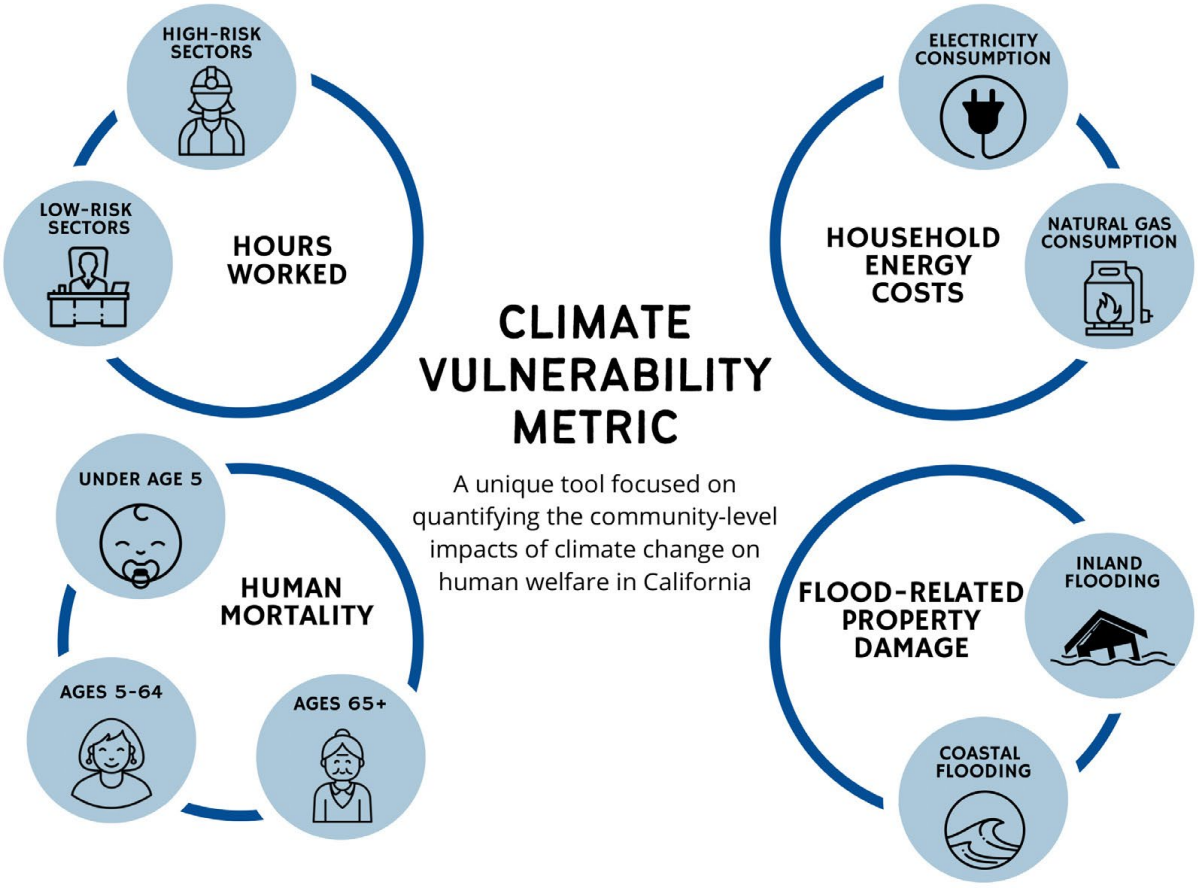
Climate Vulnerability Metric

As California invests in climate mitigation and adaptation, it is essential to understand that the relative impact of climate change will vary across the state's communities. Due to persisting health and opportunity gaps, not all communities are equally resilient in the face of climate impacts. A global metric such as the Social Cost of Carbon cannot adequately capture the incremental additional economic impact faced by overly burdened communities. The Climate Vulnerability Metric (CVM) is specifically focused on quantifying the community-level impacts of a warming climate on human welfare and the additional costs. Additional details and results are included in Appendix K (Climate Vulnerability Metric).

The CVM aggregates the impacts of climate change that can be quantified at the census tract level using robust and currently available research. The CVM includes the projected impacts of climate change on human welfare across four categories (hours worked, household energy costs, human mortality, and flood-related property damage) through midcentury. The CVM identifies nine components of the four climate impacts as shown in Figure 3-9 and aggregates the data to generate a total CVM result for each census tract. To ensure that the CVM represents the diversity of California communities, it is reported as the aggregate monetized impact of climate change as a percentage of census tract-specific incomes.[243] For example, a CVM value of 3 implies that by 2050, a census tract is projected to experience human welfare impacts of climate change that amount to 3% of annual income in that tract.

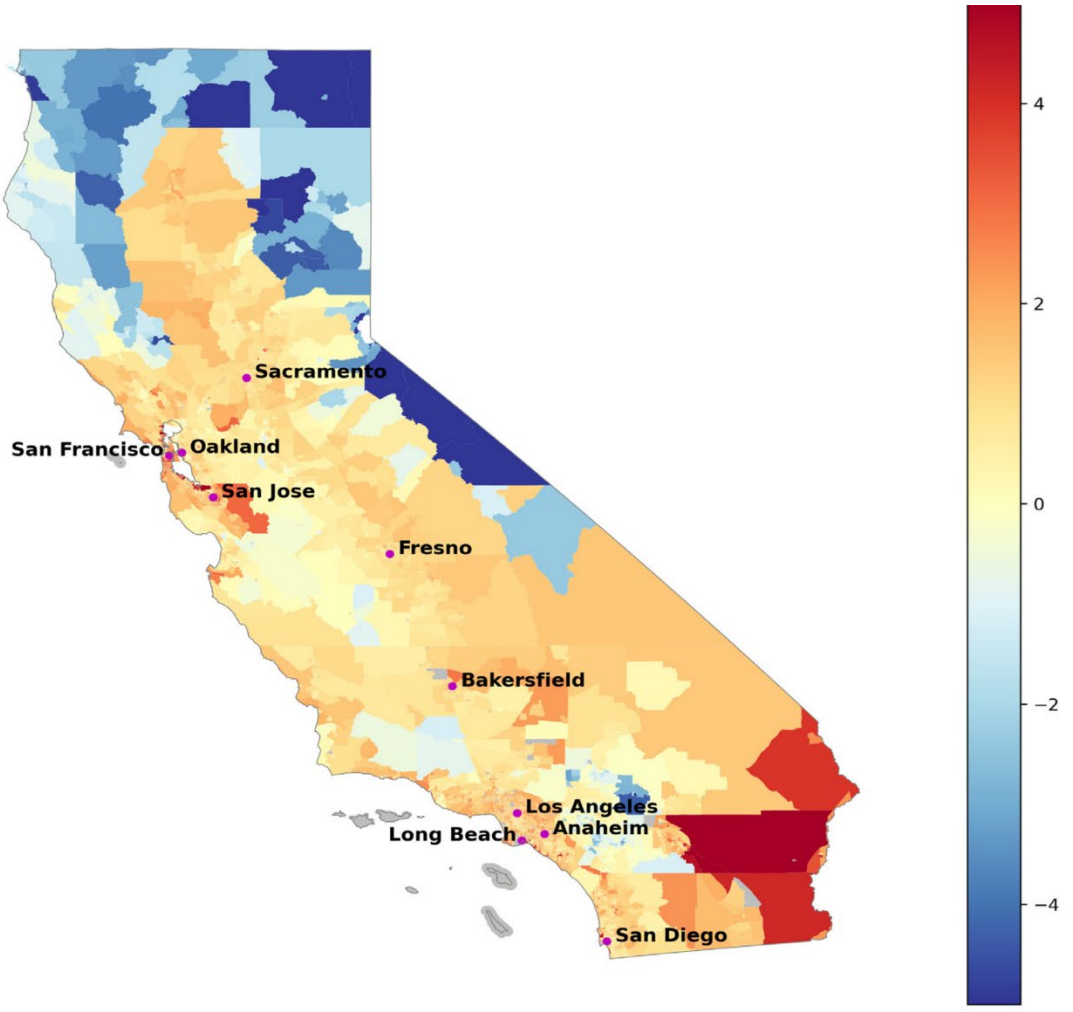
[243] Per capita income in 2019 for census tracts across California ranges from $633 to $176,388, with a median of $32,181 ($2019). Source: American Community Survey.

Figure 3-9: Categories of climate change impacts on human welfare included in the Climate Vulnerability Metric.



The CVM shows that climate change will have highly unequal impacts across California. While some southeastern regions of California are estimated to suffer damages that exceed 5% of annual income, other high-elevation northeastern regions of California are estimated to see benefits of up to 10%. Some low-lying urban areas, such as the San Francisco Bay Area, are estimated to be particularly vulnerable, while much of the Central Valley is estimated to suffer at least moderate economic damages relative to the rest of the state. It is important to note that the CVM does not set a threshold for vulnerability. Instead, it shows relative impacts across census tracts. The CVM is limited to the impacts that can currently be quantified at the census tract level.

Figure 3-10: Combined impacts of climate change in 2050 under a moderate emissions scenario; damages as share of 2019 tract income (%)



The map shows combined impacts of climate change in 2050 under a moderate emissions scenario (RCP 4.5), reported as a share of 2019 census tract income. For example, a CVM value of 3 implies that by 2050, a census tract is projected to experience human welfare impacts of climate change that amount to 3% of annual income. Impacts are combined across the categories shown in Figure 3-9. The higher the CVM for a given census tract, the more damaging the projected impacts of climate change on human welfare. Census tracts with high CVMs are represented by positive percentages in orange and red. A lower CVM is associated with lower projected impacts of climate change, shown in yellow, while a negative CVM value represents a projected beneficial impact of climate change (e.g., through reductions in deaths caused by extremely cold winter weather). Negative CVMs are represented by negative percentages in blue.

By providing information about how climate vulnerability varies across California (Figure 3-10), the CVM results can be used to direct resources to enhance resiliency in the state's

most vulnerable communities based on the specific impacts, such as heat or flooding, they are experiencing. The CVM may be used in combination with existing screening tools, such as CalEnviroScreen 4.0, to identify communities that face environmental and health hazards that contribute to disproportionate economic impacts in addition to climate vulnerability. The CVM can become an essential source of information to implement this Scoping Plan and build a more resilient, just, and equitable future for all communities.

Public Health

Health Analysis Overview

This section focuses on a broader evaluation of public health and climate change. Science demonstrates that taking action to address climate change presents one of the most significant opportunities to improve public health outcomes.[244] Transitioning to clean energy and technology and improving land and ecosystem management will lead to a much healthier future. Many actions to reduce GHG emissions also have health co-benefits that can improve the health and well-being of populations across the state, as well as address climate change. This section and the accompanying Appendix G (Public Health) provide a qualitative analysis of health benefits to accompany the quantitative health analysis included in this chapter, in Appendix C (AB 197 Measure Analysis), and in Appendix H (AB 32 GHG Inventory Sector Modeling). Together the qualitative and quantitative analyses of benefits are demonstrating the many ways that climate action and health improvements go hand in hand.

Climate change can lead to a wide range of direct health impacts such as increased heat-related illnesses (i.e., heat exhaustion and heat stroke), and injuries and deaths from extreme weather events or disasters (e.g., severe storms, flooding, wildfires). Indirect impacts include:

- more air pollution-related exacerbations of cardiovascular and respiratory diseases (e.g., due to increased smog, wildfire smoke)
- increased vector-borne and fungal diseases due to changes in the distribution and geographic range of disease-carrying species (e.g., mosquitoes, ticks, fungi in dust)
- negative nutritional consequences related to decreases in agricultural food yields
- stress and mental trauma due to extreme weather-related catastrophes
- anxiety, depression, and other mental health impacts associated with gradual changes in the climate (e.g., prolonged drought or temperature shifts affecting jobs and industries) that result in unemployment and income loss

[244] Watts, N., W. N. Adger, P. Agnolucci, et al. 2015. “Health and climate change: Policy responses to protect public health.” *Lancet* 386, 1861–1914.

- residential displacement and home loss (e.g., sea level rise impacting coastal communities)

Wildfires and wildfire smoke are one area where we have already seen and expect to see even further drastic impacts on the health of Californians. According to CalFire, since 1932 the top eight largest wildfires in California have occurred in the past five years (2017–2022), with 151 deaths due directly to fires during that period.[245] Researchers estimate that wildfire smoke during fall 2020 may have led to as many as 3,000 excess deaths, with at least 95% of Californians suffering unhealthy levels of particle pollution due to wildfires in 2020.[246] Continued climate change is projected to further increase smoke exposure from wildfires through the end of the century.[247] Wildfires also create a high-risk environment for outdoor workers, including agricultural workers. While the direct medical and physical health impacts are often most noticeable, the psychological impacts can develop and persist well after the event. Estimates indicate that 20%–65% of survivors of extreme weather events have mental health issues following the event.[248]

Extreme heat, drought, and associated worsened air quality impacts are among the most serious climate-related exposures affecting the health of Californians. Numerous studies find a wide range of adverse health effects accompanying extreme heat, including heat stroke and adverse birth outcomes, and find that extreme heat can harm most body systems. Climate change exacerbates air pollution problems that cause difficulty breathing and can lead to serious illness and death in many parts of California. Increasing temperatures cause increases in ozone and other pollution concentrations, including for California's most polluted regions, and heighten health risks for the vulnerable and marginalized populations living in these areas.[249] In 2020, there were 157 ozone polluted days across Los Angeles, Orange, Riverside, and San Bernardino Counties—the most days since 1997. In addition, particulate matter exposure is a heightened problem during

[245] California Department of Forestry and Fire Protection (CAL FIRE). "Stats and Events." *Cal Fire Department of Forestry and Fire Protection*, https://www.fire.ca.gov/stats-events/.
[246] G-FEED. 2020. Indirect mortality from recent wildfires in CA. *http://www.g-feed.com/2020/09/indirect-mortality-from-recent.html*.
[247] M. D. Hurteau, A. L. Westerling, C. Wiedinmyer, and B. P. Bryant. 2014. "Projected effects of climate and development on California wildfire emissions through 2100." *Environ. Sci. Technol.* 48, 2298–2304.
[248] American Public Health Association. 2019. Addressing the Impacts of Climate Change on Mental Health and Well-Being. Policy No: 20196. *https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2020/01/13/addressing-the-impacts-of-climate-change-on-mental-health-and-well-being*.
[249] American Lung Association. State of the Air 2021. *https://www.lung.org/research/sota*.

droughts, which are expected to increase over this century.[250,251] Worse air quality leads to illnesses, emergency room visits, and hospitalizations for chronic health conditions, including chronic obstructive pulmonary disease (COPD), asthma, chronic bronchitis, and other respiratory and cardiovascular conditions, as well as increased risk for respiratory infections, which all result in greater health costs to the state.[252,253,254] These and other climate-related health impacts are discussed in more detail in Appendix G (Public Health).

Health Analysis Components

This Scoping Plan health analysis focuses on the contrast between a California that is still dependent on a fossil fuel-based economy and a California that is transitioned to a carbon-neutral, clean energy future. This qualitative analysis evaluates and demonstrates the broad range of benefits of a dramatic reduction in fossil fuels by 2045 combined with healthier ecosystem management, comparing health outcomes for a "no-action" scenario (Reference) to a "take-action" decarbonization scenario. As this is a qualitative analysis, it looks more broadly at the public health benefits of a drastic reduction in fossil fuel combustion. While this analysis provides scientific evidence for Scoping Plan benefits based on achieving carbon neutrality by 2045, it does not analyze a specific scenario.

The key areas of focus for the analysis are: heat impacts, children's health and development, economic security, food security, mobility and physical activity, urban greening, wildfires and smoke impacts, and housing affordability. For each area of focus, the analysis covers the scientific evidence and compares expected health effects between the Reference and decarbonization scenarios. This analysis looks at the major health outcomes, provides directional effects for each health outcome, and where possible provides information on the strength and scale of health impacts. Some areas include quantitative information where tools are available to measure health outcomes. While the analysis is focused on health outcomes statewide, it also includes discussion

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[250] Cvijanovic, I., B. D. Santer, C. Bonfils, et al. 2017. "Future Loss of Arctic Sea-ice Cover Could Drive a Substantial Decrease in California's Rainfall." 8 *Nat. Commun.* 1947. https://doi.org/10.1038/s41467-017-01907-4.

[251] Williams, A. P., R. Seager, J. T. Abatzoglou, B. I. Cook, J. E. Smerdon, and E. R. Cook. 2015. "Contribution of anthropogenic warming to California drought during 2012–2014." *Geophysical Research Letters* 42(16), 6819–6828.

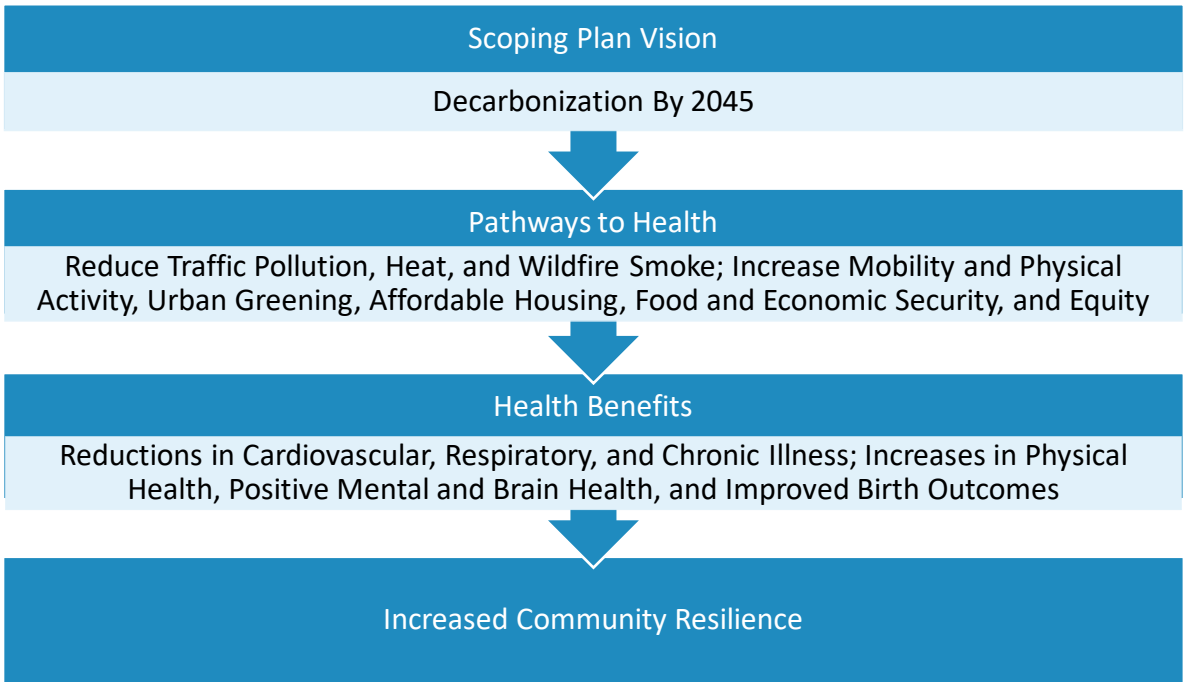
[252] Romley, J. A., A. Hackbarth, and D. P. Goldman. 2010. Cost and Health Consequences of Air Pollution in California. Santa Monica, California. RAND Corp. https://www.rand.org/pubs/research_briefs/RB9501.html.

[253] Wang, M., C. P. Aaron, J. Madrigano, E. A. Hoffman, E. Angelini, J. Yang, A. Laine, et al. 2019. "Association between long-term exposure to ambient air pollution and change in quantitatively assessed emphysema and lung function." *JAMA* 322(6), 546–556.

[254] Inserro, A. 2018. "Air Pollution Linked to Lung Infections, Especially in Young Children." *Am. J. Managed Care* (May 6). https://www.ajmc.com/view/air-pollution-linked-to-lung-infections-especially-in-young-children.

of benefits to community health and climate resilience, as well as potential inequities experienced at a community level. Figure 3-11 shows the co-benefit areas covered in this Scoping Plan and the path to health improvements and increased community resilience.

Figure 3-11: Scoping Plan outcome and the path to health improvements

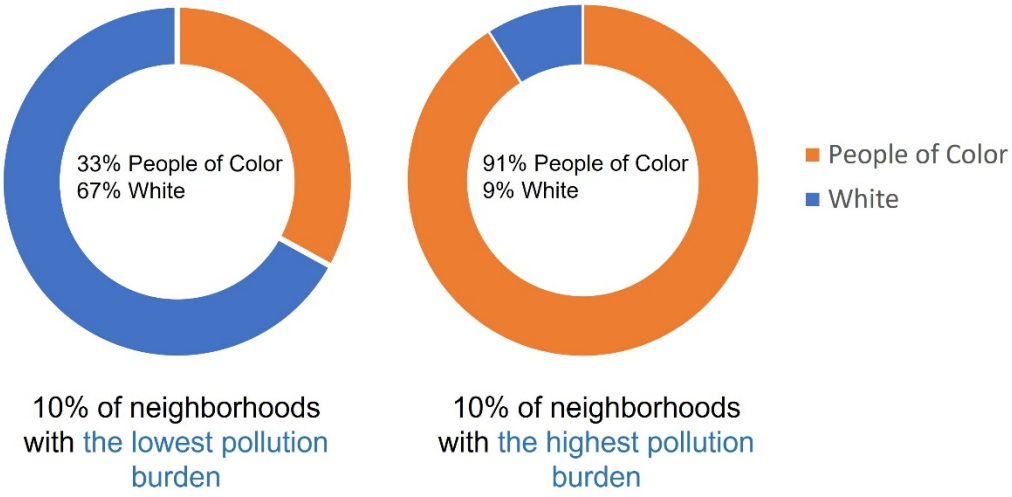


Social and Environmental Determinants of Health Inequities

Communities across the state do not experience exposure to pollution sources and the resulting effects equally. Low-income communities and communities of color (including Black, Latino and Indigenous communities) consistently experience significantly higher rates of pollution and adverse health conditions than others due to factors including historic marginalization rooted in systemic racism. As shown in Figure 3-12, the most impacted neighborhoods according to CalEnviroScreen (CES) are home to very high percentages of people of color while the least impacted neighborhoods are predominantly white. Recent findings show that Black Californians have 19% higher $PM_{2.5}$ exposure from vehicle emissions than the state average, and the census tracts with the highest $PM_{2.5}$ pollution burden from vehicle emissions have a high proportion of people of color.[255] Air pollutant emissions from mobile sources have disproportionate impacts on low-income communities and communities of color due to their proximity.[256] Diesel-fueled vehicles traveling on California's freeways and major roads expose nearby residents to pollution that is linked to lung cancer, hospitalizations and emergency department visits for chronic heart and lung disease, and premature death.[257,258] A combination of historical and social inequities are evident in communities of color disproportionately living close to freeways and other major sources of vehicle pollution. Environmental exposures and contaminants are one component of a broader set of social, economic, and environmental factors that can amplify health conditions, and the combination of all these factors can compound the health effects of individual exposures. This broader set of community factors can be referred to as "cumulative impacts." In addition, specific populations are more sensitive to pollution and face greater susceptibility. This includes young children, older adults, and individuals with existing health conditions.

[255] Reichmuth, D. 2019. *Inequitable exposure to air pollution from vehicles in California.* https://www.ucsusa.org/resources/inequitable-exposure-air-pollution-vehicles-california-2019.
[256] CARB. 2017. *California's 2017 climate change scoping plan.* https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.
[257] CARB. 2020. Overview: Diesel exhaust & health. https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health.
[258] Kagawa, J. 2002. "Health effects of diesel exhaust emissions—a mixture of air pollutants of worldwide concern." *Toxicology* 181–182:349–353.

Figure 3-12: Least and most impacted neighborhoods from CalEnviroScreen[259]



Social Determinants of Health Inequities

The physical and mental health of individuals and communities is shaped, to a great extent, by the social, economic, and environmental circumstances in which people live, work, play, and learn. According to the World Health Organization, these same circumstances—or social determinants of health—are "mostly responsible for health inequities: the unfair and avoidable differences in health status seen within and between countries." In fact, a strong body of research demonstrates that more than 50 percent of long-term health outcomes are the result of social determinants affecting an individual.[260] Race/ethnicity and socioeconomic status, for example, have been found to amplify impacts from long- and short-term environmental exposures for several health outcomes,

[259] The figure represents the top and bottom decile scoring of CalEnviroScreen census tracts for pollution burden. This chart is modified from Figure 2. Race in the Least and Most Impacted Census Tracts of CalEnviroScreen 4.0 in the Office of Environmental Health Hazard Assessment, California Environmental Protection Agency. Analysis of Race/Ethnicity and CalEnviroScreen 4.0 Scores. 2021. *https://oehha.ca.gov/media/downloads/calenviroscreen/document/calenviroscreen40raceanalysisf2021.pdf*.

[260] California Department of Public Health (CDPH). 2015. *The Portrait of Promise: The California Statewide Plan to Promote Health and Mental Health Equity.* A Report to the Legislature and the People of California by the Office of Health Equity. Sacramento, California. California Department of Public Health, Office of Health Equity.

such as mortality and birth outcomes.[261,262,263,264] Social factors combine in low-income communities and communities of color to create levels of toxic chronic stress and limit opportunities for healthy food and healthy lifestyles. Social factors also can cause health disparities through psychosocial pathways such as discrimination and social exclusion.[265] While the importance of social determinants is well known, measuring the specific and cumulative impacts of social determinants is challenging.

There are several important tools to evaluate and map cumulative impacts and factors contributing to the results of historical practices such as redlining, and these tools have been used for air quality and climate planning, community protection, and investments. CalEnviroScreen is a tool that maps cumulative pollution burdens and vulnerabilities on a statewide basis and ranks census tracts based on environmental, exposure, population, and socioeconomic indicators. An analysis using CES shows a direct, persistent relationship between exposure to environmental burdens and socioeconomic and health vulnerabilities affecting communities of color and historical redlining practices. OEHHA has evaluated health impacts of certain climate change policies on disadvantaged communities and communities of color utilizing CES rankings.[266] The Healthy Places Index (HPI) maps indicators that affect life expectancy on a statewide basis. In the future, these and other tools can be helpful to prioritizing investments and informing implementation efforts for GHG emission reductions policies.

Environmental Determinants of Health Inequities

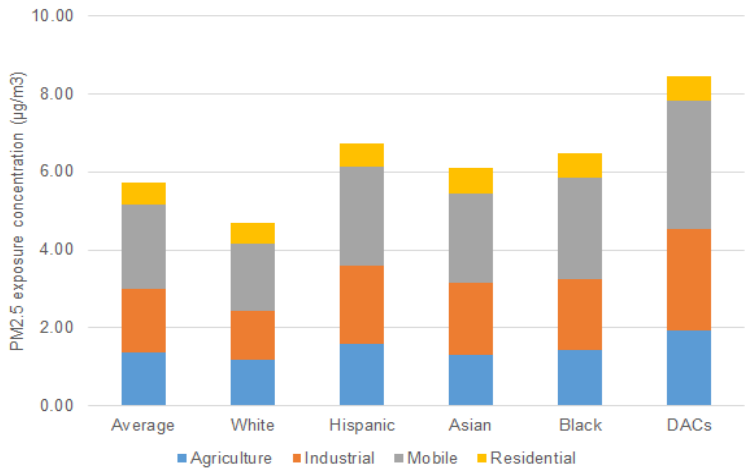
Communities with large percentages of Black and other socially vulnerable and marginalized groups are disproportionately located near pollution sources, such as traffic

[261] O'Neill, M. S., M. Jerrett, I. Kawachi, J. I. Levy, A. J. Cohen, N. Gouveia, et al. 2003. "Health, wealth, and air pollution: Advancing theory and methods." *Environ Health Perspect.* 111 (16): 1861–70.
[262] Ponce, N. A., K. J. Hoggatt, M. Wilhelm, and B. Ritz. 2005. "Preterm birth: The interaction of traffic-related air pollution with economic hardship in Los Angeles neighborhoods." *Am J Epidemiol.* 162 (2): 140–8.
[263] Morello-Frosch, R., B. Jesdale, J. Sadd, and M. Pastor. 2010. "Ambient air pollution exposure and full-term birth weight in California." *Environ Health.* 9: 44.
[264] Finkelstein, M. M., M. Jerrett, P. DeLuca, N. Finkelstein, D. K. Verma, K. Chapman, et al. 2003. "Relation between income, air pollution, and mortality: A cohort study." *CMAJ.* 169 (5): 397–402.
[265] Clougherty, J., and L. Kubzansky. 2009. "A framework for examining social stress and susceptibility in air pollution and respiratory health." *Environ Health Perspect.* 117 (9): 1351–8.
[266] OEHHA. 2022. *Impacts of Greenhouse Gas Emission Limits Within Disadvantaged Communities.* https://oehha.ca.gov/media/downloads/environmental-justice//impactsofghgpoliciesreport020322.pdf.

and freight facilities, industrial facilities, and hazardous waste sites.[267,268,269,270] Research shows large disparities in exposure to pollution between white and non-white populations in California, and between low-income and communities of color (Figure 3-13). The research also shows Black and Latino populations experience significantly greater air pollution impacts than white populations in California.[271] Additionally, Native Americans are disproportionately impacted by air pollution with high rates of exposure to industrial, diesel, and residential pollution sources and higher rates of diseases linked to air pollution.[272, 273]

[267] Mohai. P., P. M. Lanz, J. Morenoff, J. S. House, and R. P. Mero. 2009. "Racial and socioeconomic disparities in residential proximity to polluting industrial facilities: Evidence from the Americans' Changing Lives Study." *Am J Public Health.* 99 (Suppl 3): S649–56.
[268] Mohai, P., and R. Saha. 2007. "Racial inequality in the distribution of hazardous waste: A national-level reassessment." *Soc Probl.* 54 (3): 343–70.
[269] Morello-Frosch, R., M. Pastor, C. Porras, and J. Sadd. 2002. "Environmental justice and regional inequality in southern California: Implications for future research." *Environ Health Perspect.* 110 (Suppl 2): 149–54.
[270] Gunier, R. B., A. Hertz, J. von Behren, and P. Reynolds. 2003. "Traffic density in California: Socioeconomic and ethnic differences among potentially exposed children. *J Expo Anal Environ Epidemiol.* 13 (3): 240–6.
[271] Apte, J. S., S. E. Chambliss, C. W. Tessum, and J. D. Marshall. 2019. *A Method to Prioritize Sources for Reducing High $PM_{2.5}$ Exposures in Environmental Justice Communities in California.* CARB Research Contract Number 17RD006.
[272] Indigenous People and Air Pollution in the United States. A Report from the National Tribal Air Association and Moms Clean Air Force. 2021. *https://7vv611.a2cdn1.secureserver.net/wp-content/uploads/2021/04/indigenousairpollution_041421.pdf*
[273] National Tribal Air Association. 2022. Status of Tribal Air Report. Pg. 66. *https://7vv611.a2cdn1.secureserver.net/wp-content/uploads/2022/10/2022-NTAA-Status-of-Tribal-Air-Report.pdf*.

Figure 3-13: Top sources of $PM_{2.5}$ and their contribution to $PM_{2.5}$ exposures by race and in disadvantaged communities



These disparities in exposure to pollution sources generate health inequities. Communities located near major roadways are at increased risk of asthma attacks and other respiratory and cardiac effects. Studies consistently show that mobile source pollution exposure near major roadways or freight sources contributes to and exacerbates asthma, impairs lung function, and increases cardiovascular mortality.[274] The exposure to mixtures of gaseous and particulate pollutants in mobile sources (including PM, NO_x, and benzene) is associated with higher rates of heart attacks, strokes, lung cancer, autism, and dementia.[275]

Environmental hazards found in communities also can include exposures to toxic substances and emissions, as well as occupational exposures. Due to historical inequities, under-resourced communities and communities of color are often located close to sources of toxic pollution, including chrome platers; metal recycling facilities; oil and gas operations; agricultural burning; railyards; facilities transporting, managing, or disposing of hazardous waste; and areas impacted by pesticides, among others. Some populations may be at increased risk of exposure to pollutants, both at work and home.

Children are more susceptible to environmental pollutants for many reasons, including the ongoing development of their nervous, immune, digestive, and other bodily systems. Moreover, children eat more food, drink more fluids, and breathe more air relative to their

[274] U.S. Environmental Protection Agency website. How Mobile Source Pollution Effects Your Health. https://www.epa.gov/mobile-source-pollution/how-mobile-source-pollution-affects-your-health.
[275] USC Environmental Health Centers. 2018. Living Near Busy Roads or Traffic Pollution. https://envhealthcenters.usc.edu/wp-content/uploads/2016/10/living-near-bus_19696172.pdf.

body weight, as compared to adults.[276] Exposure to high levels of air pollutants, including indoor air pollutants, increases the risk of respiratory infections, heart disease, and asthma.[277] Children living in low-income communities near industrial operations, rail yards, and heavily trafficked freeways and streets in urban areas are at especially high risk of chronic respiratory conditions. Black children are four times more likely to be hospitalized for asthma compared with white children, and urban Black and Latino children are two to six times more likely to die from asthma than white children.[278] Native American children also experience more impacts from asthma and Native American children, along with Black children, have the highest prevalence of asthma.[279]

For older adults, increased vulnerability is linked to respiratory, cardiovascular, and immune systems weakened by aging.[280] Preexisting health conditions interact with environmental pollutants to enhance risks of adverse health outcomes.[281,282] The recent COVID-19 pandemic has highlighted the heightened vulnerability of older adults as well as communities of color to respiratory disease, as hospital admissions and mortality data linked to COVID-19 cases for these groups have been higher than other groups. Research has also underscored the important link between COVID-19 mortality and morbidity and air pollution, demonstrating significantly higher mortality and morbidity for COVID-19 in areas of elevated $PM_{2.5}$ pollution.

Climate Vulnerabilities

Climate change is expected to exacerbate the existing disparities of health conditions and worsen climate vulnerability, which is the degree to which natural systems and people or

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[276] Blaisdell, R. J. Air Toxics Hot Spots Program Risk Assessment Guidelines. 2012. Technical Support Document for Exposure Assessment and Stochastic Analysis. Oakland, California: California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. August.
[277] Woodruff, T. J., D. A. Axelrad, A. D. Kyle, O. Nweke, and G. G. Miller. 2003. *America's Children and the Environment: Measures of Contaminants, Body Burdens, and Illness.* 2nd ed. Washington, D.C.: United States Environmental Protection Agency. February.
[278] California Department of Public Health. Asthma Inequities in California Children. 2021. *https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHIB/CPE/CDPH%20Document%20Library/CA_Asthma_Inequities_Children_2021-Infographic.pdf*.
[279] Meng, Y., S. H. Babey, T. A. Hastert, and E. Brown. 2007. California's Racial and Ethnic Minorities More Adversely Affected by Asthma. UCLA: Center for Health Policy Research. Retrieved from *https://escholarship.org/uc/item/4k45v3xt*.
[280] Sandström, T., A. J. Frew, M. Svartengren, and G. Viegi. 2003. "The need for a focus on air pollution research in the elderly." *Eur Respir J Suppl.* 40: 92s–5s.
[281] Zanobetti, A., and J. Schwartz. 2001. "Are diabetics more susceptible to the health effects of airborne particles?" *Am J Respir Crit Care Med.* 164 (5): 831–3. *https://www.atsjournals.org/doi/pdf/10.1164/ajrccm.164.5.2012039*.
[282] Zanobetti, A., J. Schwartz, and D. Gold. 2000. "Are there sensitive subgroups for the effects of airborne particles?" *Environ Health Perspect.* 108 (9): 841–5.

communities are at risk of experiencing the negative impacts of climate change.[283] A report from the California Climate Change Center warned that the impacts of climate change will likely create especially heavy burdens on low-income and other vulnerable populations: "*Without proactive policies to address these equity concerns, climate change will likely reinforce and amplify current as well as future socioeconomic disparities, leaving low-income, minority, and politically marginalized groups with fewer economic opportunities and more environmental and health burdens*."[284]

In the U.S. Environmental Protection Agency's "Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts,"[285] investigators analyzed risks of six primary climate change impacts disproportionately affecting communities across income, educational attainment, race/ethnicity, and age groups. Four socially vulnerable populations—low income, communities of color, no high school diploma, and age 65 and older—were identified as having a higher likelihood of experiencing the greatest impacts of a changing climate (according to the projected 2°C of global warming or 50 centimeters of global sea level rise). Disproportionate impacts were projected for climate events, including air quality, extreme temperature, coastal flooding, and other impacts, leading to increased risk of health and other adverse outcomes. The study projected significant health impacts for low-income communities, certain racial and ethnic subgroups, and those with lower educational attainment.

Several climate vulnerability tools have been developed or are under development to better understand and map areas at higher risk of climate impacts. The Climate Change and Health Vulnerability Indicators (CCHVIs) for California helps state and local health officials prepare for and reduce adverse health impacts due to a changing climate.[286] For example, Los Angeles County shows higher than state average climate vulnerability overall, particularly for those who are linguistically isolated (more than twice the state average).

In summary, there are many environmental, social, individual, and economic factors affecting health and equity in California and contributing to worsening health outcomes from climate change impacts. This section and Appendix G (Public Health) reference a substantial and growing body of research documenting the different social and

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[283] OPR. 2018. Defining Vulnerable Communities in the Context of Climate Adaptation. *https://opr.ca.gov/docs/20180723-Vulnerable_Communities.pdf*.

[284] Shonkoff, S., R. Morello-Frosch, M. Pastor, and J. Sadd. 2011. "The climate gap: environmental health and equity implications of climate change and mitigation policies in California—A review of the literature." *Climatic Change* 109 (Suppl 1): S485–S503.

[285] U.S. EPA. 2021. Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts. U.S. Environmental Protection Agency. EPA 430-R-21-003.

[286] CDPH. 2022. Climate Change and Health Vulnerability Indicators for California. California Department of Public Health. *https://www.cdph.ca.gov/Programs/OHE/Pages/CC-Health-Vulnerability-Indicators.aspx*.

environmental factors affecting health outcomes and the many groups that are vulnerable to increased effects or that experience health inequities in California (see Table 3-13).

Table 3-13: Examples of vulnerable groups due to socioeconomic, environmental, developmental, and climate change factors

Examples of Vulnerable Groups Due to Socioeconomic, Environmental, Developmental, and Climate Change Factors		
Older People	People with Existing Chronic Illness	People Impacted Due to Working Conditions
Tribal Groups	Infants and Children	Low-Income People
People with Disabilities	People Experiencing Homelessness	Pregnant People
Communities of Color	Marginalized People	Immigrants/Refugees
People with Less Educational Options	Linguistically Isolated Households	People Impacted Due to Poor Housing Conditions

Summary of the Qualitative Health Analysis

CARB has developed a detailed health analysis that covers eight social and environmental co-benefit areas that impact public health (listed below). These co-benefit areas were selected due to ongoing research in these areas as well as discussion in a public workshop on climate change and health impacts held in summer 2018. For each social and environmental area, the analysis includes:

- a discussion of health impacts and disparities,
- key health metrics or epidemiological research on this topic,
- a discussion of how these areas would be affected by "no-action" (i.e., Reference) scenario compared to a "take-action" (i.e., Scoping Plan) scenario
- a discussion of where there are actions to consider for further success, and
- the types of mitigation actions that can help reduce or eliminate disparities and promote greater health equity and resilience.

All co-benefit areas are interconnected, and pursuing benefits in all areas has the potential to multiply positive results and further support building community resilience. *Community resilience* is the ability of a community to reduce harm and maintain an acceptable quality of life in the face of climate-induced stresses, which vary depending on that community's circumstances and location. Below is a brief description of the areas evaluated for public health co-benefits. The specific health outcomes impacted by each

area, as well as the directional health benefits, are included in the Summary of Health Benefits section of the chapter and covered in more detail in Appendix G (Public Health).

Heat Impacts

Globally, increased GHG concentrations in the atmosphere are causing a continuing increase of the planet's average temperature. California temperatures have risen since records began in 1895, and the rate of increase is accelerating. Recent heat waves have broken heat records and caused serious illness across the state, and these events are becoming more frequent. Heat waves have a particularly high impact in Southern California, where they have become more intense and longer lasting. In the past two years, Los Angeles recorded 121°F, and the Coachella Valley had its hottest year ever, with temperatures reaching 123°F. Heat island effects in urbanized areas can elevate heat effects and disproportionately affect low-income communities and communities of color. Heat events exacerbate respiratory and cardiac illness and cause emergency room visits to soar. Strategies that reduce the impacts of heat exposure promote improved health outcomes.

Wildfires and Smoke

California's NWL cover more than 90 percent of California and include rangeland, forests, woodlands, grasslands, and urban green space. They provide biodiversity and ecosystem benefits, including their ability to sequester carbon from the atmosphere. Protecting and managing California's forests and other natural lands and maintaining their ecosystem health are key practices for maximizing GHG benefits and minimizing negative climate change impacts. Vegetation plays an important role in storing carbon; however, it can also release CO_2 back into the atmosphere when it dies or is burned by fires. California's wildfires are getting worse with increased fire risks, higher frequency of occurrence, larger burn areas, more costly damage, and a longer fire season due to climate change. Strategies that promote healthy ecosystem management of natural and working lands and increased urban greening promote improved health outcomes. Healthy ecosystems provide many health and environmental benefits and can maximize carbon sequestration.

Children's Health and Development

There are a wide range of interconnected environmental, social, biological, and community factors associated with climate change that are adversely affecting children's health. This section focuses on air pollution and near-roadway or traffic pollution as environmental impacts that have a profound effect on children's health. Children's bodies and lungs are still developing, and they take in more air per body weight than adults do. Many low-income communities and communities of color in California experience disproportionately high levels of air pollution, as well as high levels of traffic and freight that impact children. This excess exposure harms children's development and

predisposes them to increased risk of illness throughout their lives. Strategies that reduce air pollution and traffic emissions promote improved health outcomes for children.

Economic Security

Climate change is expected to result in serious adverse socioeconomic effects across many sectors. Economic factors, such as income inequality (among geographic regions), poverty, wealth, debt, unemployment rate, and job security are among the strongest determinants of health. Along the entire income spectrum, higher income is associated with increased life expectancy and improved health outcomes in the United States. Additionally, economic insecurity and negative health impacts are more pronounced in low-income communities and communities of color. Economic strategies, such as the promotion of clean energy and other green jobs and investments in low-income communities and communities of color, and promoting a transition to high road jobs in economic sectors tied to the current fossil fuel economy, can promote improved health outcomes.[287]

Food Security

The food system is under pressure from numerous factors, and climate change is a key concern. Climate change can affect food production and agricultural yield, impact culturally significant plants and animals for Native American tribes, and exacerbate factors that limit food availability, such as supply chain disruption. Food security is defined as stable access to affordable, sufficient food for an active, healthy life. Many Californians routinely experience food insecurity, and while that impacts Californians of all races and groups, low-income communities and communities of color and children are disproportionately affected by food insecurity. Many Native Americans depend on resources from the land, such as animals and plants for consumption and cultural practices. Strategies that promote sustainable agriculture, access to healthy foods, and reduced organic food waste promote improved health outcomes.

Mobility and Physical Activity

Physical activity is one of the most important factors for a healthy lifestyle, and lack of activity increases the risk of chronic illness and premature death. Research shows that regular physical activity improves health in people of all ages by improving heart and lung

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[287] According to the California Labor and Workforce Development Agency's High Road Training Partnership program, high road jobs are considered "Quality jobs [that] provide family-sustaining wages, health benefits, a pension, worker advancement opportunities, and collective worker input and are stable, predictable, safe and free of discrimination." *https://cwdb.ca.gov/wp-content/uploads/sites/43/2020/08/OneSheet_Job-Quality_ACCESSIBLE.pdf*.

function, muscle fitness, mental health and brain function, and sleep quality. A sedentary lifestyle contributes to chronic illnesses, including obesity, heart disease, and Type 2 diabetes among other chronic illnesses. Promoting community design that supports sustainable patterns of land use and transportation enables active transportation choices like walking, biking, and public transit over driving, and can significantly increase physical activity, leading to many valuable health benefits.

Affordable Housing

Housing is an important social determinant of health. The stability of housing, housing quality, conditions inside and outside the home, the cost of housing, and the environmental and social characteristics of the places people live all affect health (including energy efficiency and insulation, cooler building material, tree canopy, home size). Housing affordability is a key factor, and this section highlights how housing affordability supports not only improved health but also more sustainable land use and transportation patterns. A lack of affordable housing is increasing commute distances for low-income renters and creating health burdens. Strategies that support sustainable transportation and housing patterns, together with increased housing affordability, promote improved health outcomes.

Urban Greening

Urban Greening is well recognized as an important amenity, but the inherent health benefits are not always well understood. Under-resourced and vulnerable areas consistently show a lack of urban greening and higher percentages of concrete, asphalt, and impervious surfaces. Under-resourced communities have a greater proportion of concrete and heat-trapping surfaces and a lower amount of tree cover in the neighborhoods in which they live. Areas with reduced urban greening have the potential to create areas of higher temperatures as heat is reflected from pavements and buildings. By contrast, increasing urban greening can provide air pollution buffers and promote physical activity. Strategies that preserve and create urban parks, green space, natural infrastructure, and sustainable agricultural practices support improved physical and mental health outcomes.

No Action Scenario (Reference)

In a no-action scenario, California would remain dependent on fossil fuels and other GHG emitting technologies. Fossil-fuel powered mobile sources including cars, trucks, trains, tractors, and a myriad of other on-road and off-road vehicles and equipment are the largest source of criteria pollutants and toxic air contaminants that directly affect

community health and contribute the largest portion of GHG emissions.[288] Other key GHG emission sources include buildings, natural and working lands, and power production and industry. The no-action scenario reflects a continued reliance on fossil fuels in mobile and stationary sectors, including buildings. The continued production and use of fossil fuels; ongoing dependence on gasoline and diesel cars, trucks, buses, and equipment; continued releases of short-lived climate pollutants; and decreased emphasis on forest and ecosystem health will impact communities by reducing climate resilience and health benefits. Green space will likely remain at the same levels or degrade, and urban heat islands will likely increase. With continued growth of vehicle miles traveled, physical activity and the accompanying health benefits will not increase.

Exposure to wildfire smoke will increase, and air quality is expected to worsen as rising temperatures will increase levels of harmful air pollution. Jobs and economic security will be affected by the continuing potential for price spikes in fossil fuels, impacts to the economy from climate change, and fewer job opportunities in green technologies such as solar and electric vehicles. Food security in California will decrease due to the effects of accelerating climate impacts to agriculture; and without increased recovery of organic waste, including food products, food security will continue to decline under a no action scenario. All these impacts can be linked to worse health outcomes. Adverse health impacts are often most felt by Black, Latino, Native American, and other people of color and in low-income communities. These groups are affected more intensely by the physical stress of environmental pollution, social inequities, and the psychological stress of extreme weather events and food and economic insecurity.

Take Action Scenario

In the Take Action scenario, California will drastically reduce reliance on fossil fuels for motor vehicles, freight, buildings, electricity, or other sectors. This scenario is not a specific scenario within this Scoping Plan but examines the broad outcomes of actions to achieve carbon neutrality in 2045. Implementation of this Scoping Plan would achieve a transition to ZEVs, with 100% sales of light-duty ZEVs by 2035 and 100% sales of zero emission trucks by 2040, along with 30% VMT reductions below 2019 levels by 2045. State and local action that supports sustainable land use and transportation patterns and enables more transit and active transportation will lead to substantial health benefits from physical activity, including reduced illness and deaths.

[288] CARB. 2022. *California Greenhouse Gas Emissions for 2000 to 2020.* *https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf*.

The economic benefits of improved health through active transportation can be modeled using the Healthy Mobility Options Tool (HMOT).[289] In order to demonstrate the important health and economic benefits of VMT reduction, CARB and CDPH used the HMOT to analyze an illustrative trip reduction scenario for 2050 from the California Transportation Plan (CTP). The CTP has a goal of increasing active modes of travel and transit from the current level of 13 percent to a level of 23 percent of all travel trips. While the CTP goal of 23 percent for active modes of travel is not a VMT reduction target, the scenario increases active transportation through a mix of changes in land use planning for increased transportation options, including increases in biking, walking, and transit use, and it helps to show the health benefits of increased active transportation. By achieving the CTP 2050 goals, nearly 8,000 deaths would be avoided in 2050 alone (see Figure 3-14), along with significant reductions in chronic diseases. Achieving this would rank among the top public health accomplishments (see Appendix G [Public Health] for additional modeling results and detailed discussion).

The dramatic reduction in fossil fuel combustion, combined with reductions in VMT and freight and traffic emissions projected in this Scoping Plan will significantly reduce air pollution and its associated health impacts on a statewide basis and in communities near freight sources. Coordinated action strategies will emphasize natural and working lands management changes, including healthy forests, increased vegetative cover, and increased organic farming. Wildfire smoke exposure will reduce significantly with healthy ecosystem management strategies. Since many communities in California are disproportionately impacted by high levels of traffic pollution, the reduction in petroleum fueled vehicles will reduce the additional impacts of living or going to school near historically highly polluting sources. Indoor air quality is also likely to improve through a shift to non-fossil fuel appliances. Concerted state and local action to support sustainable land use and transportation patterns can enable more active transportation with health benefits from physical activity.

[289] ITHIM California. 2020. Transportation Planning for Health, Equity, and Climate Change. *https://skylab.cdph.ca.gov/HealthyMobilityOptionTool-ITHIM/*.

Figure 3-14: Quantified health benefits of active transportation from increased physical activity

*Calculated by the Healthy Mobility Options Tool, active transportation (including walking, rolling, cycling, and taking public transit) from the California Transportation Plan 2050 compared to business as usual for 2050.

Overall community resilience is expected to increase as physical activity and green space increases—potentially decreasing urban heat islands. Efforts to support VMT reduction will include coordination across state agencies on affordable housing measures. Reduced fossil fuel dependence will reduce economic pressure from wildfires, droughts, and price spikes in fossil fuels, especially as more jurisdictions implement plans with similar actions. Investment in sustainable agriculture, healthy forests, urban greening, and clean energy technologies will add sustainable jobs and further promote economic security. More sustainable agriculture and food recovery efforts will add to food security. All these impacts can be linked to wide ranging health benefits, including positive respiratory and cardiovascular effects, healthier birth and brain outcomes, improved mental health indicators, improved life expectancy, reductions in chronic illness and cancers, improved children's health and development, reduced depression, and other benefits. The magnitude of the possible co-benefits is extremely large, especially in areas that are currently the most affected.

Summary of Health Benefits

Below, Tables 3-14 and 3-15 show overall summaries of the directional benefits by co-benefit area estimated for this Scoping Plan. The supporting epidemiological studies used for qualitative or quantitative analysis of each co-benefit area are included in Appendix G (Public Health). Another section of Chapter 3, together with Appendix C (AB 197 Measure Analysis) and Appendix H (AB 32 GHG Inventory Sector Modeling), also includes the quantitative analysis of air pollution related health impacts, including recently added health endpoints for CARB's ongoing analysis.

Table 3-14: Scoping Plan directional benefits for health co-benefit areas (heat, affordable housing, food security, economic security, and urban greening)

Health Co-benefit Areas*					
Quantitative vs. Qualitative	**Reduced Heat Impacts**	**Increased Affordable Housing**	**Increased Food Security**	**Increased Economic Security**	**Increased Urban Greening**
Research was used for Qualitative Analysis	↓ Mortality ↓ Emergency Room Visits for cardiovascular and respiratory causes and intestinal infections ↓Hospitalization for cardiovascular, respiratory causes ↓ Preterm Birth ↓ Mental Illness	↓ Infectious Disease ↓ Chronic Illness ↓ Asthma ↓ Injuries ↓ Mental Illness ↑ Children's Performance in Schools ↑ Children's Health ↓ Children's Behavioral Problems	↓ Mental Illness ↓ Iron Deficiency ↓ Chronic Diseases ↑ Life Expectancy ↓ Children's Mental Illness ↓ Children's Cognitive Problems ↓ Children's Behavioral Health Problems ↓ Children's Iron Deficiency ↓ Children's Oral Health Problems	↑ Life Expectancy ↑ Health Status ↑ Mental Health	↓ Mortality ↓ Asthma Prevalence ↓ Depression ↓ Adverse Birth Outcomes including low birth weight and small for gestational age ↑ Life Expectancy

*See Appendix G (Public Health) for a table with references to research for each health outcome listed.

Table 3-15: Scoping Plan directional benefits for health co-benefit areas (traffic pollution, wildfire, and active transportation)

Health Co-benefit Areas*			
Quantitative vs. Qualitative	**Reduced Traffic Pollution**	**Reduced Wildfire Smoke**	**Increased Active Transportation**
Research was used for Quantitative Analysis	↓ Children's Respiratory Outcomes, Hospital Admissions ↓ Children's Respiratory Outcomes, Emergency Room Visits ↓ Children's Asthma Onset ↓ Children's Asthma Symptoms	↓ All-Cause Mortality ↓ Asthma, Hospital Admissions ↓ COPD, Hospital Admissions ↓ All Respiratory Outcomes, Hospital Admissions ↓ Asthma, Emergency Room Visits ↓ All Respiratory Outcomes, Emergency Room Visits ↓ All Cardiac Outcomes, Emergency Room Visits	↓ Cardiovascular Diseases ↓ Colon Cancer ↓ Breast Cancer ↓ Diabetes ↓ Dementia ↓ Lung Cancer ↓ Respiratory Disease ↓ Depression ↑ Traffic Accidents
Research was used for Qualitative Analysis	↑ Children's Lung Function Growth ↓ Children's Bronchitic Symptoms ↓ Children's Impaired Cognitive Development ↓ Children's Adverse Birth Outcomes, including low birth weight and preterm birth		

*See Appendix G (Public Health) for a table with references to research for each health outcome listed.

In summary, the qualitative health analysis of the No-Action versus Take-Action scenarios for this Scoping Plan shows an overwhelming benefit for the state by taking action to move forward to carbon neutrality while continuing efforts to increase health equity and resilience in individual communities. Taking action can improve physical and mental health for adults and children, reduce a range of chronic illnesses, and promote improvements in life expectancy. Development and implementation of actions to achieve the outcomes called for in this Scoping Plan should consider how to engage affected communities in implementation, address the existing health and opportunity gaps, and pursue equitable implementation statewide and locally. This Scoping Plan deployment of clean technology and fuels, together with improved land management, will reduce GHGs and air pollution and create more resilient communities that are better able to prepare for and recover from extreme climate events.

Environmental Analysis

In May 2022, CARB, as the lead agency for the Scoping Plan, released for public review the Draft Environmental Analysis (Draft EA) for this Scoping Plan; it assessed the potential environmental impacts of implementing the Scoping Plan. CARB circulated the Draft EA for public review and comment for a period of 45 days that began on May 10, 2022, and ended on June 24, 2022. CARB held a public hearing on June 23, 2022 to provide the opportunity for public comment. During the review period, written and oral comments were received on the Draft EA. CARB reviewed the comments to identify environmental topics and began preparation of responses to those comments.

After the end of the Draft EA public review period, CARB identified potential revisions to certain aspects of this Scoping Plan that merit revisions to the project description. This new information results from, among other things, revisions to the project description regarding energy sector goals (including offshore wind), revised carbon removal targets, and additional strategies for natural and working lands. CARB released a Recirculated Draft EA for a written public comment period that started September 9, 2022, and ended on October 24, 2022. See Chapter 2 of the Recirculated Draft EA[290] for further information regarding the changes. The Recirculated Draft EA assesses the potential for significant adverse and beneficial environmental impacts associated with all proposed actions in this Scoping Plan, and provides a programmatic environmental analysis of the reasonably foreseeable compliance responses that could result from implementation of the Scoping

[290] CARB. 2022. Recirculated Draft EA. *https://ww2.arb.ca.gov/sites/default/files/2022-09/2022-draft-sp-appendix-b-draft-ea-recirc.pdf*.

Plan.[291] The Recirculated Draft EA concluded implementation of this Scoping Plan could result in the following:

- Beneficial impacts to: air quality (long-term operational-related) and GHG emissions (short-term construction-related and long-term operational-related)
- Less than significant impacts to: energy demand, mineral resources, population and housing, public services, recreation (short-term construction-related), and wildfire (short-term construction-related)
- Potentially significant and unavoidable adverse impacts to: aesthetics, agriculture and forest resources, air quality (construction-related and operational odors), biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, recreation (long-term operational-related), transportation and traffic, tribal cultural resources, utilities and service systems, and wildfire (long-term operational-related

Before the public meeting at which the Board will consider this Scoping Plan Update, CARB will publish the Final EA as Appendix B (Final Environmental Analysis) to this Scoping Plan, along with written responses to timely submitted comments raising significant environmental issues received on the Draft EA and the Recirculated Draft EA, which will be presented to the Board for consideration.

[291] The Recirculated Draft EA is available at *https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents*.

Chapter 4: Key Sectors

Chapter 4 provides an overview of the major energy sources and technology in use today, and of alternative clean technology and fuels to support decarbonization based on the latest information available. Every sector of the economy will need to begin to transition in this decade to meet our GHG reduction goals and achieve carbon neutrality no later than 2045. AB 32 requires climate change mitigation policies to be considered in the context of the sector's contribution to the state's total GHG emissions. The transportation, electricity (in-state and imported), and industrial sectors are the largest contributors of GHGs in the state and present the largest opportunities for GHG reductions. Actions to reduce fossil fuel combustion in these sectors also can provide critical air pollution reductions in low-income communities and communities of color, which are often located adjacent to these sources. A carbon neutrality framework also elevates the role of CO_2 removal through natural and working lands and mechanical capture and storage. Actions that support energy efficiency, reduced VMT, alternative fuels, and renewable power also can provide benefits by reducing both criteria and toxic air pollutants.

What sets this plan apart from previous Scoping Plans is the focus on the accelerated rate of deployment of clean technology and energy within every sector. As a result, specific actions, including accelerated rates of deployment of clean technology and fuels identified within this Scoping Plan, will need to be translated into both new and amended regulations, policies, and incentive programs. State agencies will need to evaluate current authority to align existing policies or develop new ones to achieve outcomes called for in this Scoping Plan. Legislative support may be needed in some cases to ensure authority and funding is sufficient to ensure this Scoping Plan is translatable to action on the ground. Most regulations, or change to existing regulations, ultimately considered by the Board or other state agencies for adoption will be subject to administrative procedure requirements. Accordingly, they must rely on specific subsequent supporting analysis and extensive public processes and consultations with interested tribes to develop and identify appropriate proposals for effective implementation. For example, any proposal to strengthen the LCFS regulations through amendments increasing the stringency of the carbon intensity (CI) targets would be considered on the basis of a public process, including workshops, and focused environmental, economic, and public health analyses.

Policies that ensure economy-wide investment or program decisions that incorporate consideration of GHG emissions are particularly important. As we pursue GHG reduction targets, we must acknowledge the manner in which built and natural environments are connected, how changes in one may impact the other, and how policy choices in one sector can and do impact other sectors. For example, fostering more compact, transportation-efficient development in infill areas and increasing transportation choices with the goal of reducing VMT not only reduces demand for transportation fuel but also requires less energy for buildings and helps to conserve natural and working lands that

sequester carbon. Therefore, the multiple and often interwoven actions that reduce VMT both reduce emissions from the transportation sector and support reductions needed in other sectors.

Legislation, such as SB 350[292] (De León and Leno, Chapter 457, Statutes of 2015), has recognized the need for CARB, the CEC, and the CPUC to work together to ensure the state's energy and climate goals are integrated in procurement decisions by load serving entities as part of Integrated Resource Plans. Moving forward, it is especially critical that similar approaches are adopted to break down silos across state agencies to ensure policies and programs are aligned with multiple state priorities outlined in this plan. Finally, supportive legislative direction, such as SB 905 that requires CARB to create the Carbon Capture, Removal, Utilization, and Storage Program, may also benefit emerging areas of policy to provide express agency authority and roles for these nascent efforts, including streamlining of permitting, while ensuring that protections for communities are in place.

Unlike previous Scoping Plans that separated out individual economic sectors, this Scoping Plan approaches decarbonization from two perspectives: (1) managing a phasedown of existing energy sources and technology and (2) ramping up, developing, and deploying alternative clean energy sources and technology over time. This approach supports a more comprehensive consideration of our energy infrastructure, the ability to repurpose existing assets, and the need to build new assets. It also provides multiple metrics beyond just the annual AB 32 GHG Inventory to better enable tracking progress. For example, it clearly demonstrates the production and distribution rates of specific types of clean energy, such as adding 4.3 GW of utility solar and 2.5 GW of storage year-over-year between now and 2035 to be on track to achieve carbon neutrality no later than 2045, and does the same for technology deployment, such as 11 million ZEVs in 2035.

The sections below include key actions to support success in the necessary transition away from fossil combustion, which is an overriding goal of this plan. The wide array of complementary and supporting actions being contemplated or to be undertaken across state government are detailed here. The broad view of actions described in this chapter thus provides context for the specific deployment of clean technology and fuels identified in the Scoping Plan Scenario described in Chapter 2. Actions identified in this Scoping Plan are based on currently known options and the latest science. As part of future Scoping Plan updates, additional clean technology and fuels may be identified and added to the mix of needed tools to continue to reduce the state's GHG emissions, support air quality co-benefits, and remove carbon from the atmosphere.

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[292] California Air Resources Board. SB 350 Electricity Sector Greenhouse Gas Planning Targets. *https://ww2.arb.ca.gov/our-work/programs/sb350*.

Transportation Sustainability

The transportation sector has long relied on liquid petroleum fuels as the primary energy source for internal combustion engine (ICE) vehicles, including cars, trucks, locomotives, marine equipment, and aircraft. Combustion of fossil fuels in vehicles emits significant amounts of GHGs, criteria pollutants, and toxic air contaminants. In 2019,[293] the transportation sector accounted for approximately 50 percent of statewide GHG emissions[294] and thus was by far the single largest source of carbon pollution in the state. In addition, the transportation sector accounted for over 80 percent of statewide NOx emissions and 30% of fine particulate matter emissions, including toxic diesel particulate matter.[295]

Communities adjacent to congested roadways, including ports and distribution centers, are exposed to the highest concentration of toxic pollutants from vehicles and equipment consuming fossil fuels, leading to a number of demonstrated health impacts such as respiratory illnesses, higher likelihood of cancer development, and premature death. In addition, communities located near oil extraction operations or crude oil refineries often experience higher exposure to poor air quality. While CARB's programs, along with local action, have made substantial progress over the past few decades, it is clear that California must transition away from fossil fuels to zero-emission technologies with all possible speed and pursue policies that result in less driving, in order to meet our GHG and air quality targets.

The transportation sector can be divided into three general categories: Technology, Fuels, and Vehicle Miles Traveled.

- *Technology* refers to the vehicles themselves, as well as the associated refueling infrastructure for those vehicles.
- *Fuels* refers to the energy source used to power vehicles and the facilities that produce them.
- Vehicle travel is measured as *vehicle miles traveled* (VMT), and is a product of development patterns and available transportation options.

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[293] In 2020 the state experienced shelter-in-place orders in response to the COVID-19 pandemic. The orders, and the effects of the pandemic, led to a significant year-over-year decline in transportation emissions in 2020. This means 2019 is likely a more representative year for overall transportation emissions and 2020 a likely outlier in the historical transportation emissions trend data.
[294] CARB. 2022. *California Greenhouse Gas Emissions for 2000 to 2020.* *https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf*. This includes upstream oil extraction and refining emissions.
[295] CARB. California Greenhouse Gas Emission Inventory Program. *https://ww2.arb.ca.gov/our-work/programs/ghg-inventory-program*.

Sector Transition

Technology

Vehicles must transition to zero emission technology to decarbonize the transportation sector. Executive Order N-79-20[296] reflects the urgency of transitioning to zero emission vehicles (ZEVs) by establishing target dates for reaching 100 percent ZEV sales or fleet transitions to ZEV technology. The primary ZEV technologies available today are battery-electric and hydrogen fuel cell electric vehicles (FCEVs), both of which emit zero tailpipe GHGs, criteria pollutants, and toxic air contaminants, as they do not burn fuel. These vehicles are rapidly growing in performance, affordability, and popularity.[297] Plug-in hybrid electric vehicles also offer a limited but increasing range of zero emission operation and will play a role in the transition to ZEVs.

Light-duty passenger vehicles consume the majority of gasoline in the state—12.9 billion gallons in 2019[298]—and are well-suited for transitioning to ZEVs. EO N-79-20 calls for 100 percent ZEV sales of new light-duty vehicles by 2035, and this target is reflected in this Scoping Plan.[299] The Advanced Clean Cars II regulation fulfills the goal in the Executive Order and serves as the primary mechanism to help deploy ZEVs. A number of existing incentive programs also support this transition, including the Clean Cars 4 All Program.[300] Heavy-duty trucks are the largest source of diesel particulate matter, a toxic air contaminant that is directly linked to a number of adverse health impacts, and EO N-79-20 also sets targets for transitioning the medium- and heavy-duty fleet to zero emissions: by 2035 for drayage trucks and by 2045 for buses and heavy-duty long-haul trucks where feasible. Replacing heavy-duty vehicles with ZEV technology will significantly reduce GHG emissions and diesel PM emissions in low-income communities and communities of color adjacent to ports, distribution centers, and highways. The existing Advanced Clean Trucks regulation, paired with the proposed Advanced Clean Fleets regulation, are designed to transition a significant amount of the

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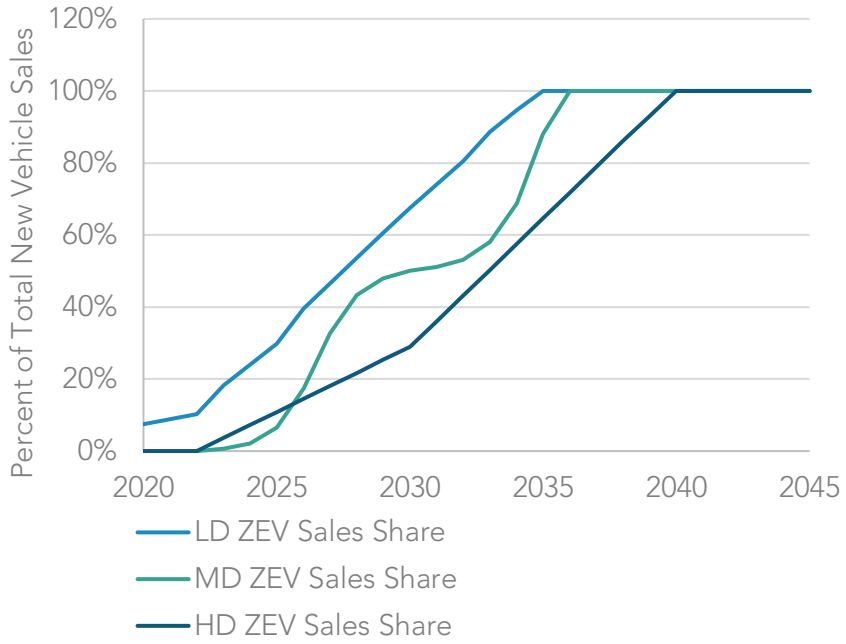
[296] Executive Department. State of California. Executive Order N-79-20. *https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf*.
[297] CARB. 2021. Public Workshop for Advanced Clean Cars II. May 6. *https://ww2.arb.ca.gov/sites/default/files/2021-05/acc2_workshop_slides_may062021_ac.pdf*.
[298] CARB. 2022. *Fuel Activity for California's Greenhouse Gas Inventory by Sector and Activity. https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/fuel_activity_inventory_by_sector_all_00-20.xlsx*.
[299] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1A, with reference to the date at which all new vehicle sales are ZEVs. *finalejacrecs.pdf (arb.ca.gov)*.
[300] CARB. Clean Cars 4 All. *https://ww2.arb.ca.gov/our-work/programs/clean-cars-4-all*. The Clean Vehicle Rebate Project (CVRP) also supports the transition to ZEVs. *https://cleanvehiclerebate.org/en*.

California truck fleet to ZEV technology. As with the LDV sector, a number of incentive programs support this transition, such as the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP).[301]

Figure 4-1 below illustrates the pace of transition in vehicle technology needed to drastically reduce GHG emissions from vehicles. All vehicle classes reach 100 percent ZEV sales before 2045, with some achieving this well before. The ZEV technology across the vehicle classes is assumed to be primarily battery electric and hydrogen fuel cell (reflecting the primary ZEV technologies available today).[302]

Figure 4-1: Transition of on-road vehicle sales to ZEV technology in the Scoping Plan Scenario



Today, off-road vehicles also rely heavily on ICE technology. Executive Order N-79-20 sets an off-road equipment target of transitioning the entire fleet to ZEV technology by 2035, where feasible. There is a great need for both investment and innovation in the off-road space in order to develop and commercialize zero emission equipment types that meet or exceed the performance of existing equipment. A number of funding sources currently support this transition, including programs such as FARMER, Carl Moyer, and

[301] California HVIP. Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project. https://californiahvip.org/?msclkid=efaf65f2c26f11eca6bdd08ecc323864.

[302] The light-duty fleet includes more than 11 million battery electric and hydrogen fuel cell vehicles in 2035 and over 23 million battery electric and hydrogen fuel cell vehicles in 2045.

the Community Air Protection Incentives—as well as Low Carbon Transportation Incentives, including the Clean Off-Road Equipment (CORE) program. In addition, the 2021–22 California budget provided record-high allocations for funding ZEVs, including off-road equipment, and the 2022–23 budget is similarly ambitious.[303] Several regulations focused on transitioning to zero emission off-road equipment have recently been adopted or are in the works, and apply to locomotives,[304] forklifts, ocean-going vessels at berth,[305] commercial harbor craft,[306] small off-road engines,[307] and more.

Intrastate aviation relies on ICE technology today, but battery-electric and hydrogen fuel cell aviation applications are in development, along with sustainable aviation fuel. The Scoping Plan Scenario includes a transition of 20% of aviation fuel demand to ZEV technologies by 2045 and sustainable aviation fuel for the rest.

Refueling infrastructure is a crucial component of transforming transportation technology. Electric vehicle chargers and hydrogen refueling stations must become easily accessible for all drivers to support a wholesale transition to ZEV technology. Deployment of ZEV refueling infrastructure is currently supported by a number of existing local and state public funding mechanisms, the new National Electric Vehicle Infrastructure (NEVI) federal funding mechanism, California's electric utilities, the Electrify America initiative that was established in response the Volkswagen ZEV commitment, and by numerous companies, such as EVgo, ChargePoint, Tesla, Ford, FirstElement Fuel, Chevron, Shell, and Iwatani, who are investing substantial private resources into developing these networks. Private investment in reliable, affordable and ubiquitous refueling infrastructure must drive the transition as the business case for ZEVs continues to strengthen.

Strategies for Achieving Success

- Achieve 100 percent ZEV sales of light-duty vehicles by 2035[308] and medium-heavy-duty vehicles by 2040.
- Achieve a 20% zero emission target for the aviation sector.

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[303] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1C. CARB and the Administration are committed to increasing focus on transportation equity investment as was reflected in the governor's 2022–23 budget. *finalejacrecs.pdf (arb.ca.gov)*.
[304] CARB. Reducing Rail Emissions in California. *https://ww2.arb.ca.gov/our-work/programs/reducing-rail-emissions-california*.
[305] CARB. Ocean-Going Vessels At Berth Regulation. *https://ww2.arb.ca.gov/our-work/programs/ocean-going-vessels-berth-regulation*.
[306] CARB. CARB passes amendments to commercial harbor craft regulation. *https://ww2.arb.ca.gov/news/carb-passes-amendments-commercial-harbor-craft-regulation*.
[307] CARB. Small Off-Road Engines (SORE). *https://ww2.arb.ca.gov/our-work/programs/small-off-road-engines-sore*.
[308] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1A. *finalejacrecs.pdf (arb.ca.gov)*.

- Develop a rapid and robust network of ZEV refueling infrastructure to support the needed transition to ZEVs.
- Ensure that the transition to ZEV technology is affordable for low-income households and communities of color, and meets the needs of communities and small businesses.[309]
- Prioritize incentive funding for heavy-duty ZEV technology deployment in regions of the state with the highest concentrations of harmful criteria and toxic air contaminant emissions.[310]
- Promote private investment in the transition to ZEV technology, undergirded by regulatory certainty such as infrastructure credits in the Low Carbon Fuel Standard for hydrogen and electricity[311] and hydrogen station grants from the CEC's Clean Transportation Program[312] pursuant to Executive Order B-48-18.[313]
- Evaluate and continue to offer incentives similar to those through FARMER,[314] Carl Moyer,[315] the Clean Fuel Reward Program,[316] the Community Air Protection Program,[317] and Low Carbon Transportation,[318] including CORE.[319] Where feasible, prioritize and increase funding for clean transportation equity programs.[320]
- Continue and accelerate funding support for zero emission vehicles and refueling infrastructure through 2030 to ensure the rapid transformation of the transportation sector.

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[309] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF6, in the context of communities. *finalejacrecs.pdf (arb.ca.gov)*.
[310] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF7. *finalejacrecs.pdf (arb.ca.gov)*.
[311] CARB. LCFS ZEV Infrastructure Crediting. *https://ww2.arb.ca.gov/resources/documents/lcfs-zev-infrastructure-crediting*.
[312] CEC. Clean Transportation Program. *https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program*.
[313] EO B-48-18 calls for 200 hydrogen refueling stations by 2025. *https://www.library.ca.gov/wp-content/uploads/GovernmentPublications/executive-order-proclamation/39-B-48-18.pdf*.
[314] CARB. FARMER program. *https://ww2.arb.ca.gov/our-work/programs/farmer-program*.
[315] CARB. Carl Moyer program. *https://ww2.arb.ca.gov/our-work/programs/carl-moyer-memorial-air-quality-standards-attainment-program*.
[316] California Clean Fuel Reward Program. *https://cleanfuelreward.com/*.
[317] CARB. Community Air Protection Program. *https://ww2.arb.ca.gov/capp*.
[318] CARB. Low Carbon Transportation Investments and Air Quality Improvement Program. *https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program*.
[319] Clean Off-Road Equipment (CORE) Voucher Incentive Program. *https://californiacore.org/*.
[320] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1C. *finalejacrecs.pdf (arb.ca.gov)*.

- Evaluate and align with this Scoping Plan relevant CARB policies such as Advanced Clean Cars II,[321] Innovative Clean Transit,[322] Zero Emission Airport Shuttle,[323] California Phase 2 GHG Standards,[324] Advanced Clean Trucks, Advanced Clean Fleets, Zero Emission Forklifts,[325] In-use Locomotives,[326] the Off-Road Zero-Emission Targeted Manufacturer rule, Clean Off-Road Fleet Recognition Program, In-use Off-Road Diesel-Fueled Fleets Regulation,[327] Commercial Harbor Craft,[328] Off-Road Zero-Emission Targeted Manufacturer rule, Clean Off-Road Fleet Recognition Program, Amendments to the In-use Off-Road Diesel-Fueled Fleets Regulation,[329] carbon pricing through the Cap-and-Trade Program,[330] and the Low Carbon Fuel Standard.[331]
- Identify and address permitting and market barriers to successful rapid ZEV technology deployment while protecting public health and the environment.

Fuels

Transitioning away from conventional ICE vehicles is part of the solution, but we must ensure that an adequate supply of zero-carbon alternative fuel and distribution is available to power these vehicles. Electricity and hydrogen are currently the primary fuels for ZEVs,

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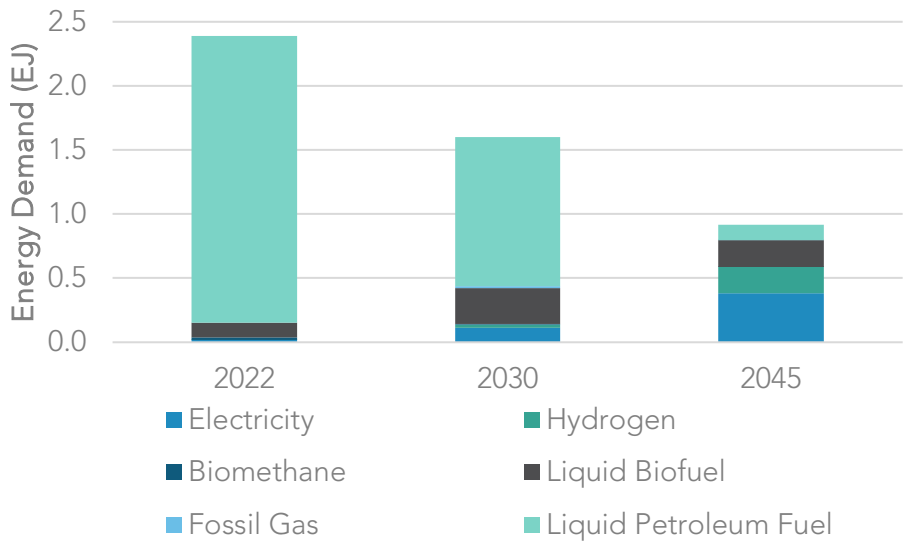
[321] CARB. Advanced Clean Cars Program. *https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program*. Cal. Code Regs., tit. 13, §§ 1900, 1961.2, 1961.3, 1961.4, 1962.2, 1962.3, 1962.4, 1962.5, 1962.6, 1962.7, 1962.8, 1965, 1968.2, 1969, 1976, 1978, 2037, 2038, 2112, 2139, 2140, 2147, 2317, 2903.
[322] CARB. Innovative Clean Transit. *https://ww2.arb.ca.gov/our-work/programs/innovative-clean-transit*. Cal. Code Regs., tit. 13, §§ 2023—2023.11.
[323] CARB. Zero-Emission Airport Shuttle. *https://ww2.arb.ca.gov/our-work/programs/zero-emission-airport-shuttle*. Cal. Code Regs., tit. 17, §§ 95690.1—95690.8.
[324] CARB. California Phase 2 Greenhouse Gas Standards. *https://ww2.arb.ca.gov/our-work/programs/greenhouse-gas-standards-medium-and-heavy-duty-engines-and-vehicles/phase2*. Cal. Code Regs., tit. 13, §§ 1956.8 and 2036; and Cal. Code Regs., tit. 17, §§ 95301, 95302, 95303, and 95663.
[325] CARB. Zero-Emission Forklifts. *https://ww2.arb.ca.gov/our-work/programs/zero-emission-forklifts*. Cal. Code Regs., tit. 17, §§ 95690.1—95690.8.
[326] CARB. Reducing Rail Emissions. *https://ww2.arb.ca.gov/our-work/programs/reducing-rail-emissions-california*. Proposed Cal. Code Regs., tit. 13, §§ 2478—2478.16.
[327] CARB. In-use Off-Road Diesel-Fueled Fleets Regulation. *https://ww2.arb.ca.gov/our-work/programs/use-road-diesel-fueled-fleets-regulation*. Cal. Code Regs., tit. 13, §§ 2449, 2449.1, 2449.2.
[328] CARB. Commercial Harbor Craft. *https://ww2.arb.ca.gov/our-work/programs/commercial-harbor-craft*. Cal. Code Regs., tit. 13, § 2299.5.
[329] CARB. In-use Off-Road Diesel-Fueled Fleets Regulation. *https://ww2.arb.ca.gov/our-work/programs/use-road-diesel-fueled-fleets-regulation*.
[330] CARB. Cap-and-Trade Program. *https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program*. Cal. Code Regs., tit. 17, §§ 95801 et seq.
[331] CARB. Low Carbon Fuel Standard. *https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard*. Cal. Code Regs., tit. 17, §§ 95480 et seq.

and both fuels must be produced using low-carbon technology and feedstocks to minimize upstream emissions.

The transition to complete ZEV technology will not happen overnight. Conventional ICE vehicles from legacy fleets will remain on the road for some time, even after all new vehicle sales have transitioned to ZEV technology. In addition, some equipment types are only now in the initial stages of development of ZEV technology for propulsion, such as commercial aircraft or ocean-going vessels. In addition to building the production and distribution infrastructure for zero-carbon fuels, the state must continue to support low-carbon liquid fuels during this period of transition and for much harder sectors for ZEV technology such as aviation, locomotives, and marine applications. Biomethane currently displaces fossil fuels in transportation and will largely be needed for hard-to-decarbonize sectors but will likely continue to play a targeted role in some fleets while the transportation sector transitions to ZEVs. Figure 4-2 provides the detail on fuels used in 2020 and the fuel mix under the Scoping Plan Scenario for 2035 and 2045.

Figure 4-2: Transportation fuel mix in 2022, 2030, and 2045 in the Scoping Plan Scenario[332]



Private investment in alternative fuels will play a key role in diversifying the transportation fuel supply away from fossil fuels. The Low Carbon Fuel Standard is the primary mechanism for transforming California's transportation fuel pool with low-carbon

[332] See https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-PATHWAYS-data-E3.xlsx for transportation fuels by year.

alternatives and has fostered a growing alternative fuel market. Partially as a result of the powerful market signals from the LCFS, fuels like renewable diesel, sustainable aviation fuel, biomethane, and electricity have all gained significant market shares and continue to displace gasoline and diesel in both on- and off-road vehicles. In addition, Executive Order N-79-20 calls on state agencies to support the transition of existing fuel production facilities away from fossil fuels and directs that this transition also protect and support workers, public health, safety, and the environment. In line with this direction, existing refineries could be repurposed to produce sustainable aviation fuel, renewable diesel, and hydrogen. This trend has already begun, and continuing to develop fuel production capacity in-state to support the energy transition while making the most efficient use of existing assets is critical to avoiding emissions leakage. If fuel demand persists after fuel production facilities have ceased operations, fuel demand will have to be met through imports.

As we transition or build new energy production facilities and infrastructure, it will be important to ensure low-income communities, tribes, and communities of color do not experience increases in existing air pollution disparities and continue to experience a reduction in the air pollution disparities that exist today. California must use the best available science to ensure that raw materials used to produce transportation fuels do not incentivize feedstocks with little to no GHG reductions from a life cycle perspective. A dramatic increase in alternative fuel production must not come at the expense of global deforestation, unsustainable land conversion, or adverse food supply impacts, to name a few examples. CARB will continue to monitor scientific findings on these topics to ensure that California policies, such as the LCFS, send the appropriate market signals and do not result in unintended consequences.[333]

Strategies for Achieving Success

- Accelerate the reduction and replacement of fossil fuel production and consumption in California.[334]
- Incentivize private investment in new zero-carbon fuel production in California.
- Incentivize the transition of existing fuel production and distribution assets to support deployment of low- and zero-carbon fuels while protecting public health and the environment.
- Invest in the infrastructure to support reliable refueling for transportation such as electricity and hydrogen refueling.

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[333] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1E. *finalejacrecs.pdf (arb.ca.gov)*.
[334] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F3. *finalejacrecs.pdf (arb.ca.gov)*.

- Evaluate and propose, as needed, changes to strengthen the Cap-and-Trade Program.
- Initiate a public process focused on options to increase the stringency and scope of the LCFS:
    - Evaluate and propose accelerated carbon intensity targets pre-2030 for LCFS.
    - Evaluate and propose further declines in LCFS post-2030 carbon intensity targets to align with this 2022 Scoping Plan.
    - Consider integrating opt-in sectors into the program.
    - Provide capacity credits for hydrogen and electricity for heavy-duty fueling.
- Monitor for and ensure that raw materials used to produce low-carbon fuels or technologies do not result in unintended consequences.[335]

Vehicle Miles Traveled

Transforming the transportation sector goes beyond phasing out combustion technology and producing cleaner fuels. Managing total demand for transportation energy by reducing the miles people need to drive on a daily basis is also critical as the state aims for a sustainable transportation sector in a carbon neutral economy. Though GHG emissions are declining due to cleaner vehicles and fuels, rising VMT can offset the effective benefits of adopted regulations.

Even under full implementation of Executive Order N-79-20 and CARB's Advanced Clean Cars II Regulations, with 100 percent ZEV sales in the light-duty vehicle sector by 2035, a significant portion of passenger vehicles will still rely on ICE technology, as demonstrated in Figure 4-2 above. Accordingly, VMT reductions will play an indispensable role in reducing overall transportation energy demand and achieving the state's climate, air quality, and equity goals. After a significant pandemic-induced reduction in VMT during 2020, passenger VMT has steadily climbed back up and is now closing in on pre-pandemic levels.[336] Driving alone with no passengers remains the primary mode of travel in California, amounting to 75 percent of the mode share for daily commute trips. Conversely, the transit industry, which was significantly impacted during

[335] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1E. *finalejacrecs.pdf (arb.ca.gov)*.
[336] U.S. Department of Transportation. 2021. December 2021 Traffic Volume Trends. Figure 3 - Seasonally Adjusted Vehicle Miles Traveled by Month. *https://www.fhwa.dot.gov/policyinformation/travel_monitoring/21dectvt/figure3.cfm*.

the lockdown months, and has struggled to recover; ridership only averages two-thirds of pre-pandemic levels,[337] [338] and service levels also lag behind.

Sustained VMT reductions have been difficult to achieve for much of the past decade, in large part due to entrenched transportation, land use, and housing policies and practices. Specifically, historic decision-making favoring single-occupancy vehicle travel has shaped development patterns and transportation policy, generating further growth in driving (and making transit, biking and walking less viable alternatives). These policies have also reinforced long-standing racial and economic injustices that leave people with little choice but to spend significant time and money commuting long distances, placing a disproportionate burden on low-income Californians, who pay the highest proportion of their wages on housing and transportation. While CARB has included VMT reduction targets and strategies in the Scoping Plan and appendices, these targets are not regulatory requirements, but would inform future planning processes. CARB is not setting regulatory limits on VMT in the 2022 Scoping Plan; the authority to reduce VMT largely lies with state, regional, and local transportation, land use, and housing agencies, along with the Legislature and its budgeting choices.

Appendix E (Sustainable and Equitable Communities) elaborates on reasons for reducing VMT and identifies a series of policies that, if implemented by various responsible authorities, could help to achieve the recommended VMT reduction trajectory included in this Scoping Plan (and related mode share increases for transit and active transportation). These policies aim to advance four strategic objectives:

1. Align current and future funding for transportation infrastructure with the state's climate goals, preventing new state-funded projects from inducing significant VMT growth and supporting an ambitious expansion of transit service and other multimodal alternatives.
2. Move funding for transportation beyond the gasoline and diesel taxes and implement fuel-agnostic pricing strategies that accomplish more productive uses of the roadway network and generate revenues to further improve transit and other multimodal alternatives.
3. Deploy autonomous vehicles, ride-hailing services, and other new mobility options toward high passenger-occupancy and low VMT-impact service models that complement transit and ensure equitable access for priority populations.
4. Encourage future housing production and multi-use development in infill locations and other areas in ways that make future trip origins and destinations

[337] U.S. Government Accountability Office. January 25, 2022. During COVID-19, Road Fatalities Increased and Transit Ridership Dipped. *https://www.gao.gov/blog/during-covid-19-road-fatalities-increased-and-transit-ridership-dipped*.
[338] American Public Transportation Association. APTA - Ridership Trends. *https://transitapp.com/APTA*.

closer together and create more viable environments for transit, walking, and biking.

The pace of change to reduce VMT must be accelerated. Certainly, structural reform will be challenging, but California has demonstrated time and again that it possesses the collective leadership and commitment to break away from ideas that no longer represent Californians' values and their aspirations for the many generations to come.

Strategies for Achieving Success

- Achieve a per capita VMT reduction of at least 25 percent below 2019 levels by 2030 and 30 percent below 2019 levels by 2045. [339]
- Reimagine new roadway projects that decrease VMT in a way that meets community needs and reduces the need to drive.
- Invest in making public transit a viable alternative to driving by increasing affordability, reliability, coverage, service frequency, and consumer experience.[340]
- Implement equitable roadway pricing strategies based on local context and need, reallocating revenues to improve transit, bicycling, and other sustainable transportation choices.[341]
- Expand and complete planned networks of high-quality active transportation infrastructure.[342]
- Channel the deployment of autonomous vehicles, ride-hailing services, and other new mobility options toward high passenger-occupancy and low VMT-impact service models that complement transit and ensure equitable access for priority populations.
- Streamline access to public transportation through programs such as the California Integrated Travel Project.
- Ensure alignment of land use, housing, transportation, and conservation planning in adopted regional plans, such as regional transportation plans (RTP)/ sustainable communities strategies (SCS), regional housing needs assessments (RHNA), and local plans (e.g., general plans, zoning, and local transportation plans), and develop tools to support implementation of these plans.

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[339] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1D. finalejacrecs.pdf (arb.ca.gov).
[340] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1D. finalejacrecs.pdf (arb.ca.gov).
[341] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1D. finalejacrecs.pdf (arb.ca.gov).
[342] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1F. finalejacrecs.pdf (arb.ca.gov).

- Accelerate infill development and housing production at all affordability levels in transportation-efficient places, with a focus on housing for lower-income residents.

Clean Electricity Grid

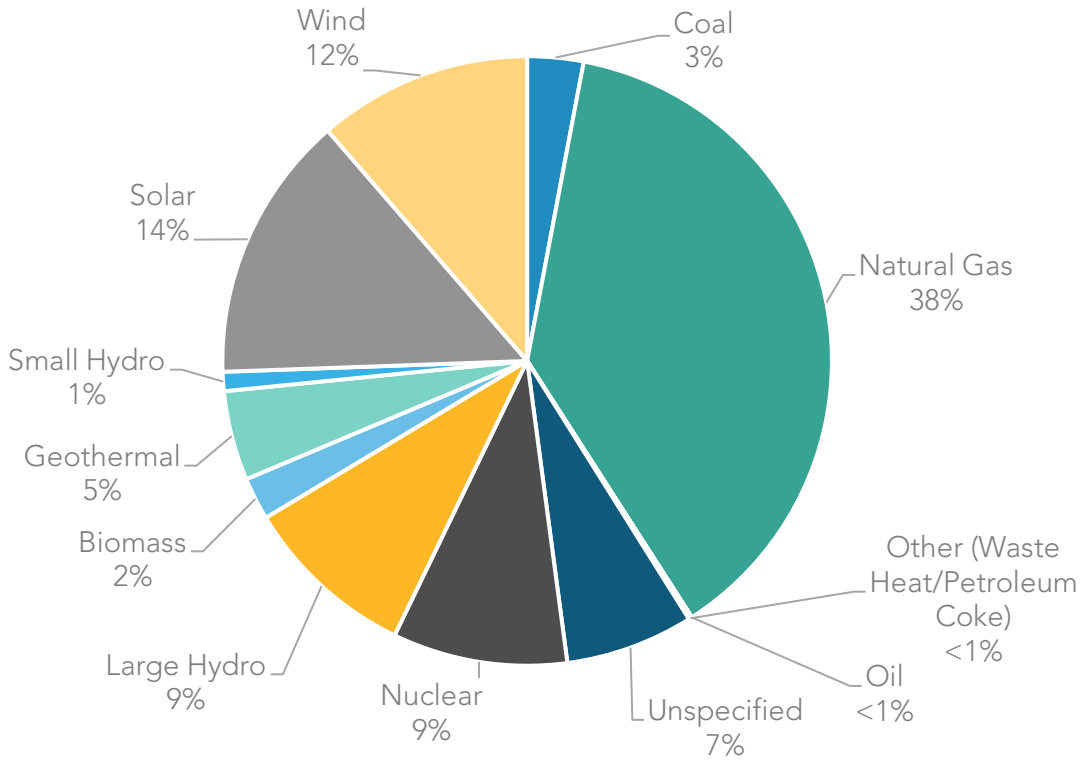
Much of the state's success to date in reducing GHGs is due to decarbonization of the electricity sector as a result of the RPS, SB 100 implementation, and the Cap-and-Trade Program. Moving forward, a clean, affordable, and reliable electricity grid will serve as a backbone to support deep decarbonization across California's economy. Under this Scoping Plan, the role of electricity in powering the economy will grow in almost every sector.

In 2021, 70 percent of California electricity demand was served by in-state power plants totaling about 82 GW, with the rest coming from out-of-state imports.[343] Additionally, approximately 8 GW of customer solar photovoltaic capacity has been installed to date to help with in-state demand.[344] Figure 4-3 shows the breakdown of in-state and imported sources of electricity.

[343] CEC. 2021. Electric Generation Capacity and Energy. Data available at: https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/electric-generation-capacity-and-energy and CEC. 2021. Total System Electric Generation. Data available at: https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2021-total-system-electric-generation. Capacity values are nameplate capacity from sources 1 MW and larger.

[344] CEC. 2021. *SB 100 Joint Agency Report Summary: Achieving 100% Clean Electricity in California, An Initial Assessment.* 10. https://www.energy.ca.gov/publications/2021/2021-sb-100-joint-agency-report-achieving-100-percent-clean-electricity.

Figure 4-3: 2021 total system electric generation (based on GWh)[345]



Note: Imports contributing to total system generation are comprised of 58% zero-carbon energy and 42% non-renewable and unspecified energy. Percentages do not add to exactly 100 due to rounding.

In 2021, about 48 percent of electricity generation serving California came from non-renewable and unspecified[346] resources, while 52 percent came from renewable and zero-carbon resources. The state's Strategic Reliability Reserve, established in AB 205 to provide additional reliability insurance during extreme events, may make three of the fossil gas-fired OTC plants planned for retirement available to support the grid on a limited basis after 2023. The state also adopted legislation to facilitate extension of the Diablo Canyon Nuclear Power Plant for five years beyond its 2025 planned closure.[347] At the

[345] *Total system generation* is the sum of all utility-scale, in-state generation, plus net electricity imports. CEC. 2021 Total System Electricity Generation. https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2021-total-system-electric-generation.

[346] *Unspecified power* refers to electricity that is not traceable to a specific generating facility, such as electricity traded through open market transactions. It typically consists of a mix of resources and may include renewables.

[347] In accordance with SB 846 (Dodd, Chapter 239, Statutes of 2022).

same time, the state continues to rapidly expand deployment of clean energy generation and storage resources and plan for increased electrification.[348] This is critical to reducing GHG emissions and addressing the long-term impacts of climate change.

Climate change is causing unprecedented stress on California's energy system—driving high demand and constraining supply. Heat, drought, and wildfires can both reduce electricity supply from reductions in hydropower generation and impacts on generation and transmission performance, and increase demand, especially in the evening hours when solar generation is declining.

California has experienced three straight years of energy reliability challenges, including a multi-day extreme heat event across the western United States with temperatures up to 20 degrees above normal in California, resulting in rotating outages in August 2020. In 2021, heat waves in June prompted a Grid Warning and the onset of emergency conditions, and the Bootleg Fire caused the loss of one transmission line, reducing import capability by 3,000 megawatts into the California Independent System Operator (CAISO) balancing authority area. And from August 31–September 9, 2022, a 10-day extreme heat event resulted in an unprecedented, sustained period of high peak loads in the CAISO system, averaging 47,000 MW and maxing at an all-time record of over 52,000 MW on September 6. The Western region also hit its record peak load on September 6, at 167.5 GW.

Reliable electricity service was maintained throughout the 10-day September 2022 heat wave in spite of the record breaking load levels. Factors that contributed to this outcome include the installation of over 3,500 MW of lithium-ion battery storage since summer 2020, enhanced coordination and communication within and outside of California, engagement with customer groups and other stakeholders, state actions to reduce load during critical times, and the additional capacity provided through the Strategic Reliability Reserve and other new state programs authorized in the 2022 Budget to provide load reduction and support the grid in extreme events. CEC, CPUC, CAISO, and the California Department of Water Resources will continue to build out strategies to enhance reliability in light of the increasing and compounding impacts of climate change on the electricity system.

[348] In June 2021, the CPUC adopted D.21-06-035 directing procurement of 11,500 MW of new capacity between 2023 and 2026 to ensure systemwide electric reliability as Diablo Canyon and several OTC facilities retire. It requires that, out of the 11,500 MW, 2,500 MW must be from zero-emission resources. Additionally, 2,000 MW must be long lead-time resources, with at least 1,000 MW of long-duration storage and 1,000 MW of firm capacity with zero on-site emissions or that qualifies under the RPS eligibility requirements.

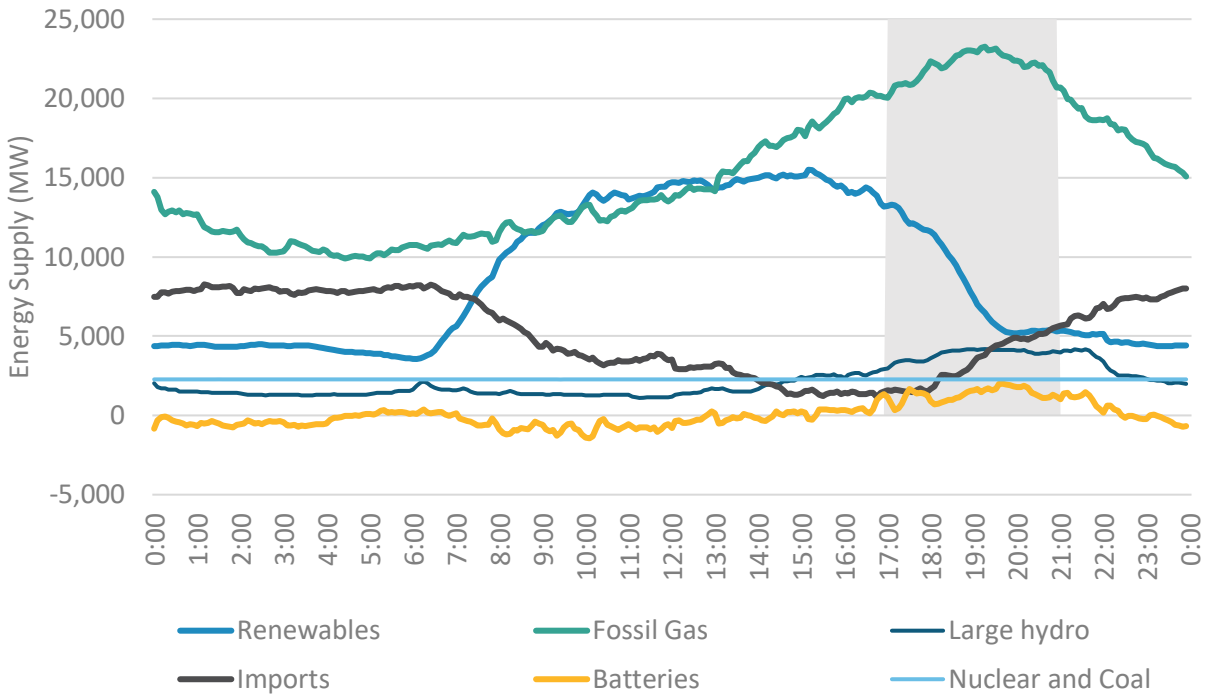
While the electricity sector is using less fossil fuel due to increasing amounts of renewables,[349] existing fossil gas generation will continue to play a critical role in grid reliability until other clean, dispatchable alternatives can be deployed at scale. The integration of greater amounts of variable renewable generation resources[350] is changing power system planning and operations, and system operators need resources with flexible attributes to balance shifting supply and demand.

High levels of solar generation can lead to instances of oversupply during the middle of the day, when the sun is brightest.[351] In the evening hours, as the sun is setting, solar generation declines to zero and customers with solar generation shift back to the electric grid. In hot weather, customer demand remains high well into the summer evening period to power air conditioning, which can lead to reliability challenges.[352]

Figure 4-4 shows the energy sources used throughout one summer day in July. Renewable energy is consistent during the middle of the day, but it cannot meet all of the evening demand in the gray area. As illustrated in the figure, fossil gas generation is currently a resource that is typically ramped up to meet this evening demand as solar production begins to drop and electrical loads increase To help address this challenge, resource installations that pair solar with batteries, as well as a greater amount of battery build-out, are coming online currently and over the next five years. Nevertheless, the state's electricity grid is expected to be stressed further in the coming years by heat waves, drought, wildfires, and the growing intermittent power supply from renewables. California must accelerate deployment of diverse clean energy resources to maintain reliability and affordability in the face of climate change.

[349] CARB. 2022. *California Greenhouse Gas Emissions for 2000 to 2020.* https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf.
[350] A *variable renewable generation resource* is a renewable source of electricity that is non-dispatchable due to its fluctuating nature and only produces electricity when weather conditions are right, such as when the sun is shining or the wind is blowing. Renewable resources that can be controlled and are dispatchable include geothermal, biomass, and dam-based hydroelectric power.
[351] *Brightness* is used colloquially here; solar energy depends on insolation (e.g., sun-hours), which is the measurement of cumulative solar energy that reaches an area over a period of time.
[352] CAISO, CPUC, and CEC. 2021. *Final Root Cause Analysis: Mid-August 2020 Extreme Heat Wave.* http://www.caiso.com/Documents/Final-Root-Cause-Analysis-Mid-August-2020-Extreme-Heat-Wave.pdf.

Figure 4-4: Electricity supply trend by resource for a California summer day, July 2022



Sector Transition

Decarbonizing the electricity sector is a crucial pillar of this Scoping Plan. It depends on both using energy more efficiently and replacing fossil-fueled generation with renewable and zero carbon resources, including solar, wind, energy storage,[353] geothermal, biomass, and hydroelectric power. The RPS Program[354] and the Cap-and-Trade Program continue to incentivize dispatch of renewables over fossil generation to serve state demand. SB 100 increased RPS stringency to require 60 percent renewables by 2030 and for California to provide 100 percent of its retail sales[355] of electricity from renewable and zero-carbon resources by 2045. Furthermore, SB 1020 has added interim targets to

[353] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF1, NF2. *finalejacrecs.pdf (arb.ca.gov)*.

[354] The CEC estimates that 36 percent of California's 2019 retail electricity sales was served by RPS-eligible renewable resources (see CPUC. 2021. CPUC Perspectives on Electric Sector Decarbonization. *https://ww2.arb.ca.gov/sites/default/files/2021-11/CPUC-sp22-electricity-ws-11-02-21.pdf*).

[355] SB 100 speaks only to retail sales and state agency procurement of electricity. The *2021 SB 100 Joint Agency Report* interprets this to mean that other loads—wholesale or non-retail sales and losses from storage and transmission and distribution lines—are not subject to the law.

SB 100's policy framework to require renewable and zero-carbon resources to supply 90 percent of all retail electricity sales by 2035 and 95 percent of all electricity retail sales by 2040; the governor has asked the CEC to establish a planning goal of at least 20 GW of offshore wind by 2045; and the governor directed that state agencies plan for an energy transition that avoids the need for new fossil gas capacity to meet California's long-term energy goals.[356] In addition to grid-level resources, state efforts have supported rapid growth of the distributed solar industry through key actions like the California Solar Initiative (SB 1, Murray, Chapter 132, Statues of 2006).[357] Steps to commercialize microgrids powered by clean resources[358] are also being examined as part of SB 1339 (Stern, Chapter 566, Statutes of 2018).[359]

California also continues to advance its appliance and building energy efficiency standards to reduce growth in electricity consumption and meet the SB 350 goal to double statewide energy efficiency savings in electricity and fossil gas end uses[360] by 2030. In 2018, the CEC adopted a building energy efficiency code requiring most new homes to have solar photovoltaic systems[361] (or be powered by a solar array nearby) starting January 1, 2020. In 2019, California reached the milestone of 1 million solar rooftop installations.

Increased transportation and building electrification and continued policy commitment to behind-the-meter solar and storage will continue to drive growth of microgrids and other distributed energy resources (DER).[362] The CPUC's High-DER proceeding is examining how to prepare the electric grid for a high DER future by determining how to integrate

[356] Newsom, Gavin. July 22, 2022. Letter from Governor Newsom to CARB Chair Liane Randolph. *https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf*.
[357] More information on the program, which closed in 2016, can be found on the CPUC website, including annual program assessment reports, at: *https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/california-solar-initiative*.
[358] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, In part (NF2, NF13). *finalejacrecs.pdf (arb.ca.gov)*.
[359] CPUC. Resiliency and Microgrids. *https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/infrastructure/resiliency-and-microgrids*.
[360] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF1, ES1. *finalejacrecs.pdf (arb.ca.gov)*.
[361] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF2. *finalejacrecs.pdf (arb.ca.gov)*.
[362] Distributed energy resources include rooftop solar and other distributed renewable generation resources, energy storage, electric vehicles, time variant and dynamic electric rates, flexible load management, demand response, and energy efficiency technologies.

millions of DERs within the distribution grid to maximize societal and ratepayer benefits from DERs while ensuring grid reliability and affordable rates.[363]

SB 350 also aims to connect long-term planning for electricity needs with the state's climate targets. This is primarily accomplished through CARB's establishment of 2030 GHG emissions targets for the electricity sector in general and for each electricity provider, which inform the CPUC and publicly owned utilities' integrated resource planning. A GHG planning target range of 30 to 53 MMTCO_2e—informed by the 2017 Scoping Plan—was originally developed and adopted by CARB in 2018. In its 2021 IRP planning cycle, the CPUC adopted a 38 MMT GHG target for the electricity sector in 2030, which drops to 35 MMT in 2032.[364]

The Scoping Plan Scenario incorporates SB 350's energy efficiency doubling goal, aligns with the CPUC's IRP 2030 GHG target and latest GHG emissions benchmarks through 2035,[365] the governor's 20 GW offshore wind and no new gas generation[366] goals, and SB 100's 2030 RPS and 2045 zero-carbon retail sales targets to reduce dependence on fossil fuels in the electricity sector by transitioning substantial energy demand to renewable and zero-carbon resources.[367] As described in Chapter 2, CCS is applied in limited sectors, including on 16.7 MMT of CO_2 from existing fossil gas electricity generation in 2045, to ensure the state achieves the 85 percent reduction in anthropogenic emissions required by AB 1279. Continued transition to renewable and

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[363] The High-DER proceeding is one of four "anchor" proceedings in the CPUC's DER Action Plan 2.0 and is within the Action Plan's infrastructure track. Information on the High-DER proceeding is available at: *https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/infrastructure/distribution-planning*. The Action Plan can be accessed at: *https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/der-action-plan*.

[364] The February 10, 2022, Decision 22-02-004 by the CPUC adopts the 2021 Preferred System Plan, completing the 2019–21 IRP cycle. *https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M451/K412/451412947.PDF*. The Decision requires load serving entities to submit plans in the next IRP cycle detailing how they will meet their proportionate share of a 30 MMT electric sector target, as well as a 38 MMT GHG target.

[365] June 15, 2022, Administrative Law Judge's Ruling for 2022 integrated resource plan filings specifies the need for GHG targets to plan for in 2035 to continue progress toward the 2045 goal. The ruling proposes a straight-line projection from the GHG planning target for 2030. Corresponding to the adopted Preferred System Plan in D.22-02-004, 38 MMT in 2030 leads to a target of 30 MMT in 2035. *https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M485/K625/485625915.PDF*.

[366] The governor's July 22, 2022, letter specifies no new gas generation but does not place any constraints on existing gas resources. Therefore, for purposes of RESOLVE electricity sector modeling, existing gas capacity is an available resource that is able to be reduced over time based on announced retirements or if selected for retirement by the model.

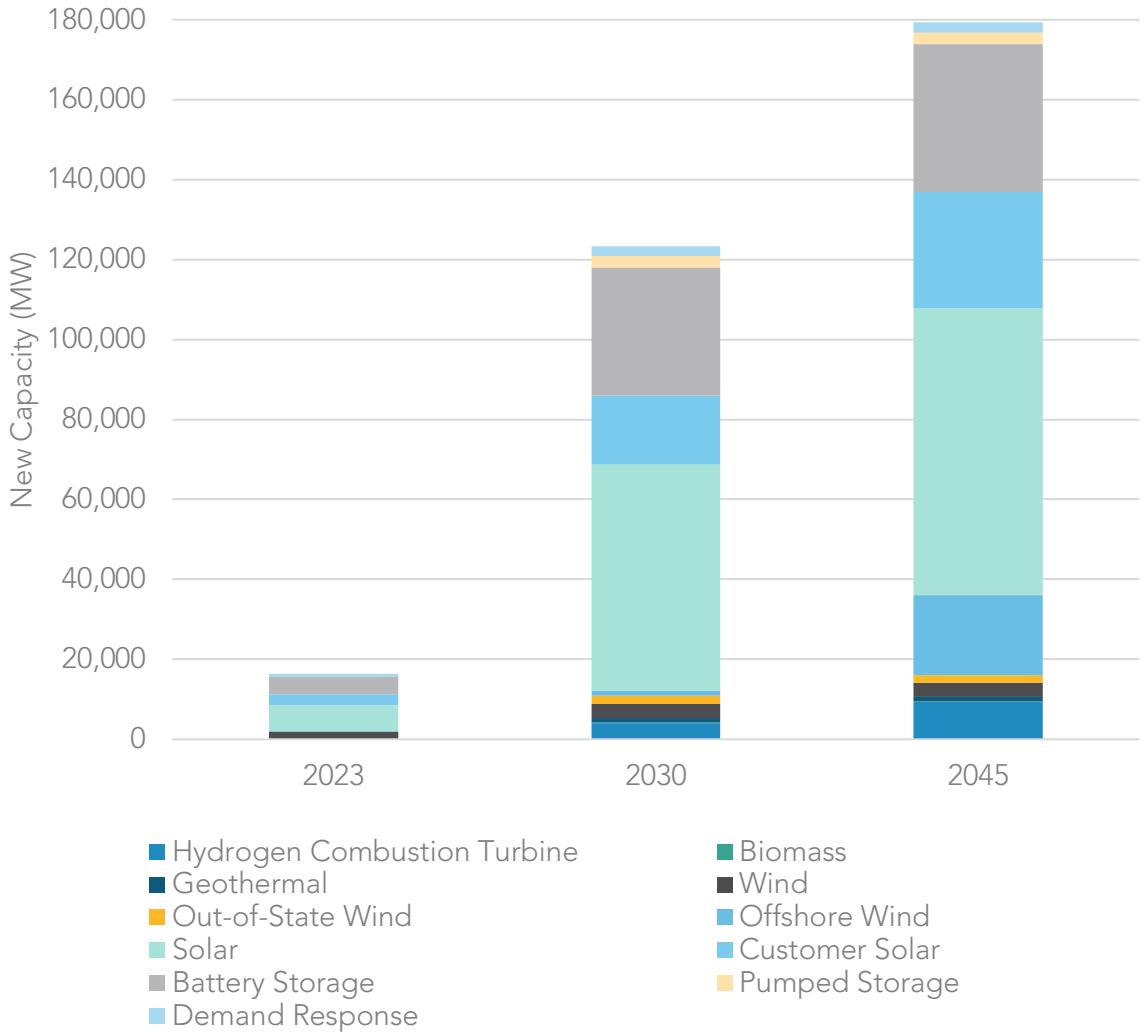
[367] CARB. 2021. PATHWAYS Scenario Modeling: 2022 Scoping Plan Update – Attachment B: Generation Technologies to be included in Modeling. *https://ww2.arb.ca.gov/sites/default/files/2021-12/Revised_2022SP_ScenarioAssumptions_15Dec.pdf*.

zero-carbon electricity resources will enable electricity to become a zero-carbon substitute for fossil fuels across the economy.

Figure 4-5 shows the modeled resource capacity to meet the SB 100 retail sales target.[368] Energy efficiency moderates some of the need for additional electricity generation. However, that is quickly surpassed by growing electricity demand of 26 percent by 2030 and 76 percent by 2045 compared to today (2022) from increased population and electrification of other sectors, as shown in Figure 4-6. The estimated resource build needed to meet this level of demand amounts to approximately 72 GW of utility solar[369] and 37 GW of battery storage by 2045. Annual build rates (over the 2022–2035 period) for the Scoping Plan Scenario will need to increase by about 60 percent and over 700 percent for utility solar and battery storage, respectively, compared to historic maximum rates.[370] To reach the 2045 target, the state will need to quadruple its current level of wind and solar capacity. This does not include capacity associated with hydrogen production nor mechanical CDR, which was modeled off-grid; assuming hydrogen production via electrolysis, this would roughly be equivalent to an additional 10 GW[371] of solar generation needed in 2045, and an additional 64 GW of solar generation for direct air capture in 2045. The scale of solar and battery build rates needed could be reduced through the commercialization of new zero-carbon technologies.

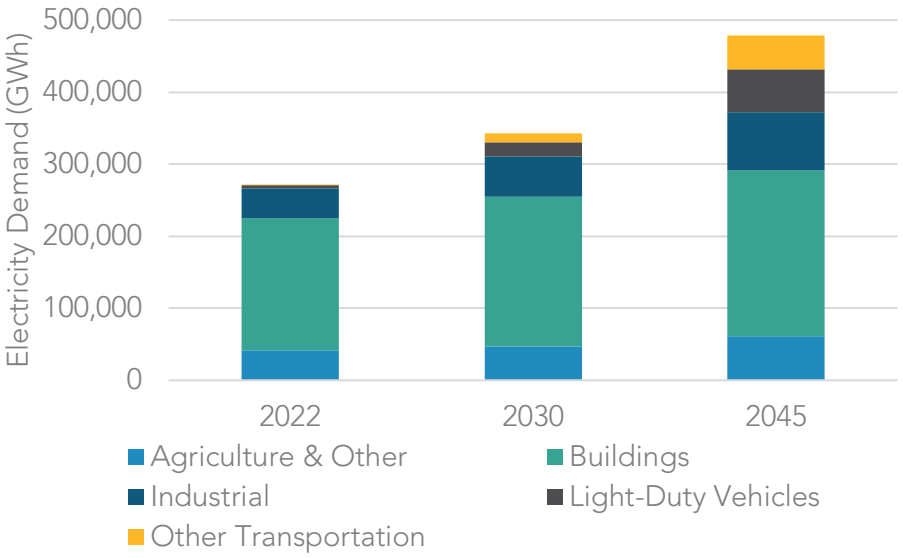
[368] SB 846 requires that load-serving entities exclude energy, capacity, or any attribute from the Diablo Canyon power plant in their resource plans. The Scoping Plan Scenario excludes energy, capacity, or any attribute from the Diablo Canyon power plant after the prior planned retirement date of 2025.
[369] The amount of additional customer solar included in the Scoping Plan Scenario is 29,208 MW by 2045.
[370] E3. 2022. CARB Scoping Plan: AB32 Source Emissions Final Modeling Results. PowerPoint. *https://ww2.arb.ca.gov/sites/default/files/2022-11/SP22-MODELING-RESULTS-E3-PPT.pdf*. Build rates are from EIA data historical builds in the 2011–2021 time frame.
[371] The estimate does not include hydrogen production assumed to be produced with bioenergy with carbon capture and storage (BECCS) and steam methane reforming (SMR).

Figure 4-5: Projected new electricity resources needed by 2045 in the Scoping Plan Scenario[372]



[372] See https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-PATHWAYS-data-E3.xlsx for the capacity build-out by resource type.

Figure 4-6: Electric loads in 2022, 2030 and 2045 for the Scoping Plan Scenario[373]



This transformation will drive investments in a large fleet of generation and storage resources but will also require significant transmission to accommodate these new capacity additions. Transmission needs include high-voltage lines to access out-of-state resources and major in-state generation pockets. In consideration of typical 8- to 10-year lead times for many projects, the CAISO published its first 20-Year Transmission Outlook to inform transmission planning focused on meeting the needs identified through the 2021 SB 100 Joint Agency Report process. The outlook calls for significant transmission development to access offshore wind and out-of-state wind and reinforce the existing CAISO footprint at an estimated cost of $30.5 billion.[374]

Presently, fossil gas power plants provide about 75 percent of the flexible capacity for grid reliability as more renewable power enters the system. Moving forward, other resources such as storage and demand-side management are essential to maintain reliability with high concentrations of renewables. Hydrogen produced from renewable resources and renewable feedstocks can serve a dual role as a low-carbon fuel for existing combustion turbines or fuel cells, and as energy storage for later use. Reliability

[373] *Other Transportation* includes all non-light-duty vehicles and reflects electrification of modes like passenger and freight rail, aviation, and ocean-going vessels.
[374] CAISO. 2022. *20 Year Transmission Outlook.* http://www.caiso.com/InitiativeDocuments/20-YearTransmissionOutlook-May2022.pdf.

also can be supported through increased coordination and markets in the interconnected western power grid; this is already helping to better integrate renewables.[375]

Strategies for Achieving Success

- Use long-term planning processes (Integrated Energy Policy Report, IRP, CAISO Transmission Planning Process, AB 32 Climate Change Scoping Plan) to support grid reliability and expansion of renewable and zero-carbon resource and infrastructure deployment.
- Complete systemwide and local reliability assessments across CAISO and other balancing authority areas, using realistic assumptions for land use, build rates, statewide and distribution system level constraints, and energy needs. Such assessments should be completed before state agencies update their electricity sector GHG targets.
- Prioritize actions to mitigate impacts to electricity reliability and affordability and provide sufficient flexibility in the state's decarbonization roadmap for adjustments as may be needed.
- Facilitate long lead-time resource development through the IRP and the SB 100 interagency process and through technology development and demonstration funding[376] that includes resources such as long-duration energy storage and hydrogen production.
- Continue coordination between energy agencies and energy proceedings to maximize opportunities for demand response.
- Continue to explore the benefits of regional markets to enhance decarbonization, reliability, and affordability.
- Address resource build-out challenges, including permitting, interconnection, and transmission network upgrades.
- Explore new financing mechanisms and rate designs to address affordability.[377]
- Per SB 350, double statewide energy efficiency savings in electricity and fossil gas end uses by 2030, through a combination of energy efficiency and fuel substitution actions.[378]
- Per SB 100 and SB 1020, achieve 90 percent, 95 percent, and 100 percent

[375] CEC. 2021. *2021 SB 100 Joint Agency Report – Achieving 100 Percent Clean Electricity in California: An Initial Assessment.* Publication Number: CEC-200-2021-001.
[376] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, ES2. The committee recommendation speaks specifically to offshore wind production. *finalejacrecs.pdf (arb.ca.gov)*.
[377] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF30. *finalejacrecs.pdf (arb.ca.gov)*.
[378] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF1, NF2. *finalejacrecs.pdf (arb.ca.gov)*.

renewable and zero-carbon retail sales by 2035, 2040, and 2045, respectively.

- Evaluate and propose, as needed, changes to strengthen the Cap-and-Trade Program.
- Target programs and incentives to support and improve access to renewable and zero-carbon energy projects (e.g., rooftop solar, community owned or controlled solar or wind, battery storage, and microgrids) for communities most at need, including frontline, low-income, rural, and indigenous communities.[379]
- Prioritize public investments in zero-carbon energy projects to first benefit the most overly burdened communities affected by pollution, climate impacts, and poverty.[380]

Sustainable Manufacturing and Buildings

Fossil gas is the primary gaseous fossil fuel used to produce heat at industrial facilities, as well as in residential and commercial buildings. In buildings, space and water heating, cooking, and clothes drying all rely on gaseous fuels today. Industrial processes that require heat for conventional boilers and other processes also rely on gaseous fuels. Refineries rely on fossil gas and other gaseous fossil fuels, like liquefied petroleum gas and refinery fuel gas, and fossil gas is also used to generate electricity, as discussed earlier.

Gaseous fossil fuel use can be displaced by four primary alternatives: zero-carbon electricity, solar thermal heat, hydrogen, and biogas/biomethane. Displacing gaseous fossil fuel use can yield indoor air quality benefits, protect public health and property from unexpected fossil gas leaks, and reduce short-lived climate pollutants, which are many times more potent in affecting climate change than CO_2. The Scoping Plan Scenario reduces dependence on fossil gas in the industrial and building sectors by transitioning substantial energy demand to alternative fuels. Reducing fossil gas combustion also will help toward achieving our air quality and equity goals by reducing pollution in neighboring areas and communities. In addition, reduced dependence on gasoline and diesel in the transportation sector diminishes the need for gaseous fossil fuels to support oil and gas production and petroleum refining operations as those are phased down relative to the demand.

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[379] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF2, NF9, NF11, NF12, NF13. finalejacrecs.pdf (arb.ca.gov).

[380] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF14. finalejacrecs.pdf (arb.ca.gov).

Sector Transition

Industry

California's industrial sector contributes significantly to the state's economy, with a total output from manufacturing in 2019 of $324 billion (10.4 percent of the state total)[381] and employment of 1,222,000 manufacturing jobs (7.6 percent of the total state workforce).[382] California industry includes a diverse range of facilities, including cement plants, refineries, glass manufacturers, oil and gas producers, paper manufacturers, mining operations, metal processors, and food processors. Combustion of fossil gas, other gaseous fossil fuels, and solid fossil fuels provide energy to meet three broad industry needs: electricity, steam, and process heat. Non-combustion emissions result from fugitive emissions and from the chemical transformations inherent to some manufacturing processes. About 20 percent of the GHG emissions from the industrial sector are non-combustion emissions.

Decarbonizing industrial facilities depends upon displacing fossil fuel use with a mix of electrification, solar thermal heat, biomethane, low- or zero-carbon hydrogen, and other low-carbon fuels to provide energy for heat and reduce combustion emissions. Emissions also can be reduced by implementing energy efficiency measures and using substitute raw materials that can reduce energy demand and some process emissions. Some remaining combustion emissions and some non-combustion CO_2 emissions can be captured and sequestered. The strategy employed will depend on the industrial subsector and the specific processes utilized in production. The left side of Figure 4-7 illustrates the fuels used to meet industrial manufacturing energy demand in 2020. Industrial manufacturing energy demand needs to transition to the fuel mix shown for 2035 and 2045. The right side of Figure 4-7 illustrates the fuel mix needed to meet the energy demand of oil and gas extraction and petroleum refining operations for the same years. Energy demand in this portion of the industrial sector declines along with decreased demand for gasoline and diesel in the transportation sector. In both figures there is a continuing demand for fossil gas due to lack of non-combustion technologically feasible or cost-effective alternatives for certain industrial sectors. Policies that support decarbonization strategies like electrification, use of renewable energy, and transition to alternative fuels are needed.

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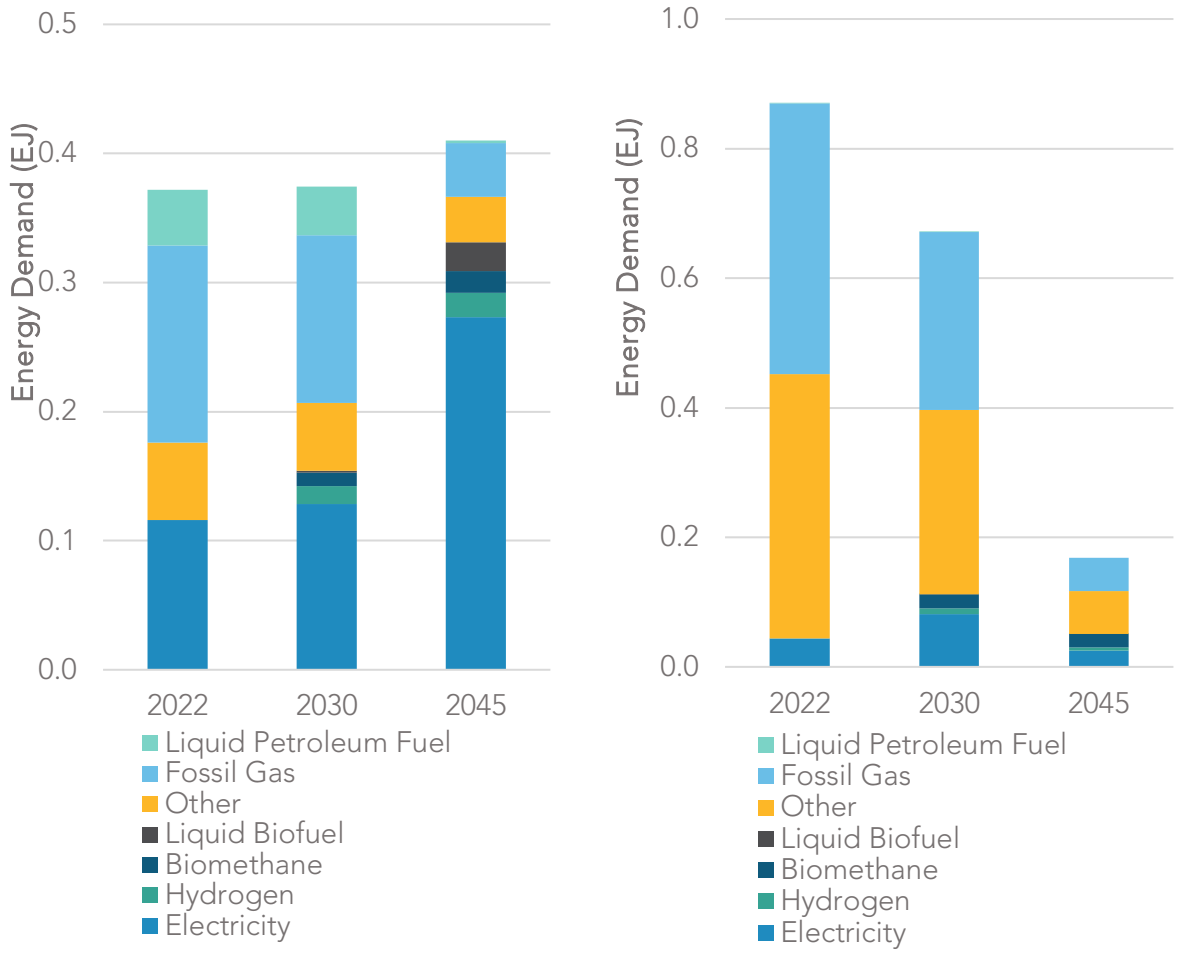
[381] National Association of Manufacturers (NAM). 2021 California Manufacturing Facts. https://www.nam.org/state-manufacturing-data/2021-california-manufacturing-facts/.
[382] NAM. 2021 California Manufacturing Facts. https://www.nam.org/state-manufacturing-data/2021-california-manufacturing-facts/.

Figure 4-7: Final energy demand in industrial manufacturing (left) and in oil and gas extraction and petroleum refining (right) in 2022, 2030, and 2045 in the Scoping Plan Scenario[383]



Electrification and solar thermal heat are best-suited to industrial processes that have relatively low heat requirements, such as food processors, paper mills, and industries that use low-pressure steam in their processes. Approaches could include replacing fossil gas boilers with electric boilers, process heaters with industrial electric heat pumps, steel forging furnaces with induction heaters, and implementing other sector-specific process electrification. Under current rate structures for industrial electricity and fossil gas in

[383] *Other* fuel in the industrial manufacturing sector is primarily coke and coal for cement production. *Other* fuel in the petroleum refining sector is primarily fossil gas associated with refining petroleum products.

California, most projects to electrify a fossil gas-powered industrial process will face operating cost barriers and potential reliability concerns. Microgrids powered by renewable resources and with battery storage are emerging as a key enabler of electrification and decarbonization at industrial facilities.

There are fewer commercially available and economically viable electrification options to replace industrial processes that require higher-temperature heat. For these processes, onsite combustion may continue to be needed, and decarbonization will require fuel substitution to hydrogen,[384] biomethane, or other low-carbon fuels. Fuel substitution and continued combustion will require monitoring and mitigation of any potential air quality impacts, especially in low-income and communities of color which already face disproportionate air pollution burdens. Industries in California with high heat needs include steel forging, glass manufacturing, and industries with calcination processes, such as manufacturing lime and cement.

Onsite emissions from cement manufacturing derive from two main sources: (1) fuel combustion to heat the kiln to a very high temperature and (2) process CO_2 emissions from the chemical transformation of limestone. Over 60 percent of emissions from the sector are process emissions unrelated to fuel use, and most emissions related to fuel use are from coal and petroleum coke combustion. Process emissions from cement manufacturing are significant and will continue even if the sector were to operate using only zero-carbon fuels; thus carbon capture and use/sequestration will be a likely component of any strategy to fully decarbonize cement manufacturing. There are additional opportunities to reduce GHG emissions from cement manufacturing via the combination of fuel-switching to low-carbon fuels (e.g., biomethane, municipal solid waste, biochar), increased blending of non-clinker materials, and efficiency improvements. High technological and economic barriers exist to electrifying kiln process heat at cement plants, as clinker production requires temperatures in excess of 1,500°C. There are potential decarbonization opportunities throughout the value chain of cement use, including in cement manufacturing, concrete mixing, and construction practices.[385] SB 596 (Becker, Chapter 246, Statutes of 2021), which was signed by Governor Newsom in September 2021, requires CARB to develop a comprehensive strategy for cement use in California to achieve a GHG intensity 40 percent below 2019 levels by 2035, and net-zero emissions by 2045.

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[384] Griffiths, Steve, Benjamin K. Sovacool, Jinsoo Kim, Morgan Bazilian, and Joao M. Uratani. 2021. "Industrial decarbonization via hydrogen: A critical and systematic review of developments, socio-technical systems and policy options." *Energy Research & Social Science* 80. 102208, ISSN 2214-6296. https://doi.org/10.1016/j.erss.2021.102208.

[385] California Nevada Cement Association. Achieving Carbon Neutrality in the California Cement Industry. https://cncement.org/attaining-carbon-neutrality.

Oil and gas extraction and refining make up over half of California's industrial GHG emissions. Reduced demand for transportation fossil fuels corresponds to reduced supply of fossil gas and other gaseous fossil fuels for refineries to produce these fuels. Some refining operations will continue to operate to produce fossil fuel for the remaining transportation energy demands, along with renewable diesel and sustainable aviation fuel, as discussed in the Transportation Sustainability section of this chapter.

Across industrial subsectors and processes, California facilities also could realize significant reductions in GHG emissions and energy-related costs by implementing advanced energy efficiency projects and tools.[386] While enhanced operation and maintenance practices are typical at industrial facilities, additional strategic energy management practices offer greater efficiency gains by focusing on setting goals, tracking progress, and reporting results.

Strategies for Achieving Success

- Maximize air quality benefits using the best available control technologies for stationary sources in communities most in need, including frontline, low-income, disadvantaged, rural, and tribal communities.[387]
- Prioritize alternative fuel transitions first in communities most in need, including frontline, low-income, disadvantaged, rural, and tribal communities.[388]
- Invest in research and development and pilot projects to identify options to reduce materials and process emissions along with energy emissions in California's industrial manufacturing facilities, leveraging programs like the CEC's Electric Program Investment Charge (EPIC).[389]
- Evaluate and propose, as needed, changes to strengthen the Cap-and-Trade Program.
- Support electrification with changes to industrial rate structures.
- Develop infrastructure for CCS and hydrogen production to reduce GHG emissions where cost-effective and technologically feasible non-combustion alternatives are not available.
- Implement SB 905.

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[386] Therkelsen, Peter, Aimee McKane, Ridah Sabouini, and Tracy Evans. 2013. *Assessing the Costs and Benefits of the Superior Energy Performance Program.* U.S Department of Energy. https://www.osti.gov/servlets/purl/1165470.

[387] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, JT14. finalejacrecs.pdf (arb.ca.gov).

[388] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, JT15. finalejacrecs.pdf (arb.ca.gov).

[389] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, M20. finalejacrecs.pdf (arb.ca.gov).

- Establish markets for low-carbon products and recycled materials using Buy Clean California Act and other mechanisms relying on robust data
- Develop a net-zero cement strategy to meet SB 596 targets for the GHG intensity of cement use in California.
- Continue to leverage energy-efficiency programs, including the U.S. DOE's ENERGY STAR program,[390] U.S. DOE's Superior Energy Performance program,[391] and ISO 50001.[392]
- Evaluate and continue to offer incentives to install energy efficiency and renewable energy technologies through programs such as CPUC decisions as part of rulemaking R.19-09-009[393] and the CEC's Food Production Investment Program (FPIP) and EPIC programs.[394]
- Leverage low-carbon hydrogen programs, including the Bipartisan Infrastructure Law, for regional hydrogen hubs, hydrogen electrolysis, and hydrogen manufacturing and recycling.
- Evaluate the role of hydrogen in meeting GHG emission reductions, including policy recommendations regarding the use of hydrogen in California as required by SB 1075.
- Address cost barriers to promote low-carbon fuels for hard-to-electrify industrial applications.

Buildings

Buildings have cross-sector interactions that influence our public health and well-being and affect land use and transportation patterns, energy use, water use, and indoor and outdoor environments.[395] There are about 14 million existing homes and over 7.5 billion square feet of existing commercial buildings[396] in California. Fossil gas supplies about half of the energy consumed by end uses in these buildings. In addition to GHG emissions, fossil gas usage in buildings also produces CO_2, NOx, $PM_{2.5}$, and

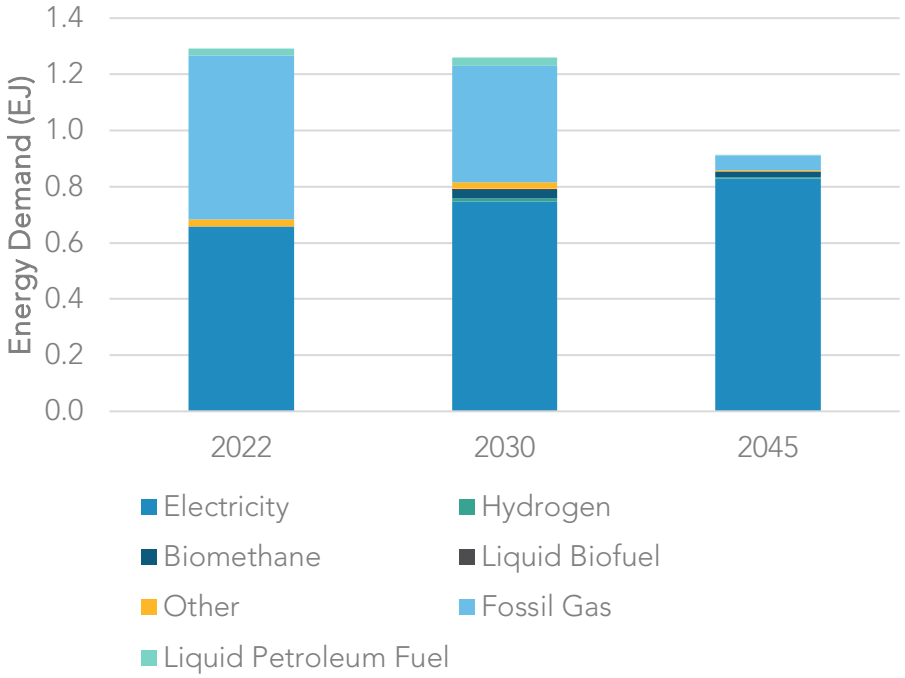
[390] ENERGY STAR. ENERGY STAR Guidelines for Energy Management. https://www.energystar.gov/buildings/tools-and-resources/energy-star-guidelines-energy-management.
[391] Energy.gov. Superior Energy Performance 50001. https://www.energy.gov/eere/amo/superior-energy-performance.
[392] ISO. ISO 50001 Energy Management. https://www.iso.org/iso-50001-energy-management.html.
[393] CPUC. January 14, 2021. CPUC Adopts Strategies to Help Facilitate Commercialization of Microgrids Statewide. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M360/K370/360370887.PDF.
[394] Bailey, Stephanie, David Erne, and Michael Gravely. 2021. *Final 2020 Integrated Energy Policy Report Update, Volume II: The Role of Microgrids in California's Clean and Resilient Energy Future, Lessons Learned From the California Energy Commission's Research.* California Energy Commission. Publication Number: CEC-100-2020-001-V2-CMF.
[395] See Appendix F (Building Decarbonization).
[396] CEC. 2021. California Building Decarbonization Assessment. https://efiling.energy.ca.gov/GetDocument.aspx?tn=239311&DocumentContentId=72767.

formaldehyde.[397] Each year, about 120,000 new homes[398] and more than 100 million-square feet[399] of commercial buildings are newly constructed across California. These new buildings will represent between a third to half of the total building stock by mid-century.

Achieving carbon neutrality must include transitioning away from fossil gas in residential and commercial buildings, and will rely primarily on advancing energy efficiency while replacing gas appliances with non-combustion alternatives. This transition must include the goal of trimming back the existing gas infrastructure so pockets of gas-fueled residential and commercial buildings do not require ongoing maintenance of the entire limb for gas delivery. Blending low-carbon fuels such as hydrogen and biomethane into the pipeline further displaces fossil gas. Pipeline safety and reliability must be evaluated to accommodate low-carbon fuels. Figure 4-8 illustrates the energy Californians use in buildings at present compared with the Scoping Plan Scenario, which introduces alternatives to fossil gas. In that scenario almost 90 percent of energy demand is electrified by 2045, and the remaining energy demand is met with combustion of hydrogen, biomethane, and fossil gas.

[397] Zhu, Yifang, et al. 2020. *Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California.* UCLA Fielding School of Public Health Department of Environmental Health Sciences.
[398] Construction Industry Research Board. 2018. Annual Building Permit Summary. *http://www.cirbreport.org*.
[399] Delforge, Pierre. August 11, 2021. California Forging Ahead on Zero Emission Buildings. Blog. NRDC. *https://www.nrdc.org/experts/pierre-delforge/california-forging-ahead-zero-emission-buildings*.

Figure 4-8: Final energy demand in buildings in 2022, 2030, and 2045 in the Scoping Plan Scenario[400]

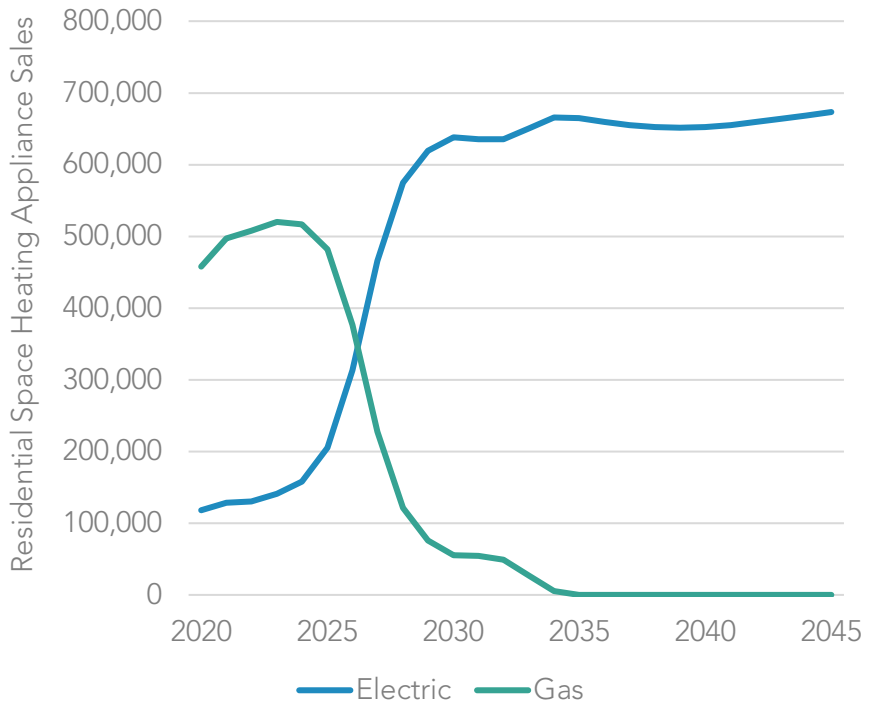


This transition is achieved when all new buildings constructed include non-combustion appliances, and appliances in existing buildings are replaced at the end of their useful life with non-combustion alternatives. Currently, electric alternatives, combined with the decarbonizing of California's grid, are the most effective alternatives, and the Scoping Plan Scenario modeled these alternatives. The Scoping Plan Scenario assumes three million all-electric and electric-ready homes by 2030 and seven million by 2035. Figure 4-9 illustrates the pace at which electric space heating appliance sales increase and gas space heating appliance sales decrease in residences in the Scoping Plan Scenario, such that by 2035 100 percent of residential home appliance sales are electric. By 2030 over six million electric heat pumps are installed statewide. The residential electric space heating appliance sales increases rapidly in the near term as new all-electric buildings are constructed and as existing buildings are renovated to utilize electric appliances. A similar transition is envisioned for other home appliances. Commercial buildings also will undergo a transition away from gas appliances to electric appliances, achieving 80 percent sales of all-electric appliances by 2035 and 100 percent by 2045. Appendix F (Building Decarbonization) describes a holistic policy approach to rapidly grow the

[400] *Other* fuel in the buildings sector is primarily liquid petroleum gas and waste heat.

number of zero emission appliances and buildings, to surmount the market barriers, and to prioritize an equitable transition for vulnerable communities.

Figure 4-9: Residential space heating appliance sales in the Scoping Plan Scenario



Strategies for Achieving Success

- Prioritize California's most vulnerable residents with the majority of funds in the new $922 million Equitable Building Decarbonization program, created through the 2022–2023 state budget. This would include residents in frontline, low-income, disadvantaged, rural, and tribal communities. This program is dedicated to a statewide direct-install building retrofit program for low-income households to replace fossil fuel appliances with electric appliances, energy-efficient lighting, and building insulation and sealing while also coordinating reductions in gas infrastructure in specific geographic areas.
- Achieve three million all-electric and electric-ready homes by 2030 and seven million by 2035 with six million heat pumps installed statewide by 2030.
- Expand incentive programs to support the holistic retrofit of existing buildings, especially for vulnerable communities.
- Ensure that incentive programs prioritize energy affordability and tenant protections, promote affordable and low-income household retrofits that improve habitability and reduce expenses, protect and empower small landlords and homeowners, address overlooked consumer groups, and pair decarbonization

with other critically needed renovation efforts to ensure that buildings support human health and are climate- and weather-resistant.[401]

- End fossil gas infrastructure expansion for newly constructed buildings.[402]
- Evaluate and propose, as needed, changes to strengthen the Cap-and-Trade Program.
- Strengthen California's building standards to support zero-emission new construction.
- Develop building performance standards for existing buildings.
- Adopt a zero-emission standard for new space and water heaters sold in California beginning in 2030, as specified in the 2022 State Strategy for the State Implementation Plan.
- Expand use of low-GWP refrigerants within buildings.
- Support electrification with changes to utility rate structures and by promoting load management programs.
- Increase funding for incentive programs and expand financing assistance programs focused on existing buildings and appliance replacements.
- Expand consumer education efforts to raise awareness and stimulate the adoption of decarbonized buildings and appliances, especially in vulnerable communities.
- Implement biomethane procurement targets for investor-owned utilities as specified in SB 1440 (Hueso, Chapter 739, Statutes of 2018) to reduce GHG emissions in remaining pipeline gas and reduce methane emissions from organic waste.

[401] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF23, NF24, NF25, NF26, NF28. *finalejacrecs.pdf (arb.ca.gov)*.
[402] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF22. *finalejacrecs.pdf (arb.ca.gov)*.

Carbon Dioxide Removal and Capture

Climate Change 2022: Mitigation of Climate Change,[403] a report by the IPCC released in early 2022, states "The deployment of CDR to counterbalance hard-to-abate residual emissions is unavoidable if net zero CO_2 or GHG emissions are to be achieved. The scale and timing of deployment will depend on the trajectories of gross emission reductions in different sectors. Upscaling the deployment of CDR depends on developing effective approaches to address feasibility and sustainability constraints especially at large scales." In line with that report, this Scoping Plan considers CDR as a complement to technologically feasible and cost-effective GHG emissions mitigation, and the size of its role will depend on the degree of success in reducing GHG emissions at the source across the economy. [404] The modeling shows that emissions from the AB 32 GHG Inventory sources will continue to persist even if all fossil related combustion emissions are phased out. These residual emissions must be compensated for to achieve carbon neutrality. Options for CDR include both sequestration in natural and working lands and mechanical approaches like direct air capture. Chapter 2 provides estimates on how much CO_2 removal is possible by our natural and working lands and how much must be removed by mechanical CDR.

CCS, which is carbon capture from anthropogenic point sources, is described in Chapter 2 and involves capturing carbon from a smokestack of an emitting facility. Direct air capture, on the other hand, captures carbon directly from the atmosphere. Direct air capture technologies, unlike CCS, are not associated with any particular point source.

For this section, *carbon management* refers to the capture, movement, and sequestration of CO_2 through mechanical solutions for both capture at point sources and direct removal from the atmosphere through direct air capture.[405] Enabling policies and regulations across each of these steps are necessary for individual projects, and on a broader scale, for delivering reductions in support of the state's carbon neutrality and long-term carbon-negative goals. Figure 4-10 provides a graphic of the typical carbon management infrastructure.

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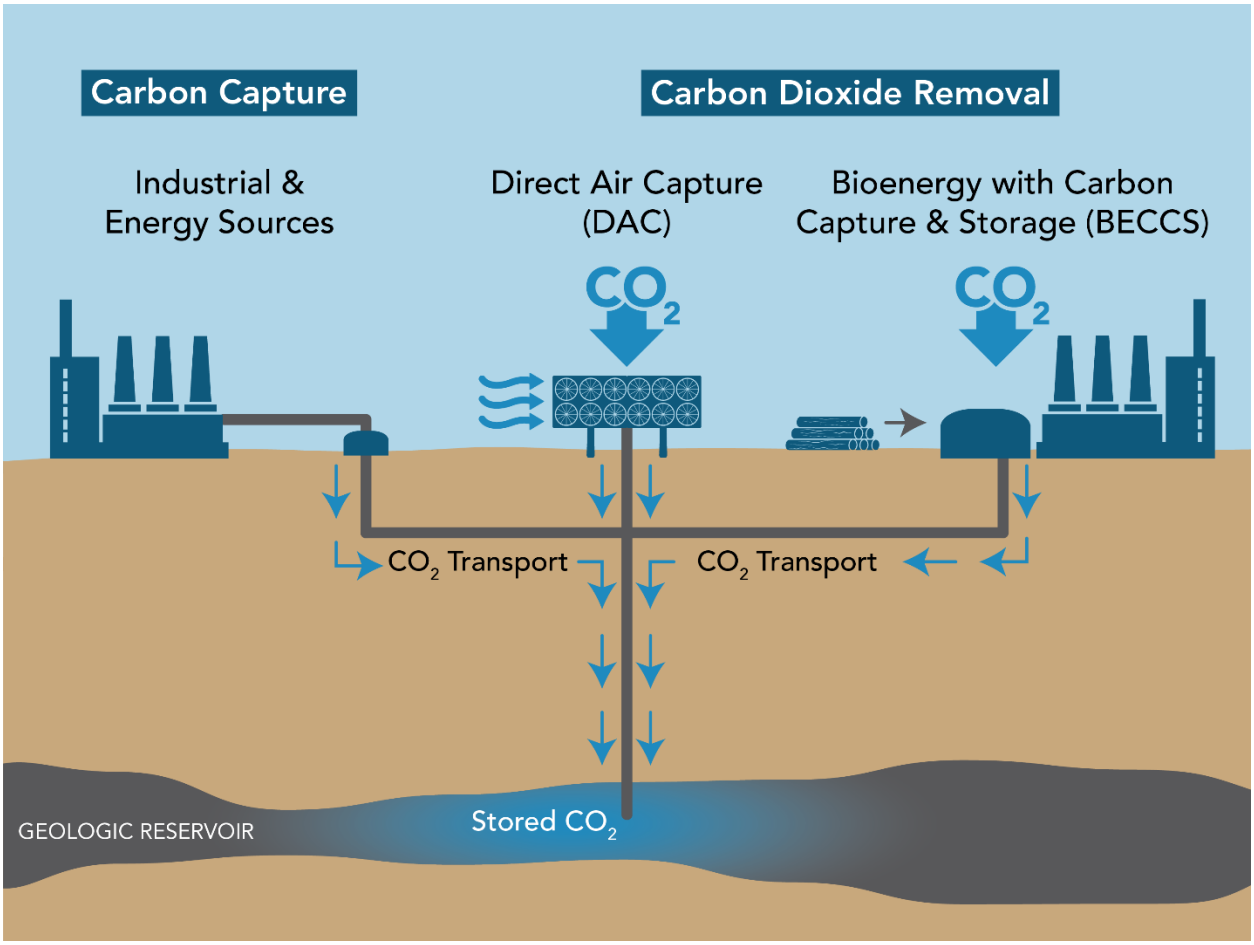
[403] IPCC. 2022. *Climate Change 2022: Mitigation of Climate Change.* https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/.
[404] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F4.7. finalejacrecs.pdf (arb.ca.gov).
[405] CDR through natural and working lands is discussed in Chapter 2 and later in this chapter.

Figure 4-10: Carbon management infrastructure



Carbon dioxide removal directly from the atmosphere itself refers to a suite of carbon negative technologies that can be used to draw down ongoing and historical carbon emissions already in the atmosphere. Some CO_2 removal technologies leverage the abilities of both natural photosynthesis and mechanical removal by using biomass wastes as inputs to make low- or zero-carbon energy or fuels, all while capturing and storing produced CO_2.

Captured CO_2 from point sources or from the atmosphere is permanently stored in specialized geologic formations, typically half a mile or more underground. A recent Stanford University study estimated the state's commercial storage potential is nearly 70,000 million metric tons of CO_2, even when excluding oil and gas reservoirs.[406] California is well-positioned because few other places on the West Coast are suitable for

[406] Stanford Center for Carbon Storage. Opportunities and Challenges for CCS in California. https://sccs.stanford.edu/california-projects/opportunities-and-challenges-for-CCS-in-California.

geologic storage at scale. To inform discussion around CO_2 removal, CARB held two full-day workshops exploring the types of options for carbon capture and geologic storage and utilization in products.[407,408,409]

The modeling results provided in Chapter 2 demonstrate the targeted need for CCS on large facilities such as refineries and cement. The CCS numbers do not include the potential additional applications for producing hydrogen with biomethane, other manufacturing, electricity, or other bioenergy. If CCS is not deployed, those emissions would be released directly into the atmosphere and instead need to be addressed through CDR to achieve carbon neutrality. Although a study finds California has 76 existing electricity and industrial facilities that are suitable candidates for CCS retrofit,[410] this Scoping Plan proposes a targeted role for this technology such that it would only be used to address sectors where non-combustion options are not technologically feasible or cost-effective at this time, to the extent needed to achieve the 85 percent reduction in anthropogenic emissions as called for in AB 1279. In future updates to the Scoping Plan, there may be additional options for technologically feasible or cost-effective technologies that may be deployed, which would further reduce the need for CCS and CDR except in situations to address historical GHG emissions.

Recognizing the need for carbon capture and utilization sequestration and removal, the Legislature passed, and the governor signed, SB 905. It includes several key requirements in the development of the state's Carbon Capture Removal, Utilization, and Storage Program. The following is a summary of the work to be completed to establish and administer this program. Many of these steps will address the need to evaluate the safety and efficacy of actions to support carbon removal, sequestration, and transfer via pipelines. Note that not all of these actions are under CARB's authority.

- Review technology to evaluate efficacy, safety, viability of CCUS/CDR methodologies.
- Develop monitoring and reporting requirements and schedules.
- Develop a unified permit application.
- Develop financial responsibility requirements.
- Develop a centralized public database for project status.

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[407] CARB. December 11, 2019. Carbon Neutrality Meetings & Workshops. *https://ww2.arb.ca.gov/our-work/programs/carbon-neutrality/carbon-neutrality-meetings-workshops*.
[408] CARB. August 2, 2021 Scoping Plan Meetings & Workshops. *https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/scoping-plan-meetings-workshops*.
[409] *Carbon utilization* refers to the use of captured carbon to produce products such as plastics and concrete.
[410] Glenwright, Kara. 2020. *Roadmap for carbon capture and storage in California.* Precourt Institute for Energy. *https://earth.stanford.edu/news/roadmap-carbon-capture-and-storage-california#gs.ysj78q.*

- Consult with CNRA on pore space requirements as CNRA develops a framework for pore space governing agreements.
- Establish a Geologic Carbon Sequestration Group to identify suitable injection well locations, subsurface monitoring, and potential hazards that may require suspension of injection.

SB 905 also has requirements for project developers such as to develop monitoring plans and to avoid any adverse health and environmental impacts at the carbon capture location—or mitigation of unavoidable impacts as required under existing requirements. For the site of injection, there are requirements for site stability, monitoring, and reporting plans. SB 905 also bans CCS with enhanced oil recovery in California and prohibits the transfer of CO_2 via pipeline until the U.S. Department of Transportation's Pipelines and Hazardous Materials Safety Administration (PHMSA) completes its current rulemaking to update existing CO_2 pipeline safety requirements.

An often-cited example of pipeline concerns involves a CO_2 pipeline in Mississippi. On February 22, 2020, a CO_2 pipeline operated by Denbury Gulf Coast Pipelines LLC (Denbury) ruptured in proximity to the community of Satartia, Mississippi. The rupture followed heavy rains that resulted in a landslide, creating excessive axial strain on a pipeline weld (DOT 2022). The combination of weather and topography resulted in a slower dissipation of the gas. The pipeline was also carrying hydrogen sulfide, a flammable and toxic gas. The pipeline failed on a steep embankment, which had recently subsided. Heavy rains are believed to have led to a landslide, which created axial strain on the pipeline and resulted in a full circumferential girth weld failure. The PHMSA investigation also revealed several contributing factors to the accident, including but not limited to: Denbury not addressing the risks of geohazards in its plans and procedures, underestimating the potential affected areas that could be impacted by a release in its CO_2 dispersion model, and not notifying local responders to advise them of a potential failure.

As the Satartia example highlights, appropriate pipeline safety and environmental standards in California are critical to minimize any risks from CO_2 transport in the future. As such, SB 905 also tasks CNRA, in consultation with the Public Utilities Commission, to, no later than February 1, 2023, provide a proposal to the Legislature to establish a state framework and standards for the design, operation, siting, and maintenance of intrastate pipelines carrying CO_2 fluids of varying composition and phase to minimize the risk posed to public and environmental health and safety. The recommended framework shall be designed to minimize risk to public health and environmental health and safety, to the extent feasible. Because SB 905 prohibits the transfer of CO_2 via pipeline until the PHMSA completes its current rulemaking to update existing CO_2 pipeline safety requirements, CCS or CDR projects that would require a pipeline to transfer CO_2 are not feasible at this time within California.

Ultimately, and in accordance with SB 905, the merits of each CCS or CDR project must be evaluated on a case-by-case basis.[411] Deployment of CCS and CDR could support skilled jobs and workforces, including those in traditional fossil energy communities. Other co-benefits could include criteria air pollutant reductions and water production. It will be important to design projects that do not exacerbate community health impacts, include early and ongoing community engagement, and are in compliance with local, state, and federal public health and environmental protection laws. It also should be noted that, as these types of projects are an emerging area of governance, additional coordination and discussion will be needed among the various levels of authorities involved. SB 905 has already initiated this process by assigning specific agencies with tasks related to their expertise and authority.

Chapter 2 includes a more detailed discussion about the proposed role of CO_2 removal in this Scoping Plan.

Sector Transition

State,[412] national,[413,414] and global decarbonization analyses[415] indicate a significant role for carbon management infrastructure, yet relatively few projects are operational. Around the world, about two dozen large CCS projects are capturing tens of millions of metric tons of CO_2 each year, with about a dozen operating in the United States.[416] The vast majority of capacity is at industrial facilities, such as ethanol and fertilizer plants, that would otherwise vent nearly pure CO_2 into the atmosphere as a by-product of normal, non-combustion processes. Future research, development, and demonstration projects must refine and commercialize capture systems for more complex applications, especially

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[411] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F4.5. *finalejacrecs.pdf (arb.ca.gov)*.

[412] E3. October 2020. Achieving Carbon Neutrality in California Report: Final Presentation. *https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_presentation_oct2020_2.pdf*.

[413] World Resources Institute. January 31, 2020. CarbonShot: Federal Policy Options for Carbon Removal in the United States. Working paper. *https://www.wri.org/research/carbonshot-federal-policy-options-carbon-removal-united-states*.

[414] C2ES. No date. Getting to Zero: A U.S. Climate Agenda — Center for Climate and Energy Solutions. *https://www.c2es.org/getting-to-zero-a-u-s-climate-agenda-report/*.

[415] IPCC. Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development. Chapter 2. *https://www.ipcc.ch/sr15/chapter/chapter-2/*. All analyzed pathways limiting warming to 1.5°C with no or limited overshoot use CDR to some extent to neutralize emissions from sources for which no mitigation measures have been identified and, in most cases, also to achieve net negative emissions to return global warming to 1.5°C following a peak (high confidence). The longer the delay in reducing CO_2 emissions toward zero, the larger the likelihood of exceeding 1.5°C, and the heavier the implied reliance on net negative emissions after mid-century to return warming to 1.5°C (high confidence).

[416] Congressional Research Service. 2021. Carbon Capture and Sequestration (CCS) in the United States. R44902. *https://crsreports.congress.gov/product/pdf/R/R44902?msclkid=e45e0012c25911ec8085ca575cb61e82*.

for those with limited decarbonization options. It has only been in the last few years that attention has seriously turned to mechanical CDR. As new information and modeling on climate change have been made available, the science has become clearer that avoiding the most catastrophic impacts of climate change requires both reducing emissions and deploying mechanical CDR.

California is paving a path forward on a science-based carbon management infrastructure policy that can serve as an example for other jurisdictions. The LCFS, which reduces the carbon intensity of transportation fuels, includes a protocol for select carbon management projects to become certified and generate LCFS credits.[417] CCS is not a new concept or technology. Twenty years of CCS testing show it is a safe and reliable tool.[418] As mentioned in Chapter 2, while no new CCS projects have been implemented or generated any credits under the CARB CCS protocol, CCS projects have been implemented elsewhere since the 1970s. Moreover, there has been a U.S. Department of Energy CCS research program underway for more than two decades. These all form a foundation of information for future efforts. Certified projects must successfully demonstrate adherence to rigorous pre-construction, operational, and site closure standards designed to strengthen environmental performance, as described in CARB's CCS Protocol. The protocol is designed to layer on top of existing federal carbon sequestration regulations designed to protect the environment. The protocol would need to be reevaluated if CCS were to be more broadly applied across sectors beyond transportation fuel production.

Direct air capture and carbon mineralization have high potential capacity for removing carbon, but direct air capture is currently limited by high cost. Carbon mineralization may also have high potential for removing carbon from the atmosphere, but understanding of the technology is still limited.[419] Direct air capture could also be deployed at higher rates to remove legacy GHG emissions from the atmosphere. Chapter 2 contains additional information on the current status of CCS and mechanical CDR projects globally, as well as federal support of such technologies.

Strategies for Achieving Success

- Implement SB 905.

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[417] CARB. 2018. Carbon Capture and Sequestration Protocol under the Low Carbon Fuel Standard. August 13. *https://ww2.arb.ca.gov/sites/default/files/2020-03/CCS_Protocol_Under_LCFS_8-13-18_ada.pdf*.

[418] National Energy Technology Laboratory. Permanence and Safety of CCS. *https://netl.doe.gov/coal/carbon-storage/faqs/permanence-safety*.

[419] Aines, Roger. No date. Options for Removing CO_2 from California's Air. Lawrence Livermore National Laboratory. *https://ww2.arb.ca.gov/sites/default/files/2021-08/llnl_presentation_sp_engineeredcarbonremoval_august2021.pdf*.

- Convene a multi-agency Carbon Capture and Sequestration Group comprised of federal, state, and local agencies to engage with environmental justice advocates, tribes, academics, researchers, and community representatives to identify the current status, concerns, and outstanding questions concerning CCS, and develop a process to engage with communities to understand specific concerns and consider guardrails to ensure safe and effective deployment of CCS.[420]
- Iteratively update the CARB CCS Protocol with the best available science and implementation experience.
- Incorporate CCS into other sectors and programs beyond transportation where cost-effective and technologically feasible options are not currently available and to achieve the 85 percent reduction in anthropogenic sources below 1990 levels as called for in AB 1279.
- Evaluate and propose, as appropriate, financing mechanisms and incentives to address market barriers for CCS and CDR.
- Evaluate and propose, as appropriate, the role for CCS in cement decarbonization (SB 596) and as part of hydrogen production pathways (SB 1075).
- Support carbon management infrastructure projects through core CEC research, development, and demonstration (RD&D) programs.
- Continue to explore carbon capture applications for producing or leveraging zero-carbon power for reliability needs as part of SB 100.
- Consider carbon capture infrastructure when developing hydrogen roadmaps and strategy, especially for non-electrolysis hydrogen production.
- Evaluate and streamline permitting barriers to project implementation while protecting public health and the environment.
- Explore options for how local air quality benefits can be achieved when CCS is deployed.
- Explore opportunities for CCS and CDR developers to leverage existing infrastructure, including subsurface infrastructure.
- Explore permitting options to allow for scaling the number of sources at carbon sequestration hubs.

Short-Lived Climate Pollutants (Non-Combustion Gases)

Short-lived climate pollutants (SLCPs) include black carbon (soot), methane (CH_4), and fluorinated gases (F-gases, including hydrofluorocarbons [HFCs]). They are powerful climate forcers and harmful air pollutants that have an outsized impact on climate change

[420] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F4.9. finalejacrecs.pdf (arb.ca.gov).

in the near term, compared to longer-lived GHGs, such as CO_2. According to the IPCC's *Climate Change 2021: The Physical Science Basis,* in the near-term (i.e., 10- to 20-year time scale) the warming influence of all SLCPs combined will be at least as large as that of CO_2.[421] The United Nations Environment Programme's Global Methane Assessment[422] advises that achieving the least-cost pathways to limit warming to 1.5°C requires global methane emission reductions of 40–45 percent by 2030 alongside substantial simultaneous reductions of all climate forcers, including CO_2 and SLCPs. Action to reduce these powerful emissions sources today will provide immediate benefits—both to human health locally and to reduce warming globally—as the effects of our policies to transition to low carbon energy systems and achieve carbon neutrality further unfold.

In 2017, the Board approved the comprehensive Short-Lived Climate Pollutant Reduction Strategy (Strategy).[423] This strategy explained how the state would meet the following SB 1383-established targets:

- 40 percent reduction in total methane emissions[424] (including a separate 40 percent reduction in dairy and livestock emissions)
- 40 percent reduction in hydrofluorocarbon gas emissions
- 50 percent reduction in anthropogenic black carbon emissions
- 50 percent reduction of organic waste disposal from 2014 levels by 2020, and 75 percent by 2025, including recovery of at least 20 percent of edible food for human consumption

The state is expected to achieve roughly half of the SB 1383 targeted emissions reductions by 2030 through strategies currently in place (See Figure 4-11). As directed by the Legislature under SB 1383, state agencies focused on voluntary, incentive-based mechanisms to reduce SLCP emissions in the early years of implementation to overcome technical and market barriers. Under this "carrot-then-stick" strategy, incentives are replaced with requirements as the solutions become increasingly feasible and cost-effective. To meet legislated targets, more aggressive action is needed.

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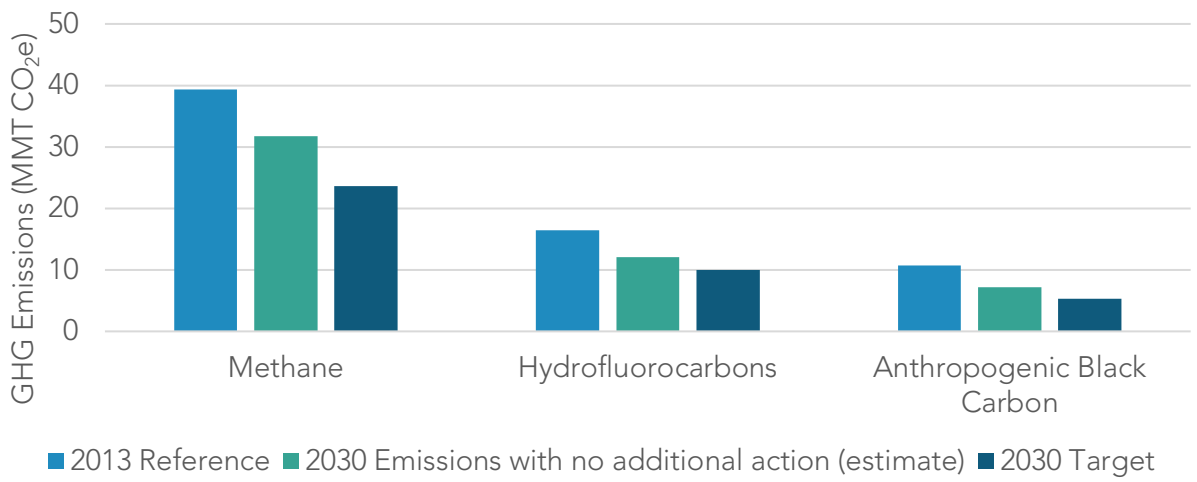
[421] IPCC. 2021. *Climate Change 2021:The Physical Science Basis.* https://www.ipcc.ch/report/ar6/wg1/.
[422] United Nations. Global Methane Assessment. Summary for Policymakers. https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA_ES.pdf.
[423] CARB. 2017. Short-Lived Climate Pollution Reduction Strategy. https://ww2.arb.ca.gov/sites/default/files/2020-07/final_SLCP_strategy.pdf.
[424] All SB 1383 emissions reductions are mandated to be realized by 2030 and are relative to 2013 levels.

Figure 4-11: Expected progress toward SB 1383 targeted emissions reductions by 2030 through strategies currently in place



While the state's overall GHG emissions have declined by 9 percent over the past decade, SLCP emissions reductions have not kept pace with broader progress toward decarbonization. After growing steadily in the preceding decade, methane emissions have remained relatively flat since 2013.

HFCs are the fastest growing source of GHG emissions, primarily driven by their use to replace ozone-depleting substances and an increased demand for cooling and refrigeration.[425] Since 2005, statewide HFC emissions have more than doubled. While the rate of increase has slowed in recent years due to the state's measures, HFC emissions are still on the rise in California, and have grown by over 50 percent since 2010.[426] Globally, as temperatures rise, adoption of cooling technologies (and refrigerants) is increasing rapidly. If no measures are taken, it is estimated that HFCs will account for 9 to 19 percent of the total global GHG emissions by 2050.[427]

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[425] CARB. 2022. *California Greenhouse Gas Emissions for 2000 to 2020: Trends of Emissions and Other Indicators.* https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf.

[426] CARB. 2022. *California Greenhouse Gas Emissions for 2000 to 2020.* https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf.

[427] Velders, G. J., D. W. Fahey, J. S. Daniel, M. McFarland, and S. O. Andersen. 2009. "The large contribution of projected HFC emissions to future climate forcing." *Proceedings of the National Academy of Sciences* 106(27), 10949–10954.

Methane

Human sources of methane emissions are estimated to be responsible for up to 25 percent of current warming.[428] Fortunately, methane's short atmospheric lifetime of ~12 years[429] means that emissions reductions will rapidly reduce concentrations in the atmosphere, slowing the pace of temperature rise in this decade. Further, a substantial portion of the targeted reductions can be achieved at low cost and will provide significant human health benefits. For example, the UN's *Global Methane Assessment* (2021)[430] found that over half of the available targeted measures have mitigation costs below $21/MTCO$_2$e, and that each million metric tons of methane reduced would prevent 1,430 premature deaths annually due to ozone pollution caused by methane.

Following the Twenty Sixth Conference of Parties (COP26) (the United Nations Convention on Climate Change in 2021), over 110 nations have signed onto the Global Methane Pledge (Pledge)[431] to limit methane emissions by 30 percent relative to 2020 levels. The Pledge covers countries that emit nearly half of all methane and make up 70 percent of global GDP. The UN's Global Methane Assessment[432] shows that human-caused methane emissions can be reduced by up to 45 percent this decade, which would avoid nearly 0.3°C of global warming by 2045.

As shown in Figure 4-12, the three largest sources of California's methane emissions are the dairy and livestock industry, landfills, and oil and gas systems.

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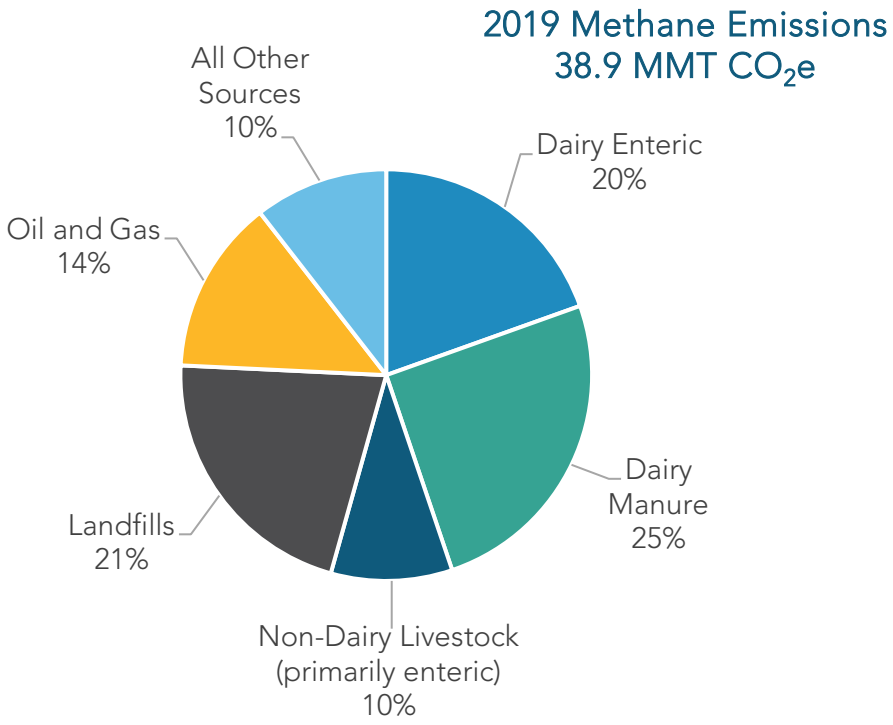
[428] IPCC. 2021. *Climate Change 2021:The Physical Science Basis.* https://www.ipcc.ch/report/ar6/wg1/.
[429] In contrast, the lifetime of CO_2 is hundreds of years. The IPCC Third Assessment Report concluded that no single lifetime can be defined for CO_2 because of the different rates of uptake by different removal processes. According to IPCC Fourth Assessment Report, the majority of an increase in CO_2 will be removed from the atmosphere within decades to a few centuries, while the remaining 20 percent may stay in the atmosphere for many thousands of years.
[430] United Nations. 2021. Global Methane Assessment. https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA_ES.pdf.
[431] Global Methane Pledge. https://www.globalmethanepledge.org/.
[432] United Nations Environment Programme. 2021. Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions. https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions?msclkid=00661370c85811eca078eb8fdbd603d1.

Figure 4-12: Sources of California methane emissions (2019)



Emissions from dairy and livestock operations come from two main sources: (1) enteric fermentation and (2) manure management operations, especially at dairies that employ open anaerobic lagoons that allow methane to escape into the atmosphere. Landfills, the second largest source of methane emissions, produce methane from the decomposition of organic waste. Although approximately 95 percent of all the waste that has been disposed of in the state has been deposited in a landfill that is equipped with a gas collection and control system, as required by California's Landfill Methane Regulation,[433] a portion of the methane still escapes into the atmosphere. Fugitive methane emissions can be intermittent and highly variable, both seasonally and spatially, particularly at landfills. Research has shown that landfills are complex systems and a wide range of conditions (e.g., atmospheric, operational, biological, chemical, and physical) may contribute to variability in rates of organic waste degradation, methane generation, and capture efficiency, so reducing the amount of organics deposited in landfills is critical to reducing overall landfill methane emissions. And despite the variability in individual landfill emissions, landfill gas collection and control systems remain the most effective strategy

[433] CARB. Landfill Methane Regulation. https://ww2.arb.ca.gov/our-work/programs/landfill-methane-regulation.

for reducing methane emissions from waste once it is placed in a landfill. Non-combustion methane emissions from the oil and gas sector are the third largest source of methane emissions in California. Almost three-quarters of the methane emissions from this sector come from leaks and venting from fossil gas transmission and distribution pipelines and equipment.

Hydrofluorocarbons

HFCs are synthetic GHGs that are powerful climate forcers. They are used mainly as refrigerants or heat transfer fluids in refrigeration, space conditioning, and heat pump equipment. Refrigerants are ubiquitous and are used everywhere from supermarkets, convenience stores, cold storage warehouses and wineries, to vending machines and residential and motor vehicle air-conditioners. Additionally, HFCs are also used as foam-blowing agents, solvents, aerosol-propellants, and fire suppressants. While HFCs remain in the atmosphere for a much shorter time than CO_2, the relative global warming potential (GWP) values of HFCs can be hundreds to thousands of times greater than CO_2. The mix of HFCs currently in use in California, weighted by usage (tonnage), have an average 100-year GWP of 1,700.[434] The average atmospheric lifetime of the mix of HFCs in use is 15 years.[435] Given the short average lifetimes, rapid reductions in HFC emissions can translate into near-term reductions in climate change effects.

As the global temperatures increase, the demand for cooling and refrigerants will continue to grow, as will the use of electric heat pumps to replace conventional fossil gas heating options. Unless addressed, continued use of high-GWP HFCs will perpetuate a feedback loop, where the cooling agents themselves cause additional warming.

In 2016, representatives from 197 nations signed the Kigali Amendment, which amended the existing Montreal Protocol (to reduce ozone-depleting substance production and consumption) to include a global phasedown in the production and consumption of HFCs beginning in 2019.[436] As of September 2022, 137 nations have either accepted, approved, or ratified the Kigali Amendment. On September 21, 2022, the U.S. Senate approved ratification of the Kigali Amendment, and it is expected that the United States

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[434] CARB. 2020. *Initial Statement of Reasons: Public Hearing to Consider the Proposed Amendments to the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Chillers, Aerosols-Propellants, and Foam End-Uses Regulation.* October 20. https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2020/hfc2020/isor.pdf?_ga=2.164659835.592460318.1646664679-912670513.1542398285.

[435] Zhongming, Z., et al. 2011. *HFCs: A Critical Link in Protecting Climate and the Ozone Layer: A UNEP Synthesis Report.*

[436] United Nations Treaty Collection. Chapter XXVII, Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer. https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-2-f&chapter=27&clang=_en.

will soon join the 137 nations that have already ratified.[437] In the United States, Congress enacted the federal *American Innovation and Manufacturing (AIM) Act* in December 2020.[438] The AIM Act authorizes the U.S. EPA to address HFCs in several ways, including a national HFC phasedown that nearly mirrors the schedule of the global phasedown under the Kigali amendment.[439]

Nearly 90 percent of HFC emissions in California come from their use as refrigerants in the commercial, industrial, residential, and transportation sectors. The timescales over which the HFC emissions occur vary, depending on the type of application. Thus, strategies to reduce HFC emissions must be tailored by equipment type. CARB has several measures in place to tackle HFC emissions from the various sources shown in Figure 4-13 below. This includes the Refrigerant Management Program[440] that tracks and manages emissions from large commercial, industrial, and cold storage refrigeration facilities in the state. CARB has adopted regulations to reduce HFC emissions from consumer product aerosol propellants, semiconductor manufacturing, and small cans of automotive refrigerant.[441]

In 2018, California adopted HFC prohibitions via regulation and legislation for several sectors, including stationary refrigeration and foam end uses to backstop the partially vacated federal Significant New Alternatives Policy (SNAP) program.[442] Most recently, in 2020, CARB adopted additional measures that place GWP limits on refrigerants used in refrigeration and air conditioning equipment, which are the largest sources of HFC emissions, and are commonly used in residential, commercial, and industrial buildings. Additionally, CARB adopted a unique pilot program requiring the use of reclaimed refrigerant: the Refrigerant Recovery, Reclaim, and Reuse (R4) Program. The newly adopted HFC rules for the refrigeration and air conditioning sectors are the first of their kind in the nation.

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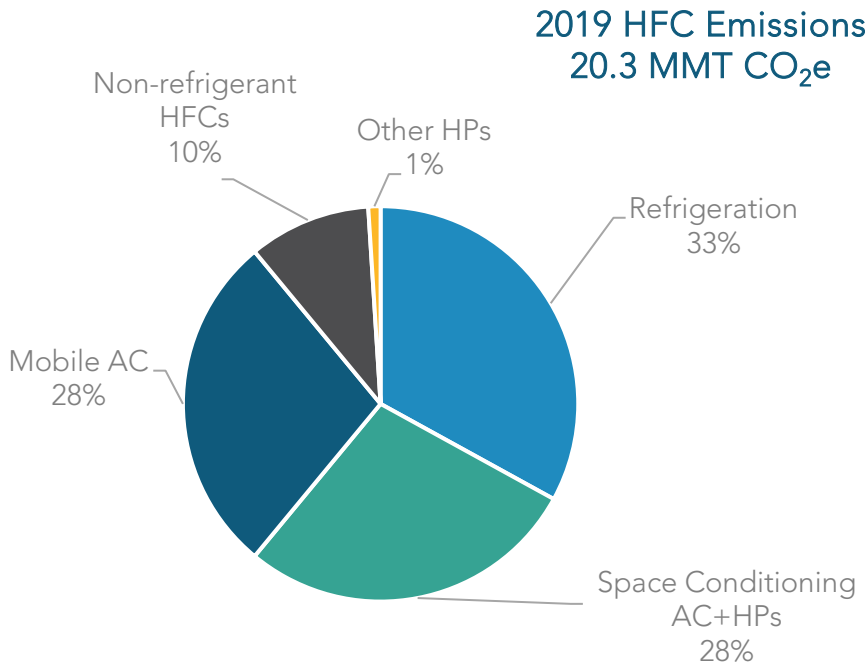
[437] U.S. Ratification of the Kigali Amendment - United States Department of State. *https://www.state.gov/u-s-ratification-of-the-kigali-amendment/*.
[438] 42 U.S.C § 7675, Pub. L. 116-260, § 103. *https://www.epa.gov/sites/default/files/2021-03/documents/aim_act_section_103_of_h.r._133_consolidated_appropriations_act_2021.pdf*.
[439] 42 U.S.C § 7675, Pub. L. 116-260, § 103.
[440] Cal. Code of Regs., tit. 17, §§ 95380, et seq.
[441] Contained in various sections, commencing with Cal. Code of Regs., tit. 13, §§ 1900 et seq.
[442] Cal. Code of Regs., tit. 17, §§ 95371, et seq.; California Cooling Act, Senate Bill 1013 (Lara, Stats. of 2018, Ch. 375, Health & Saf. Code § 39764).

Figure 4-13: Sources of hydrofluorocarbon (HFC) emissions (2019)

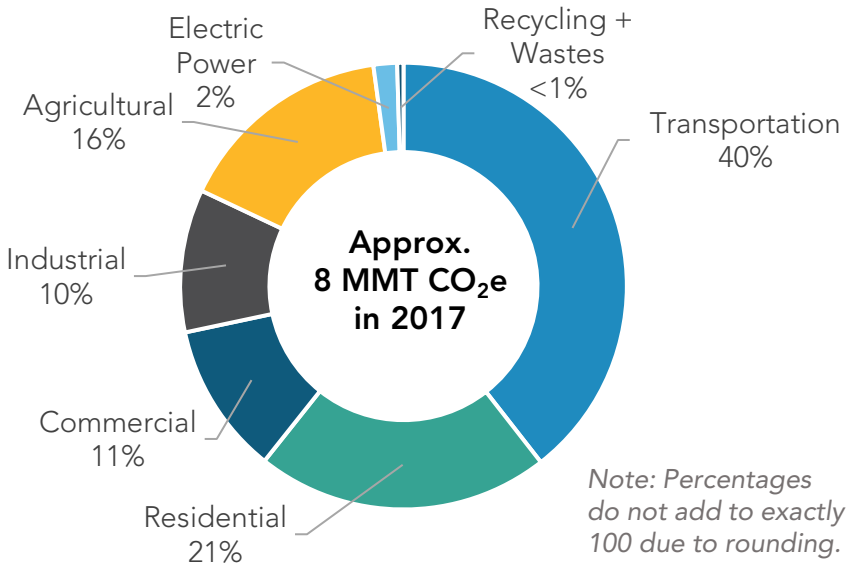


Anthropogenic Black Carbon

Black carbon is not included in AB 32 or the state's AB 32 GHG inventory that tracks progress toward the state's climate targets; however, it has been identified as a powerful climate forcer and is included California's Short-Lived Climate Pollutant Reduction Strategy. The majority of anthropogenic black carbon emissions come from transportation, specifically heavy-duty vehicles, and they have decreased since 2013 due to engine certification standards and in-use rules for on-road and off-road fleets, along with clean fuel requirements and incentives, including California Climate Investments and LCFS credits. Additionally, fuel combustion for residential, commercial, and industrial applications contribute significantly to overall black carbon emissions. Approximately 95 percent of residential black carbon emissions are due to wood combustion; these emissions are being reduced through programs like the Woodsmoke Reduction Program established by SB 563 (Lara, Chapter 671, Statutes of 2017). Alternatives to agricultural burning and policies that phase out agricultural burning will also result in agricultural black carbon emissions reductions. In 2021 CARB provided a preliminary estimate of 2017

black carbon emissions (Figure 4-14).[443] This estimate will be finalized as part of a future update to the Short-Lived Climate Pollutant Inventory.

Figure 4-14: Sources of anthropogenic black carbon (preliminary 2017 estimates; AR5 100-yr GWP 900)



Sector Transition

California has long recognized the importance of mitigating non-combustion SLCPs and took several early action measures as part of a comprehensive, ongoing program to reduce in-state GHG emissions under AB 32. The early action measures included CARB's Landfill Methane Regulation,[444] Refrigerant Management Program,[445] and Oil and Gas Methane Regulation.[446]

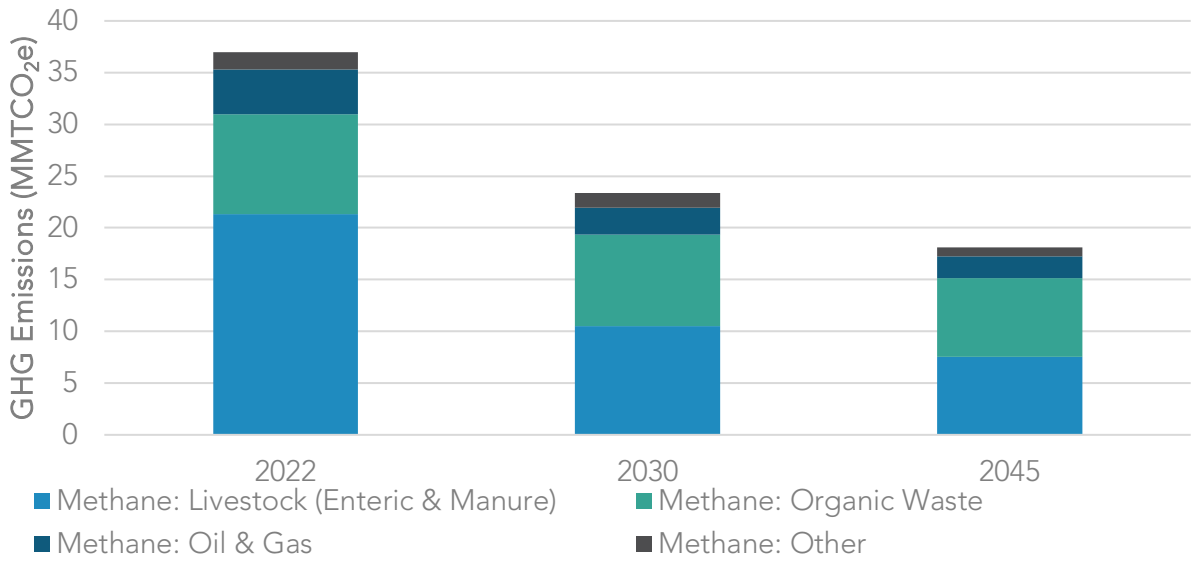
Methane

The methane abatement strategies currently in place are projected to achieve half of the methane emissions needed to meet the overall methane reduction target of SB 1383 (40 percent reduction by 2030). The reduction target translates to a limit of less than 24 MMTCO_2e in 2030 (Figure 4-15). It is anticipated that, since some sectors have fewer

[443] CARB. 2021. 2022 Scoping Plan Update – Short-Lived Climate Pollutants Workshop Presentation, September 8. https://ww2.arb.ca.gov/sites/default/files/2021-09/carb_presentation_sp_slcp_september2021_1.pdf.
[444] Cal. Code of Regs., tit. 17, §§ 95460, et seq.
[445] Cal. Code of Regs., tit. 17, §§ 95380, et seq.
[446] Cal. Code of Regs., tit. 17, §§ 95665–77.

strategies that can be implemented to reduce methane in the near-term, other sectors will need to go beyond the 40 percent reduction to meet the target.

Figure 4-15: Methane emissions in 2022, 2030, and 2045 in the Scoping Plan Scenario[447]



Dairy and Livestock Methane

California is the largest dairy-producing state, home to one in five U.S. dairy cows. To date, methane emissions reductions from the dairy and livestock sector have mainly been driven by a decreasing animal population and the growing adoption of manure management strategies, including anaerobic digesters and conversion to dry manure systems and pasture systems. CARB recently completed a detailed analysis of the emission reductions expected by 2030 and the estimated additional investment needed to reach the dairy and livestock sector methane reduction target. [448]

Assuming no adoption of additional manure management and enteric mitigations strategies beyond the projects that have committed funding, and a continued annual animal population decrease of 0.5 percent per year through 2030, further reductions of approximately 4.4 $MMTCO_2e$ will be needed to achieve the 2030 methane emissions reduction target for the sector set by SB 1383. If the remaining reductions are met through

[447] The *Organic Waste* category includes methane from landfills, wastewater treatment, and compost facilities.
[448] CARB. 2021. Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target. June. *https://ww2.arb.ca.gov/sites/default/files/2021-06/draft-2030-dairy-livestock-ch4-analysis.pdf*.

a mix of dairy projects in which half are dairy digesters and half are alternative manure management projects, then it is estimated that at least 420 additional projects will be necessary. Additional emissions reductions beyond this level will likely be necessary to ensure that the overall state methane emissions reduction targets are met.

Despite the considerable methane emissions mitigation potential of enteric strategies like feed additives, little progress has been made, as few products with proven mitigation potential have become commercially available, and unlike manure management strategies, there is a lack of financial incentives for their adoption.

Market conditions favoring farm consolidation and improved production efficiencies have driven reductions in the California and U.S. dairy population over the past decade. [449] These efficiency gains have allowed California to maintain production levels despite the decreasing population. If demand for dairy and beef products remains steady or increases, continued improvements in production efficiency and adoption of effective manure management and enteric mitigation strategies will be important to support dairy and livestock methane emission reductions.

Strategies for Achieving Success

- Install state of the art anaerobic digesters that maximize air and water quality protection, maximize biomethane capture, and direct biomethane to sectors that are hard to decarbonize or as a feedstock for energy.
- Increase alternative manure management projects, including but not limited to conversion to "solid," "dry," or "scrape" manure management; installation of a compost-bedded pack barn; an increase in the time animals spend on pasture; and implementation of solid-liquid separation technology into flush manure management systems.
- Implement enteric fermentation strategies that are cost-effective, scientifically proven, safe for animal and human health, and acceptable to consumers, and that do not impact animal productivity. Provide financial incentives for these strategies as needed.
- Accelerate demand for dairy and livestock product substitutes such as plant-based or cell-cultured dairy and livestock products to achieve reductions in animal populations.
- In consideration of pace of deployment of methane mitigation strategies and the scale of complimentary incentives, consider regulation development to ensure that the 2030 target is achieved, assuming the conditions outlined in SB 1383 are met.

[449] MacDonald, James M., Jonathan Law, and Roberto Mosheim. 2020. *Consolidation in U.S. Dairy Farming.* ERR-274. July. https://www.ers.usda.gov/webdocs/publications/98901/err-274.pdf.

Landfill Methane

Achieving the 75 percent organic waste disposal reduction target[450] of SB 1383, and maintaining that level of disposal in subsequent years, would bring annual landfill emissions in 2030 to just below the 2013 baseline. Annual methane emissions will be higher through 2030 than originally anticipated by the SLCP Strategy because the state did not achieve the anticipated reductions in organic waste disposal of 50 percent below 2014 levels by 2020. SB 1383 prohibited the organic disposal regulations from taking effect until 2022,[451] and, as a result, emissions have continued to increase.

Due to the multidecadal time frame required to break down landfilled organic material, the emissions reductions from diverting organic material in one year are realized over the course of several decades. For example, one year of waste diversion in 2030 is expected to avoid 8 $MMTCO_2e$ of landfill emissions, cumulatively, over the lifetime of that waste's decomposition.[452] Near-term diversion efforts are critical to avoid locking in future landfill methane emissions.

CalRecycle's 2020 report, *Analysis of the Progress Toward the SB 1383 Waste Reduction Goals,*[453] estimated that 8 million short tons of composting and anerobic digestion capacity will be needed to manage organic wastes, above the existing and new capacity expected to be available by 2025. The 2019 report, *Co-Digestion Capacity in California,*[454] from the State Water Resources Control Board estimated that at least 2.4 million tons of digester capacity is available at urban wastewater treatment plants if sufficient incentives or funding for collection, receiving, and processing operations are provided to enable utilization of this capacity. The CPUC approved a decision in February 2022 implementing the biomethane procurement program, which will require investor-owned utilities by 2025 to procure 17.6 billion cubic feet (BCF) of biomethane produced from organic wastes to support the landfill disposal reduction and SLCP target and reduce fossil gas reliance for

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[450] The target is from 2014 levels by 2025.
Public Resources Code, § 42652.5. CalRecycle approved the SLCP: Organic Waste Reductions regulations (*https://calrecycle.ca.gov/organics/slcp/*) in 2020 and began implementing them in January 2022. These regulations are designed to achieve the 2025 disposal reduction and edible food recovery targets.

[452] The life cycle emissions reduction is based on anticipated diversion of 27 million short tons of organic waste from CalRecycle (2020) Analysis of the Progress Toward the SB 1383 Organic Waste Reduction Goals (*https://www2.calrecycle.ca.gov/Publications/Details/1693*). Under CalRecycle's SLCP regulations, an alternative to landfill disposal must achieve a life cycle GHG reduction of 0.3 $MTCO_2e$ per short ton of waste diverted.

[453] CalRecycle. 2020. *Analysis of the Progress Toward the SB 1383 Waste Reduction Goals.* *https://www2.calrecycle.ca.gov/Publications/Details/1693*.

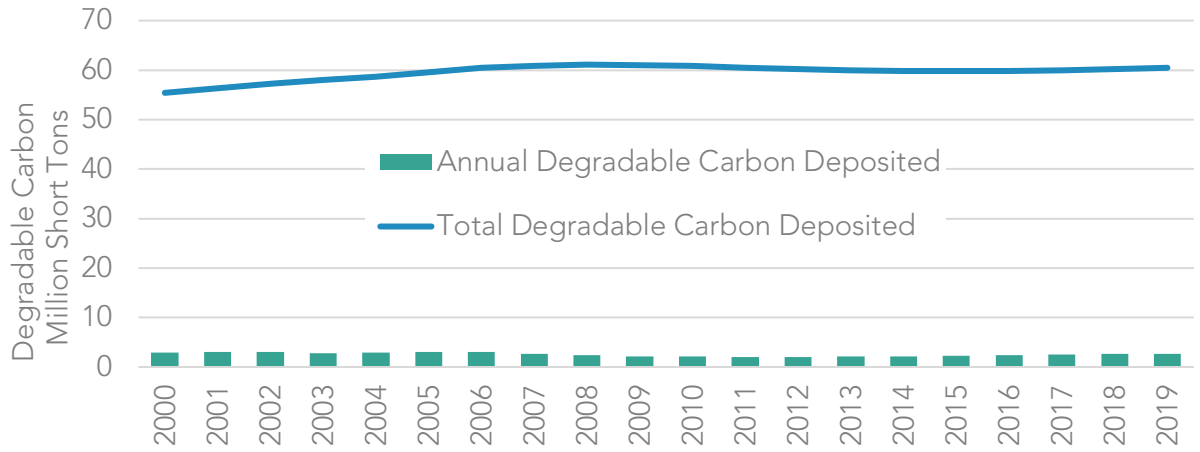
[454] State Water Resources Control Board. 2019. *Co-Digestion Capacity in California.* *https://www.waterboards.ca.gov/water_issues/programs/climate/docs/co_digestion/final_co_digestion_capacity_in_california_report_only.pdf*.

residential and commercial customers.[455] Additionally, the organic waste stream includes more than one million tons of edible food that could be recovered before it enters the waste stream through food rescue programs that combat hunger in communities throughout California.

While reducing organic waste disposal is the most effective means of achieving reductions in waste sector methane, strategies to reduce emissions from waste already in place in landfills also will play a role in achieving near-term reductions. As Figure 4-16 shows, the total degradable carbon (a measure of the amount of waste with potential to generate methane) that is accumulated from waste deposited in previous years is over 20 times greater than the amount added each year. This illustrates that even if we were able to entirely phase out landfilling of organic waste today, the existing waste in place at landfills would continue to generate methane for decades into the future.

Through a combination of improvements in operational practices, use of lower permeability covers, advanced landfill gas collection systems, and increased monitoring to detect and repair leaks, it is estimated that a direct emission reduction of 10 percent is achievable across the state's landfills by 2030. Technologies to utilize landfill gas efficiently can contribute further emission reductions in the energy sector.

Figure 4-16: Degradable carbon deposited in landfills



Strategies for Achieving Success

- Maximize existing infrastructure and expand it to reduce landfill disposal, with strategies including composting, anaerobic digestion, co-digestion at wastewater treatment plants, and other non-combustion conversion technologies.

[455] CPUC. 2022. Decision 22-02-025.

- Expand markets for products made from organic waste, including through recognition of the co-benefits of compost, biochar, and other products.[456]
- Recover edible food to combat food insecurity.
- Invest in the infrastructure needed to support growth in organic recycling capacity.
- Utilize existing digesters at wastewater treatment facilities to rapidly expand food waste digestion capacity.
- Direct biomethane captured from landfills and organic waste digesters to sectors that are hard to decarbonize.
- Implement improved technologies and best management practices at composting and digestion operations.
- Reduce emissions from landfills through improvements in operational practices, lower permeability covers, advanced collection systems, and technologies to utilize landfill gas.
- Leverage advances in remote sensing capabilities to quickly pinpoint large methane sources and mitigate leaks, improve understanding of the factors that lead to better capture efficiency, and explore new technologies and practices that can reliably improve methane control at landfills.

Upstream Oil and Gas Methane Reduction

For oil and gas production, processing, and storage, California is currently on track to achieve a 41 percent reduction in methane emissions by 2025 relative to 2013. The additional reductions needed to meet the 2030 target may be achieved by implementing additional regulatory requirements to further reduce intentional venting of fossil gas from equipment. If necessary, additional reductions from transmission and distribution facilities may be achieved by requiring the utilities to increase inspection and repair activities or further reduce emissions from pipeline blowdowns by implementing methods such as using portable compressors, using plugs to isolate sections of pipelines, flaring vented gas, routing gas to fuel gas systems, and installing static seals on compressor rods. Advances in methane detection technologies (e.g., satellites equipped to detect large methane sources) may also help to identify and mitigate methane emissions quickly across the oil and gas sector.

As California transitions away from fossil fuels, in-state oil and gas production will likely decline. This could result in an increase over time in the number of long-term idle and orphan wells (idle wells lacking a financially solvent, responsible owner) in the state. While California has regulations aimed at helping ensure operators manage their idle wells,

[456] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F4.4. finalejacrecs.pdf (arb.ca.gov).

there could likely be an increase in California's orphan well population. Plugging all orphan wells, of which there are currently over 5,000, could take decades due to the limited resources California has for orphan well plugging. The benefits from plugging wells include methane emission reductions and job creation; employment gains from well plugging and site remediation activities could help temporarily offset job losses from the oil and gas industry. The California Council on Science and Technology's 2018 report on orphan wells, *Orphan Wells in California: An Initial Assessment of the State's Potential Liabilities to Plug and Decommission Orphan Oil and Gas Wells,*[457] found that the potential cost to the state of plugging current orphan wells could be approximately $500 million, and the cost of plugging all active and idle wells could total over $9.1 billion. As oil and gas production in California declines due to reduced demand for fossil fuels, additional funding will likely be needed to cover the costs of plugging wells that have no viable operator.

Strategies for Achieving Success

- Mitigate emissions from leaks by regular leak detection and repair (LDAR) surveys at all facilities.
- Replace high emitting equipment with zero emission alternatives wherever feasible.[458]
- Have CARB and CalGEM lead a Task Force to identify and address methane leaks from oil infrastructure near communities.
- Pursuant to SB 1137, develop leak detection and repair plans for facilities in health protection zones, implement emission detection system standards, and provide public access to emissions data.
- Minimize emissions from equipment that must vent fossil gas by design (e.g., fossil gas powered compressors).
- Install vapor collection systems on high emitting equipment.
- Phase out venting and routine flaring of associated gas (gas produced as a by-product during oil production).
- Continuous ambient monitoring at fossil gas underground storage facilities to quickly detect large methane sources.
- Reduce pipeline and compressor blowdown emissions.

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[457] The California Council on Science and Technology. 2018. *Orphan Wells in California: An Initial Assessment of the State's Potential Liabilities to Plug and Decommission Orphan Oil and Gas Wells.* *https://ccst.us/wp-content/uploads/CCST-Orphan-Wells-in-California-An-Initial-Assessment.pdf*.

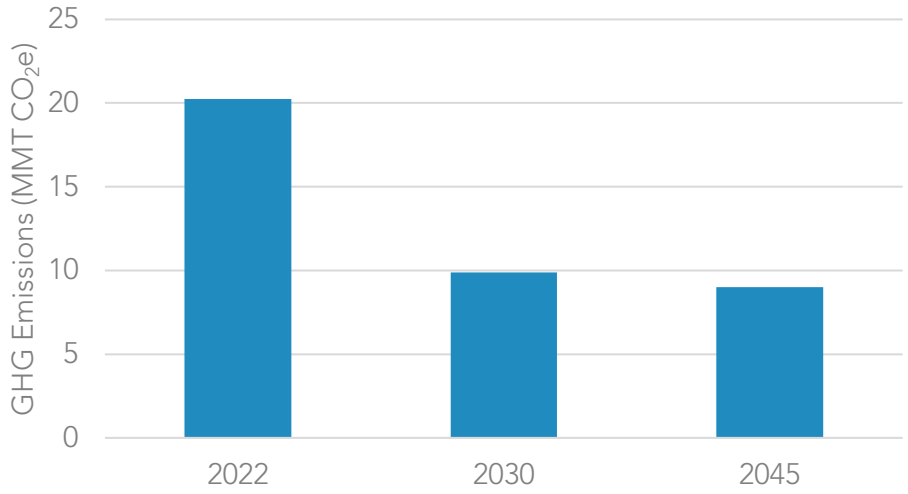
[458] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, P5. *finalejacrecs.pdf (arb.ca.gov)*.

- Leverage advances in remote sensing capabilities to quickly pinpoint large methane sources and mitigate leaks.[459]

Hydrofluorocarbons

In California, all the HFC measures currently in place will help achieve more than 70 percent of the reductions needed to achieve the 2030 HFC goal and provide very significant emissions reductions by 2045 and beyond. However, new targeted measures will be needed to maintain the pace of reductions, as demand for technologies that currently predominantly use high-GWP refrigerants is anticipated to grow. Despite decarbonization efforts, high-GWP HFCs are expected to be among the last remaining persistent GHG emission sources, as shown in Figure 4-17.[460]

Figure 4-17: Hydrofluorocarbon emissions in 2022, 2030, and 2045 in the Scoping Plan Scenario



HFC emissions from new and existing sources should be addressed in tandem with building decarbonization efforts to maximize reductions.[461] As buildings are electrified in an effort to decarbonize them, the use of heat pumps for space conditioning, water heaters, and clothes dryers is expected to increase significantly. Heat pumps, while using

[459] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, CC17. finalejacrecs.pdf (arb.ca.gov).
[460] Energy and Environmental Economics, Inc. 2020. *Achieving Carbon Neutrality.* https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_report_oct2020_0.pdf.
[461] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF26. finalejacrecs.pdf (arb.ca.gov).

electricity, not fossil gas, currently rely predominantly on high-GWP refrigerants. Very low- or no-GWP technologies and solutions are either available or emerging for various heat pump technologies, and likely to develop further as international efforts to mitigate HFCs continue. However, most of these technologies are still nascent in the United States. In addition, some of the alternatives cannot be used until California building codes are updated, which is currently expected at the earliest in mid-2024 for some technologies based on the recently adopted provisions in AB 209[462] requiring the California Building Standards Commission to adopt the latest safety standards for refrigerant containing equipment into California's building codes. The current updates to the building codes will allow the use of many refrigerants with lower GWPs than HFCs currently in use. However, additional building code updates are needed to expand the choices of ultra-low-GWP alternatives, and that will need to happen in the next few years. The adoption of low-GWP refrigerants must occur in parallel with building decarbonization efforts; without such efforts, the vast GHG benefits of the latter will be partially offset, and the proportion of HFC emissions from buildings will continue to grow.

Leaks from existing air conditioning and refrigeration equipment are a major source of statewide and global HFC emissions. Once installed, refrigeration and air conditioning equipment can stay in place for decades, while leaking refrigerants into the atmosphere. This makes it very important that new installed equipment use refrigerants with a GWP as low as possible. The refrigerants inside existing equipment are sometimes collectively referred to as the *installed base* or *banks* of potential HFC emissions. If released spontaneously, the existing HFC banks would equal 60 percent of all annual statewide GHG emissions in California, as illustrated in Figure 4-18.[463]

The sales prohibitions on newly produced refrigerants set forth in SB 1206 (2022) and the national/international HFC phasedown will help in reducing HFC emissions from existing equipment by restricting the supply of and increasing the value of existing high-GWP HFCs, thus enabling a circular economy. In the 2022–2023 state budget, CARB received $45 million in incentive funding for climate-friendly refrigerant technologies; this funding will be critical in shifting the market toward the best available refrigerant technologies in various sectors.

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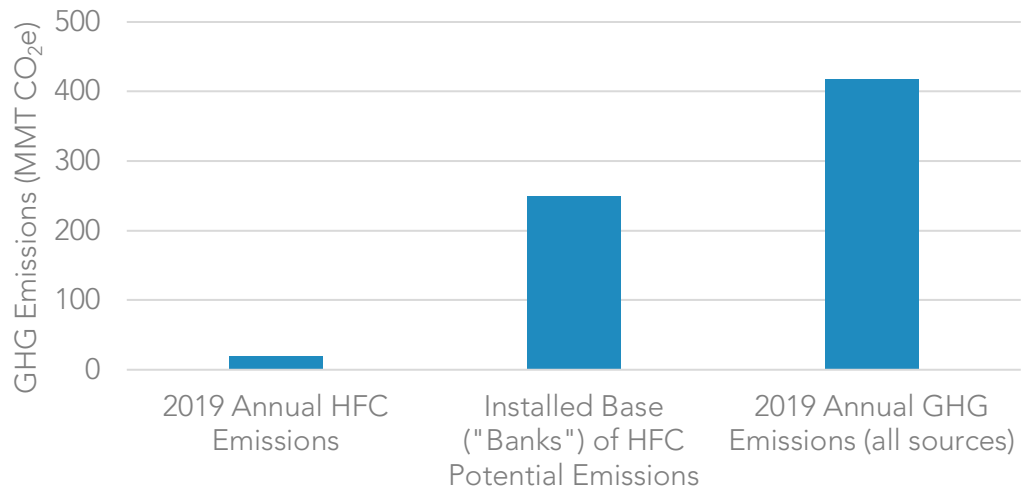
[462] AB 209: Energy and climate change. *https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB209.*

[463] CARB. 2021. 2022 Scoping Plan Update – Short-Lived Climate Pollutants Workshop Presentation. September 8. *https://ww2.arb.ca.gov/sites/default/files/2021-09/carb_presentation_sp_slcp_september2021_1.pdf*.

Figure 4-18: Potential emissions from refrigerants in existing equipment



Strategies for Achieving Success

- Expand the use of very low- or no-GWP technologies in all HFC end-use sectors, including emerging sectors, like heat pumps for applications other than space conditioning, to maximize the benefits of building decarbonization.[464]
- Convert large HFC emitters such as existing refrigeration systems to the lowest practical GWP technologies.[465]
- Prioritize small-scale and independent grocers serving priority populations in addressing existing "banks" of high-GWP refrigerants.[466]
- Improve recovery, reclamation, and reuse of refrigerants by limiting sales of new or virgin high-GWP refrigerants and requiring the use of reclaimed refrigerants where appropriate.[467]
- Assist low-income and disadvantaged communities in obtaining low-GWP space conditioning units to protect vulnerable communities from heat stress and wildfire smoke.[468]

[464] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF26. finalejacrecs.pdf (arb.ca.gov).
[465] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF22. finalejacrecs.pdf (arb.ca.gov).
[466] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, JT5 and JT6. finalejacrecs.pdf (arb.ca.gov).
[467] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, JT1. finalejacrecs.pdf (arb.ca.gov).
[468] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, NF28, JT5, and JT6. finalejacrecs.pdf (arb.ca.gov).

- Accelerate technology transitions in California and the U.S. overall by collaborating with international partners committed to taking action on HFCs under the Kigali Amendment to the Montreal Protocol; this includes addressing barriers to adoption of very low- or no-GWP refrigerant technologies such as high upfront costs, shortage of trained technicians, and lag in updating safety standards and building codes.

Anthropogenic Black Carbon

Significant progress has been made since 2013 to reduce anthropogenic black carbon emissions, primarily from decreased combustion of distillate fuels in the agricultural sector, as well as improvements to provide cleaner, on-road combustion technologies. Under current strategies, anthropogenic black carbon from transportation is expected to be reduced by over 60 percent in 2030. Continued reductions in combustion emissions across all sectors from both the state's climate and air quality programs will also help reduce anthropogenic black carbon emissions going forward.

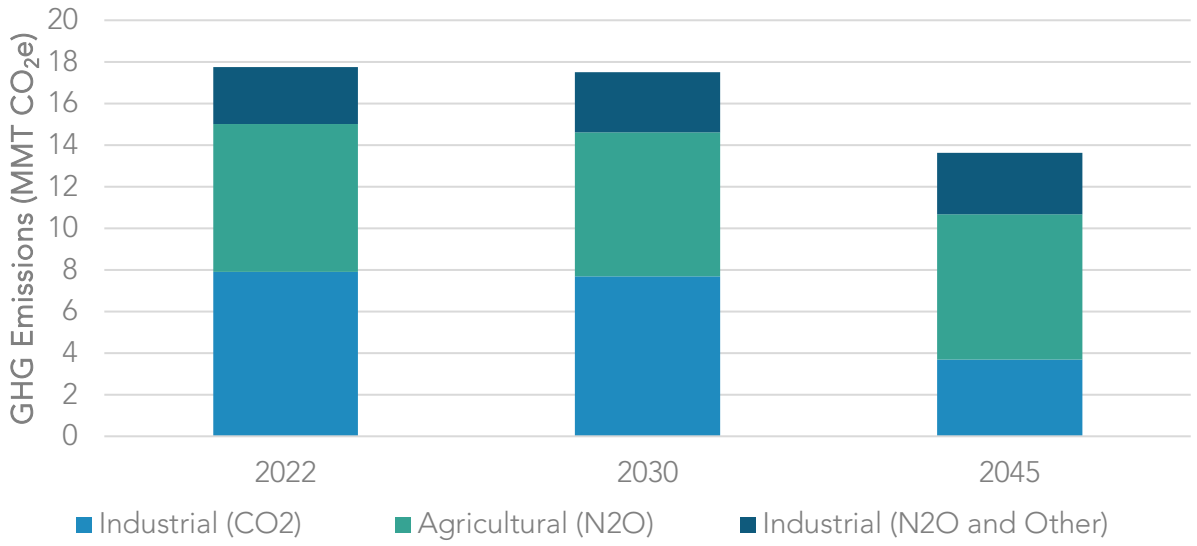
Strategies for Achieving Success

- Reduce fuel combustion commensurate with state's climate and air quality programs, particularly from reductions in transportation emissions and agricultural equipment emissions.[469]
- Invest in residential woodsmoke reduction.

In addition to SLCP emissions, some remaining non-combustion emissions are anticipated to persist in the coming decades, as shown in Figure 4-19. These include CO_2 from industrial processes such as cement manufacturing, oil and gas extraction, and geothermal electric power; N_2O from wastewater treatment, fertilizers, and livestock manure applied to agricultural soils; and other industrial, non-HFC GHG emissions.

[469] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, F1A and Appendix A (Table Summary of Direct Emission Reduction Strategies). "Emissions reductions from energy consumed by California's agricultural sector, including post-harvest processing, use of tractors and other farm equipment, and water import and irrigation." finalejacrecs.pdf (arb.ca.gov).

Figure 4-19: Remaining non-combustion emissions in 2022, 2030, and 2045 in the Scoping Plan Scenario



Natural and Working Lands

California's natural and working lands (NWL) cover approximately 90 percent of the state's 105 million acres,[470] and include forests, grasslands, shrublands and chaparral, croplands, wetlands, sparsely vegetated lands, and the green spaces in urban and built environments. These lands include California Native American tribes' ancestral and cultural lands, parks and green spaces in our cities and communities, and the waters and the iconic landscapes we know and love. The diverse landscapes and biodiversity found throughout California's NWL provide a multitude of benefits to the people of California, including clean water, clean air, biodiversity, food, economic prosperity, recreational opportunities, continuation of traditional tribal ways of life, mental health benefits, and many others.

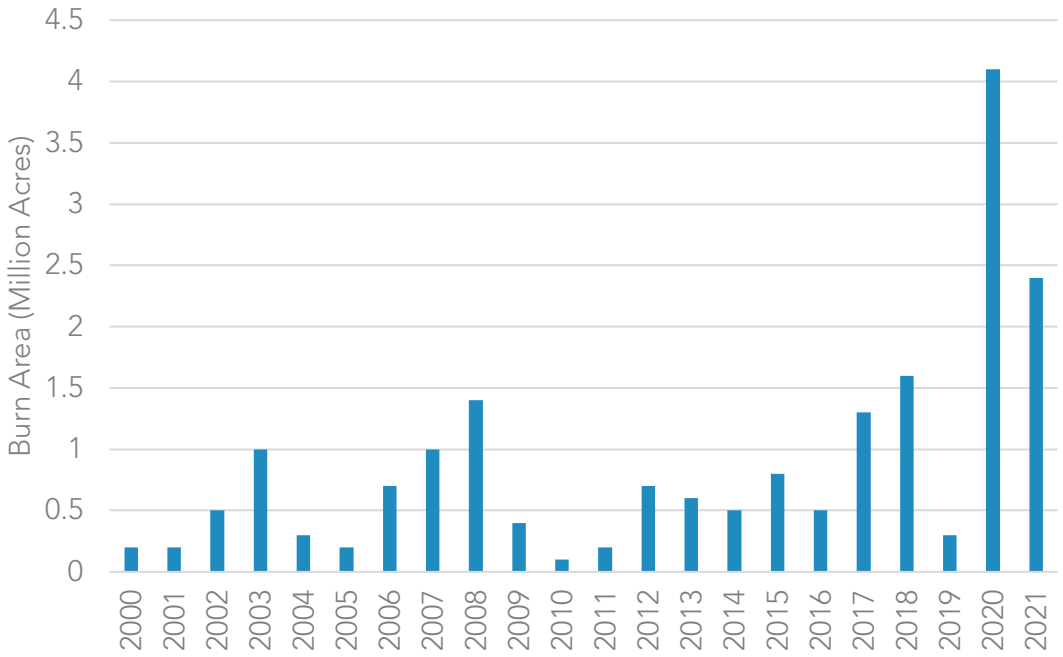
Our lands are a critical sector in California's fight to achieve carbon neutrality and build resilience to the impacts of climate change. Healthy land can sequester and store atmospheric CO_2. Healthy lands also can reduce emissions of powerful SLCPs, limit the release of future GHG emissions, protect people and nature from the impacts of climate change, and build our resilience to future climate risks. Creation of healthy lands through

[470] CNRA. 2022. Natural and Working Lands Climate Smart Strategy. *https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Expanding-Nature-Based-Solutions/CNRA-Report-2022---Final_Accessible_Compressed.pdf*.

multi-benefit and mitigation measures can also support tribal and local traditional lifeways. Unhealthy lands have the opposite effect—they release more GHGs than they store and are more vulnerable to future climate change impacts.

Climate change impacts have become more apparent in recent years and are having significant effects on communities throughout the state. One of these impacts is the much more frequent occurrence of unusually large, high-severity wildfires, which are being driven by climate change and by a recent history of fire-exclusion and land management practices that have resulted in forests with high levels of biomass. These recent large and high-severity wildfires have resulted in a significant amount of burned acreage and emissions in California (Figure 4-20).[471]

Figure 4-20: Acreage of burned wildland vegetation area



These wildfires deviate from the lower-severity fires that previously occurred at frequent intervals, around which California's forests evolved. As climate change accelerates, these large, uncharacteristic wildfires are likely to become more common and impact more of our landscapes. Climate change is also expected to have other significant effects on our lands, including more extreme droughts, floods, extreme heat, and the spread of invasive aquatic and terrestrial species, pests, diseases, and parasites. These impacts can lead

[471] CARB. 2022. Wildfire Emission Estimates for 2021. https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/Wildfire%20Emission%20Estimates%202000-2021.pdf.

to negative feedback loops on human and ecological health; for example, increasing the spread of invasive species can lead to increases in pesticide use, if not managed through regulation or mitigation, which can pose risks to human health and the environment.

California's approach to climate action in the NWL sector is not solely focused on maximizing carbon stocks but instead on supporting carbon management that holistically fosters ecosystem health, resilience, provision of overall climate function, and other co-benefits.

Natural systems operate on a longer timescale than the energy and industrial sectors, and benefits from climate action on our lands can take decades to accrue. Scaling climate smart land management in California requires taking action now and playing the "long game" by establishing and maintaining consistent, patient approaches and programs.

Landscapes

For the first time, this Scoping Plan includes modeling for the NWL sector. The focus of the initial modeling is limited to seven land types that align with the those in the NWL Climate Smart Strategy.[472] Work will continue to incorporate more landscapes and management practices into the modeling over time. The initial landscapes included in the modeling for this Scoping Plan are:

- Forests
- Shrublands and Chapparal
- Grasslands
- Croplands
- Wetlands
- Developed Lands
- Sparsely Vegetated Lands

Each of these land types are a key component to the state's approach to increasing climate action in the NWL sector, as called for in Executive Order N-82-20 and AB 1757.[473] The Executive Order directs CARB to update the target for this sector in support of carbon neutrality by 2045 as part of this Scoping Plan, and to take into consideration the NWL Climate Smart Strategy. AB 1757 calls for the development of an

[472] CNRA. 2022. *Natural and Working Lands Climate Smart Strategy. Appendix B.* *https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Expanding-Nature-Based-Solutions/Appendix-B_04132022_ada.pdf*.

[473] AB 1757 California Global Warming Solutions Act of 2006: Climate Goal: Natural and Working Lands. *https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB1757*.

ambitious range of targets for the NWL sector to be integrated into the Scoping Plan and other state policies. It directs CARB and CNRA to work closely together to update the NWL Climate Smart Strategy, and establish an expert advisory committee to inform and advise on NWL modeling, targets, and implementation strategies.[474] Additionally, in 2021, the governor signed SB 27[475] (Skinner, Chapter 237, Statutes of 2021) into law. It directed CARB to establish CO_2 removal targets for 2030 and beyond and take into consideration the NWL Climate Smart Strategy. The governor's Executive Order, AB 1757, and SB 27 go beyond previous direction from the Legislature and past administrations. These directives emphasize the importance of quantifying land-based carbon both statewide,[476] and in programs and policies,[477] setting targets[478] for NWL to support the state's climate objectives, and advancing land management actions[479] that support the health and resiliency of these lands.

Blue carbon (also known as carbon captured and held in coastal vegetation and soils, such as seagrasses, seaweeds, and wetlands)—is also important to consider as we look at long-term climate goals. While this landscape is not currently covered by IPCC inventory guidelines or included in California's NWL Inventory, the United States was the first nation to include blue carbon in its national GHG emissions inventory. California's Ocean Protection Council and San Francisco Estuary Institute are partnering to create a new coastal wetlands, beaches, and watersheds inventory. CARB staff will utilize information from this effort and assess other available data to evaluate how this landscape may be integrated into our efforts in the future as more data become available.[480]

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[474] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N20. *finalejacrecs.pdf (arb.ca.gov)*.
[475] SB 27 Carbon sequestration: state goals: natural and working lands: registry of projects. *https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220SB27*.
[476] SB 859 Public resources: greenhouse gas emissions and biomass (SB 859, Committee on Budget and Fiscal Review, Chapter 368, Statutes of 2016). *https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB859*.
[477] SB 1386. Resource conservation: working and natural lands. (SB 1386, Chapter 545, Statutes of 2016). *https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1386*.
[478] CARB. 2017. 2017 Climate Change Scoping Plan Update. Board Resolution 17-46. *https://ww2.arb.ca.gov/sites/default/files/barcu/board/res/2017/res17-46.pdf*.
[479] Executive Department. State of California. EO B-52-18. *https://www.ca.gov/archive/gov39/wp-content/uploads/2018/05/5.10.18-Forest-EO.pdf*.
[480] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N2. *finalejacrecs.pdf (arb.ca.gov)*.

Trends of Carbon on Landscapes

CARB currently tracks the carbon stock changes though the Inventory of Ecosystem Carbon in California's Lands[481] (NWL Inventory), which is summarized in Chapter 1. The NWL Inventory is a key tool for tracking changes in carbon stocks across the state, and it will serve as the inventory of record for this sector, tracking sector-wide progress toward the target. The NWL Inventory provides a retrospective snapshot of the status of California's lands, and captures the gains or losses of carbon stocks that occur over time. In addition to tracking carbon stock changes, the NWL Inventory is an important tool for understanding the impacts of our efforts to increase climate action in this sector (such as those identified in this Scoping Plan and the NWL Climate Smart Strategy) on NWL carbon stocks. The inventory is also used as the foundation for Scoping Plan scenario modeling and target setting.

CARB's inventory shows that carbon stocks decreased in NWL lands from 2001 to 2011, releasing more carbon than they were storing, and then increased slightly from 2012 to 2014.[482] These trends highlight the interannual and interdecadal variability of lands and their ability to be both a source and a sink of carbon, and the importance of looking at NWL data and trends over multiyear and multidecadal time periods, as opposed to looking only at annual changes. This movement is part of the Earth's carbon cycle, where carbon transfers between the land, ocean, and atmosphere. As part of the carbon cycle, over decades or centuries, fire and plant respiration and decomposition move carbon from the land to the atmosphere, while plant growth and other processes move carbon from the atmosphere to the land. Emissions from fossil-fuel combustion are contributing to putting this cycle out of balance.

Additionally, some historic land management practices that have resulted in the loss of carbon from the soil are also contributing to the atmospheric rise of CO_2 while simultaneously exacerbating the imbalance of the water cycle, which is influenced by and linked to the carbon cycle. These emissions are also contributing to a feedback loop for California's lands: as CO_2 emissions accumulate in the atmosphere—and California experiences more warming, extreme heat events, and droughts—the risk and intensity of carbon losses also increases, which in turn transfers more carbon from the land to the atmosphere. And because forests and shrublands comprise approximately 85 percent of the carbon stocks in California, management strategies and disturbances in forest and

[481] CARB. *An Inventory of Ecosystem Carbon in California's Natural & Working Lands.* 2018 Edition. *nwl_inventory.pdf (ca.gov).* Accessed 3/2/2022.
[482] These trends are consistent estimates in the most recent AB 1504 reporting period.

shrubland carbon play an important role in determining whether California's lands are providing either net carbon sequestration or net emissions on an annual basis.

The gains and losses of carbon on our lands will fluctuate in the future; what is important is to restore carbon in places where it has been lost and reduce large carbon losses on our NWL through active, attentive, and adaptive management. For additional details on the nexus between NWL and GHGs, see pages 5–6 of the NWL Climate Smart Strategy.

Goals and Accelerating Nature-Based Solutions

The state's climate mitigation targets are traditionally identified by individual years, (i.e., tons of GHG emissions in 2020 or 2030). However, because NWL processes fluctuate year to year and because it can sometimes take decades for climate action to fully impact carbon in NWL, it is important to consider the statewide, long-term trends of carbon stock change when identifying how this sector contributes to California's pathway to achieving carbon neutrality. Tracking carbon stock change over a multi-decadal period is the best way to assess the full direct impact climate action has on carbon storage. Such an approach filters out fluctuations from year-to-year weather variations and multi-year natural climate cycles, such as El Niño patterns.

Current data sources and methods allow us to track only certain carbon stocks that exist on NWL. For target tracking to be successful, each carbon pool must be inventoried using a methodology that can detect changes due to management and climate change. Certain carbon pools lack the scientific data and methodologies necessary for target-setting and tracking. For example, soils in forests, shrublands, and grasslands are not included in the Scoping Plan carbon stock target because, currently, there is no way to track statewide soil carbon through time in a way that would capture the effects of increased climate action and climate change.

When considering how NWL contribute to the state's goal of carbon neutrality, all lands' carbon stock gains and losses must be considered, and the Scoping Plan target is set in these terms. It is not sufficient to aggregate climate benefits only within areas where projects, management, or climate action occur. Much of the state does not receive active or quantifiable management, but these areas still contribute to the state's overall carbon stock change and GHG emissions. To incorporate the entire carbon balance toward true carbon neutrality, the Scoping Plan target is set in terms of carbon stock change across the entire state. This incorporates all lands that both receive and do not receive active management, and includes the end result of all sequestration, emissions, and other changes to carbon on the landscape.

However, carbon stock change is not equivalent to emissions. Currently, the data and emission quantification science is not sufficient to enable inventories to comprehensively track all NWL emissions in a way that would enable us to set an NWL target in terms of

statewide emissions and sequestration. There is a great need, across the entire NWL sector statewide, for more empirical data, science, and tools to track all carbon stocks across each carbon pool, and to begin to track emission and sequestration rates. As California implements AB 1757, there is an opportunity to update the data, science, and tools to enable this level of tracking and target setting in the future.

As outlined in Chapter 2, California is projected to lose carbon stocks over the coming decades, but this Scoping Plan analysis also shows that increasing the pace and scale of climate smart land management in California will reduce the carbon stock losses and GHG emissions from the NWL sector. In response to EO N-82-20 and AB 1757, the proposed target for NWL is shown in Table 4-1.

Table 4-1: Scoping Plan modeled target for NWL, based on increasing action on NWL

	Total Carbon Stock % Change from 2014
2045	-4

Achieving this target will require significant expansion of the pace and scale of climate action on California's NWL, including the following:

- Increasing climate smart forest, shrubland, and grassland management to at least 2.3 million acres a year—an approximate 10x increase in management from current levels.
- Increasing climate smart agricultural practices by at least 78,000 acres adopted a year, annually conserving at least 8,000 acres a year of croplands, and increasing organic agriculture to comprise at least 20 percent of cultivated acres in California by 2045—an approximate 7.5x increase in healthy soils practices from previous levels and a 2x increase in total acres of organic agriculture.
- Increasing annual investment in urban trees in developed lands by at least 200 percent above historic levels and establishing defensible space on all parcels by 2045.
- Restoring at least 60,000 acres, or approximately 15 percent of all Sacramento–San Joaquin River Delta (Delta) wetlands, by 2045.
- Cutting land conversion of deserts and sparsely vegetated landscapes by at least 50 percent annually from current levels, starting in 2025.

If the carbon stock target above is met, and the management actions above are implemented, the modeling for NWL indicates that California's lands will be a net source of emissions, producing approximately 7 $MMTCO_2e$ of average annual emissions.

Additional climate smart management practices and additional landscapes, such as those included in the Climate Smart Strategy and discussed below in Additional Management Strategies, have the potential to increase carbon stocks and reduce GHG emissions from NWL beyond the levels modeled for this Scoping Plan.

The purpose of the NWL target and the above estimated outcomes is to provide a numerical guide that can support the state's efforts to accelerate both near-term and long-term climate action on California's lands, prioritizing durable solutions that deliver multiple outcomes. Taking these actions over the coming decades will reduce the potential carbon losses from NWL, reduce GHG emissions from some landscape types (such as croplands and Delta wetlands), and support sequestration of GHGs from NWL between 2025 and 2045. These actions will also deliver significant benefits to Californians beyond advancing our climate goals, such as reducing wildfire emissions and their associated health impacts, increasing habitat for biodiversity, reducing urban heat island effects, reducing harmful pesticide exposure, expanding economic opportunities, and others. Additional information on several economic and health outcomes from the Scoping Plan Scenario is included in Chapters 2 and 3.

Statewide planning and target setting for the NWL sector will only create meaningful change if followed by effective on-the-ground implementation. State government cannot accomplish this implementation alone. Effective large scale climate action is dependent on partnerships among tribal, federal, state, regional, and local partners, and across governmental, private, nonprofit, and commercial sectors. The NWL sector of the Scoping Plan sets a carbon target with climate action recommendations that can be used to achieve the quantified carbon, health, and economic outcomes. Implementation of these actions must be led by local or regional partnerships that plan and execute projects appropriate to the specific conditions. The technical expertise and local knowledge of land managers and stewards in all sectors must be elevated to ensure relevant, efficient, and effective climate action.

Implementation of climate action should contribute to state targets, maximize local benefits, and alleviate environmental injustices and other social inequities. On-the-ground action is largely executed and managed by local and regional actors, but state government agencies must support communities across the state in implementing nature-based climate solutions that address statewide objectives, such as the Scoping Plan carbon target. This includes providing resources and developing frameworks, while greatly increasing capacity and technical assistance to assist and empower local partners. Examples of how this can be done are the Regional Forest and Fire Capacity Program within the forestry sector, the UC Cooperative Extension in the agricultural and forestry sectors—as well as the work of the state's 10 regional Conservancies. These programs provide strong examples to emulate as they facilitate statewide coordination, and information and resource transfer from the state to the regional and local levels. The Regional Forest and Fire Capacity Program provides funding for local and regional groups

to build their organizational capacity to plan and implement wildfire and forest management projects that are informed by their own local expertise. The UC Cooperative Extension is an example of how the state provides technical assistance to local landowners and community organizations, helping them apply the latest science-based management strategies to their lands. California's regional Conservancies play a pivotal role in implementing regional conservation, restoration, and land management efforts through activities such as grant funding, science generation, and planning assistance.

The state also has identified the need to incorporate and elevate traditional indigenous knowledge into climate action on the regional and local scales. Accomplishing this requires close partnerships with tribes for mutual knowledge and resource sharing, while protecting culturally sensitive knowledge and resources. As Tribes are sovereign nations with specialized cultural knowledge and experience in managing lands, climate action on these lands that contribute to the State of California's climate targets can only be accomplished with the full participation and under the leadership of the Tribes that govern those lands.

Strategies for Achieving Success: Crosscutting Items for all NWL

- Implement AB 1757 and SB 27.
- Implement the Climate Smart Strategy.
- Accelerate the pace and scale of climate smart action, consistent with the management levels identified above, as part of a collective effort between federal, state, private, nonprofit, and individual land managers.
- Prioritize and practice equity, including through meaningful community engagement and prioritizing implementation of nature-based solutions that benefit the communities most vulnerable to climate change.[483]
- Advance multi-benefit, collaborative, landscape-level approaches that engage communities and landowners, and incorporate adaptive managements.
- Consult and partner with California Native American tribes to increase co-management and tribal management authority; restore, protect, and enhance natural cultural resources, traditional foods, and cultural landscapes; respect tribal sovereignty; and support tribes' implementation of tribal expertise and Traditional Ecological Knowledge and cultural easements.[484]

[483] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N8. *finalejacrecs.pdf (arb.ca.gov).*
[484] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N1, N6, N16, N17, N18. *finalejacrecs.pdf (arb.ca.gov)*.

- Leverage existing innovative financial and market mechanisms, and explore new ones, between the public, private, and philanthropic sectors to secure funding of climate smart land management.
- In partnership with communities, tribes, and the private sector, expand and develop new infrastructure for manufacturing and processing of climate smart agricultural and biomass products.
- Leverage and support technical assistance providers: such as the UC Cooperative Extension and California's 98 Resource Conservation Districts, that have track records of providing technical assistance to local landowners and implementing agriculture, forestry, natural resource management, and restoration projects across the state.
- Establish and expand mechanisms that ensure NWL are protected from land conversion and parcelization (e.g., conservation easements or Williamson Act), in line with the strategies outlined in CNRA's Pathways to 30x30 California.[485,486] Pair land conservation projects with management plans that increase carbon sequestration, where feasible.
- Increase opportunities for private and philanthropic investments in nature-based climate solutions, utilizing existing voluntary and compliance carbon markets, existing state and local programs, and the California Carbon Sequestration and Climate Resiliency Project Registry established pursuant to SB 27.
- Expand monitoring and tracking of management actions and outcomes consistent with the tracking and monitoring recommendations of the Climate Smart Strategy.

Forests, Shrublands, and Chaparral

At roughly 29 million acres, forests cover 27 percent of California. Shrublands and chaparral cover 31 percent of the state; roughly 33 million acres. Both types are distinct, with their own ecological dynamics and management strategies, and are modeled within a single model that is calibrated to treat them uniquely.

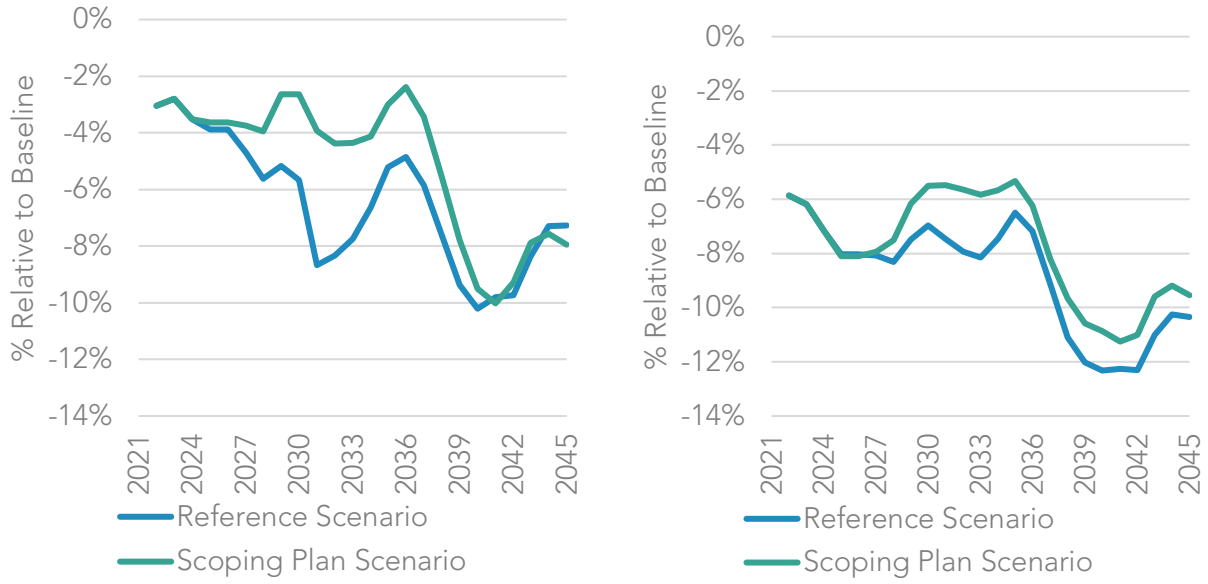
Together, forests, shrublands, and chaparral support a high biodiversity of plants and animals, in addition to high levels of carbon stocks. They provide important air and water quality benefits to all Californians, as well as recreational opportunities and, for forests, harvested wood products for the state. These landscapes are fire-adapted, and historical tribal management of these lands has fostered ecosystem health and resilience. Over the past century, these lands have been impacted severely by fire exclusion, including

[485] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N5, N26, N27. finalejacrecs.pdf (arb.ca.gov).
[486] CNRA. 2022. *Pathways to 30x30 California*. https://www.californianature.ca.gov/pages/30x30.

exclusion of indigenous people's management and past management practices, which has resulted in less resilient ecosystems and communities and more destructive wildfires today. This, along with drought induced stress and mortality, has changed these landscapes from a carbon sink to a carbon source. Climate smart management can help make forests more resilient to climate change and less prone to catastrophic wildfire. Climate-smart management in shrublands and chaparral face additional challenges and uncertainty, but can still provide protection for threatened communities and natural resources. This management, if conducted on a regular basis to maintain forest health, can help reduce emissions from forests, shrublands, and chaparral, and help strengthen and maintain the co-benefits that Californians experience from them.

Under all management levels, forests and shrublands are expected to lose carbon over the next two decades due to climate change and wildfire (Figure 4-21).

Figure 4-21: Forest (left) and shrubland (right) carbon stocks by 2045[487,488]



While this decrease in carbon stocks may be inevitable, forest management under the Scoping Plan Scenario can help direct where and how carbon loss occurs. By proactively managing forests and shrublands, the loss of carbon from wildfire can be lessened as the risk of high severity fire is decreased, with the removed biomass going toward a more

[487] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N13. *finalejacrecs.pdf (arb.ca.gov)*.
[488] This analysis is the aggregation of all forests and shrublands from all ownerships across the entire state of California.

useful purpose such as harvested wood products, bioenergy, and engineered carbon removal. Managing for a diverse and resilient forest landscape also can help forests recover more quickly so that when climate change and wildfire impacts occur, forests will be less affected and can continue to thrive and sequester carbon. Additional details on the climate benefit potential of forests and shrublands/chapparal can be found in Section 2 of the NWL Climate Smart Strategy.

Strategies for Achieving Success

- Accelerate the pace and scale of climate smart forest management to at least 2.3 million acres annually by 2025, in line with the climate smart management strategies identified in this Scoping Plan, the NWL Climate Smart Strategy, and the Wildfire and Forest Resilience Action Plan.[489]
- Establish and expand mechanisms that ensure forests, shrublands, and grasslands are protected from land conversion and that support ongoing, rather than one-time, management actions.
- In collaboration with state and local agencies, accelerate the deployment of long-term carbon storage from waste woody biomass residues resulting from climate smart management, including storage in durable wood products, underground reservoirs, soil amendments, and other mediums.
- Expand infrastructure to facilitate processing of biomass resulting from climate smart management.
- Expand permit streamlining in collaboration with state and local agencies to accelerate implementation of climate smart forest management while protecting natural resources.

Grasslands

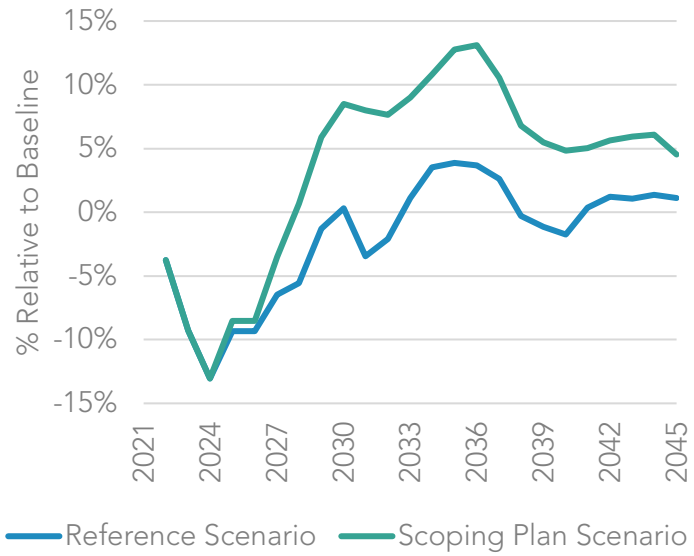
Grasslands cover 9 percent of California, roughly 10 million acres, and are found throughout the state in various landscapes, with concentrations in the foothills surrounding the Sacramento and San Joaquin Valleys. In addition to carbon storage (primarily in the soil), grasslands provide open space, wild habitat, grazing land, and important water filtration and recharge benefits. The protection of grasslands provides an opportunity to reduce sprawl and complement VMT reduction strategies. As grasslands are susceptible to invasive species, climate smart strategies can increase grassland

[489] Forest Management Task Force. 2021. *California's Wildfire and Forest Resilience Action Plan: Recommendations of the Governor's Forest Management Task Force.* https://www.fire.ca.gov/media/ps4p2vck/californiawildfireandforestresilienceactionplan.pdf.

resilience to climate change by improving species diversity and maintaining or increasing soil carbon stocks.

Modeling results show that increased fuels treatments and avoided land conversion can increase carbon stocks on grasslands by 2045, but sequestration rates fluctuate annually. Grasslands are capable of high carbon sequestration rates but are susceptible to carbon losses from wildfire and land conversion. Soil carbon is the major carbon pool on these lands, and continued future improvement of the monitoring and modeling of soil carbon is needed. Similar to forests and shrubland/chaparral, modeling alternatives that include fuels treatments resulted in greater carbon stocks compared to no management, and had lower wildfire emissions. Unlike forests and shrubland/chaparral, which have a general declining carbon stocks trend, the modeling results (Figure 4-22) show grasslands can maintain or increase carbon stocks with active management. Details on the climate benefit potential of grasslands can be found in Section 2 of the NWL Climate Smart Strategy.

Figure 4-22: Grassland carbon stocks by 2045



Strategies for Achieving Success

- Establish and expand mechanisms that ensure grasslands are protected from land conversion/parcelization and that support ongoing, rather than one-time, management actions that improve carbon sequestration.
- Deploy grassland management strategies, like prescribed grazing, compost application, and other regenerative practices, to support soil carbon sequestration, biodiversity, and other ecological improvements.

- Increase adoption of compost production on farms and application of compost in appropriate grassland settings for improved vegetation and carbon storage, and to deliver waste diversion goals through nature-based solutions.

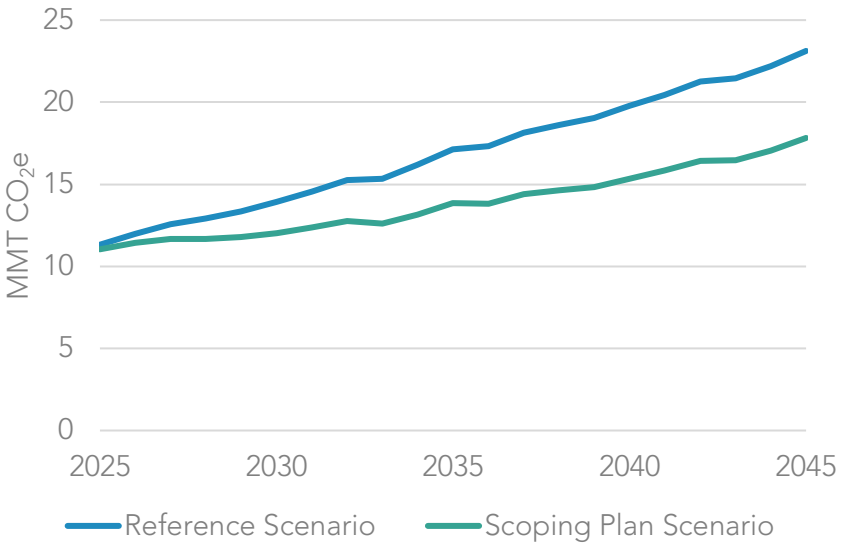
Croplands

Croplands cover 9 percent of the state, roughly 9.5 million acres. This land is some of the most productive agricultural land in the world, and enables California to be a global leader in agriculture. Aside from developed lands, croplands are the most intensively managed landscapes in the state, and are closely tied to society through the food they produce and the constant, direct contact that people have with croplands through the course of management. In addition to food security, croplands provide considerable carbon storage in the soil and, in perennial croplands, in aboveground biomass. Climate smart practices can improve public health; for example, by reducing synthetic fertilizer and pesticide use. They also help to maintain or increase the climate resilience of cropland productivity through improved soil conditions and increased pollinator habitat.

There is also significant potential to transform this sector to increase soil carbon storage, reduce GHG emissions (Figure 4-23), and reduce pesticide exposure and health impacts. Moving to an agricultural system that improves soil health and water holding capacity reduces over-application of nitrogen, reduces the use of pesticides and fumigants, and increases biodiversity and pollinator habitat, supporting California's pathway to carbon neutrality while simultaneously improving the lives of those who live and work in the agricultural community. Croplands are intricately tied to people, communities, and their health, and through climate smart practices and cropland conservation, these lands have the potential to contribute more to society than just food.[490] The implementation of climate smart agricultural practices and diversified organic agriculture can help California achieve social and environmental benefits, like improving water use efficiency, increasing pollinator habitat, and reducing synthetic fertilizer and pesticide use.[491] Additional details on the climate benefit potential of croplands can be found in Section 2 of the NWL Climate Smart Strategy.

[490] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations In-part (N3, N4, N22), N5, N21. *finalejacrecs.pdf (arb.ca.gov)*.
[491] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N11. *finalejacrecs.pdf (arb.ca.gov)*.

Figure 4-23: Cumulative CO_2e emissions from annual croplands in 2045[492]



CARB recognizes the complex nature of croplands, cross-sector relationships, and the need to build on this analysis to further our understanding of cropland dynamics. Many more aspects of cropland management need to be explored for potential climate benefits, such as water and nutrient use management, pest control methods, crop rotations, and other management practices. The impacts of climate change on water availability, annual/perennial crop growth, and future carbon sequestration trends are uncertain, and recent policies such as the Sustainable Groundwater Management Act may also influence cropland management in unforeseen ways. Nonetheless, it is clear that greater climate smart practice implementation can prepare California for the future and yield tangible benefits for the state.

Strategies for Achieving Success

- Accelerate the pace and scale of healthy soils practices to 80,000 acres annually by 2025, conserve at least 8,000 acres of annual crops annually, and increase organic agriculture to 20 percent of all cultivated acres by 2045.

[492] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N11. *finalejacrecs.pdf (arb.ca.gov)*.

- Utilize the recommendations included in CDFA's Farmer and Rancher-Led Climate Change Solutions[493] report to accelerate deployment of healthy soils practices, organic farming, and climate smart agriculture practices.
- Establish or expand financial mechanisms that support ongoing deployment of healthy soils practices and organic agriculture.[494]
- Support strategies that achieve co-benefits of safer, more sustainable pest management practices and the health and preservation of ecosystems, such as implementing the California Department of Pesticide Regulation's (DPR's) Sustainable Pest Management Work Group recommendations.[495]
- Conduct research on the intersection of pesticides, soil health, GHGs, and pest resiliency via a multi-agency effort with DPR, CDFA, and CARB.[496]
- Conduct outreach and education to develop and facilitate the increased adoption of safer, more sustainable pest management practices and tools; reduce the use of harmful pesticides; promote healthy soils; improve water and air quality; and reduce public health impacts.
- In collaboration with state and local agencies, accelerate the deployment of alternatives to agricultural burning that increase long-term carbon storage from waste agricultural biomass, including storage in durable wood products, underground reservoirs, soil amendments, and other mediums.
- Work across state agencies to reduce regulatory and permitting barriers around some healthy soils practices (e.g., composting), where appropriate.
- Utilize innovative agriculture energy use and carbon monitoring and planning tools to reduce on-farm GHG emissions from energy and fertilizer application or to increase carbon storage, as well as to promote on-farm energy production opportunities.

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[493] California Department of Food and Agriculture. 2021. Farmer and Rancher Led Climate Change Solutions. *https://www.cdfa.ca.gov/oefi/climate/docs/cdfa_farmer_and_rancher-led_climate_solutions_meetings_summary.pdf*.

[494] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N5, N7. *finalejacrecs.pdf (arb.ca.gov).*

[495] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations N3, N4, N5, N7, N22. *finalejacrecs.pdf (arb.ca.gov)*.

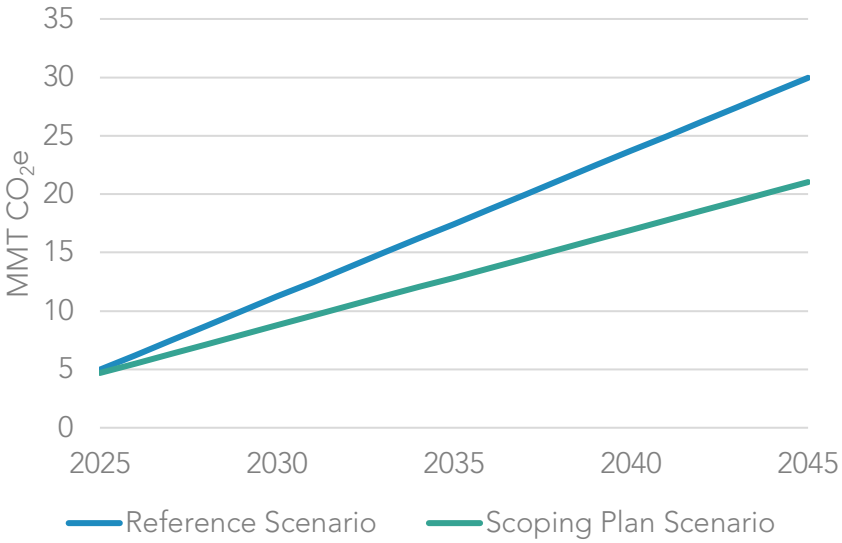
[496] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N11. *finalejacrecs.pdf (arb.ca.gov)*.

Wetlands

Wetlands cover 2 percent of the state (roughly 1.7 million acres) and include inland and coastal wetlands, such as vernal pools, peatlands, mountain meadows, salt marshes, and mudflats. These lands are essential to California's communities as they serve as hotspots for biodiversity, contain considerable carbon in the soil, are critical to the state's water supply, and protect upland areas from flooding due to sea level rise and storms. Wetlands have been severely degraded through reclamation, diking, draining, and dredging practices in the past, resulting in the emissions of the carbon stored in the soils and the loss of ecosystem benefits. Climate smart strategies to restore and protect all the types of wetlands can reduce emissions while simultaneously improving the climate resilience of surrounding areas and improving the water quality and yield for the state. Restored wetlands also can reduce pressure on California's aging water infrastructure. These benefits beyond emissions reductions will help in the future, as climate change is predicted to negatively affect water supply.

Avoided conversion and restoration of Delta wetlands reduces CO_2 and methane emissions from wetlands, with GHG reductions scaling with implementation rates (Figure 4-24). Expansion of conservation and restoration efforts will generate benefits such as the conservation of biodiversity, improved water quality and supply, and reduced flood risk. Additional details on the climate benefit potential of wetlands can be found in Section 2 of the NWL Climate Smart Strategy.

Figure 4-24: Cumulative CO_2e emissions from Delta wetlands by 2045



Strategies for Achieving Success

- Restore 60,000 acres of Delta wetlands annually by 2045 to reduce methane emissions from wetlands and reverse the resulting subsidence.

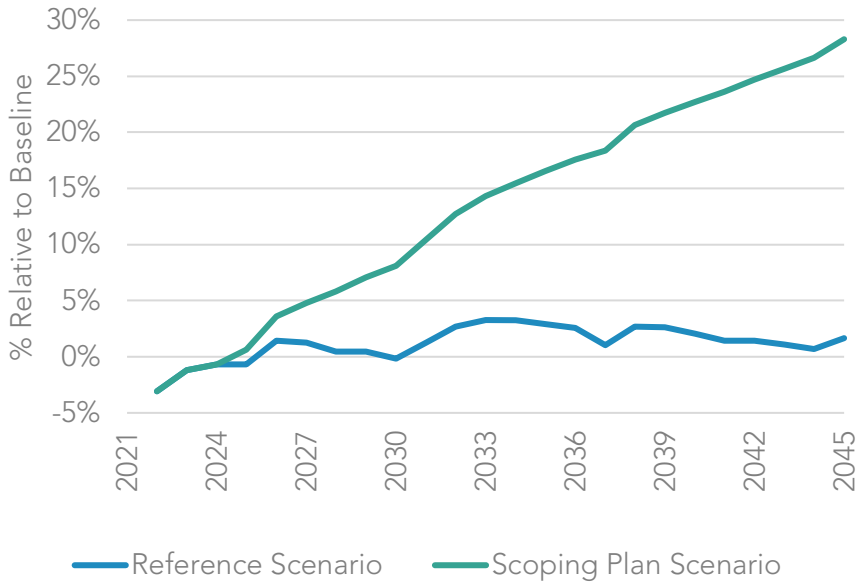
- Identify and prioritize wetland restoration efforts around climate vulnerable communities.
- Leverage other funding and institutions to support wetland restoration projects, including land trusts, local funding (e.g., San Francisco Measure AA), federal funding, and private and philanthropic funding to support wetlands restoration projects.
- Work across state agencies to reduce regulatory and permitting barriers around wetland restoration projects, where appropriate.

Developed Lands

Developed lands cover 6 percent of the state (roughly 6.8 million acres) and include urban, suburban, and rural areas, as well as transportation and supporting infrastructure throughout California. This area encapsulates the land on which the vast majority of Californians reside and call home. The vegetation within cities and communities, and along infrastructure, are all part of developed lands. This vegetation provides numerous benefits to surrounding areas, including carbon storage, air and water filtration, reduced urban heat island effect, and access to nature, aesthetics, and mental health, among others. These areas are susceptible to climate change as well, and climate smart strategies to protect and expand the urban forests, landscaping, green spaces, parks, and associated vegetation can increase their climate resilience and the benefits Californians derive from them. These strategies also have a significant opportunity to benefit disadvantaged communities, who may not have equitable access to these practices or the benefits they provide. Additional details on the climate and equity benefit potential of developed lands can be found in Section 2 and the Introduction of the NWL Climate Smart Strategy.

Urban forests have a significant potential to sequester carbon (Figure 4-25). They are vastly different from wildland forests, as they require investments to maintain and irrigate. This results in the need for a significant increase in investment to increase urban forest carbon. As urban forests become denser and management difficulty increases, the carbon stock returns on investment diminish, making it expensive to maximize carbon in urban forests. Water availability and irrigation efficiency are also an important consideration for increasing urban forest cover. As water becomes scarcer, the prioritization of irrigating trees over lawns or gardens may be required to achieve increases in urban forest carbon.

Figure 4-25: Carbon stocks in urban forests by 2045



Within wildland-urban interface (WUI) areas, defensible space can protect urban and rural communities from wildfire. Analysis results show that 48 percent of parcels are currently fully compliant with defensible space requirements. This highlights how much work needs to be done to protect communities and homes. Defensible space results in a decrease in carbon stocks, as expected when reducing fuels for wildfire.

Strategies for Achieving Success

- Increase urban forestry investment annually by 200 percent, relative to business as usual.
- Increase public awareness of urban forest benefits and, where appropriate, prioritizing irrigation of trees over lawns.
- Provide technical assistance and resources to disadvantaged communities to implement community urban greening projects to provide equitable access to the benefits of urban greening projects.[497]
- Work with state and local agencies to expand technical assistance for and enforcement of the defensible space requirements of PRC 4291 to reduce wildfire risk to homes and structures.

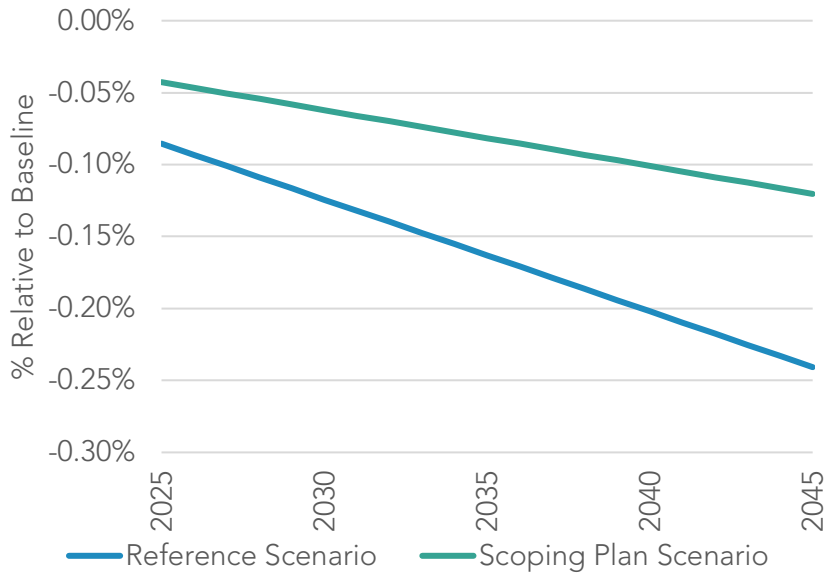
[497] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N8. *finalejacrecs.pdf (arb.ca.gov)*.

Sparsely Vegetated Lands

Sparsely vegetated lands cover 10 percent of the state, roughly 10.2 million acres, primarily in the east and southern parts of California. These lands include deserts, beaches, dunes, bare rock, and areas covered in ice and snow (e.g., higher mountain elevations). The limited carbon storage of these lands varies from bare rock and mineral soil to more vegetated areas, though severe climate limits the amount of biomass. Nonetheless, sparsely vegetated lands are important for open space and provide rare and unique habitats for endemic species and a diversity of wildlife. These lands present important recreational opportunities for Californians and serve as important protective buffers in coastal and low-lying areas. Land use change threatens these lands, and conservation efforts are important for protecting these unique areas of California.[498]

Avoided conversion of sparsely vegetated lands reduces the organic carbon lost from the soil, which is the major carbon pool in this land type (Figure 4-26). In identifying the outcomes for sparsely vegetated lands, CARB modeled avoided land conversion to another land use.

Figure 4-26: Carbon stocks in sparsely vegetated lands by 2045



Strategies for Achieving Success

- Establish and expand mechanisms that ensure sparsely vegetated lands are

[498] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N26. finalejacrecs.pdf (arb.ca.gov).

protected from land conversion, prioritizing those areas most vulnerable to climate change and loss.

Additional Management Strategies

Additional nature-based climate solutions beyond those management strategies modeled for this Scoping Plan are available for implementation, but either cannot currently be modeled and/or affect carbon and the landscape in ways that cannot currently be tracked. Nevertheless, it is important to take action even where these technical gaps exist. Some of these actions, such as cultural burning and indigenous farming practices, have been used on large scales for decades or even centuries, while others are relatively new concepts. The state nevertheless recommends implementing the additional solutions listed here to achieve potential additional climate benefits, as well as other co-benefits. These additional solutions were drawn from the NWL Climate Smart Strategy and stakeholder, tribal government, and interagency feedback.[499]

Considerations

Although these practices are recommended, because of the lack of in-depth modeling and analysis available, several considerations must be addressed when implementing them. These considerations also apply to the management strategies included in the Scoping Plan Scenario.

- Future climate change impacts are uncertain: The negative impact that climate change can have on the ability of these practices to maintain expected climate benefits is uncertain and may significantly change in the future. Climate change is expected to further diminish the already constricting growing conditions in California, with increasing droughts, more extreme weather events, and expanding disturbances from fire, insects, and disease. It is estimated that suitable habitat for many native plant and animal species could shift, creating novel ecosystems without historical precedent. Close monitoring of all practices, including no management, across our NWL will be critical to understand if and how future climate change affects outcomes and how to adapt management to meet the needs of the system under climate change.[500]

[499] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N24. *finalejacrecs.pdf (arb.ca.gov)*.
[500] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N15. *finalejacrecs.pdf (arb.ca.gov)*.

- Local conditions: Not every practice is applicable, feasible, or even desirable in every location across California. Implementation of these practices should account for local conditions and needs that may affect the appropriateness of that practice.
- Long-term carbon storage: The ability to sequester additional carbon into NWL is only beneficial to the climate if that carbon stays out of the atmosphere. Many of the additional practices listed here may require continual incentives or interventions to ensure permanence of carbon storage in the soil and biomass. For example, in croplands, it is difficult to estimate how much of the carbon stored by no-tillage can be released by a single subsequent tillage, but a return to conventional tillage would usually be expected to erase most gains.[501,502]
- Scaling actions: There are uncertainties on how these practices may impact both the environment and communities when significantly expanded. For this reason, it is best to take a cautious and measured approach to ramping up actions to a larger scale.
- Infrastructure and operational needs: Scaling up the implementation of some of these practices demands transformational change in the supporting infrastructure and operational frameworks. For example, increasing forest management to the degree included in the Scoping Plan Scenario will require significant changes to wood-processing infrastructure, workforce capacity, permitting processes, technical assistance, and other operational constraints. The increased application of compost to croplands, and potentially to rangelands, will require a significant increase in organic waste and dairy manure collection to increase compost supply, in line with SB 1383. This will also require additional compost production facilities as well as compost/organic waste transportation and application methods.
- Co-benefits: Many co-benefits from these practices exist beyond the climate benefits. These co-benefits include improved public and worker health; improved microbial, insect, and wildlife habitat; enhanced biodiversity; greater labor demand in the nature-based economy; and improved climate resilience.
- Labor and Economics: Many of these practices require additional labor, and an evaluation of how many more jobs are needed to carry out many of these practices

[501] Muñoz-Romero, V., R. J. Lopez-Bellido, P. Fernandez-Garcia, R. Redondo, S. Murillo, and L. Lopez-Bellido. 2017. “Effects of tillage, crop rotation and N application rate on labile and recalcitrant soil carbon in a Mediterranean Vertisol.” *Soil Tillage Res.* 169, 118–123.
[502] Mitchell, J. P., A. Shrestha, W. R. Horwath, R. J. Southard, N. Madden, J. Veenstra, and D. S. Munk. 2015. “Tillage and cover cropping affect crop yields and soil carbon in the San Joaquin Valley.” *California. Agron. J.* 107, 588–596.

is currently unknown. There will also be the need to explore the costs and economic benefits of implementing these additional practices.

- Retreatments: All of these practices have limits on how long they can enhance carbon sequestration. Many of these practices need to be periodically repeated, followed by complementary practices, or maintained through time. This increases costs and requires diligence and long-term stewardship.

Additional NWL Actions and Strategies

Below is a set of additional actions that should be taken on California's natural and working lands. Again, these practices were not modeled for this Scoping Plan, and all of the considerations listed above should be taken into account before implementing the following actions.

- Conservation of all NWL types (in line with the NWL Climate Smart Strategy and CNRA's Pathways to 30x30 California) is critical to ensuring continued carbon sequestration and provision of co-benefits from these lands for all Californians.[503]
- Reforestation following disturbance, using appropriate species, is an impactful practice that can help prevent conversion away from forestland and establish new trees to sequester carbon. The number of acres that may need reforestation following high severity wildfires is estimated to continue to increase into the future.
- Restoration of shrublands, chaparral, riparian zones, and oak woodlands across California includes a variety of practices to alter their structure and return endemic species to the areas. These unique habitats provide multiple co-benefits to the state, such as clean water, reduced wildfire risk, and biodiverse habitats for flora and fauna.
- Conservation and restoration of wetlands, beyond the Delta wetlands included in the NWL modeling, can protect these unique habitats and the climate benefits they provide. These wetland types can include but are not limited to coastal wetlands, mountain meadows, vernal pool complexes, alkali sinks and meadows, and floodplains.
- Conservation and restoration of seagrasses and seaweeds provide a number of benefits, including carbon storage and sequestration, habitat provision for many culturally and commercially important species of fishes and invertebrates, shoreline protection, and tourism opportunities.[504]

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[503] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N26, N27. finalejacrecs.pdf (arb.ca.gov).
[504] AB 32 EJ Advisory Committee. 2022 Scoping Plan Recommendations, N2. finalejacrecs.pdf (arb.ca.gov).

- Prescribed herbivory utilizes various livestock to consume vegetation to reduce fuel loads across an area. This fuel management practice can be used in forests, grasslands, and shrublands as an effective alternative to herbicide use, and should be considered wherever local conditions allow.
- Urban and community greening efforts such as green schoolyards, urban farms, rain gardens, community gardens, community composting, and many more provide numerous health benefits to communities.
- Additional Healthy Soils Program practices on annual croplands such as conservation cover and crop rotation, biomass planting for borders, wind barriers, riparian areas, and improved nutrient management can improve soil health, water retention, and increase carbon stocks.
- Healthy Soils Program practices on perennial croplands and rangelands, such as compost application and alley cropping/cover cropping to improve soil health, water retention, erosion control, and biomass growth.[505]
- Stacking of these Healthy Soils Program practices, where appropriate, in perennial and annual systems, can synergistically improve soil health and provide multiple benefits.
- Mulching adds high carbon materials to croplands or fallowed lands to reduce competing vegetation and retain moisture. This practice can support other benefits such as reduced water use and reduced synthetic pesticide and fertilizer use, as well as provide a use for suitable forest and agricultural waste biomass.
- Reductions in the use of synthetic fertilizers in cropland management, generally supported by the implementation of new management tools or technologies, can lead to reductions in GHG emissions from the production and application of fertilizers. This benefit is in addition to the co-benefits of reduced chemical runoff into waterways and reduced exposure of human populations to their harmful effects.

[505] Various types of organic amendments are being researched for application to particular landscape types. For example, compost application to rangelands is a relatively new practice that has been shown to improve soil health and increase carbon sequestration in the short term, though the science on the long-term impacts of this practice is still developing and the supply of available compost may be limiting.

Chapter 5: Challenge Accepted

This chapter provides an overview of the next steps and partnerships that will be needed to successfully implement this Scoping Plan. The path forward is not dependent on one agency, one state, or even one country. It will take action on a global level to address the threat climate change poses. But, the work begins at home.[506] The state can lead by engaging Californians and demonstrating how action at the state, regional, and local levels of government, as well as action at community and individual levels, can contribute to addressing the challenge before us. We must build partnerships with academic institutions, private industry, and others to support and accelerate the transition to carbon neutrality. Ultimately, the success of this Scoping Plan will be measured by our ability to implement the actions modeled in the Scoping Plan Scenario at all levels of government and society. This will depend on a mix of legislative action, regulatory program development, incentives, institutional support, workforce and business development, education and outreach, community engagement, and research and development and deployment. Optimizing this mix will help to ensure that clean energy and other climate mitigation strategies are clear, winning alternatives in the marketplace and in communities—to promote equity, drive innovation, and encourage consumer adoption. Bold institutional action will catalyze continued research and push private investment to create jobs and bring innovative ideas to reality.

State-level Action

Achieving the targets described in this Scoping Plan will require continued commitment to and successful implementation of existing policies and programs and identification of new policy tools and technical solutions to go further, faster. California's Legislature and state agencies will continue to collaborate to achieve the state's climate, clean air, equity, and broader economic and environmental protection goals. It will be necessary to maintain and strengthen this collaborative effort, and to draw upon the assistance of the federal government, regional and local governments, tribes, communities, academic institutions, and the private sector to achieve the state's near-term and longer-term emission reduction goals and a more equitable future for all Californians.

[506] This "polycentric" approach to climate challenges, engaging many levels of government, was articulated in leading papers by Nobel laureate Elinor Ostrom. See, for example, Ostrom, E. 2014. "A Polycentric Approach to Coping with Climate Change." *Annals of Economics and Finance* 15-1, 97–134.

Regulations and Programmatic Development

Meeting the AB 32 2020 GHG emissions reduction target several years earlier than mandated demonstrated that developing mitigation strategies through a public process, where all stakeholders have a voice, leads to effective actions that address climate change and yields a series of additional economic and environmental co-benefits to the state. Following adoption of this Scoping Plan, state agencies will continue to update and implement new and existing programs to align with the outcomes in the plan. Community, tribal, and stakeholder engagement will be a critical part of this work. Several state agencies, including CARB, the CEC, the California State Transportation Agency (CalSTA), the CPUC, and others will need to be part of various subsequent rulemaking processes. Each of these agencies' leadership and technical staff will engage with the public through public meetings, written and oral comment, and other methods of engagement. This work will be informed by evaluations of the health, air quality, environmental, equity, and economic benefits and impacts of regulations, including an assessment of the societal cost of carbon, as required under AB 197.

Incentive Programs

As described in Chapter 1, incentive programs are one of the most important tools the state has in advancing our low carbon future, especially for climate vulnerable communities. The programs ensure clean technology and energy are accessible and are critical to closing ongoing opportunity gaps. These programs also leverage private-sector investment and build sustainable, growing markets for clean and efficient technologies, and they are particularly necessary to support GHG emission reduction strategies for priority sectors, sources, and technologies. Clean technologies are often already the best and lowest cost option over their lifetimes but incentive funding is critical to ensure that they are broadly available, especially in climate vulnerable communities. Incentives also build on California's long track record of driving innovative technology developments, and creating new industries, with targeted investment. The Inflation Reduction Act also provides a new source of funding and tax incentives that must be leveraged to help achieve the state's climate goals.

Many state funding programs are designed to achieve multiple objectives simultaneously: reduce emissions from GHGs, criteria pollutants, and toxic air contaminants; manage natural and working lands for carbon sequestration; and address health and opportunity gaps in disadvantaged communities. California's incentive programs focused on jump-starting the transition to a zero emission transportation future are a good example of this "stacked" approach. The state is investing billions of dollars through programs such as the On-Road Heavy-Duty Voucher Incentive Program and Clean Cars 4 All in order to replace the light- and heavy-duty vehicles most responsible for the state's GHG emissions and poor air quality, all while bolstering the nascent ZEV market. Further strategies aid in developing new technologies, in ramping up access for all, and in shifting to cleaner

modes of transport; for instance, by supporting investments in walkable, bikeable communities and transit, as well as in vehicles. This funding strategy is, of course, paired with the regulatory approach described above.

Local Action

Local action by cities can support and amplify efforts to reduce GHGs. For example, the City of Oakland requires all new construction to be all-electric and is currently working on electrifying existing buildings.[507] In addition, starting in 2023, the City of Sacramento will require all new buildings under three stories to be all-electric, and it extends the mandate to all new construction by 2026 with some limited exemptions. The City of Sacramento also requires levels of EV charging infrastructure in new construction starting in 2023, higher than the minimum state requirements, and provides parking incentives for zero-emission carsharing and EV charging.[508] Local governments asserting this type of leadership are critical partners in supporting state-level measures to contain the growth of GHG emissions associated with the transportation system and the built environment.

California must accommodate population and economic growth in a far more sustainable and equitable manner than in the past. Good climate policy can and should create affordable and pleasant places to live, with effective transport and clean air for all—a future in which local governments and communities are central partners. Local governments have the primary authority to plan, zone, approve, and permit how and where land is developed to accommodate population growth, economic growth, and the changing needs of their jurisdictions. They also make critical decisions on how and when to deploy transportation infrastructure, and can choose to support transit, walking, bicycling, and neighborhoods that do not force people into cars. Local governments also have the option to adopt building ordinances that exceed statewide building code requirements, and play a critical role in facilitating the rollout of ZEV infrastructure. As a result, local government decisions play a critical role in supporting state-level measures to contain the growth of GHG emissions associated with the transportation system and the built environment—the two largest GHG emissions sectors over which local governments have authority.

Local governments are also frequently the source of innovative and practical climate solutions that can be replicated in other areas. Their efforts to reduce GHG emissions within their jurisdictions are vital to achieving the state's near-term air quality and long-term climate goals. Local governments must continue to take action that affirmatively

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[507] City of Oakland. Building Electrification. *https://www.oaklandca.gov/projects/building-electrification*.

[508] City of Sacramento. Electrification of New Construction. *http://www.cityofsacramento.org/SacElectrificationOrdinance*.

builds the projects and expend the funds needed to further the state's collective path toward equitable emissions reductions. As such, aligning local jurisdiction action with state-level priorities to tackle climate change and the outcomes called for in this Scoping Plan is critical to achieving the statutory targets for 2030 and 2045. Local governments can implement climate strategies that can effectively engage residents by addressing local conditions and issues that also deliver local economic benefits.

Local Climate Action Planning and Permitting

California encourages local jurisdictions to take ambitious, coordinated climate action at the community scale; action that is consistent with and supportive of the state's climate goals.[509] As discussed in more detail in Appendix D (Local Actions), local jurisdictions can do much to enable statewide priorities, such as taking local action to help the state develop the housing, transport systems, and other tools we all need. Indeed, state tools—such as the Cap-and-Trade Program or zero-emission vehicle programs—do not substitute for these local efforts. Multiple legal tools are open to local jurisdictions to support this approach, including development of a climate action plan (CAP), sustainability plan, or inclusion of a plan for reduction of GHG emissions and climate actions within a jurisdiction's general plan. Any of these can help to align zoning, permitting, and other local tools with climate action.

Once adopted, the GHG emissions reductions plans detailed in CAPs can provide local governments with a valuable tool for coordinated climate planning in their community. When a local CAP complies with CEQA requirements, individual projects that comply with the CAP are allowed to streamline the project-specific GHG analysis.[510,511] Effectively, local governments that adopt a CEQA-compliant CAP enable project developers to use this streamlined approach. This saves time and resources and provides more consistent expectations for how GHG reduction measures are applied across projects in the jurisdiction. While the state encourages local governments to follow this approach, we acknowledge not all jurisdictions have the resources to develop a CAP that meets the CEQA requirements.

In addition to being required for a local CAP to comply with CEQA, local GHG reduction targets have long been recommended as part of the process of developing a climate

[509] This plan provides more detailed guidance and tools to local governments in Appendix D (Local Actions).
[510] Cal. Code of Regs., tit. 14, § 15183.5.
[511] California Governor's Office of Planning and Research. n.d. "General Plan Guidelines - Chapter 8 Climate Change."

action plan.[512] One challenge local jurisdictions have faced is how to evaluate and adopt quantitative, locally appropriate goals that align with statewide goals. An effective response to this challenge is to focus on goals that can help implement overall state priorities—enabling the key transformations California needs.

There are many ways that local governments can make key contributions to this transformation, depending on the characteristics of their jurisdiction and community. For example, some jurisdictions will inherently have more land capacity to remove and store carbon, whether through natural and working lands or by other means. Other jurisdictions will be host to GHG-emitting facilities that serve necessary functions and will take time to transition to clean technology (e.g., municipal wastewater treatment plants, landfills, and energy generation and transmission facilities). It is important to recognize that we will need to build new energy production and distribution infrastructure, and repurpose existing ones, for clean technology and energy before we are able to phase down existing fossil sources. There also will be a need to handle the significant amount of biomass resulting from sustainable forest management for catastrophic wildfire prevention, agricultural waste, and landfill diversion.

Regional efforts can support change too: energy and transportation systems that serve Californians do not stop at jurisdictional boundaries, and some local decisions can have ramifications for other communities. For instance, Metropolitan Planning Organizations (MPOs) can help to integrate local efforts by planning consistent with the Scoping Plan and Climate Action Plan for Transportation Infrastructure, including by removing polluting roadway capacity expansions from project pipelines and instead focusing on climate-friendly solutions. These varied capabilities and needs should be taken into account in setting targets for local climate plans. For instance, although net zero targets can often be valuable and achievable, and mitigation is important, targets should be considered in the larger context of these goals. This all means any GHG targets on a local scale should take into consideration the actions and outcomes included in this Scoping Plan. Jurisdictions considering “net zero” targets should carefully consider the implications such targets may have on emissions in neighboring communities and the ability of the state to meet our collective targets.

Jurisdictions without formal CAPs also have important opportunities within this context. These jurisdictions can still take actions that effectively translate key state plans, goals, and targets, including those articulated in this Scoping Plan for local action. For instance, state ZEV targets can advance local efforts to promote broad and equitable access to charging and fueling. Similarly, local jurisdictions can enable reduced dependence on

[512] Climate Smart Communities. 2014. Climate Action Planning Guide. https://cdrpc.org/wp-content/uploads/2015/05/CAP-Guide_MAR-2014_FINAL.pdf.

single-occupancy vehicles by supporting dense infill housing and transit, among other actions. Such actions can be reflected in particular project plans, in general plans, or through other local policies. Regional partnerships among these jurisdictions can also help tap resources and provide for more effective overall action.

Unlocking CEQA Mitigation for Local Success

The California Environmental Quality Act also provides important tools for lead agencies to support the achievement of the state's GHG and VMT reduction goals. Although many climate-friendly local government actions already fall into categories that may not require a full CEQA analysis, thanks to streamlining or other tools, and although certain product types (such as affordable infill housing) are generally clearly consistent with state climate goals, CEQA analyses may still sometimes be required. CEQA can be a powerful and useful tool to engage the public, identify additional opportunities to support climate efforts, and localize change. It is important that lead agencies look for ways to use CEQA to support these core purposes, ensuring that these processes do not become sources of delay but instead unlock more opportunities. The uncertainty analysis in Chapter 2 evaluates how project implementation delays can lead to missed state climate targets and continued dependence on fossil energy. Mitigation measures applied in the communities affected by projects subject to CEQA have the added benefit of improving health, social, and economic resiliency as climate impacts worsen.

Appendix D (Local Actions) explores the role of local government action and CEQA in detail. As discussed there, an important CEQA-related tool is mitigation—which can be used to further drive local action consistent with state climate goals. When a lead agency determines that a proposed project would result in potentially significant GHG impacts due to its GHG emissions or a conflict with state climate goals, the lead agency must impose feasible mitigation measures to minimize the impact. Appendix D (Local Actions) provides suggestions for prioritizing the various types of mitigation, starting with on-site GHG-reducing design features[513] and mitigation measures, such as methods to reduce VMT and support building decarbonization, access to shared mobility services or transit, and EV charging. After exhausting all the on-site GHG mitigation measures, CARB recommends prioritizing local, off-site GHG mitigation measures, including both direct investment and voluntary GHG reduction or sequestration projects, in the neighborhoods impacted by the project. This could include, for example, development of a neighborhood green space, investment in street trees, or expansion of transit services. Implementing GHG mitigation measures in the project's vicinity would allow the project proponent and the lead agency to work directly with the affected community to identify and prioritize the

[513] Cal. Code of Regs., tit. 14, § 15126.4(c)(2) and (3).

mitigation measures that meet their needs while minimizing multiple environmental and societal impacts.

Once all potential on-site and local off-site GHG mitigation measures have been incorporated to the extent feasible, Appendix D (Local Actions) provides further suggestions for prioritizing other mitigation types, including non-local off-site mitigation, and voluntary offsets issued by a recognized and reputable voluntary carbon registry (as listed on CARB's website[514]) may be appropriate. Additional in-state mitigation also may be available in the upcoming SB 27[515] (Skinner, Chapter 237, Statues of 2021) registry, which will serve as a database of projects in the state that drive climate action on natural and working lands. Lead agencies should use substantial evidence to demonstrate that the project proponent explored and prioritized investments in feasible, local mitigation prior to moving mitigation to a geography located farther away from the project.

Communities and Environmental Justice

As noted in Board Resolution 20-33,[516] it is incumbent on CARB to function as an agent of responsible social change, especially when it is clear that environmental injustices continue to persist for low-income communities, tribes, and communities of color.

State law defines *environmental justice* as the fair treatment of all people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.[517] Government Alliance for Race and Equity (GARE)[518] defines *racial equity* as when race can no longer be used to predict life outcomes and outcomes for all groups are improved.

For this Scoping Plan to be successful, it must address environmental justice and advance racial equity. Implementation of the plan needs to address the needs of those communities that are disproportionately burdened by climate impacts and continue to face significant health and opportunity gaps. Now, we need to ensure our actions allow these communities to not only have a seat at the table, but also inform and shape the policies

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[514] CARB. 2022. Offset Project Registries. https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program/offset-project-registries.

[515] SB 27. Carbon sequestration: state goals: natural and working lands: registry of projects. (SB 27, Skinner, Chapter 237, Statutes of 2021). https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB27.

[516] CARB. 2020. Resolution 20-33: A Commitment to Racial Equity and Social Justice. October 22. https://ww2.arb.ca.gov/sites/default/files/barcu/board/res/2020/res20-33.pdf.

[517] Gov. Code, § 65040.12, subd. (e).

[518] Local and Regional Government Alliance on Race and Equity. 2015. *Advancing Racial Equity and Transforming Government: A Resource Guide to Put Ideas into Action.* Page 9. https://racialequityalliance.org/wp-content/uploads/2015/02/GARE-Resource_Guide.pdf.

to ensure their communities thrive. With this Scoping Plan, the state also adds a new tool to identify which communities will be the least resilient in the face of selected climate impacts and will see disproportionate economic impacts as a result. As described in Chapter 3, the CVM will enable the state to target programs and policies to build resiliency in the specific regions that will feel climate impacts more acutely due to existing health and opportunity disparities leading to disproportionate economic impacts. This tool will be critical in the state's efforts to address climate impacts while accounting for environmental injustices and racial inequities. CARB will incorporate the CVM into its work as it moves forward and will share this new tool with other agencies to align our efforts. The goal is to keep expanding the CVM to incorporate additional climate impacts to better identify disproportionate economic impacts as community level data becomes available.

AB 617 is another important tool for both Air Districts and CARB to bring resources to communities that have long been disproportionately burdened by poor air quality. While AB 617 does not require local agencies to participate in the Community Air Protection Program, several AB 617 communities are finding ways to bring local land use agencies to the table to respond to community priorities. We look forward to more opportunities to foster relationships with local authorities and continued collaboration between state and air district programs.

In alignment with AB 32, and to ensure environmental justice and racial equity were integrated into this Scoping Plan, CARB reconvened the AB 32 Environmental Justice Advisory Committee (EJ Advisory Committee) to advise CARB on the development of this Scoping Plan. Since reconvening in May 2021, the EJ Advisory Committee has engaged in the following activities:

- In October 2021, the EJ Advisory Committee sent a letter to the governor requesting a timeline extension for the Scoping Plan process. In response to the EJ Advisory Committee's letter, CARB modified this Scoping Plan process[519] and committed to an active engagement with the EJ Advisory Committee following the approval of this Scoping Plan. The EJ Advisory Committee also presented to the CARB Board[520] at its October 2021 Board meeting, reiterating its request for a timeline extension, as well as sharing additional concerns about process.

[519] Randolph, L. M. 2021. LMR October 19 response to Environmental Justice Advisory Committee Letter. *https://ww2.arb.ca.gov/sites/default/files/2021-10/LMR%20October%2019%20response%20to%20EJAC%20Letter%20Final.pdf*.

[520] Argüello, M. D., K. Hamilton, S. Taylor, and P. Torres. 2021. EJ Advisory Committee Co-Chair Informational Presentation to CARB Board. October 28. *https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2021/102821/21-11-4pres.pdf*.

- In December 2021, the EJ Advisory Committee shared its responses to Scenario Input Questions,[521] as well as a narrative document outlining their concerns[522] around the process, the need for evaluation, and the need for a tribal representative. In response to the EJ Advisory Committee Scenario Input Questions, CARB incorporated the EJ Advisory Committee responses into the Scenario Assumptions document,[523] and modeled results from PATHWAYS.[524] In response to the EJ Advisory Committee's concerns, CARB worked diligently to appoint a tribal representative[525] in February 2022, and to outline additional opportunities for the EJ Advisory Committee to engage in the Scoping Plan process.[526]
- In March 2022, the EJ Advisory Committee presented at the joint EJ Advisory Committee / CARB Board meeting[527] and walked through their preliminary draft recommendations to inform this Scoping Plan. In April, the EJ Advisory Committee shared its revised preliminary draft recommendations[528] to inform this Scoping Plan.
- In September 2022, the EJ Advisory Committee presented at the joint EJ Advisory Committee / CARB Board meeting[529] and engaged in discussion about priority items as they relate to incorporating environmental justice into the Scoping Plan. By the end of September, the EJ Advisory Committee shared its final

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[521] EJ Advisory Committee. 2021. EJ Advisory Committee Final Responses to CARB Scenario Inputs. December 2. *https://ww2.arb.ca.gov/sites/default/files/2021-12/EJAC%20Final%20Responses%20to%20CARB%20Scenario%20Inputs_12_2_21.pdf*.

[522] EJ Advisory Committee. 2021. EJ Advisory Committee Responses to Scenario Input Questions. EJ Advisory Committee narrative document regarding scenario input recommendations. December 1. *https://ww2.arb.ca.gov/sites/default/files/2021-12/EJAC%20Narrative%20Document%20re%20Scenario%20Input%20Recommendations%2012_1_2021.pdf*.

[523] CARB. 2021. PATHWAYS Scenario Modeling. *https://ww2.arb.ca.gov/sites/default/files/2021-12/Revised_2022SP_ScenarioAssumptions_15Dec.pdf*.

[524] E3. 2022. CARB Draft Scoping Plan AB32 Source Emissions Initial Modeling Results. March 15. *https://ww2.arb.ca.gov/sites/default/files/2022-03/SP22-Model-Results-E3-ppt.pdf*.

[525] CARB. AB32 EJ Advisory Committee Meeting, February 28, 2022 CARB Update. *https://ww2.arb.ca.gov/sites/default/files/2022-02/CARB%20EJAC022822presentation.pdf*.

[526] Fletcher, C. 2021. CARB Response to EJ Advisory Committee Narrative. CARB. December 15. *https://ww2.arb.ca.gov/sites/default/files/2021-12/CARB%20response%20to%20EJAC%20Narrative.pdf*.

[527] EJ Advisory Committee. 2022. EJ Advisory Committee Presentation: Preliminary Draft Recommendations. March 10. *https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2022/031022/ejacpres.pdf*.

[528] AB 32 EJ Advisory Committee. Draft Recommendations. *https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2022/031022/ejacrecsrevised.pdf*.

[529] EJ Advisory Committee. 2022. EJAC Presentation. September 1. *https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2022/090122/ejacpres.pdf*

recommendations[530] to inform this Scoping Plan. To the extent possible, CARB has incorporated and cited these recommendations through this Scoping Plan.

In addition to the activities listed above, Central Valley EJ Advisory Committee members hosted a successful community engagement workshop[531] in San Joaquin Valley in February 2022 with over 100 attendees. Members of EJ Advisory Committee hosted a statewide community engagement workshop[532] in June 2022 with more than 165 attendees. Throughout the EJ Advisory Committee's process, members of the Committee continued to work with their communities to ground truth their recommendations to inform the development of the Scoping Plan. The EJ Advisory Committee worked hard to ensure the voices of those communities most burdened by climate impacts were reflected in the plan. The EJ Advisory Committee will continue to play an ongoing role in the implementation of this Scoping Plan to ensure environmental justice and racial equity are prioritized in our effort to address the climate challenge before us.

To the extent possible, the EJ Advisory Committee's recommendations were integrated throughout the plan. This plan directly cites instances where there is alignment between the plan and the EJ Advisory Committee recommendations. This approach seeks to ensure there is more transparency and identify consensus that exists, as well as relevant ways equity and environmental justice are addressed in this plan and in the planning for future related implementation activities. CARB is dedicated to its efforts to ensure this plan does not leave communities behind.

As this Scoping Plan moves into the implementation phase, there will be a need to better understand how to address EJ Advisory Committee recommendations on the following topics:

- Actions under the jurisdiction of other agencies: there are certain EJ Advisory Committee recommendations that are outside of CARB's jurisdiction. As the EJ Advisory Committee continues to convene, it would be helpful to understand the

[530] EJ Advisory Committee. 2022. EJAC 2022 Scoping Plan Recommendations. September 30. https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2022/090122/finalejacrecs.pdf

[531] San Joaquin Valley Climate Justice & the Scoping Plan. 2022. https://ww2.arb.ca.gov/sites/default/files/2022-07/SJV%20Climate%20Justice%20%26%20the%20Scoping%20Plan%20Workshop%20Report%20out%20%26%20Recommendations_5.2022.pdf

[532] EJAC. 2022. *EJAC/Community Engagement Synthesis Report '22.* https://ww2.arb.ca.gov/sites/default/files/2022-07/EJAC-CommunityEngagement-SynthesisReport-2022-English%26Spanish.pdf.

role that CARB can play as it relates to the EJ Advisory Committee's recommendations for actions outside CARB's jurisdiction and coordinates with sister agencies.

- Actions that require legislative direction: there are certain EJ Advisory Committee recommendations that would require legislative action. As the EJ Advisory Committee continues to convene, it will be helpful to understand how CARB can work with the EJ Advisory Committee to share these recommendations with the appropriate members of the Legislature.
- Actions directly tied to implementation activities: This Scoping Plan is not an implementation document; it is a plan to chart a course to continue to reduce GHG emissions and achieve carbon neutrality. Once the Scoping Plan is approved, there will be follow-up action at CARB, as well as at other agencies. In these follow-up efforts, there will be a role for ongoing EJ Advisory Committee engagement.
- Actions to implement recent legislation, such as SB 905.

CARB proposes to continue to work with the EJ Advisory Committee to better understand how to move forward on EJ Advisory Committee recommendations that fall into the topics listed above and any other recommendations that were not included in this plan. It is also important to note that there are numerous recommendations where CARB shares the goals of the EJ Advisory Committee and can assist in implementation steps. Examples include the following:

- CARB shares the goal of prioritizing non-fossil energy generation and supports non-fossil projects and opportunities to locate behind-the-meter clean resources in communities of concern in programs such as the Solar on Multifamily Affordable Housing program.
- CARB will engage with agencies and academic institutions to further workforce development.
- Many other recommendations related to financial support for various energy projects, such as microgrids, are within the purview of the CPUC or local publicly owned utilities. Similarly, utility scale projects are within the jurisdiction of other agencies. However, CARB supports strategies identified in the recommendations such as offshore wind to reduce the reliance on fossil fuel generation.
- CARB is supportive of rooftop solar, although it is not within CARB's jurisdiction to determine how incentives for those projects are structured.
- CARB is supportive of strong energy decarbonization goals, recognizing that increased reliance on electrification in transportation and other sectors will create significant demand for electricity, and therefore ensuring reliability of a decarbonized grid is a critical need for the state.
- In the transportation sector, CARB is supportive of the EJ Advisory Committee's recommendations to maintain aggressive zero emission vehicle goals consistent

with its statutory mandate to ensure regulations are technologically feasible and in alignment with Governor Newsom's ZEV Executive Order (EO N-79-20). CARB looks forward to continued engagement on rulemakings that will implement these goals.

- As noted elsewhere in this plan, CARB is supportive of the Caltrans California Transportation Plan 2050 and the California Climate Action Plan for Transportation Infrastructure.
- CARB is supportive of additional public support for transit. CARB is supportive of locating EV charging in low-income communities and communities of color.
- CARB is supportive of prioritizing funding incentives for transit and heavy- and medium-duty vehicles, although CARB does believe there is an important role for incentives that support adoption of light-duty vehicles for the time being. CARB will also be opening a rulemaking on the Low Carbon Fuel Standard to ensure it continues to support clean fuels that will displace petroleum fuels and will consider the EJ Advisory Committee recommendations on this program.
- In the industrial sector, in addition to the strategies discussed more fully in this Scoping Plan, CARB continues to work with the Legislature, local agencies, and air districts to support, implement, and enforce effective reductions in emissions of GHGs and air pollutants in stationary sources. The air districts have the authority to directly issue permits addressing a facility's criteria pollutant and toxics emissions levels. These levels are set after careful permit review, under district regulation and statute. However, AB 617 directs and authorizes CARB to take several actions to improve data reporting from facilities, air quality monitoring, and pollution reduction planning for communities affected by a high cumulative exposure burden. CARB will continue to implement AB 617 and look for ways to strengthen the Community Air Protection Program.
- Considerations around the phaseout of oil and gas extraction and refining, and the role of carbon capture are discussed more thoroughly in Chapter 2.

As CARB continues to engage with the EJ Advisory Committee—in addition to the EJ Advisory recommendations that have been integrated throughout this plan—below are the following commitments that CARB is making to ensure that environmental justice is integrated in this plan and its implementation:

- Building decarbonization is a pillar of this Scoping Plan and CARB commits to working closely with state and local agencies to implement the EJ Advisory Committee recommendations that call for prioritization for residents in low-income communities and communities of color in this transition.
- CARB commits to sharing the EJ Advisory Committee's recommendations with the CEC, CPUC, and other agencies administering funds to support building

decarbonization, and to work closely with those agencies as they engage in public processes to further building decarbonization.

- CARB has committed to review the Cap-and-Trade program and determine what potential legislative or regulatory amendments could be necessary to ensure the program continues to deliver GHG reductions needed to achieve the statutory climate goals. In that process, CARB will consider the recommendations of the EJ Advisory Committee[533] and Independent Emissions Market Advisory Committee,[534] as well as others.

Critically, the EJ Advisory Committee makes numerous recommendations centered around tracking progress of the various strategies in this Scoping Plan. Currently, progress is tracked and reported in numerous ways, including the annual GHG inventory and reports to the Legislature. Part of the ongoing work of implementation, however, will include consideration of ways to provide more data and information to the public, such as rates of deployment of clean energy and technology as described in Chapter 1. CARB will also continue to collaborate with CDPH and OEHHA on health metrics to track cumulative benefits of air pollution and climate programs, especially in low-income communities and communities of color.

As noted earlier in this document, the EJ Advisory Committee will continue to play a vital role in the Scoping Plan and its implementation to ensure environmental justice and racial equity are prioritized in our effort to address the climate challenge before us. This includes ongoing EJ Advisory Committee engagement to advise CARB on the development of the Scoping Plan and any other pertinent matters in implementing AB 32. The ongoing EJ Advisory Committee will help to ensure integration of environmental justice in implementation efforts as it relates to AB 32, and also help CARB as we work toward a future where race is no longer a predictor for life outcomes.

Academic Institutions and the Private Sector

Academic institutions produce and present the latest science on both the impacts of, and actions to reduce, climate change damages. They are also leading the way by

[533] California Legislative Information. Bill Text – AB 32. Air pollution: greenhouse gases: California Global Warming Solutions Act of 2006. (AB 32, Nuñez, Chapter 488, Statutes of 2006). *https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200520060AB32*.

[534] California Legislative Information. Bill Text – AB 398. California Global Warming Solutions Act of 2006: market-based compliance mechanisms: fire prevention fees: sales and use tax manufacturing exemption. (AB 398). *https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB398*.

establishing their own climate goals and GHG emissions reductions targets.[535, 536, 537] They are incubators for innovation and knowledge in clean energy and technology and play an important role in adding to the wealth of robust information to inform policies and programs. Academic institutions have the ability to fill knowledge gaps and push us toward new frontiers. As we move forward, we will continue to see these institutions as partners and resources that can help CARB look for ways to accelerate and introduce actions to reduce GHG emissions and remove and store carbon.

As such, it will be important to maintain and enhance relationships with academic institutions, including community colleges. Community colleges are more likely to have a large proportion of first generation students or students that come from low-income communities or communities of color. The perspective of this diverse student body will be critical to inform discussions on climate change damages and mitigation efforts. This student body is also a future workforce, and courses to teach the skills for a sustainable economy are a chance to close historical opportunity gaps. Importantly, many of the students at community colleges are local residents and community members. This engagement provides another way to invest in communities across our state. The Foundation for California Community Colleges is already leading the way through innovate programs such as their Good Jobs Challenge - California Resilient Careers in Forestry.[538] These types of programs could be replicated across other sectors. CARB will evaluate how to leverage the requirements in AB 680 on workforce development in the California Climate Investments programs with the work at the Foundation for California Community Colleges.

As noted in Chapter 1, public and private partnerships will be important as we move forward in the great energy transition. But the private sector is also important in the context of research and development and deployment. Many of these companies have the resources and expertise to build and produce the clean technology and energy we will need. It was through the efforts of several private companies (Bell, Exxon, Telecom

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[535] University of California. Our Commitment. *https://www.universityofcalifornia.edu/initiative/carbon-neutrality-initiative/our-commitment*.
[536] California State University. Energy, Sustainability, & Transportation. *https://www.calstate.edu/csu-system/doing-business-with-the-csu/capital-planning-design-construction/operations-center/Pages/energy-sustainability.aspx*.
[537] California Community Colleges Chancellor's Office. Climate Action and Sustainability. *https://www.cccco.edu/About-Us/Chancellors-Office/Divisions/College-Finance-and-Facilities-Planning/Facilities-Planning/Climate-Action-and-Sustainability?msclkid=4a72350ec4f511ecaf292c6b14ac9a4f*.
[538] Foundation for California Community Colleges. 2022. Good Jobs Challenge. Developing Resilient Careers in Forestry for Californians. *https://foundationccc.org/What-We-Do/Workforce-Development/Good-Jobs-Challenge*.

Australia) that the photovoltaic solar panels in use today were developed.[539] Similarly, it was companies such as General Electric and Texas Instruments that contributed to the development of hydrogen fuel cells.[540] This Scoping Plan includes the known and emerging clean technologies and fuels available today. The private sector spirit of invention, improvement, and innovation must continue to deliver new tools in the fight against climate change.

Individuals

This Scoping Plan not only projects ambitious availability of clean technology and energy, but also includes aggressive assumptions about consumer adoption of ZEVs, heat pumps, and other energy efficiency practices, among others. When it comes to climate change mitigation, the sum of the parts matters. Only when we add up the impacts of the choices we make do we understand the true impact on GHG emissions. Today, many Californians have opportunities to choose between driving a car, taking a bus, biking, or walking. Many can choose to install a heat pump or buy an electric cooktop. Together, we can increase these opportunities and pick the future we want. We can start or transform businesses that create clean jobs, innovate new technologies, or introduce new systems. We can engage with fellow workers to support durable paths for labor in a clean economy. And we can choose to engage with our community, tribes, and our governments to advocate for change, call out challenges, and propose solutions. Our choices will help determine California's climate future. Down one path is a future of climate impacts that will continue to worsen and further increase disparities across communities. Down the other is a future that avoids the worst impacts of climate change, improves air quality—especially for the most burdened communities—and fosters new economic and job opportunities to support a sustainable economy.

Importantly, we must acknowledge that historical decisions have resulted in health and opportunity gaps for residents in low-income communities and communities of color. Not everyone has the resources or access to make these choices—to buy a ZEV, install a heat pump, or use public transit to get to work. It is here that government can help. Government, at multiple levels, can fund programs and structure policies to provide consumers with more choice and to support them in adopting cleaner technology options. Whether through affordable energy rates or assistance in purchasing zero emission vehicles and appliances, we can use the transition to a carbon neutral economy as an opportunity to close some of these persisting opportunity gaps. By acting now, we can

[539] Californiasolarcenter.org. Passive Solar History. http://californiasolarcenter.org/old-pages-with-inbound-links/history-pv/.
[540] Fuel Cell Store. History of Fuel Cells. https://www.fuelcellstore.com/blog-section/history-of-fuel-cells?msclkid=04a19450c50211ec8d20f2afff4039fe.

change our planet’s fate and build a more resilient, healthier, and equitable future for all Californians.

Building Energy Efficiency Standards - Title 24

Building Energy Efficiency Standards - Title 24

California's energy code is designed to reduce wasteful and unnecessary energy consumption in newly constructed and existing buildings. The California Energy Commission updates the Building Energy Efficiency Standards (Title 24, Parts 6 and 11) every three years by working with stakeholders in a public and transparent process.

STANDARDS DOCUMENTS AND FORMS

The 2019 Building Energy Efficiency Standards take effect January 1, 2020. Find compliance manuals, forms, software, and supporting content.

2016 Building Energy Efficiency Standards

The 2016 Building Energy Efficiency Standards were effective January 1, 2017. Find compliance manuals, forms, software, and supporting content.

The 2022 Building Energy Efficiency Standards will be effective January 2023. Find compliance manuals, forms, software, and supporting content.

2025 Building Energy Efficiency Standards

Pre-rulemaking activities for the 2025 Building Energy Efficiency Standards are underway. Learn about workshops and how to submit comments.

UPCOMING EVENTS

No events are available at this time.

Expand All

Successes in Energy Efficiency

The state's Building Energy Efficiency Standards have saved Californians billions of dollars in reduced electricity bills. They conserve nonrenewable resources, such as natural gas, and ensure renewable resources are extended as far as possible so power plants do not need to be built. Learn more in the Energy Almanac about how far we've come-and need to go-on the road toward a more resilient, affordable, equitable, and environmentally sustainable energy system."

CONTACT

BEES Hotline
title24@energy.ca.gov
Toll-free in California: 800-772-3300
Outside California: 916-654-5106

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CONTACT

California Energy Commission
715 P Street
Sacramento, CA 95814

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Back to Top

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WE THE PEOPLE

of Ventura, in order to ensure that our City continues to be a great place for us to live . . .

ACHIEVING THE VISION

2005 ventura general plan

CITY OF SAN BUENAVENTURA

2005 VENTURA GENERAL PLAN

ADOPTED AUGUST 8, 2005

RESOLUTION NOS.2005-072 AND 2005-073

The following people contributed to the preparation of the 2005 Ventura General Plan:

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…and to the countless citizens who gave their time and energy towards the making of this plan.

This plan is dedicated to the citizens of Ventura.

August 8, 2005

In loving memory of Roma Armbrust and
Dennis R. Mackay

Table of Contents

FIGURES

ventura's general plan

OVERVIEW

"The building of cities is one of man's greatest achievements. The form of his city always has been and always will be a pitiless indicator of the state of his civilization. This form is determined by the multiplicity of decisions made by the people who live in it."

— Edmund N. Bacon
Design of Cities, 1967

CITY OF
VENTURA

We, the people of Ventura, in order to ensure that our City remains a great place for us to live ...

. . . establish these goals for our community's future:

OUR NATURAL COMMUNITY

Our goal is to be a model for other communities of environmental responsibility, living in balance with our natural setting of coastline, rivers, and hillside ecosystems.

OUR PROSPEROUS COMMUNITY

Our goal is to attract and retain enterprises that provide high-value, high wage jobs; to diversity the local economy; to increase the local tax base; and to anticipate our economic future in order to strengthen our economy and help fund vital public services.

OUR WELL-PLANNED COMMUNITY

Our goal is to protect our hillsides, farmlands, and open spaces; enhance Ventura's historic and cultural resources; respect our diverse neighborhoods; reinvest in older areas of our community; and make great places by insisting on the highest standards of quality in architecture, landscaping and urban design.

OUR ACCESSIBLE COMMUNITY

Our goal is to provide residents with more transportation choices by strengthening and balancing bicycle, pedestrian and transit connections in the City and surrounding region.

OUR SUSTAINABLE INFRASTRUCTURE

Our goal is to safeguard public health, well being and prosperity by providing and maintaining facilities that enable the community to live in balance with natural systems.

OUR ACTIVE COMMUNITY

Our goal is to add to and enhance our parks and open spaces to provide enriching recreation options for the entire community.

OUR HEALTHY AND SAFE COMMUNITY

Our goal is to build effective community partnerships that protect and improve the social well being and security of all our citizens.

OUR EDUCATED COMMUNITY

Our goal is to encourage academic excellence and life-long learning resources to promote a highly-educated citizenry.

OUR CREATIVE COMMUNITY

Our goal is to become a vibrant cultural center by weaving the arts and local heritage into everyday life.

OUR INVOLVED COMMUNITY

Our goal is to strive to work together as a community to achieve the Ventura Vision through civic engagement, partnerships, and volunteer service.

State law requires each California city to adopt a comprehensive, long-term General Plan for the physical development of the community that guides local decision-making by expressing community goals about the future distribution and character of land uses and activities. The plan should be comprehensive by both covering the City's entire planning area and addressing the broad range of issues facing the community, including physical, social, aesthetic and economic concerns. The plan must be internally consistent and serve as a long-term guide, establishing policies for day-to-day land use decisions over an approximately 20-year period.

Introduction and Background

"To remain successful, Ventura must periodically renew itself, re-examine its goals and create a shared vision to guide the community into the future."

With these opening words, the citizens of our community proclaimed the **Ventura Vision,** which was unanimously accepted by the City Council in March 2000. That landmark report captured the results of "a partnership encompassing city government, non-profit organizations, community groups, businesses, schools and individual residents to chart the community's future through a process of visioning."

Building on that shared vision, the City embarked on an effort to revise the 1989 Comprehensive Plan that served as the General Plan that all cities are required by State law to use to guide land use, transportation and other important policy decisions. This new General Plan is the culmination of that effort to translate the Ventura Vision into a coherent and comprehensive implementation plan to guide future development and preservation.

Throughout the visioning process and at the ballot box, Ventura residents have made clear we want a well-planned approach to managing growth. We don't want continued suburban sprawl paving over farm land and sensitive hillside areas. Instead, we want vacant or run-down properties to be improved with high quality "infill" to provide new jobs, new homes and new stores and services.

Managing growth to improve our quality of life and standard of living is the smart thing to do. Ventura residents don't want uncontrolled growth and suburban sprawl. We also don't want traffic gridlock, more "cookie cutter" tract houses or housing prices that make Ventura unaffordable for working families. By targeting new development to areas that would benefit from reinvestment – and by respecting our historic character and sense of place – "smart growth" is a better alternative.

Our vision is for a prosperous and well-planned community. Smart Growth emphasizes reusing existing buildings and land, revitalizing our historic downtown and neighborhoods, and protecting the environment for future generations. Smart Growth channels new businesses and homes into appropriate areas. It also provides options for public transportation, creates neighborhoods where homes are in walking distance of local services and ensures green space for public use.

We seek to protect and enhance our unique "sense of place" that builds on our pride in Ventura's history and natural setting. Instead of new development that looks like everywhere else, our vision is for interesting, unique neighborhoods and districts, which reflect our values and heritage. The policies for pursuing these goals are spelled out in this new General Plan.

The Ventura General Plan

The *2005 Ventura General Plan* is the second in a series of three connected documents that will guide future conservation and change in the city. The *Ventura Vision* set the stage for this plan and enumerated four overarching principles that were affirmed by the community to guide Ventura into the future:

- Reach broadly and deeply into the community.
- Build on existing cultural, natural, and economic assets.
- Emphasize and encourage connections within the community.
- Work proactively and collaboratively to achieve the community's shared vision.

The final piece of the trilogy is a form-based *Development Code*. This code represents a new approach to zoning that prioritizes the appearance of development, while still ensuring that neighboring land uses are compatible and appropriate.

The *General Plan* will be put into action through the Development Code and a variety of other mechanisms, such as a mobility plan, specific plans, community plans, and capital improvement projects that will together shape the future of Ventura. The *General Plan* purposefully anticipates the *Code* focusing on the districts, corridors, and neighborhood centers where future change will be most pronounced.

The following vision statements reflect a high level of community consensus about a desired future for Ventura.

In the future, Ventura is a community that…

Environment

- Seeks sustainability by simultaneously promoting ecological health, economic vitality, and social well-being for current and future generations.
- Acts as an environmentally responsible model for other coastal areas.
- Protects and restores the natural character of its beaches, ocean views, hillsides, barrancas, and rivers as a scenic backdrop for its high quality urban environment.

Economy

- Develops a flourishing and balanced economy by encouraging a broad range of high quality employment and entrepreneurial opportunities.
- Encourages private economic development that supports public services and amenities associated with high quality of life.
- Has a vital, prosperous, and stable economy while maintaining its small-town feel.
- Is noted for private and public sector cooperation that enhances economic vitality.
- Actively participates in regional economic development efforts.

Planning, Design, and Circulation

- Retains its character as an attractive coastal town by growing slowly and sustainably, and by emphasizing its history, diversity, and natural environment.
- Cherishes its distinctive, diverse, and eclectic neighborhoods, and preserves their character.
- Has safe, accessible, and balanced transportation that promotes multiple modes of travel to local and regional destinations.

Social Activity

- Is known as an inclusive, diverse, and tolerant place that welcomes and celebrates all people.
- Provides all residents access to quality and affordable health and social services.
- Recognizes the importance of children and seniors by providing exceptional cultural, educational, and social support programs.
- Offers a diverse range of active and passive recreation for residents and visitors of all ages and abilities.
- Is dedicated to educational excellence and an emphasis on lifelong learning.
- Celebrates and is enriched by the arts and diverse cultural opportunities.

Collaboration

- Encourages residents to collaborate with each other and City government in an informed, active, and constructive manner to assess and resolve common issues.


ventura
seize
the future

Building on the Vision

Following adoption of the *Ventura Vision*, the City Council established a 19-member Comprehensive Plan Advisory Committee (CPAC) to shape the *Vision* concepts into issues and priorities for revision of the 1989 Comprehensive Plan. The CPAC included representatives of varied interests, including neighborhoods, agriculture, seniors and schools, as well as one member from the Planning Commission and one from the City Council. The committee met more than 30 times over almost three years. During that effort, the City published the August 2002 *Comprehensive Plan Update Background Report*, which provides a highly detailed account and analysis of opportunities and constraints that affect planning and land use in Ventura. This ultimately led to their findings, contained in the September 2003 *CPAC Issues & Alternatives Report*.

CPAC endeavored to create strategies to resolve planning and land use issues in Ventura utilizing the smart growth principles formulated by the U.S. Environmental Protection Agency:

- Mix land uses.
- Achieve compact building design.
- Provide a range of housing opportunities.
- Create walkable neighborhoods.
- Foster distinctive, attractive communities with a strong sense of place.
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Strengthen and direct development toward existing communities.
- Provide a variety of transportation choices.
- Make development decisions predictable, fair, and cost effective.
- Encourage community collaboration in planning decisions.

The recommendations of the CPAC were presented to the Planning Commission and City Council. After several months of reviewing the CPAC recommendations, the Planning Commission in December 2003 made some modifications to the CPAC's recommended land use scenario.

The City Council met 11 times from February through August 2004 to consider the CPAC and Planning Commission recommendations, review relevant data, and formulate broad goals, policies, and a diagram to guide growth and change in the City until 2025. In September 2004, the City Council established an ad-hoc General Plan Committee consisting of three Planning Commissioners and three City Council members to work with City staff and consultants to ensure that the *General Plan* would be completed expeditiously and with ample public participation, and to ensure open communication, transparency, and coordination among all parties interested in the creation of the *Plan*. All of the CPAC, Planning Commission, City Council, and General Plan Committee workshops, meetings, and hearings were open to the public and included significant, meaningful, and often extensive citizen input and participation.

Goals *summarize how conservation, development, and future growth should occur by identifying physical, economic and social ends that the community wishes to achieve.*

Policies *establish basic courses of action for the Planning Commission and City Council to follow in working to achieve community goals, by directly guiding the response of elected and appointed officials to development proposals and related community actions.*

Actions *need to be undertaken by the City to implement policies.*

Plan Format

The comprehensive and involved process of creating what is really a totally new (not just updated) *General Plan* – based on a new community vision and smart growth principles – resulted in a new set of goals, policies, and actions to guide future decision-making in Ventura that truly reflect the planning objectives of the community. These policy directives are organized by subject area in *General Plan* Chapters 1 through 10, which follow the organizational framework established in the *Ventura Vision* (see Table 1). Each topic is introduced with an overarching goal that carries forward the *Vision*, a description of issues needing resolution and methods for remedying them, and finally measurable policies and actions to achieve those solutions. Each of the policies contained within the Plan are intended to be understood and read with the following preface: "It is the intent of the City of San Buenaventura to...". All of the actions are summarized in table form in Appendix A, along with the City department or division responsible for implementing each action and timeframe for completion. Also included in the Plan are the legally binding Appendices B through E. Attachment A is provided as a reference, while Attachment B is provided to serve as guidelines for future development until an update to the Zoning Ordinance is completed.

Table 1
General Plan Organization

Vision/General Plan Chapter	Required/*Optional* Elements	Examples of Topics Covered
1. Our Natural Community	Conservation Open Space	Open space, hillsides, watersheds, riparian areas, sensitive plants and animals
2. Our Prosperous Community	*Economic Development*	Commercial and industrial growth, economic diversification, job opportunities, tourism
3. Our Well-Planned and Designed Community	Land Use/*Design* Housing *Park & Recreation*	Development patterns, neighborhoods, visual character, urban design, streetscapes, demographics, housing needs, affordability, constraints on production
4. Our Accessible Community	Circulation	Traffic, street network, parking, transit services, bike routes
5. Our Sustainable Infrastructure	Land Use	Water supply, wastewater treatment, drainage
6. Our Active Community	Land Use *Park & Recreation*	Park and recreation facilities, youth and senior programs
7. Our Healthy and Safe Community	Safety Noise Land Use	Development in hazardous areas, hazardous waste management, seismicity, flood control, water quality, brownfields, noise, police, fire, air quality
8. Our Educated Community	Land Use	Schools and libraries
9. Our Creative Community	*Culture*	Arts, events, community programs, cultural and historic resources
10. Our Involved Community	*Citizen Input*	Participation in governance

The format of the *General Plan* satisfies the State requirement that every general plan include policies for seven "elements," as follows:

Land use – establishes the general distribution and intensity of land uses, including housing, commerce, industry, open space, education, and public facilities.

Circulation – identifies the location and type of existing and proposed highways, arterial and collector roadways, bicycle routes, and other transportation facilities.

Conservation – addresses treatment of natural and cultural resources, including watersheds, wetlands, trees, rivers and barrancas, and cultural and historic landmarks.

Housing – assesses current and projected housing needs of all segments of the community and identifies land to provide adequate housing to meet those needs. Although the City's Housing Element and Technical Report is contained in a separate document to facilitate the frequent updating required by the State, the goals, policies and programs of the Housing Element must be and are consistent with the goals, policies, and actions of the *2005 Ventura General Plan.* (See Chapter 3, page 3-28, for 2004 Housing Element Goals and Policies.)

Noise – appraises noise sources in the community and develops means to mitigate nuisances.

Open Space – details techniques for preserving open space areas for natural resources, outdoor recreation, public health and safety, and agricultural activities.

Safety – establishes policies to protect the community from risks associated with seismic, geologic, flood, fire, and other hazards.

The *General Plan* also contains a number of special elements that aren't required by State law but are integral to the unique identity of Ventura. These cover a range of topics including education, recreation, arts and culture, and community involvement in local government. Another chapter treats the very important subject of the local economy, providing guidance to citizens, City staff and policy makers regarding strategies and priorities for economic development in Ventura.

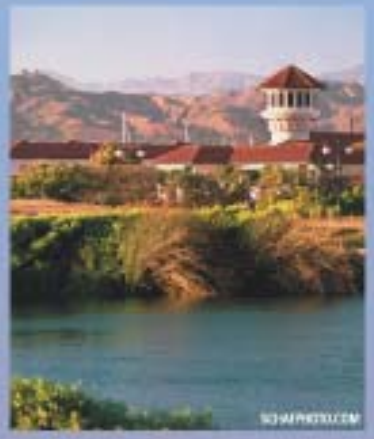
California Coastal Act

The *General Plan* also satisfies State requirements for the City's **Local Coastal Program** in accordance with the California Coastal Act (*Public Resources Code § 30000 et seq.)*. Actions in the *General Plan* that affect coastal resources are intended to become part of the Land Use Plan of the Local Coastal Program, which will be accomplished through specific or community plans for those areas. These actions are identified with the logo of the California Coastal Commission (which oversees all Local Coastal Programs). The basic goals of the State for the coastal zone are to:

- Protect, maintain, and where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources.
- Assure orderly, balanced utilization and conservation of coastal zone resources taking into account the social and economic needs of the people of the state.
- Maximize public access to and along the coast and maximize public recreational opportunities in the coastal zone consistent with sound resources conservation principles and constitutionally protected rights of the private property owners.
- Assure priority for coastal-dependent and coastal-related development over other development on the coast.
- Encourage state and local initiatives and cooperation in preparing procedures to implement coordinated planning and development for mutually beneficial uses, including educational uses, in the coastal zone.
  (Public Resources Code § 30001.5)

ventura's general plan

OUR NATURAL COMMUNITY



"As age comes on, one source of enjoyment after another is closed, but Nature's sources never fail. Like a generous host, she offers her brimming cups in endless variety, served in a grand hall, the sky its ceiling, the mountains its walls, decorated with glorious paintings and enlivened with bands of music ever playing."

— John Muir
20th Century Naturalist

CITY OF
VENTURA

1. OUR NATURAL COMMUNITY

Our goal is to be a model for other communities of environmental responsibility, living in balance with our natural setting of coastline, rivers, and hillside ecosystems.

Natural Context

Ventura's natural setting is one if its greatest assets, and preserving the environment is a top community priority. Situated between the ocean, hills, and two rivers, the city affords its residents and visitors with a significant amount of accessible, beautiful, and biologically diverse open space. Although a number of programs are in place to protect coastal and watershed ecosystems and to maintain and preserve existing open lands, some natural features in and around the city have been compromised by the impacts of human activity.

As in many communities across the nation, concern is growing in Ventura about human impacts on natural resources. The historic spread of local development has given rise to grassroots efforts aimed at preserving Ventura's viable agricultural land, open space, and hillsides. The 1995 Save Our Agricultural Resources initiative (see Appendix B) and the 2001 Hillside Voter Participation Area (Appendix C) measure require voter approval before the city can expand into open space areas. The Ventura Hillsides Conservancy formed in 2003 seeks to preserve local hillsides, canyons, and open space.

Ventura, Oxnard, Ventura County, and the County Local Agency Formation Commission have adopted agreements to preserve agricultural and open space land located between the cities. A change that amends these greenbelts requires the approval of all signatories.

Protecting Ventura's fragile natural resources is a fundamental focus of the *2005 Ventura General Plan*. Policies and actions in this chapter intend to ensure that coastal, hillside, and watershed features are preserved, remain visible and accessible, and demarcate boundaries for urban development to define and enhance the city's identity.

The community cherishes the shoreline as one of Ventura's best features. Coastal facilities in the city include:

- Emma Wood State Beach
- Ventura Seaside Park and Fairgrounds
- Surfers Point at Seaside Park
- Beachfront Promenade Park
- San Buenaventura State Beach
- Pierpont Community Beach
- Marina Beach/Cove Port District Beach
- Channel Islands National Park Headquarters
- Surfers Knoll
- Santa Clara River Mouth

Coastal Resources

Ventura boasts seven miles of beautiful sand beaches and valuable shoreline habitat. This "string of pearls" has long been identified by the community as one of the city's most prized features. At its eastern end, the Ventura Harbor offers opportunities for residents and visitors to explore the local marine environment, including the Channel Islands National Park and Marine Sanctuary. Elsewhere along the coast, shoreline and dune habitat provide nesting, feeding, and mating grounds for a wide variety of wildlife, including threatened or endangered species such as the western snowy plover and the least tern.

Shoreline conservation programs underway include the Surfers Point Managed Shoreline Retreat, San Buenaventura State Beach restoration, Ventura Harbor wetland rehabilitation, and coastline water quality monitoring. The City will continue to invest in restoration to enhance the shoreline ecosystem, with the actions in this chapter augmenting current efforts.

Hillsides

The hills of the Transverse Range rise 1,200 feet above Ventura, providing an important visual backdrop that frames the City. Not only do these hills provide residents and visitors with scenic vistas, they are also part of a larger integrated ecosystem comprised by the hillsides, coastal areas, rivers and barrancas that together provide a rich habitat for many species. It is vital to the community that these hillsides that lie outside the city limits (with a County land use designation of either Open Space or Agriculture), are protected and preserved.

These hillsides, by definition, are coterminous with the Hillside Voter Participation Area, and comprise the Hillside Open Space community as depicted on the General Plan Diagram (page 3-22). Because the Hillside Voter Participation Area measure prohibits the extension of City urban services to the hillsides through 2030 without voter approval, the General Plan Diagram identifies the hillsides affected by the measure with a Planning Designation of Open Space. The full text and map of the Hillside Voter Participation Area appears in Appendix C (as required by the act). This chapter calls working with land conservation organizations to establish a Ventura hillsides preserve, and Chapter 6, *Our Active Community*, contains actions to work with the County to create public trails in the hillsides.

Definitions for “Hillside Open Space,” “Hillside Area,” “hillsides,” and “Hillside Voter Participation Area” can be found in the Glossary (Attachment A).

Rivers and Barrancas

The Ventura River flows south to the Pacific Ocean along the western edge of the city, and the Santa Clara River bisects the Oxnard coastal plain south of Ventura. A series of seasonal watercourses called barrancas traverse the city in narrow incised drainage channels running down from the hillsides. The rivers and barrancas and their larger watersheds provide undeveloped open space, riparian vegetation, wildlife habitat and corridors, recreational opportunities, and aesthetic beauty.

Where local watercourses have not been channelized, riparian trees and shrubs grow in fringing woodlands and thickets. Several sensitive bird species breed in these areas, including the least Bell's vireo, willow flycatcher, yellow warbler, and yellow-breasted chat. Steelhead and rainbow trout seasonally inhabit both the Ventura and Santa Clara Rivers.

Riparian and freshwater marsh areas in Ventura represent only a remnant of pre-human coverage, but the City has initiated conservation and restoration efforts such as the Ventura River Estuary Program to help reverse this trend. The estuaries at the mouths of the Ventura and Santa Clara Rivers serve as breeding grounds and feeding areas for migratory and resident shorebirds and waterfowl, as well as home to many terrestrial animals, fish, and free-swimming invertebrates.

Actions in this chapter – such as maintaining adequate buffers from watercourses, requiring restoration of natural drainage features, and prohibiting the placement of manmade materials in drainages – can protect and improve water and habitat quality in local watersheds. The bolder action of removing concrete channel structures would further enhance natural functions and aesthetics.

Resource Conservation

As Ventura continues to grow, conserving resources, increasing energy efficiency, and achieving environmental sustainability become ever more important. The City desires to incorporate green building measures into the design, construction, and maintenance of public and private buildings which can result in significant cost savings and promote overall health and productivity of residents, workers, and visitors to the city. Raising conservation awareness can help minimize waste and pollution released into the natural environment. Improving energy efficiency in buildings, expanding recycling programs, and reducing transportation-related energy consumption will make the city a greener place. The policies and actions in this chapter provide clear direction to guide conservation, green practices, and responsible use of resources.

Policy 1A: Reduce beach and hillside erosion and threats to coastal ecosystem health.

Action 1.1: Adhere to the policies and directives of the California Coastal Act in reviewing and permitting any proposed development in the Coastal Zone.

Action 1.2: Prohibit non-coastal-dependent energy facilities within the Coastal Zone, and require any coastal-dependent facilities including pipelines and public utility structures to avoid coastal resources (including recreation, habitat, and archaeological areas) to the extent feasible, or to minimize any impacts if development in such areas is unavoidable.

Action 1.3: Work with the State Department of Parks and Recreation, Ventura County Watershed Protection Agency, and the Ventura Port District to determine and carry out appropriate methods for protecting and restoring coastal resources, including by supplying sand at beaches under the Beach Erosion Authority for Control Operations and Nourishment (BEACON) South Central Coast Beach Enhancement program.

Action 1.4: Require new coastal development to provide non-structural shoreline protection that avoids adverse impacts to coastal processes and nearby beaches.

Action 1.5: Collect suitable material from dredging and development, and add it to beaches as needed and feasible.

Action 1.6: Support continued efforts to decommission Matilija Dam to improve the sand supply to local beaches.

Action 1.7: Update the Hillside Management Program to address and be consistent with the Planning Designations as defined and depicted on the General Plan Diagram.

Policy 1B: Increase the area of open space protected from development impacts.

Action 1.8: Buffer barrancas and creeks that retain natural soil slopes from development according to State and Federal guidelines.

Action 1.9: Prohibit placement of material in watercourses other than native plants and required flood control structures, and remove debris periodically.

Action 1.10: Remove concrete channel structures as funding allows, and where doing so will fit the context of the surrounding area and not create unacceptable flood or erosion potential.

Action 1.11: Require that sensitive wetland and coastal areas be preserved as undeveloped open space wherever feasible and that future developments result in no net loss of wetlands or "natural" coastal areas.

Action 1.12: Update the provisions of the Hillside Management Program as necessary to ensure protection of open space lands.

Action 1.13: Recommend that the City's Sphere of Influence boundary be coterminous with the existing City limits in the hillsides in order to preserve the hillsides as open space.

Action 1.14: Work with established land conservation organizations toward establishing a Ventura hillsides preserve.

Action 1.15: Actively seek local, State, and federal funding sources to achieve preservation of the hillsides.

Policy 1C: Improve protection for native plants and animals.

Action 1.16: Comply with directives from regulatory authorities to update and enforce stormwater quality and watershed protection measures that limit impacts to aquatic ecosystems and that preserve and restore the beneficial uses of natural watercourses and wetlands in the city.

Action 1.17: Require development to mitigate its impacts on wildlife through the development review process.

Action 1.18: Require new development adjacent to rivers, creeks, and barrancas to use native or non-invasive plant species, preferably drought tolerant, for landscaping.

Action 1.19: Require projects near watercourses, shoreline areas, and other sensitive habitat areas to include surveys for State and/or federally listed sensitive species and to provide appropriate buffers and other mitigation necessary to protect habitat for listed species.

Action 1.20: Conduct coastal dredging in accordance with the U.S. Army Corps of Engineers and California Department of Fish and Game requirements in order to avoid impacts to sensitive fish and bird species.

Action 1.21: Work with State Parks on restoring the Alessandro Lagoon and pursue funding cooperatively.

Action 1.22: Adopt development code provisions to protect mature trees, as defined by minimum height, canopy, and/or trunk diameter.

Action 1.23: Require, where appropriate, the preservation of healthy tree windrows associated with current and former agricultural uses, and incorporate trees into the design of new developments.

Action 1.24: Require new development to maintain all indigenous tree species or provide adequately sized replacement native trees on a 3:1 basis.

Policy 1D: Expand the use of green practices.

Action 1.25: Purchase and use recycled materials and alternative and renewable energy sources as feasible in City operations.

Action 1.26: Reduce pesticide use in City operations.

Action 1.27: Utilize green waste as biomass/compost in City operations.

Action 1.28: Purchase low-emission City vehicles, and convert existing gasoline-powered fleet vehicles to cleaner fuels as technology becomes available.

Action 1.29: Require all City funded projects that enter design and construction after January 1, 2006 to meet a design construction standard equivalent to the minimum U.S. Green Building Council LEED™ Certified rating in accordance with the City's Green Building Standards for Private and Municipal Construction Projects. 

Action 1.30: Provide information to businesses about how to reduce waste and pollution and conserve resources.

Action 1.31: Provide incentives for green building projects in both the public and private sectors to comply with either the LEED™ Rating System, California Green Builder, or the Residential Built Green program and to pursue registration and certification; incentives include "Head-of-the-Line" discretionary processing and "Head-of-the-Line" building permit processing. 

Action 1.32: Apply for grants, rebates, and other funding to install solar panels on all City-owned structures to provide at least half of their electric energy requirements. 

Action 1.33: Publicly acknowledge individuals and businesses that implement green construction and building practices.

OUR PROSPEROUS COMMUNITY

ventura's general plan

"Every increment of construction should be done in such a way as to heal the city."

— Christopher Alexander
Author of *A Pattern Language*, 1977

CITY OF
VENTURA

2. OUR PROSPEROUS COMMUNITY

Our goal is to attract and retain enterprises that provide high-value, high wage jobs; to diversify the local economy; to increase the local tax base; and to anticipate our economic future in order to strengthen our economy and help fund vital public services.

Adapting in the 21st Century

Great communities are prosperous communities. A successful city brings people, institutions, ideas, and capital together in creative ways that enrich the lives of those who live and work there. In today's global economy, high-wage high-value jobs are the foundation of the prosperity that instills a city with the financial resources necessary to provide high quality of life and excellent community amenities.

Ventura has been blessed with a history of prosperity, thanks in large part to success in harnessing the area's natural assets for economic benefit. For most of the 20th Century, Ventura was sustained largely by its role as the hub of the region's oil and agriculture industries. These two sectors not only provided a stable source of jobs and business opportunities, but also helped to shape Ventura's role as the legal, governmental, and cultural center of the County.

In the 21st Century, however, Venturans can't take continued prosperity for granted. Competition occurs regionally, nationally, and globally for innovative businesses, top talent, and good jobs. The community must build on its resources and constantly be on the lookout for new economic opportunities.

County government will likely remain the city's largest employer, providing an important element of economic stability, but government employment is not likely to grow significantly. Oil and agriculture will continue to be important, but their roles are diminishing. While Ventura is a regional center for healthcare, that industry will continue to face intense pressures to reduce costs. Still, the City of Ventura is positioned to move into an era dominated by innovation and reliant on emerging technologies. Cities and regions that excel in the "New Economy" promote high tech industries and boast a high quality of life. Likewise, to remain competitive, Ventura must continue to support economic development, but also create a more attractive living environment, including by providing appropriate housing for all segments of the local workforce. Efforts to boost economic development must be supported by a high quality of life, including a thriving cultural arts scene, award winning schools, and an engaged community. Tourism is also a strong market for Ventura. The beaches, museums, downtown, harbor and the nearby Channel Islands National Park attract more than 1.5 million visitors a year.

The policies and actions in this chapter seek to identify business niches that can thrive locally to diversify the economic base and ensure future community prosperity.

Economic Challenges

Ventura faces a variety of interrelated challenges to continued economic vitality, including:

1. Capturing a share of high-value job markets, such as biotechnology, computer software, communications, entertainment, multimedia, education, and business and financial services.

2. Diversifying the local economy to reduce dependence on the service, retail, and government sectors.

3. Building on the success of the tourism, manufacturing, business, and financial services sectors through marketing and job training programs that will ensure retention and attraction of these enterprises.

4. Finding appropriate locations for commercial and industrial land, including through revitalization opportunities in the Westside and Downtown and possibly via annexations of sites in the North Ventura Avenue and 101 Business Corridor areas.

5. Expanding the retail base, because sales tax represents a major City revenue source.

6. Providing housing for the full range of workforce households at all income levels.

7. Providing adequate infrastructure and financing resources.

Meeting all of these challenges in an integrated, strategic manner will be necessary to achieve long-term economic stability and success. The City must endeavor to identify the businesses most likely to remain and grow in an area that has very high costs – especially for housing – but also has outstanding community amenities, including good weather, a spectacular natural setting, and a safe and desirable community fabric.

The *Ventura Vision* calls for targeting industries that demonstrate the greatest promise for long-term community prosperity by:

- Providing high-wage, high skilled jobs,
- Possessing a local competitive advantage in the global economy,
- Being committed to local responsibility,
- Growing from local ownership, control or management,
- Practicing environmental leadership in their markets, and
- Strengthening the community's creative, cultural identity.

The *Vision* also offers principles for the City to pursue in charting future strategies for economic development:

- Encourage a broad range of high-quality employment and entrepreneurial opportunities.
- Encourage private economic prosperity that can support public services and quality-of-life amenities.

- Develop a vital, prosperous, and stable economy while maintaining a "small-town" flavor.
- Encourage the public and private sectors to work together to achieve prosperity.
- Participate constructively in regional economic development efforts.

Implementing these strategies will not be simple or easy. For one reason, California's current tax system contains provisions that result in some of the lowest-paying economic sectors providing the city with the most tax revenue, and vice versa.

Pillars for Prosperity

Community prosperity is not something that a city government can create by itself. Any successful economic development effort requires the participation of many partners, including community-based business organizations, educational and training institutions, venture capitalists, individual entrepreneurs and business owners, networks of suppliers, and other government agencies that have a mission to enhance prosperity.

Together, the City and its economic partners must ensure that the building blocks for community prosperity are in place. These foundations include organizations and institutions that can coordinate local economic development efforts, as well as land and other economic infrastructure required to make Ventura an attractive business location.

This organizational infrastructure is evolving in Ventura. Business groups such as the Chamber of Commerce and the Ventura County Economic Development Association (a countywide group) are already active, but a wider network is needed to assemble the resources and capacity of entrepreneurs, venture capitalists, educators, and other stakeholders in building a healthy business climate. Greater synergy is needed among the area's higher education institutions – including California State University Channel Islands, Ventura College, Brooks Institute, and satellite campuses of other colleges and universities.

Appropriate and sufficient land will also be necessary to ensure continued economic prosperity over the next 20 years, even as we seek to protect open space and combat sprawl. Demand for land to support retail and office development is likely to outstrip current supply unless allowable building intensities are significantly increased. While some increased density is likely, and some older industrial land may be recycled for new business uses, the City must take care to reserve sufficient land for these purposes – especially in an environment where short-term pressure is likely to encourage conversion of land to commuter housing.

Thus, the strategy for community prosperity must be coordinated with area-specific planning efforts, especially on the Westside (where industrial land is likely to be recycled), Downtown (which must stress office, studio, and retail business growth as well as an emerging residential component), and in the 101 Corridor between Mills Road and

Johnson Drive (where most of the city's business activity now takes place). The City will advance on a set of defined focused areas:

Auto Center – efforts over the short term will focus on making the area a regional retail destination. The City will strengthen its partnership with Auto Center dealers to realize beautification projects and facilitate land use entitlements for additional dealerships.

McGrath Property – the 76-acre site provides Ventura with the very best opportunity to attract new industry with high-value, high-wage jobs. The City and property owners will work on securing project entitlement approvals and recruiting desired tenants. The objective is to attract targeted industries and provide the impetus for initial site development over the short-term.

Westside – the feasibility of establishing a redevelopment project area will be considered by the City and Westside citizens. Such legal designation would provide the resources needed to leverage and implement planned initiatives in various Westside plans. Brownfield reuse efforts will also continue to secure funding for much needed site assessment and remediation activities.

Upper North Avenue – the objective is to transform this area from an oilfield industrial area to a dynamic economic engine. Development efforts will address reuse of the former USA Petroleum site, including and evaluation of the site's potential to emerge as a component of a campus expansion opportunity for Brooks Institute. Keys to this effort are site remediation, compatibility issues, and future annexation to the City.

Downtown – proposed initiatives include well defined design standards in the updated Downtown Specific Plan, enhanced efforts to market the Downtown Cultural District, formation of a downtown management entity, and attracting uses that create "around–the-clock" activity.

Anticipating Our Economic Future – Ventura's economic growth is built on a foundation of concerted efforts that fuel innovation, collaboration, and continuous learning. The focus will be on attracting high technology and knowledge-based businesses including biotechnology, non-durable manufacturing, and business and financial services. Continuous learning opportunities for job seekers, workers, and employers will acknowledge demographic pressures and rapidly changing skill needs. Through specific strategies, the community will develop leaders for tomorrow, and attract and retain new graduates and skilled employees. Critical players will include the Workforce Investment Board, Ventura College, California State Channel Islands, and the Brooks Institute.

The policies and actions in this chapter attempt to provide the means to support these targeted efforts to achieve a stable and balanced economic base.

Policy 2A: Establish a clear economic strategy.

Action 2.1: Track economic indicators for changes that may affect City land resources, tax base, or employment base, such as terms and conditions of sale or lease of available office, retail, and manufacturing space.

Action 2.2: Prepare an economic base analysis that identifies opportunities to capture retail sales in sectors where resident purchasing has leaked to other jurisdictions.

Action 2.3: Maintain and update an Economic Development Strategy to implement City economic goals and objectives.

Policy 2B: Make the local economic climate more supportive of businesses investment.

Action 2.4: Map priority locations for commercial and industrial development and revitalization, including a range of parcel sizes targeted for high-technology, non-durables manufacturing, finance, business services, tourism, and retail uses.

Action 2.5: Share economic and demographic information with organizations that may refer businesses to Ventura.

Action 2.6: Encourage intensification and diversification of uses and properties in districts, corridors, and neighborhood centers, including through assembly of vacant and underutilized parcels.

Action 2.7: Partner with local commerce groups to recruit companies and pursue funding for business development and land re-utilization.

Action 2.8: Carry out Housing Element programs that provide housing to all segments of the local workforce.

Action 2.9: Expedite review for childcare facilities that will provide support to local employees.

Policy 2C: Encourage niche industries.

Action 2.10: Expedite review of the entitlement process for installation of infrastructure necessary to support high technology and multimedia companies.

Action 2.11: Allow mixed-use development in commercial and industrial districts as appropriate.

Action 2.12: Allow uses such as conference centers with resort amenities on appropriately sized and located parcels.

Action 2.13: Market the city to businesses that link agriculture with high technology, such as biotechnology enterprises.

Action 2.14: Partner with local farms to promote farmers markets and high quality locally grown food.

Policy 2D: Expand tourism opportunities.

Action 2.15: Provide incentives for use of waterfront parcels for recreation, visitor-serving commerce, restaurant, marina, and fishing uses.

Action 2.16: Work with the State to create year-round commercial opportunities at the fairgrounds.

Action 2.17: Partner with the Harbor District and National Park Service to promote Channel Islands tours and develop a marine learning center.

Action 2.18: Prioritize uses within the Harbor master plan area as follows: (1) coastal dependent, (2) commercial fishing, (3) coastal access, and (4) visitor serving commercial and recreational uses.

Action 2.19: Partner with hotels and the Chamber of Commerce to promote city golf courses.

Action 2.20: Promote outdoor recreation as part of an enhanced visitor opportunities strategy.

OUR WELL PLANNED COMMUNITY

ventura's general plan

"Communities should be designed to serve the cycle of the day and the cycle of the lifetime."

— Andres Duany
Architect & Town Planner

CITY OF
VENTURA

3. OUR WELL PLANNED & DESIGNED COMMUNITY

Our goal is to protect our hillsides, farmlands and open spaces; enhance Ventura's historic and cultural resources; respect our diverse neighborhoods; reinvest in older areas of our community; and make great places by insisting on the highest standards of quality in architecture, landscaping and urban design.

Our City

Ventura is a unique coastal community, proud of our heritage and dedicated to being a national model for effectively managing growth to protect our natural environment and continue to be a great place for us to live.

It is our public responsibility to plan and shape the physical realm to achieve these goals. Past policies, particularly the 1989 Comprehensive Plan, reined in rapid outward suburban sprawl. The 1992 Downtown Specific Plan set the direction for revitalization of the historic heart of our community. Voter-approved measures clearly underscored a mandate to protect agricultural resources and open space, particularly in our hillsides.

Guided by the Ventura Vision of 2000, the centerpiece for this General Plan is creating a "well-planned and designed community." The policies build on the foundation of the past. This plan also represents an historic commitment to *smart* growth:

1. Mix land uses
2. Take advantage of compact building design
3. Create a range of housing opportunities and choices
4. Create walkable communities
5. Foster distinctive, attractive communities with a strong sense of place
6. Preserve open space, farmland, natural beauty, and critical environmental areas
7. Strengthen and direct development toward existing communities
8. Provide a variety of transportation choices
9. Make development decisions predictable, fair, and cost effective
10. Encourage community and stakeholder collaboration in development decisions

Source: U.S. Environmental Protection Agency

"**Smart growth** is about being good stewards of our communities and of our rural lands, parks, and forests. It is about ensuring that the best of the past is preserved, while creating new communities that are attractive, vital, and enduring."
--Michael Leavitt, EPA Administrator

Infill First

Ventura today is the product of decades of earlier growth and development. These patterns have largely established our community's character and will continue to do so in the future. The passage of SOAR, the Hillside Voter Protection Area, and other land-use constraints, along with natural boundaries, such as the ocean and the rivers, make it abundantly clear that before we expand outward any further, we must pursue an "Infill First" strategy. Such a strategy will help avoid sacrificing farmland and sensitive areas in our hillsides and along our rivers.

Our “Infill First” strategy for Ventura means avoiding suburban sprawl by directing new development to vacant land in the City and Sphere of Influence (with the exception of SOAR land), and by focusing new public and private investment in carefully selected districts, corridors, and neighborhood centers where concentrated development and adaptive reuse will improve the standard of living and quality of life for the entire community.

Recognizing that the rate of future population growth is not subject to City control, this plan has been analyzed (in the accompanying Environmental Impact Report) on the basis of estimates of what new homes and other development might be expected to take place over the next twenty years (see Table 3-2). Looking at the rate of growth over the past decade and recognizing the challenges to "infill" development compared to "greenfield" expansion, a projection of roughly 8,300 additional housing units and approximately 5 million square feet of non-residential development has been used for the plan's 20 year planning horizon. Table 3-2 provides estimates of the amount of development that could reasonably be expected to occur in the City and Sphere of Influence.

The actual distribution of future growth in the City may vary based on market forces and other factors. The districts, corridors, and neighborhood center areas, shown on Figure 3-1 Infill Areas, could accommodate more development and/or a different mix of development than shown in Table 3-2. To demonstrate this, Table 3-1 shows the potential development based on the overall carrying capacity of the land.

Distribution of growth in the districts and corridors is based on the following general assumptions:

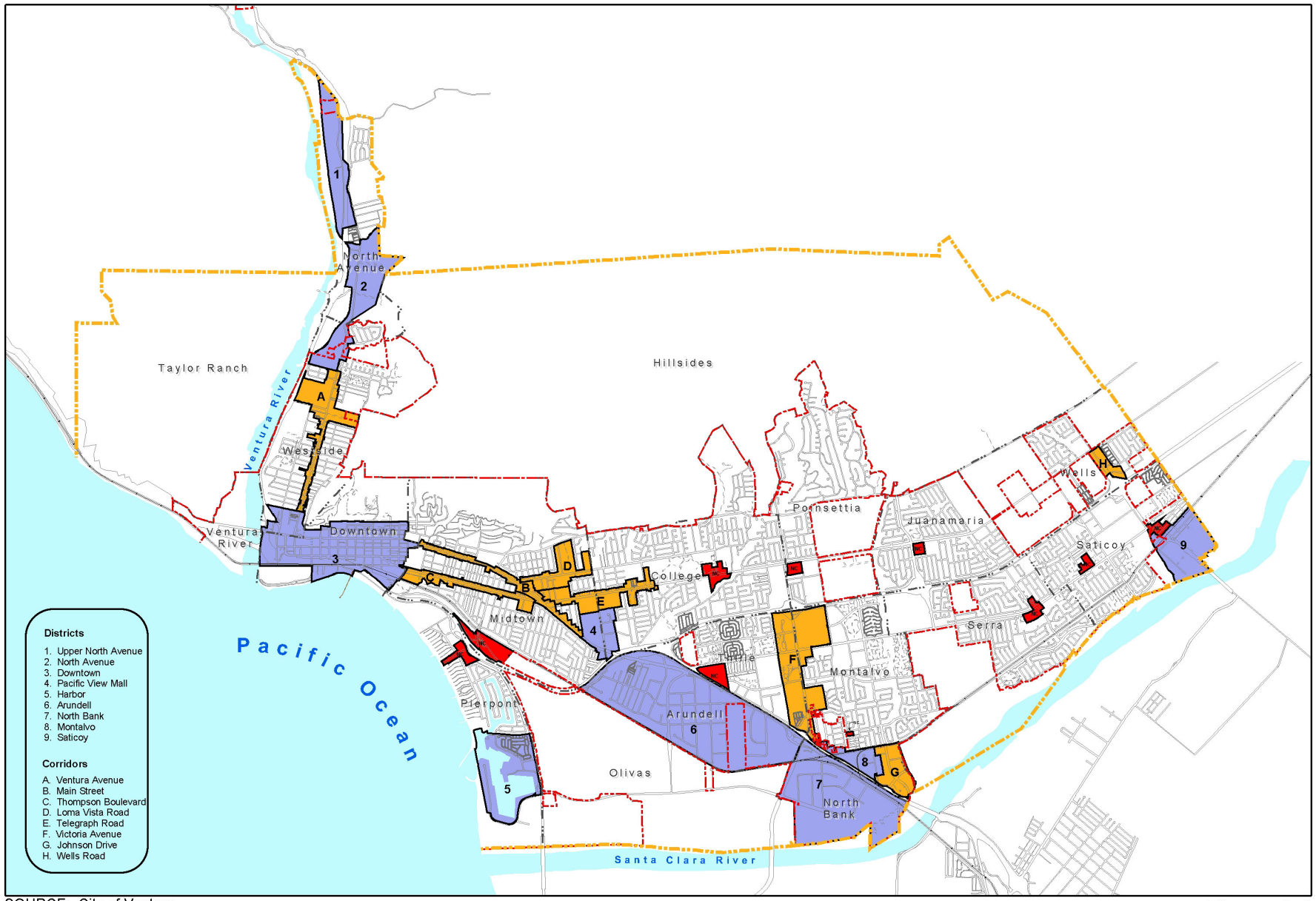
- Development in the Downtown and Harbor Districts will conform to the plans for those areas,
- The Downtown area and, to a lesser extent, the Ventura Avenue corridor will be the focus of future residential and commercial growth, and
- The Arundell, North Avenue, and Upper North Avenue areas will be the focus of future economic growth, potential expansion of the Brooks Institute, with some residential uses.

Table 3-1. Potential Development Based on Carrying Capacity of Land Area

Planning Designation	Allowed Density (du/acre)	Existing Development 2004					General Plan Capacity			
		Single Family Units	Multi Family Units	Comm./Ind. Sq. Ft.	Parcels	Acres	Vacant Parcels	Vacant Acres	Additional Potential[3] Units	Additional Potential[3] Sq. Ft.
Neighborhood Low	0-8	19,425	3,335	49,386	22,511	4,629	108	426	1,221	
Neighborhood Medium	9-20	1,163	8,965	149,513	4,414	1,061	32	116	4,859	
Neighborhood High	21-54	814	2,468	194,143	1,634	303	8	16	8,477	
Commerce[1]		257	490	4,995,248	1,366	808	95	108	7,892	22,328,276
Industry[2]		29	31	8,299,840	1,037	1,401	89	392	4,724	34,215,483
Public & Institutional		4	0	54,422	66	571				
Park & Open Space		6	0	15,491	264	11,693				
Agriculture		4	0	19,550	154	6,857				
Downtown Specific Plan	21-54	332	1,543	1,795,401	1,174	307	45	20	2,500	450,000
Harbor District		0	310	350,160	10	254	1	21	300	876,100
Total		**22,034**	**17,142**	**15,923,154**	**32,630**	**27,884**	**378**	**1099**	**29,910**	**57,869,859**

1. Commerce residential unit capacity is for property within a Corridor, District, or Neighborhood Center and assumes buildout to the maximum FAR and that 25% of floor area would be commercial (with the remainder residential).
2. Industry residential unit capacity is for property within a Corridor, District, or Neighborhood Center and assumes buildout to the maximum FAR and that 75% of floor area would be industrial (with the remainder residential).
3. "Additional Potential" assumes a historic buildout rate of 70% for both residential and non-residential.

Table 3-2. Predicted Development Intensity & Pattern	Residential Development (units)	Non-Residential Development (square feet)				
		Retail	Office	Industrial	Hotel	Total
DISTRICTS						
Upper North Avenue	100	10,000	50,000	150,000	-	210,000
North Avenue	50	10,000	50,000	250,000	-	310,000
Downtown Specific Plan	1,600	100,000	200,000	-	150,000	450,000
Pacific View Mall	25	25,000	-	-	-	25,000
Harbor	300	315,000	-	-	230,000	545,000
Arundell	200	25,000	300,000	1,000,000	-	1,325,000
North Bank	50	300,000	50,000	300,000	-	650,000
Montalvo	50	-	50,000	25,000	-	75,000
Saticoy	50	-	-	25,000	-	25,000
Subtotals (Districts)	**2,425**	**785,000**	**700,000**	**1,750,000**	**380,000**	**3,615,000**
CORRIDORS						
Ventura Avenue	800	40,000	100,000	50,000	-	190,000
Main Street	100	15,000	40,000	-	-	55,000
Thompson Boulevard	300	15,000	40,000	-	-	55,000
Loma Vista Road	25	15,000	40,000	-	-	55,000
Telegraph Road	250	15,000	40,000	-	-	55,000
Victoria Avenue	50	15,000	40,000	-	-	55,000
Johnson Drive	150	50,000	20,000	-	-	70,000
Wells Road	50	15,000	20,000	-	-	35,000
Subtotals (Corridors)	**1,725**	**180,000**	**340,000**	**50,000**	**0**	**570,000**
SPHERE OF INFLUENCE (SOI)/OTHER INFILL/NEIGHBORHOOD CENTERS						
101/126 Agriculture	200	-	-	-	-	-
Wells/Saticoy	1,050	-	-	-	-	-
Pierpont	100	30,000	-	-	-	30,000
Other Neighborhood Centers	100	-	-	-	-	-
Second Units	300	-	-	-	-	-
Underutilized	250	-	-	-	-	-
Vacant	450	165,000	50,000	-	-	215,000
Subtotals (Other Infill)	**2,450**	**195,000**	**50,000**	**0**	**0**	**245,000**
TOTAL INFILL	***6,600***	***1,160,000***	***1,090,000***	***1,800,000***	***380,000***	***4,430,000***
PLANNED AND PENDING DEVELOPMENTS						
Downtown	50	1,072	-	-	150,000	151,072
Ventura Avenue/Westside	238	7,086	-	27,000	-	34,086
Midtown	34	13,751	-	-	-	13,751
College (Telegraph/Loma Vista)	4	2,718	8,843	-	-	11,567
Telephone Road Corridor	256	-	54,785	-	-	54,785
Montalvo/Victoria	296	-	4,300	-	-	4,300
Saticoy/East End	840	7,950	5,600	-	-	13,550
Arundell	-	41,640	42,614	18,080	-	102,334
Olivas	-	7,160	7,066	390,053	-	404,279
Subtotals (Planned/Pending)	**1,718**	**81,377**	**123,214**	**435,133**	**150,000**	**789,724**
TOTAL (Infill+SOI/Other+Pending)	**8,318**	**1,241,377**	**1,213,214**	**2,235,133**	**530,000**	**5,219,724**



SOURCE: City of Ventura

Infill Sites

- Corridor
- Neigborhood Center (NC)
- District

- City Limits
- Planning Boundary
- Planning Neighborhoods

Figure 3-1
Infill Areas

Footnotes for Table 3-2:
Growth estimates for the Arundell community consider the likely development of the 75-acre McGrath property with a mix of uses and development of other vacant lands. Growth estimates for the North Bank area consider the possibility of a large retailer in that area. Estimates of growth in the SOI/Other Infill sites are based on the following general assumptions: (a) 101/126 Orchard site will develop similarly to a project recently proposed for that site; (b) Wells/Saticoy sites will develop in accordance with ongoing planning efforts for those areas; (c) the Pierpont area will develop generally in accordance with a conceptual project recently considered by the City; (d) Second Units will be added at a rate of 15/year; (e) roughly half of underutilized lands identified in the Housing Element will be re-developed over the next 20 years; (f) all vacant lands outside the districts and corridors will be developed in accordance with the proposed planning designations. Planned and Pending Developments based upon the City's 2004 Pending Projects list. Building areas do not include self storage facilities.
The following potential projects not included in the 2004 Planned and Pending Developments list have been included in the future development totals: (1) 150,000 square feet of industrial development in the North Bank area; (2) 165,000 square feet of retail development along Wells Road in the Saticoy area; (3) 50,000 square feet of office development on a 3.5-acre site along Ralston Drive. The Auto Center industrial project is included in the North Bank district; the other two projects are included in the "vacant" category. The square footage associated with these projects has been added to the projections of future growth to provide a conservative analysis of possible future impacts.

Together Table 3-2 and Figure 3-1, Infill Areas, offer a sense of how much growth Ventura might experience by 2025, and a picture of where such change is likely to occur. Precisely how and when development happens and what resources are conserved will be determined by the actions presented in the ten chapters of the *General Plan*, and by the specific land development standards. This plan is one of many tools the City will use to control where and how any future development takes place.

21st Century Tool Kit

The City has a wide array of tools at its disposal to achieve our "Infill First" strategy in ways that respect Ventura's heritage and result in beautiful buildings, blocks, streetscapes, and public places that enhance and enrich quality of life for the entire community. Shaping the City's physical form in the 21st Century will be achieved most effectively and aesthetically by combining Planning Designations with a transect-based approach, and with a new form-based Development Code. Together these can strongly influence the design and functioning of Ventura's distinct and unique neighborhoods, districts, and corridors.

The policies and actions in this chapter seek to enrich Ventura's urban fabric through appropriate design that showcases the attractive features of neighborhoods, districts, and corridors. To promote high-quality infill, the policies and actions encourage neighborhood centers, pedestrian access, established and desirable building types, and dynamic, neighborhood-serving nodes of mixed-use development along primary streets and corridors. This chapter specifically calls for detailed attention to community design through a form-based approach.

Neighborhoods: The Basic Building Blocks of Community

Like any great city, Ventura has grown around the basic unit of the neighborhood. A true neighborhood is not a subdivision of similar houses disconnected from surrounding places. Instead it is an identifiable area containing a neighborhood center with a pedestrian-friendly mix of uses and a palette of housing types for people in all stages of their lives. Neighborhoods are often defined by a quarter-mile "pedestrian shed" (see Figure 3-2), in which most residents' daily needs can be met within a five-minute walk. The organic nature of neighborhoods and their interdependency is what makes them viable for generations. Neighborhoods are not static places that resist change, but rather evolve naturally through periods of transformation to accommodate new residents' needs and desires.

> "In a neighborhood, everything that is needed is there and everything that is there is needed."
> - Anonymous

SOURCE: City of Ventura, Created for the Midtown Ventura Design Charette, March 2005

Northeast corner of Five Points

Theoretical 5 minute walk (1/4 mile)

Theoretical 10 minute walk (1/2 mile)

Actual 5 minute walk (1/4 mile)

Actual 10 minute walk (1/2 mile)

Figure 3-2
Pedestrian Shed, Theoretical versus Actual

The City is rich in a variety of neighborhoods, most of which are within one of Ventura's distinct communities. A total of 17 communities were identified in the 1989 Comprehensive Plan and have been carried forward, with some modifications to allow for a more detailed approach to describe Ventura's geography. Figure 3-3 illustrates 19 distinct communities, some of which are composed of a group of neighborhoods, each boasting their own unique attractions and potential. The oldest settled area is nearest the ocean, with newer areas found eastward, with the exception of Saticoy. Some of Ventura's communities have neighborhood centers established around parks, community gathering places, or civic buildings, and contain or are near services they share with surrounding areas, such as schools, libraries, post offices, and specialty shopping.

Ventura also has residential subdivisions and commercial and industrial districts that could evolve into true neighborhoods. A long-term strategy should be developed to gradually transform these areas that do not yet follow the neighborhood pattern. Existing subdivisions could be linked by pedestrian routes to new small-scale retail and service centers. Congested commercial areas could be redesigned as mixed-use centers on a grid of streets with walkable blocks that connect with surrounding neighborhoods and central plazas. These streets could be lined with buildings containing upper level housing and lower level commercial, office, and civic spaces that hide internal parking structures. Industrial sites that are fast converting to light industry, high tech manufacturing, and assembly could become factory villages with green space, multiple types of housing, small-scale retail to serve workers, and spin-off businesses.

Ventura's 19 communities (Figure 3-3) can each be enriched by using the *transect* (see discussion page 3-10) as a lens to understanding the ways in which it functions and by applying form-based development controls to respect and enhance its character to ensure that, where appropriate, each community provides one, if not more, walkable neighborhoods.

SOURCE: City of Ventura

---- City Limits

- - - Planning Communities

Figure 3-3
Planning Communities

Taylor Ranch
This area is essentially undeveloped, with agriculture as the primary activity. Taylor Ranch is within the City's Planning Area, including a portion within the Coastal Zone Boundary.

Ventura River
This area includes the Ventura River Basin, is within the Coastal Zone Boundary, and with Emma Wood State Beach Park, its major activity is recreation offering day use and overnight camping. Opportunities exist for passive recreation and nature study.

Hillside Open Space
Within the City's Planning Area, is undeveloped, and designated Open Space. Plant communities include chaparral, riparian willow forest, and oak woodland. This area has tremendous potential for passive recreation including scenic trails with panoramic views. This area is coterminous with the Hillside Voter Participation Area or "HVPA" (see Chapter 1 and Appendix C).

North Avenue
Within the City's Planning Area. Historically, largely oilfield industrial. Includes both the Upper North Avenue and North Avenue districts, and is home to the Brooks Institute, which is world renown for its professional photographic and motion picture education. Opportunities exist to strengthen the economy of this area and provide for the expansion of the Brooks Institute into a campus-village including spin-off businesses with a mix of housing types and transit options for all ages.

Westside
Includes the Ventura Avenue corridor and is home to several neighborhood centers that are surrounded by well-connected neighborhood blocks. Opportunities exist to realize the potential of neighborhood improvements initiated in ongoing and past grassroots efforts, such as the Westside Revitalization Plan. This community includes "Hillside Areas" (see definition in Attachment A), which are subject to the Hillside Management Program that provides necessary development criteria in order to retain the natural qualities and minimize potential hazards.

Downtown
The area is regulated by the Downtown Specific Plan. This community is both an urban core with opportunity to grow economically stronger, and the historic center of the City. Civic uses include City Hall, Seaside Park, Grant Park, the Ventura County Museum, San Buenaventura Mission, and is home to a number of historic sites and landmarks. Additional opportunity to enhance the area's already strong cultural climate, including art, cookery, music, performance, and entertainment. Tremendous potential to create "around-the-clock activity" leading to increased vitality. This community includes "Hillside Areas".

Midtown
Includes the Main, Thompson, and Loma Vista corridors, a portion of the Telegraph corridor, as well as the Seaward/Alessandro neighborhood center. Home to the Pacific View Mall, the City's Bus Transfer Center, Ventura High School. Blanche Reynolds Park, Ocean Avenue Park,

and Memorial Park. Includes a small amount of agriculture. Opportunities exist to realize potential improvements initiated in ongoing and past grassroots efforts, such as Midtown by Design, and more recently the Midtown Urban Design Charrette. This community includes "Hillside Areas".

Pierpont
Within the Coastal Zone Boundary, a unique-beach oriented predominantly residential community, with high-quality beachfront homes. Includes the Harbor district and the Pierpont neighborhood center. Home to the Ventura Harbor, Seaward Elementary School, a mobile home park, and Marina Park. Currently offers highway retail such as motels, hotels, and fast food, but opportunity exists to offer residents and visitors with more attractive and improved neighborhood and coastal oriented services and to develop a specific plan for the Harbor district.

College
Includes a portion of the Telegraph corridor, and the College/Day neighborhood center. Major civic uses are Arroyo Verde and Camino Real Park, Ventura Community College and Buena High School. This community includes "Hillside Areas".

Thille
Includes the Gateway neighborhood center and shares the Victoria corridor with Montalvo to the east. Contains mix of housing types built mostly between 1960 and 1980, with some newer development in the 1990's and early 2000's. Its primary civic use is the County Square Linear Park

Arundell
This community contains the main industrial and warehouse district of Ventura, but also has mixed-use areas with retail, restaurants, and offices within walking distance of many workers. Callens Road, the historic center of this community, has great potential to expand and increase the mix of uses it contains, including residential. A significant vacant parcel, the 75-acre McGrath property, offers great economic opportunity to attract new industry that provides high value, high wage jobs to the City.

Olivas
Predominantly agricultural. Its major civic use is the Olivas Park Golf Course and is home to the Olivas Adobe. Contains some commercial and industrial.

North Bank
This community contains a portion regulated by the Auto Center Specific Plan. Its major civic use the Buenaventura Golf Course. Predominantly industrial, with some agriculture. Opportunity to enhance the area as a regional retail destination, while providing workforce serving retail uses.

Poinsettia
Includes the Victoria Plaza neighborhood center. Its primary civic uses include elementary and middle schools. Predominantly residential, with some housing in the Hillside Area, and a significant amount of agricultural operations.

Montalvo
Includes the Johnson Drive corridor, Bristol neighborhood center, and shares the Victoria corridor with Thille to the west. Its major civic use is the County Government Center (equal size to 12 downtown blocks), but also the Rancho Ventura Linear Park and the Barranca Vista Park. Contains mix of housing types and is home to the Metrolink Station.

Serra
Includes the Telephone/Petit neighborhood center, and is home to the City's newest civic use – the Community Park, set to open Fall 2005. Also includes the Chumash Park, Junipero Serra Park, North Bank Linear Park, and Bristol Bay Linear Park. Contains a significant amount of agricultural land.

Juanamaria
Includes the Kimball/Telegraph neighborhood center. Primary civic use is Hobert Park; this community contains some agricultural land.

Wells
Includes the Wells corridor. The Brown Barranca runs through the northerly portion of this area. Contains agricultural land.

Saticoy
Includes the Telephone/Cachuma and Saticoy neighborhood centers and the Saticoy district. Developed originally as a rural town in the late 1800s, Saticoy has the full range of transect characteristics: from the Santa Clara river and the rural eastern edge, to its neighborhood centers, and a mix of housing types at various intensities. Its major civic uses are the Fritz Huntsinger Youth Sports Complex, Saticoy Regional Golf Course and the Saticoy neighborhood park.

Planning Designations and Transect Zones

Land in the City's Planning Area is divided into eight basic Planning Designations on the General Plan Diagram (page 3-22). Each acknowledges a particular predominant development pattern that exhibits certain desirable characteristics, such as building types and functions that can be measured and described.

The wide range of building forms in Ventura offers great potential for compatible infill and viable mixed-use projects in existing neighborhoods, districts, corridors, and neighborhood centers. The wealth of building types includes attached and detached housing, duplexes, courtyard bungalows, second units (often over garages), lofts (some live-work), urban villas, neighborhood shopfronts, concentrated retail developments, and civic buildings. Public buildings retain special importance by serving as prominent landmarks that shape the visual character of the city.

Streetscapes set the tone for quality of life in Ventura by providing the shared outdoor living space of the community. Although the city's distinct neighborhoods, commercial and industrial districts, and agricultural areas are linked by corridors that have evolved primarily to accommodate motor vehicles, opportunities abound to make those streets more livable and to focus activities in neighborhood centers that emphasize walking, biking, and public gathering, and thereby ease traffic and reinforce community vitality. Accordingly, new development needs to be high quality, compact, and walkable, and it should incorporate design diversity that increases lifestyle choices and bolsters commerce and industry.

Determining which building types are most appropriate in specific locations requires shifting away from conventional zoning that emphasizes use toward a form-based approach that prioritizes function, appearance, and compatibility with surrounding context. A powerful tool for understanding this context is the *Transect*, which depicts the continuum from rural to urban conditions (see Figure 3-4).

The transect is a tool that can be used by the community to understand and describe the full range of unique environmental and built characteristics within each of Ventura's neighborhoods. Using the six parenthetical transect zones to better understand the broad Planning Designations of the General Plan Diagram, a finer-grained (site specific) set of development standards can be created to ensure that new development is in keeping with local preferences for building.

This new Development Code will better accommodate the diversity of lifestyles Ventura desires – from the *rural* farm to the *sub-urban* house and yard to the *urban core* with apartments above shops – and will contribute to the identity and character desired by the community. Common elements that the transect will help measure and describe, and that the Development Code will prescribe, include the types and

arrangements of buildings, their "intensity" of lot coverage, height and mass, the details of streets, public and private frontages and the requirements for and character of open spaces. In general it will prescribe individual neighborhood preferences for urban design and building characteristics, including standards.

In many cases, area specific codes, applying the Planning Designations including districts, corridors, and neighborhood centers, will be developed as part of community or specific plans that establish a detailed strategy for public and private investment and policies to promote the appropriate preservation and development of community desired character.

The following descriptions of the Planning Designations include a parenthetical reference to the transect zones they encompass that will be used as guidance in interpreting the planning designations while drafting detailed plans and codes:

"A **transect** is a geographical cross-section of a region used to reveal a sequence of environments. For human environments, this cross-section can be used to identify a set of habitats that vary by their level and intensity of urban character, a continuum that ranges from rural to urban. In transect planning, this range of environments is the basis for organizing the components of the built world: building, lot, land use, street, and all of the other physical elements of the human habitat."
--SmartCode, Volume 6.5, 2005

"All architecture should be beautiful. All towns should be beautiful. Beauty nurtures the soul and the spirit. It makes life worth living."
-Camillo Sitte

- Neighborhood Low – *(T3 Sub-Urban and T4 General Urban)*
emphasizes detached houses with some attached units in a small mix of building types from 0 up to 8 dwelling units per acre. Predominantly residential, with opportunity for limited home occupation and neighborhood services sensitively located along corridors and at intersections.

- Neighborhood Medium – *(T3 Sub-Urban, T4 General Urban and T5 Urban Center)*
anticipates a mixture of detached and attached dwellings and higher building types at approximately 9 to 20 dwelling units per acre. Predominantly residential with small scale commercial at key locations, primarily at intersections and adjacent to corridors.

- Neighborhood High – *(T3 Sub-Urban through T6 Urban Core)*
accommodates a broader mix of building types, primarily attached, from 21 to 54 dwelling units per acre; A mix of residential, commercial, office, and entertainment that includes mixed-use buildings.

- Commerce – *(T4 General Urban through T6 Urban Core, neighborhood center downtown, regional center, town center or village center)*
encourages a wide range of building types of anywhere from two to six stories (depending on neighborhood characteristics) that house a mix of functions, including commercial, entertainment, office and housing.

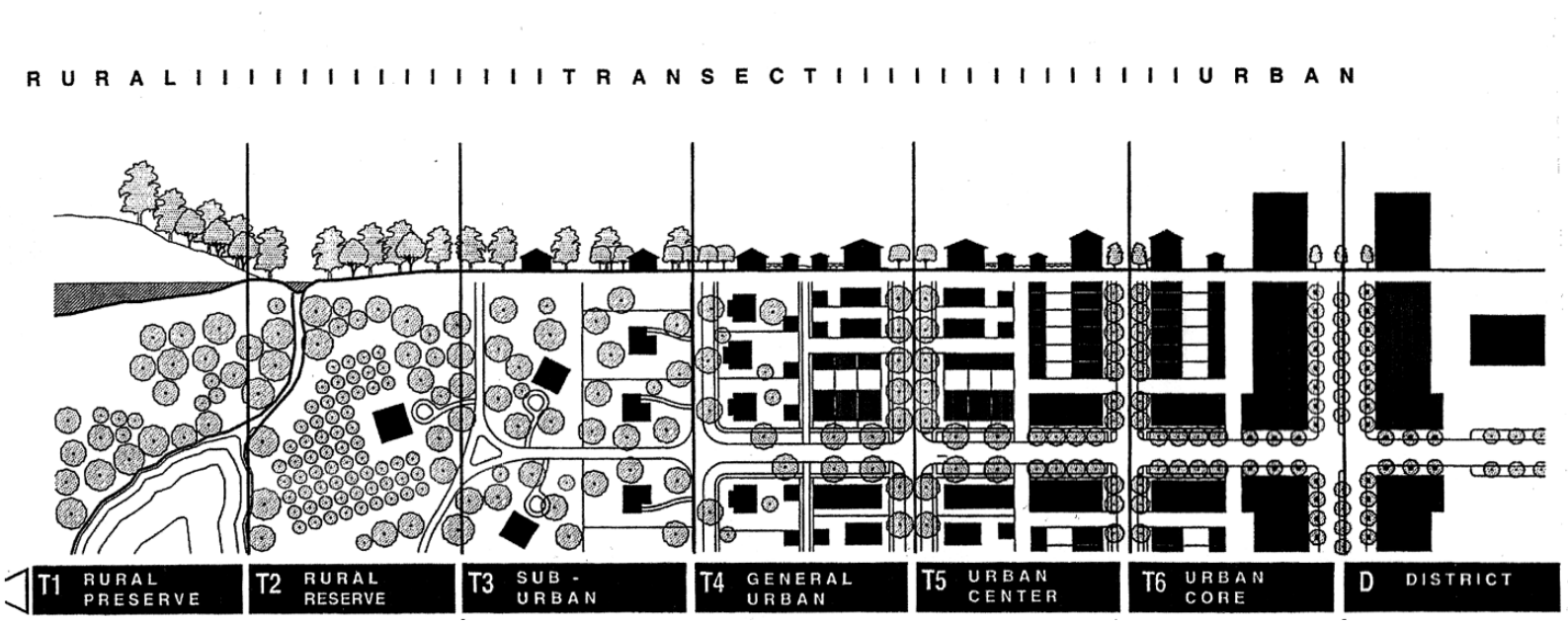
- Industry – *(T2 Rural through T6 Urban Core)*
encourages intensive manufacturing, processing, warehousing and similar uses, as well as light, clean industries and support offices; also encourages workplace-serving retail functions and work-live residences where such secondary functions would complement and be compatible with industrial uses. Primarily large-scale buildings. Also can be developed as Transit Oriented Development, employment center or working village with a mix of uses.

- Public and Institutional – *(T1 Preserve through T6 Urban Core)*
accommodates civic functions such as government offices, hospitals, libraries, schools and public green space.

- Agriculture – *(T2 Rural)*
predominantly commercial cultivation of food and plants and raising of animals.
Pursuant to SOAR: The Agricultural use (not to be considered until after the Year 2030) category identifies those lands that are designated for agricultural use on the General Plan Diagram. The target date of 2030 associated with the Agricultural Use designation indicates a review date after which agriculturally designated lands may be reconsidered for urban uses. However, during the life of this Plan as amended by initiative, it is intended that only agricultural uses are permitted on these lands, except as such lands may be appropriate to public open space and recreational usage. Furthermore, any updates to this Plan are not intended to imply that development would necessarily be appropriate at that time.

- Parks and Open Space – (*T1 Preserve through T6 Urban Core)*
designate lands to public recreation and leisure and visual resources, and can range from neighborhood tot lots and pocket parks to urban squares and plazas and playgrounds to large regional parks and natural preserves.

Figure 3-4. The Transect



Transect: a system of ordering human habitats in a range from the most natural to the most urban. For convenience, the Transect is divided into six zones which describe the physical character of place at any scale, according to the intensity of land use and urbanism. The T-Zones are T1 Natural, T2 Rural, T3 Sub-Urban, T4 General Urban, T5 Urban Center, and T6 Urban Core.

Natural Zone (T1): consists of lands approximating or reverting to a wilderness condition, includes lands unsuitable for settlement due to topography, hydrology, or vegetation.

Rural Zone (T2): consists of lands in open or cultivated state or sparsely settled. These may include woodlands, agricultural lands, grasslands and irrigable deserts.

Sub-Urban Zone (T3): though similar in density to conventional suburban residential areas, differs by its superior connectivity and by allowing home occupations. It is typically adjacent to other urban T-zones. This zone is naturalistic in its planting. Blocks may be large and the roads irregular to accommodate site conditions.

General Urban (T4): has a denser and primary residential urban fabric. Mixed-use is usually confined to certain corner locations. This zone has a wide range of building types: singles, side yard and rowhouses. Setbacks and street tree settings are variable.

Urban Center (T5): is the equivalent of the main street area. This zone includes mixed-use building types that accommodate retail, offices and dwellings, including rowhouses and apartments. This zone is a tight network of streets and blocks with wide sidewalks, steady street tree planting and buildings set close to the frontages.

Urban Core (T6): is the equivalent of a downtown. It contains the densest urbanism – the tallest buildings and the greatest variety of uses, particularly unique ones such as financial districts and important civic buildings. This zone is the least naturalistic of all the zones; street trees are formally arranged or non-existent.

Source: Duany, Plater Zyberk & Company's SmartCode, Volume 6.5, Spring 2005

The General Plan Diagram (page 3-22) also depicts the Downtown, Auto Center, and Saticoy Village Specific Plan areas, which are subject to detailed standards for form and use. In addition, the Diagram identifies Districts, Corridors, and Neighborhood Centers – where the development of housing alongside commercial uses is specifically encouraged. These Districts, Corridors, and Neighborhood Centers make up the growth priority areas as the City's "Infill First" strategy (See Figure 3-1 Infill Areas).

Districts, Corridors, and Neighborhood Centers

One of the primary objectives for infill in Ventura is to produce mixed-use development that places most people's daily needs within walking distance of their dwellings. This may include encouraging "flex space" where a single building functions as both living and working area for the owner, combining housing and commercial uses in the same structures, or sensitively integrating small-scale retail, service, and entertainment within convenient distance of residential areas. Mixed-use places inherently reduce automobile trips and improve the pedestrian experience, resulting in safer neighborhoods, healthier citizens, and better access to everyday needs. The City's corridors and districts already encompass significant mixed-use development. Opportunities exist to augment those areas in ways that complement and enhance existing urban form and streetscapes to better serve Ventura's residents.

Districts

Districts consist of streets or areas emphasizing specific types of activities and exhibiting distinct characteristics. A neighborhood or parts of neighborhoods can form a district. A thoroughfare may also be a district, such as when a major shopping avenue runs between adjoining neighborhoods. The following nine districts are depicted on the General Plan Diagram:

1. Upper North Avenue – home to a mix of industrial uses, including an abandoned oil refinery and Brooks Institute. Tremendous opportunities exist for the remediation and reuse of the former USA Petroleum site, as well as for the expansion of the Brooks Institute as a campus village, surrounded by a green edge to define the upper limits of Ventura.

2. North Avenue – an area with oilfield, industrial, and residential development, which has potential to fully develop into a more balanced mix of building types and uses with unique character, to serve as a major neighborhood anchor for northwest Ventura.

3. Downtown – the most intensely developed area of the city and its urban core. The Downtown Specific Plan regulates this area. Proposed initiatives include well-defined design standards via the Downtown Specific Plan update; enhanced efforts to market the Downtown Cultural District; formation of a

downtown management entity; and attracting uses that create "around–the-clock" activity.

4. Pacific View Mall – an enclosed shopping center and adjacent commercial uses. Large expanses of surface parking paired with significant building mass offer opportunity for the reintroduction of the block pattern and a reinvention of single-use retail into a much more sustainable mix of high intensity uses.

5. Harbor – an area with visitor serving uses, marine facilities, boating and commercial and recreational fishing activities, as well mixed-use places. A specific plan (based on the draft Harbor Master Plan) is being prepared for the Harbor District that will ensure a mix of uses, including residential, and highly defined public frontages and shared civic space for increased accessibility to ocean-front amenities.

6. Arundell – is currently an industrial center with a mix of small-scale industrial uses, business park development, and limited retail services. The McGrath Property – is a 76-acre site of undeveloped land that could provide the catalyst for Ventura's redefinition of 21st Century light industry, manufacturing, research and development, and technological innovation. It is centrally located in the Arundell area, which is ripe for redevelopment into a new form of community plan and building that incorporates large-scale employment, workforce housing and neighborhood commercial in an economically diverse setting.

7. North Bank – a combination of automobile retail, regulated by the Auto Center Specific Plan, and industrial/business park uses. Auto Center – efforts over the short tem will focus on making the area a regional retail destination. The City will strengthen its partnership with Auto Center dealers to realize beautification projects and facilitate land use entitlements for additional dealerships, as well as nurture creative partnerships to discover potential for unique attractions of regional interest.

8. Montalvo – an area of industrial and heavier commercial uses, and currently home to the Metrolink Station. Because of the strategic location of this area between east and west Ventura and it's transportation-rich infrastructure, it needs a strong plan for connectivity and a strategic mix of uses for evolution that is economically sustainable.

9. Saticoy – a mix of homes, older industrial and agricultural operations, and the planned site for the County maintenance yard. The Saticoy Village Specific Plan governs a small portion of this area. A larger effort should ensure Saticoy's seamless connection with adjacent areas, including a greenspace and circulation plan.

Corridors

Corridors, which can be natural or urban, often form boundaries, as well as connections, between neighborhoods and/or districts. Natural corridors can be those such as streams, barrancas, canyons, or green parkways. Urban corridors can be transportation thoroughfares that frequently encompass major access routes, especially ones with commercial destinations, including transit routes and rail lines. The following eight urban corridors are depicted on the General Plan Diagram. Each has the potential to evolve into a vibrant mixed-use City street with a distinct character borrowed from the neighborhoods that share it:

A. Ventura Avenue – a mix of older, small-scale commercial, industrial, and residential uses, with potential to grow even more vibrant by building on existing strengths, including its historic role as a major "working center." Using the warehouse model and diversity of building materials as a cue, "The Avenue" could harness cultural expression and become an eclectic center for the emerging arts and manufacturing crafts.

B. Main Street – currently a commerce-oriented area with a limited amount of mixed use development, this corridor displays the broadest range of architectural types and styles in the city, as well as the widest spectrum of transect characteristics. It has the most potential for increased mixed use and housing with improved streetscape and pedestrian enhancement to slow traffic.

C. Thompson Boulevard – a commercial thoroughfare in need of streetscape improvements and pedestrian amenities, this corridor is much like Main Street in that it boasts tremendous history as a "gateway to Ventura" and epitomizes a beach town character. It is a natural for a major transit or streetcar corridor, where nodes of mixed-use development and pedestrian and bike enhancement could support parallel neighborhoods and increase access to the ocean.

D. Loma Vista Road – a mix of commercial and residential development at varying scales, with a high concentration of medical facilities, this is the ideal place for Ventura to focus on creating a concentration of medical and research-centered business, with a high intensity of workforce housing and services housed in large-scale mixed-use buildings of high-tech character and serviced by increased transit.

E. Telegraph Road – a sub-urban-scale commercial area with some detached homes and multifamily buildings. The City's bus transfer station is located along this corridor, creating the perfect opportunity for a multi-modal connection with an intense node of housing and employment. The streetscape could change character along its length, with a mixture of intensities of development.

F. Victoria Avenue – currently a wide artery with high traffic volumes and shopping centers, Victoria needs effective traffic management

and pedestrian and streetscape improvements with strong attention to additional mobility options. Actions in this General Plan, along with the new Development Code, will call for revitalizing this corridor by redesigning the current array of single-use shopping centers and retail parcels with a mix of building types, uses, and public and private frontages. By eliminating "big box", mega-block, auto-oriented strip development, and the traffic patterns it generates, Victoria Avenue could create tremendous opportunity for healthy economic investment in walkable blocks, connected to better serve surrounding neighborhoods. Creative solutions, including dedicating transit or streetcar lanes, wider sidewalks, and bike lanes could transform Victoria's image into a regional thoroughfare of great and sophisticated diversity. All new commercial development within the Victoria Avenue corridor must follow this approach.

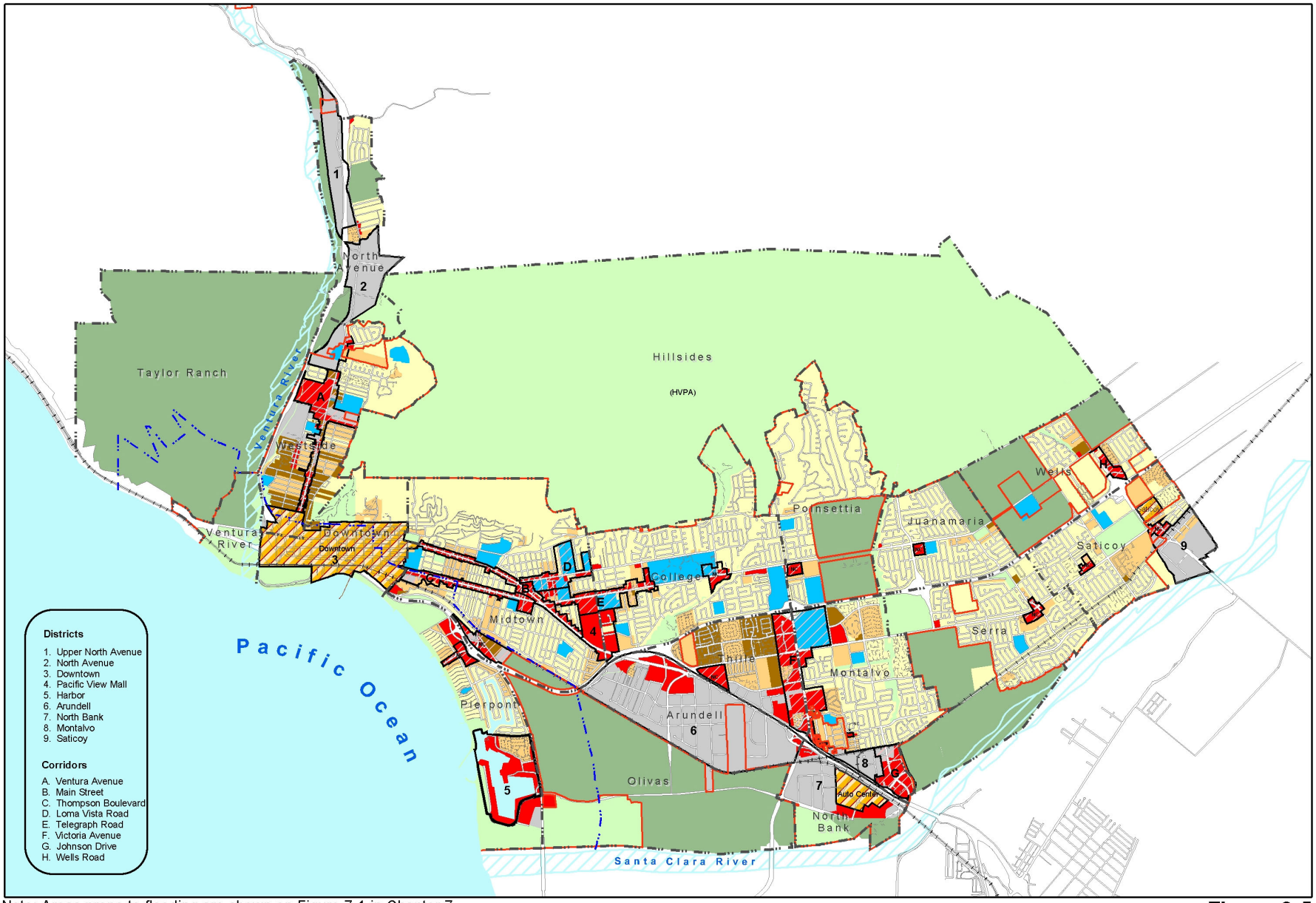
G. Johnson Drive – a connector between eastern Ventura and Highway 101 with sub-urban scale retail. Opportunities exist for high-quality, mixed-uses (such as child-care, restaurants, offices, light industrial, and housing) with ground floor commercial space to strengthen its economic presence and provide a visual gateway.

H. Wells Road – a mix of older industrial uses and newer sub-urban commercial and residential development. Well's Road should be returned to the neighborhoods it serves, so that new development can emulate the country charm that existed prior to its widening. Traffic calming in appropriate locations would encourage neighborhood connectivity, and end the current trend toward walls and buildings that turn their back to the street. This would also encourage redevelopment of the old neighborhood centers.

Neighborhood Centers

Community evolves from individual conversations and the best places to grow community are in individual neighborhoods. Every neighborhood should have at least one center where people can meet by chance at a local coffee shop, market, bookstore, diner, or even hardware store. *Our Involved Community* needs places to gather to have meaningful conversations and share civic information. Ventura's existing neighborhood centers have the opportunity to become such places. The General Plan Diagram identifies 10 neighborhood centers – where the development of housing alongside commercial uses is specifically encouraged. These centers include:

(1) Pierpont, (2) Seaward/Alessandro, (3) College/Day, (4) Gateway Plaza, (5) Victoria Plaza, (6) Bristol, (7) Kimball/Telegraph, (8) Petit/Telephone, (9) Telephone/Cachuma, and (10) Saticoy.



Note: Areas prone to flooding are shown on Figure 7-1 in Chapter 7.

Figure 3-5

GENERAL PLAN DIAGRAM

Neighborhood
- Low (up to 8 du/ac)
- Medium (9-20 du/ac)
- High (21-54 du/ac)

- Commerce
- Industry
- Public and Institutional

- Agriculture
- Parks and Open Space
- Specific Plan Area

- Corridors, Neighborhood Centers (NC)
- Districts

- City Limits
- Planning Communities
- California Coastal Zone Boundary

Special Topics

Agricultural Lands

During the 20th Century, the value of agricultural land in Ventura became secondary to that for development. However, this pattern is not irreversible, and protecting green land to save the aesthetic beauty of open space, preserve the cultural landscape of the community's heritage, and conserve land for environmental quality are high priorities in Ventura. In fact, the land's historic role for food production may soon be more highly valued once again, as prime agricultural areas continue to disappear to development at an astounding rate.

Ventura is fortunate to retain much of its rural landscape. Agriculture still plays an important role in the economy of the City and County of Ventura. Significant yields are made possible by the presence of high quality soils, adequate water supply, favorable climate, long growing season, and level topography. Mechanisms such as the California Land Conservation Act (more popularly known as the Williamson Act), the Save Our Agricultural Resources (SOAR) initiative (see Appendix B), and greenbelt agreements with neighboring jurisdictions continue to help maintain a balance between urban growth and agricultural preservation. The SOAR initiative that was adopted by the voters in 1995, and that, by its own terms, remains in full legal effect until 2030, refers to specific policies from the 1989 Comprehensive Plan that are still in effect and, as such, have been carried forward into this Plan under Policy 3D and Action 3.20 in addition to being incorporated in this General Plan as set forth in Appendix B.

A primary agricultural concern is the potential conflict with adjacent urban uses over pesticides, dust, odors, noise, and the visual impact of large greenhouses. Other issues of importance to agricultural producers include restrictions on farm-related activities, access to water, and provision of farmworker housing. Paralleling these concerns is a community interest in sustainability, the ability to provide for the needs of future generations. The policies and actions in this chapter intend to sustain viable farm operations in areas designated for agricultural use.

Growth Management

Growth management seeks to preserve public good, improve social equity, and minimize adverse impacts of development while still accommodating new housing and business attraction. The effects of growth management policies on housing prices are complex due to the idiosyncrasies of local real estate markets. Properly designed, growth management programs can plan for all development needs, such as open space, access to public transportation, and walkable neighborhoods.

The City's Residential Growth Management Program (originally established in 1979 to ensure that housing development would not outpace needed infrastructure) has not always contributed to housing affordability or quality design. This General Plan calls for revising the Residential

Subsequent to the adoption of the **SOAR** initiative, there have been two general plan amendments, which redesignated individual agricultural properties through a vote of the electorate as required by SOAR. These remain in full legal effect and have been carried forward into this Plan. These include the new Community Park at Kimball Road and the southeast corner of Montgomery and Bristol (see Appendix E and F).

Growth Management Program with an integrated set of growth management tools. Such tools not only include the adoption of a new form-based Development Code, but also community or specific plans based on availability of infrastructure and resources.

Long Term Potential Expansion Strategy

Indeed, the community has indicated that before the City expands any further, the first priority for achieving planning goals should be in the vacant and underutilized areas of the City. Yet, even the most successful effort to achieve community planning goals through infill may need to be supplemented at some point by expanding into areas outside the city limits. Such expansion may not only be necessary to fulfill development objectives; it also may be needed to provide open space, parklands, and natural areas to be preserved and restored. To address this, citizens discussed during the preparation of this General Plan which areas, if any, should be possible expansion areas. These areas were identified because they embody opportunities for achieving a variety of community vision objectives that may not be feasible within existing city limits. The community further went on to agree upon a set of rules about how these areas should be planned. These areas were analyzed in the environmental impact report prepared for this General Plan, and a "long term potential expansion strategy" will be formulated to guide the process of prioritizing any potential future expansion areas to fulfill General Plan objectives that may not be able to be achieved by our "Infill First" approach. Should any areas be selected for future planning, a specific plan, a public vote (if required pursuant to SOAR), and an amendment with the regulatory planning framework would have to occur.

The policies and actions in this chapter call for measured and appropriate growth in Ventura by prioritizing areas appropriate for additional development based on community values and infrastructure potential.

Policy 3A: Sustain and complement cherished community characteristics.

Action 3.1: Preserve the stock of existing homes by carrying out Housing Element programs.

Action 3.2: Enhance the appearance of districts, corridors, and gateways (including views from highways) through controls on building placement, design elements, and signage.

Action 3.3: Require preservation of public view sheds and solar access.

Action: 3.4 Require all shoreline development (including anti-erosion or other protective structures) to provide public access to and along the coast, unless it would duplicate adequate access existing nearby, adversely affect agriculture, or be inconsistent with public safety, military security, or protection of fragile coastal resources.

Action 3.5: Establish land development incentives to upgrade the appearance of poorly maintained or otherwise unattractive sites, and enforce existing land maintenance regulations.

Action 3.6: Expand and maintain the City's urban forest and thoroughfare landscaping, using native species, in accordance with the City's Park and Development Guidelines and Irrigation and Landscape Guidelines.

Action 3.7: Evaluate whether lot coverage standards should be changed based on neighborhood characteristics.

Policy 3B: Integrate uses in building forms that increase choice and encourage community vitality.

Action 3.8: Adopt new development code provisions that designate neighborhood centers, as depicted on the General Plan Diagram, for a mixture of residences and small-scale, local-serving businesses.

Action 3.9: Adopt new development code provisions that designate areas within districts and corridors for mixed-use development that combines businesses with housing, and focuses on the redesign of single-use shopping centers and retails parcels into walkable, well connected blocks, with a mix of building types, uses, and public and private frontages.

Action 3.10: Allow intensification of commercial areas through conversion of surface parking to building area under a district-wide parking management strategy in the Downtown Specific Plan.

Action 3.11: Expand the downtown redevelopment area to include parcels around future transit areas and along freeway frontage.

Action 3.12: The City will work with the hospitals on the new Development Code treatment for the Loma Vista corridor, which includes both hospitals.

Action 3.13: Assess whether the City's Affordable Housing Programs respond to current needs, and modify them as necessary within State mandated Housing Element updates.

Specific Plan Requirements

Specific Plans must include a statement of its relationship to the General Plan and specify all of the following:

1. distribution, location, and extent of uses
2. distribution, location, extent, and intensity of public and private transportation, sewage, water, drainage, solid waste disposal, energy
3. standards and criteria by which development will proceed and standards for conservation, development, and utilization of natural resources
4. program of implementation measures, including regulations, programs, public works projects, and financing
5. any other subjects that are necessary

(§65450-65452)

Policy 3C: Maximize use of land in the city before considering expansion.

Action 3.14: Utilize infill, to the extent possible, development to accommodate the targeted number and type of housing units described in the Housing Element.

Action 3.15: Adopt new development code provisions that ensure compliance with Housing Element objectives.

Action 3.16: Renew and modify greenbelt agreements as necessary to direct development to already urbanized areas.

Action 3.17: Continue to support the Guidelines for Orderly Development as a means of implementing the General Plan, and encourage adherence to these Guidelines by all the cities, the County of Ventura, and the Local Agency Formation Commission (LAFCO); and work with other nearby cities and agencies to avoid urban sprawl and preserve the rural character in areas outside the urban edge.

Action 3.18: Complete community or specific plans, subject to funding, for areas such as Westside, Midtown, Downtown, Wells, Saticoy, Pierpont, Harbor, Loma Vista/Medical District, Victoria Corridor, and others as appropriate. These plans will set clear development standards for public and private investments, foster neighborhood partnerships, and be updated as needed.

Action 3.19: Preparation of the new Development Code will take into account existing or proposed community or specific plans to ensure efficient use of City resources and ample citizen input.

Policy 3D: Continue to preserve agricultural and other open space lands within the City's Planning Area.

Action 3.20: Pursuant to SOAR, adopt development code provisions to "preserve agricultural and open space lands as a desirable means of shaping the City's internal and external form and size, and of serving the needs of the residents.

Action 3.21: Adopt performance standards for non-farm activities in agricultural areas that protect and support farm operations, including requiring non-farm uses to provide all appropriate buffers as determined by the Agriculture Commissioner's Office.

Action 3.22: Offer incentives for agricultural production operations to develop systems of raw product and product processing locally.

Policy 3E: Ensure the appropriateness of urban form through modified development review.

Action 3.23: Develop and adopt a form-based Development Code that emphasizes pedestrian orientation, integration of land uses, treatment of streetscapes as community living space, and environmentally sensitive building design and operation.

Action 3.24: Revise the Residential Growth Management Program (RGMP) with an integrated set of growth management tools including:

- community or specific plans and development codes based on availability of infrastructure and transit that regulate community form and character by directing new residential development to appropriate locations and in ways that integrate with and enhance existing neighborhoods, districts and corridors;
- appropriate mechanisms to ensure that new residential development produces high-quality designs and a range of housing types across all income levels; and,
- numeric limitations linked to the implementation of community or specific plans and development codes and the availability of appropriate infrastructure and resources; within those limitations, the RGMP should provide greater flexibility for timing new residential development.

Action 3.25: Establish first priority growth areas to include the districts, corridors, and neighborhood centers as identified on the General Plan Diagram; and second priority areas to include vacant undeveloped land when a community plan has been prepared for such (within the City limits).

Action 3.26: Establish and administer a system for the gradual growth of the City through identification of areas set aside for long-term preservation, for controlled growth, and for encouraged growth.

Action 3.27: Require the use of techniques such as digital simulation and modeling to assist in project review.

Action 3.28: Revise the planning processes to be more user-friendly to both applicants and neighborhood residents in order to implement City policies more efficiently.

Policies and actions related to the preservation of **historic architecture and resources** are contained in Chapter 9.

2000-2006 HOUSING ELEMENT GOALS AND POLICIES, City Council Adopted Resolution 2004-014. Adopted April 12, 2004

Goal 1

Maintain and improve the quality of existing housing and residential neighborhoods in Ventura.

Policy 1.1 Encourage citizen involvement in addressing the maintenance and improvement of the housing stock and neighborhood quality.

Policy 1.2 Continue to preserve and maintain the City's historical and architecturally significant buildings and neighborhoods.

Policy 1.3 Encourage homeowners and landlords to maintain properties in sound condition through the City's residential rehabilitation assistance programs and code enforcement efforts.

Policy 1.4 Cooperate with housing providers in the acquisition, rehabilitation, and maintenance of older residential properties as long-term affordable housing.

Policy 1.5 Permit the conversion of apartments to condominiums only when such conversion would not adversely affect the overall supply and availability of rental units, particularly units occupied by lower- and moderate-income households.

Policy 1.6 Continue to support the provision of rental assistance to lower-income households, and encourage property owners to list units with the Housing Authority.

Policy 1.7 Continue to preserve the affordability of mobile homes through the Rent Stabilization Ordinance. Support the acquisition and ownership of mobile home parks by non-profit housing providers and resident organizations.

Policy 1.8 Preserve the existing stock of affordable housing, including mobilehomes, through City regulations, as well as financial and other forms of assistance.

Goal 2

Facilitate the provision of a range of housing types to meet the diverse needs of the community.

Policy 2.1 Provide high quality housing for current and future residents with a diverse range of income levels.

Promote housing that is developed under modern sustainable community standards.

Policy 2.2 Provide expanded housing opportunities for the City's workforce. Promote the City's affordable housing programs with employers in Ventura.

Policy 2.3 Continue to offer and promote homeownership assistance programs to lower- and moderate-income households to purchase both new and existing housing. Pursue participation in other homeownership programs available in the private market.

Policy 2.4 Continue to provide financial and regulatory incentives to non-profits, private housing developers, and public agencies for the construction of the types of housing required to meet identified needs.

Policy 2.5 Support the provision of quality rental housing with three or more bedrooms to accommodate large families, and encourage room additions in the existing housing stock to address household overcrowding.

Policy 2.6 Support a variety of housing types to address the needs of agricultural workers, including affordable rentals, mobilehome parks, single room occupancy hotels (SROs), and group housing for migrant laborers.

Policy 2.7 Facilitate the provision of housing to address Ventura's growing senior population, including senior housing with supportive services, assisted living facilities, and second units.

Policy 2.8 Encourage the provision of housing adaptable to the physically disabled through integration of universal design features in new development, and compliance with Title 24 of the California Health and Safety Code.

Policy 2.9 Encourage the provision of supportive housing for persons with mental illness to address the severe shortage of housing for this special needs population.

Policy 2.10 Support efforts by non-profits to expand transitional and emergency housing in Ventura, including support of grant applications and assistance in identification of suitable sites.

Policy 2.11 Evaluate adoption of an inclusionary housing ordinance as a means of integrating affordable units within new residential development: 1) Require affordable units to be provided on or off-site, with allowance for payment of an in-lieu fee at the discretion of the City; 2) Evaluate the financial impact of inclusionary requirements on development, and assess incentive-based alternative strategies for provision of affordable housing.

Policy 2.12 Facilitate the provision of second units as a means of providing affordable rental housing in existing neighborhoods. Ensure compatibility with the primary unit and surrounding neighborhood.

Policy 2.13 Encourage the production of housing that meets the needs of all economic segments, including lower, moderate, and above moderate-income households, to achieve a balanced community.

Policy 2.14 Promote and facilitate non-traditional housing types and options, including co-housing, assisted living facilities, live-work spaces, and artist lofts.

Policy 2.15 Direct City-controlled housing funds towards programs that address the needs of very low- and low-income households.

Policy 2.16 Prioritize affordable housing opportunities and assistance for public service employees.

Policy 2.17 Annually monitor the City's progress in meeting its housing needs for all income levels.

Goal 3

Provide adequate housing sites through appropriate land use and zoning designations to accommodate the City's share of the regional housing needs.

Policy 3.1 Maintain an up-to-date inventory of vacant and underutilized parcels and provide to interested developers in conjunction with information on available development incentives. Within redevelopment project areas, provide assistance in land assembly in support of affordable housing.

Policy 3.2 Implement smart growth principles by rewarding quality infill projects that utilize existing infrastructure.

Policy 3.3 Encourage efficient utilization of the City's limited land resources by encouraging development at the upper end of the permitted Zoning Code/Comprehensive Plan density.

Policy 3.4 Utilize the Urban Infill Overlay Zone and Downtown Specific Plan as a tool to facilitate higher density residential and mixed-use development.

Policy 3.5 Explore residential reuse opportunities on obsolete commercial properties, such as older motels and underutilized historic structures.

Policy 3.6 Pursue use of publicly owned land, such as public parking lots, for development of affordable housing.

Policy 3.7 Identify opportunities for housing development that achieves other community goals such as neighborhood improvement, recreation opportunities, and the preservation of sensitive lands and neighborhood character.

Policy 3.8 Facilitate the development of mixed-use projects in appropriate commercial areas, including stand-alone residential developments (horizontal mixed-use) and housing above ground floor commercial uses (vertical mixed-use).

Policy 3.9 Promote higher density housing as part of mixed-use developments along parts of Thompson Boulevard and Main Street in Midtown Ventura, as well as other areas such as Westside, Downtown and East Ventura.

Policy 3.10 Promote mixed-use developments on the Westside of Ventura.

Policy 3.11 Ensure that the updated Land Use Element designates adequate sites for housing for executives to enhance the City's ability to attract businesses with higher paying jobs.

Goal 4

Mitigate or remove any potential governmental constraints to housing production and affordability.

Policy 4.1 Provide regulatory and/or financial incentives, where appropriate, to offset or reduce the costs of affordable housing development, including density bonuses and flexibility in site development standards.

Policy 4.2 Utilize the Affordable Housing Program to provide incentives for production of affordable units, including streamlined permit processing, reduced fees and exemption from the required competition for RGMP allocations.

Policy 4.3 Amend the City's Residential Growth Management Plan (RGMP) to better facilitate housing production, while discouraging sprawl and maintaining quality of life goals.

Policy 4.4 Undertake a comprehensive review of the City's residential development project review procedures and establish modified procedures as appropriate to streamline processing times, while maintaining adequate levels of public review.

Policy 4.5 Provide flexibility in development standards to accommodate new models and approaches to providing affordable housing, such as co-housing, live/work units and assisted living facilities.

Goal 5

Promote equal opportunity for all residents to reside in the housing of their choice.

Policy 5.1 Continue to enforce fair housing laws prohibiting arbitrary discrimination in the building, financing, selling or renting of housing on the basis of race, religion, family status, national origin, physical or mental disability, or other such factors.

Policy 5.2 Continue to support organizations that offer fair housing and mediation services to Ventura residents.

Policy 5.3 Promote housing that meets the special needs of large families, elderly persons, agricultural workers, and the disabled.

Policy 5.4 Continue to enforce notification and provide relocation assistance for lower-income persons displaced due to demolition, reuse, condominium conversion, or rehabilitation as a result of code enforcement.

ventura's general plan

OUR ACCESSIBLE COMMUNITY

"Restore human legs as a means of travel. Pedestrians rely on food for fuel and need no special parking facilities."

— Lewis Mumford
Author of *The City in History*, 1961

CITY OF
VENTURA

4. OUR ACCESSIBLE COMMUNITY

Our goal is to provide residents with more transportation choices by strengthening and balancing bicycle, pedestrian and transit opportunities in the City and surrounding region.

An Integrated Mobility System

Central to the well-being of Ventura's citizens and visitors is *mobility*, the ability to get from one place to another. Mobility depends on the range, efficiency, and connectivity of the various components that comprise the transportation network – sidewalks, bicycle routes, and thoroughfares, as well as transit services – and that enable people to access the things they need, from the most basic to the extraordinary (See Figures 4-1 Bicycle Facilities, 4-2 Bus and Rail Routes, and 4-3 Roadway Classification Plan). Ventura is a community that recognizes that thoroughfares serve a variety of functions and are not simply conduits for automobile traffic.

Balancing automobile use with other means of travel is essential to maintaining social and physical health. Safe and enjoyable routes for pedestrians and bicyclists should connect every part of the city, and neighborhoods need to be linked by ample and convenient transit service along corridors. Ventura also must be connected to the larger region by a variety of transportation modes.

Thoroughfares have a tremendous effect on neighborhood character and therefore quality of life for both residents and visitors.

Thoroughfares are essentially the stage of public life where a diversity of citizens interact. They can create places of remembrance, chance encounters, and discovery. Ensuring that Ventura thoroughfares are *great places* requires improving design and quality as well as connectivity. In some cases, city thoroughfares are over-engineered to accommodate the worst-case scenario.

Slowing down automobiles, especially in residential neighborhoods, is a desire shared by many residents. Vehicle travel should be directed toward routes that minimize congestion, avoid conflicts with walkers and bicyclists, and keep residential neighborhoods free of excessive cut-through traffic. Additionally, in some areas of the city, suburban patterns have resulted in less connectivity than is desired by the community. Transportation modes and land uses in the city need to be distributed so that residents have close and easy access to meet their basic needs and travel destinations.

Traffic congestion is a major concern among Ventura residents. Although traffic on local roads is generally free-flowing, a few key intersections and road segments experience congestion during peak traffic hours. Simply widening roads to add lanes will not solve traffic congestion. Instead, the system needs integrated solutions that improve mobility for all

The essential qualities of a properly functioning mobility system are:

1. Well connected, interesting components
2. Convenient accessibility
3. Integrated linkage of all modes
4. Comfort and safety
5. Design reflecting natural and urban context

means of travel. While walking, biking, and transit use are already popular, these alternative modes need to be enhanced and better linked. For example, bus and rail systems serve Ventura, but not thoroughly enough to provide a reasonable alternative to auto use for most travelers. And while pedestrian access exists in most areas of Ventura, the network lacks continuous routes in some key locations.

As expressed in the *Ventura Vision,* a top community priority is to minimize automobile use through a fully integrated multi-modal transportation system. The policies and actions in this chapter aim to achieve this objective.

Travel Modes

Walking

Sidewalks are arguably the most important component of the city's mobility system. As with circulation in general, the utility of pedestrian systems is inextricably linked to land use patterns. Combined with urban design elements, land use patterns influence how much walking can safely and effectively occur in the community. Circulation systems that are designed with pedestrians in mind tend to increase outdoor activity and community interaction, while those oriented toward motor vehicles tend to create disincentives to walking.

Ventura's pedestrian system consists of sidewalks, access ramps, crosswalks, linear park paths, and overpasses and tunnels. Special corridors such as the Beachfront Promenade, California Plaza, and Figueroa Plaza have been designated especially for pedestrians. The pedestrian system also includes neighborhood and park path systems, and dedicated trail facilities that are shared with bicyclists and other users.

Pedestrian paths need to be interesting, enjoyable, and lead to a destination, from the most simple – such as a pocket park – to more grand points of arrival, such as major civic spaces. Creating a network of paths that connect key features such as parks, schools, civic facilities, shops, and services is vital to the success of reducing dependence on the automobile. Those most in need of pedestrian access include children, teenagers, and the elderly, as well as those who cannot afford a car or choose not to drive.

The main deficiency of Ventura's pedestrian system is its discontinuity. Some sections of thoroughfares lack sidewalks, and pedestrian connections between some key use areas are in need of repair. Crosswalks are prohibited along some corridors, and pedestrian signal phases are not always long enough for all walkers. Traffic-calming measures also are needed to improve walkability in many neighborhoods. Citizens have placed a high emphasis on improving the pedestrian network, recommending specific improvements such as:

- narrowing selected thoroughfare segments,
- improving sidewalks and road crossings,
- lengthening pedestrian signal phases,
- adding marked crossings at key intersections,
- developing safe and attractive walkways from Downtown and Midtown to the beach,
- ensuring that new development provides ample pedestrian access,
- creating trails along watercourses and through the hillsides, and
- improving pedestrian facilities near schools.

Figure 4-1 illustrates the three State defined classes of bikeway facilities:

- Bike Path (Class I) – Class I bike paths are separated from roads by distance or barriers, and cross-traffic by motor vehicles is minimized.
- Bike Lane (Class II) – Class II bikeways are roadway lanes reserved for bicycles. These lanes are painted with pavement lines and markings and are signed.
- Bike Route (Class III) – Class III bike routes share existing roads and provide continuity to other bikeways or designated preferred routes through high traffic areas. There are no separate lanes, and bike routes are established by placing signs that direct cyclists and warn drivers of the presence of bicyclists.

Policies and actions in this chapter intend to improve pedestrian access through this range of methods.

Biking

Because bicycles are an integral component of the city's mobility system, they are allowed on *all* city thoroughfares. The City has adopted a General Bikeway Plan intended to create a safe, accessible, and interconnected network of bike paths, lanes, and routes that will ensure Ventura becomes and remains a truly bicycle-friendly community. The General Bikeway Plan is a flexible, comprehensive, and long-range guide for bicycle transportation and recreation planning, design, and budget decision-making. Accordingly, it is designed to:

- refine and implement City bicycle-related policies,
- establish bikeway design standards,
- enhance bicycle safety and education programs,
- set priorities and phasing for improvements and amenities depicted on the Select System of Bikeways map, and
- identify funding means and opportunities for interagency cooperation.

The City places high emphasis on improving the local bicycle network by following the recommendations of the General Bikeway Plan, which include:

- connecting schools, parks, activity areas, housing areas, and employment centers with bike paths and lanes, particularly in areas without thoroughfares,
- constructing additional Class I or Class II bikeways in a number of locations, including along the Santa Clara River and the coast to connect to the Ventura River Trail,
- installing bicycle racks,
- updating bicycle facility standards to ensure proper design and maintenance,
- constructing improvements to resolve bicycle/automobile conflicts,
- establishing a highly visible route identification and signage program that fits the character of the community, and
- mitigating impacts on bicyclists from new development and during and following construction of roadway projects.

Policies and actions in this chapter seek to improve bicycle access and safety by carrying out these recommendations.

Public Transit – Bus & Rail

Transit service in Ventura includes bus and rail operations (see Figure 4-2). South Coast Area Transit (SCAT) provides local bus service, Ventura Intercity Transit Authority (VISTA) runs regional routes, and Greyhound offers statewide and national connections. Metrolink provides rail service to and from Los Angeles – although on a very limited schedule, while Amtrak trains that stop in Ventura run between San Luis Obispo and San Diego.

Although local bus routes connect most activity centers, the East End is not well served, and more frequent service is needed to key destinations such as the beach and downtown. Metrolink and Amtrak need to be linked to each other and accessed by local bus routes. An agreement between the City and the Ventura County Transportation Commission calls for identifying a permanent Metrolink site, and the best way to integrate all of these services is with a major multi-modal transit center that also accommodates potential additional future alternative transportation modes.

SCAT buses are equipped with wheelchair lifts and adjustable steps to ensure access for all riders. SCAT also offers discounted fares for seniors and disabled riders, as well as dial-a-ride service. However, seniors and mobility-impaired persons also desire frequent fixed-route service in smaller vehicles, and all riders need upgraded amenities at a number of stops. Bus routes also need increased frequency and stops to make transit a viable alternative to driving.

Other transit system needs include:

- reduced-emission vehicles,
- continued use of schedule synchronization to accommodate route transfers, and
- service to regional destinations such as California State University Channel Islands and airports.

Policies and actions in this Chapter aim to improve transit efficiency, encourage ridesharing, and preserve long-term transit options.

The Automobile and Types of Roadways

The most basic component of the mobility system is the *thoroughfare*, used not only by people who drive, but also by people who ride the bus, bike and walk. Thoroughfares encompass sidewalks, bicycle lanes, travel lanes, and are the most utilized means of travel in Ventura. This system is organized into the following classifications: local thoroughfares, collectors, and arterials (see Figure 4-3, Roadway Classification Plan – also known as "Circulation Plan").

Local Thoroughfares

Local thoroughfares provide mobility within neighborhoods and are generally not shown on the Roadway Classification Plan. Local thoroughfares include *alleys, lanes,* and *"yield" streets*.

Collectors

Collectors serve as links between local thoroughfares. Collectors may front residential and neighborhood-serving commercial uses. Collectors can be configured as *boulevards, avenues, streets,* and *main streets*.

Arterials

Arterials are the primary mechanism for cross-town travel and serve the major centers of activity. These roads typically carry a high proportion of the total urban area travel. Arterials can be configured as *boulevards, avenues,* and *streets*.

Collector and arterial thoroughfare segments in the City are characterized in two ways that describe their physical features: *design* classification and *functional* classification. Design Classification defines the number of travel *lanes* using the following categories: Primary Arterial (6 lanes or more), Secondary Arterial (4 lanes), and Collector (2 lanes), as shown on the Roadway Classification Plan, Figure 4-3. Functional Classification describes how a thoroughfare is used: essentially as a *boulevard*, *avenue*, *street*, or *main street*.

Functional Classification also identifies whether roadways have medians, parking, bike lanes, and other streetscape attributes needed to achieve objectives other than just moving traffic, such as accommodating pedestrians, bicycles, and adjoining land uses and public spaces. Table 4-1 shows the design and functional classifications for thoroughfares in the City.

Ventura is mainly connected by 2-lane and 4-lane thoroughfares. The classification for each type of road segment represents a balance between vehicle capacity, pedestrian and bicycle access, parking requirements, streetscape character, and right-of-way limitations.

Boulevard
A multi-lane and generally urban corridor with a central, planted median.

Avenue
Avenues are typically multi-lane, short distance connectors, with a painted median, used in both residential and commercial areas, and often terminate at prominent buildings or plazas.

Table 4-1 Thoroughfare Sizes and Types

	Street Sizes (Engineering Design Classification)		
	Primary Arterial (6 or more lane roadway)	Secondary Arterial (4 lane roadway)	Collector (2 lane roadway)
Existing			
Future Widening			
Future Extension			
	Thoroughfare Types (Functional Classification)		
	Boulevard	Boulevard	Boulevard
	Avenue	Avenue	Avenue
		Street	Street
			Main Street

Source: Definitions for Design Classifications are the City's modifications to the American Association of State Highway and Transportation Officials (AASHTO) standards. Definitions for Functional Classifications are the City's modifications to the Traditional Neighborhood Development Street Design Guidelines.

Street
Street typically allows two way travel and may be multi-lane and does not have a central median and generally provides access to predominantly residential areas.

Main Street

Main streets have 2 vehicle lanes. Their main purpose is to provide low-speed access to commercial, mixed-uses, and higher density neighborhoods.

Consistency between the design and functional classifications is determined based on the number of through lanes. Temporary improvements, such as restriping to change the number of lanes are allowed, however a permanent improvement that moves the curbs and changes the number of lanes would require an amendment to this plan.

The *Ventura Vision* offers several key recommendations to improve the city thoroughfare system:

- add or enhance north-south arterials;
- consider an additional Santa Clara River bridge, Portola Avenue overcrossing of U.S. 101, and Johnson Drive overcrossing of Route 126; and
- soften the barrier impact of U.S. 101 by working with Caltrans to improve signage, aesthetics, undercrossings, and overcrossings.

Policies, actions, and the Roadway Classification Plan work together to address these recommendations. To improve the safety and functioning of the thoroughfare network and to maintain its compatibility with the character of the community, the policies and actions in this chapter also call for upgrading problem thoroughfares and intersections, improving and constructing freeway ramps, and connecting unfinished roadways. Additional actions intend to protect views from scenic routes, including State-designated scenic highways.

Policy 4A: Ensure that the transportation system is safe and easily accessible to all travelers.

Action 4.1: Direct city transportation investment to efforts that improve user safety and keep the circulation system structurally sound and adequately maintained. First priority for capital funding will go to our pavement management program to return Ventura streets to excellent condition.

Action 4.2: Develop a prioritized list of projects needed to improve safety for all travel modes and provide needed connections and multiple route options.

Action 4.3: Provide transportation services that meet the special mobility needs of the community including youth, elderly, and disabled persons.

Action 4.4: Combine education with enforcement to instill safe and courteous use of the shared public roadway.

Action 4.5: Utilize existing roadways to meet mobility needs, and only consider additional travel lanes when other alternatives are not feasible.

Action 4.6: Require new development to be designed with interconnected transportation modes and routes to complete a grid network.

Action 4.7: Update the traffic mitigation fee program to fund necessary citywide circulation system and mobility improvements needed in conjunction with new development.

Action 4.8: Implement the City's Neighborhood Traffic Management Program and update as necessary to improve livability in residential areas.

Action 4.9: Identify, designate, and enforce truck routes to minimize the impact of truck traffic on residential neighborhoods.

Action 4.10: Modify traffic signal timing to ensure safety and minimize delay for all users.

Action 4.11: Refine level of service standards to encourage use of alternative modes of transportation while meeting state and regional mandates.

Action 4.12: Design roadway improvements and facility modifications to minimize the potential for conflict between pedestrians, bicycles, and automobiles.

Action 4.13: Require project proponents to analyze traffic impacts and provide adequate mitigation in the form of needed improvements, in-lieu fee, or a combination thereof.

Policy 4B: Help reduce dependence on the automobile.

Action 4.14: Provide development incentives to encourage projects that reduce automobile trips.

Action 4.15: Encourage the placement of facilities that house or serve elderly, disabled, or socioeconomically disadvantaged persons in areas with existing public transportation services and pedestrian and bicycle amenities.

Action 4.16: Install roadway, transit, and alternative transportation improvements along existing or planned multi-modal corridors, including primary bike and transit routes, and at land use intensity nodes.

Action 4.17: Prepare and periodically update a Mobility Plan that integrates a variety of travel alternatives to minimize reliance on any single mode.

Action 4.18: Promote the development and use of recreational trails as transportation routes to connect housing with services, entertainment, and employment.

Action 4.19: Adopt new development code provisions that establish vehicle trip reduction requirements for all development.

Action 4.20: Develop a transportation demand management program to shift travel behavior toward alternative modes and services.

Action 4.21: Require new development to provide pedestrian and bicycle access and facilities as appropriate, including connected paths along the shoreline and watercourses.

Action 4.22: Update the General Bikeway Plan as needed to encourage bicycle use as a viable transportation alternative to the automobile and include the bikeway plan as part of a new Mobility Plan.

Action 4.23: Upgrade and add bicycle lanes when conducting roadway maintenance as feasible.

Action 4.24: Require sidewalks wide enough to encourage walking that include ramps and other features needed to ensure access for mobility-impaired persons.

Action 4:25: Adopt new development code provisions that require the construction of sidewalks in all future projects.

Action 4.26: Establish a parking management program to protect the livability of residential neighborhoods, as needed.

Action 4.27: Extend stubbed-end streets through future developments, where appropriate, to provide necessary circulation within a developing area and for adequate internal circulation within and between neighborhoods. Require new developments in the North Avenue area, where applicable, to extend Norway Drive and Floral Drive to connect to Canada Larga Road; and connect the existing segments of Floral Drive. Designate

the extension of Cedar Street between Warner Street and south of Franklin Lane and the linking of the Cameron Street segments in the Westside community as high priority projects.

Policy 4C: Increase transit efficiency and options.

Action 4.28: Require all new development to provide for citywide improvements to transit stops that have sufficient quality and amenities, including shelters and benches, to encourage ridership.

Action 4.29: Develop incentives to encourage City employees and local employers to use transit, rideshare, walk, or bike.

Action 4.30: Work with public transit agencies to provide information to riders at transit stops, libraries, lodging, and event facilities.

Action 4.31: Work with public and private transit providers to enhance public transit service.

Action 4.32: Coordinate with public transit systems for the provision of additional routes as demand and funding allow.

Action 4.33: Work with Amtrak, Metrolink, and Union Pacific to maximize efficiency of passenger and freight rail service to the City and to integrate and coordinate passenger rail service with other transportation modes.

Action 4.34: Lobby for additional transportation funding and changes to Federal, State, and regional transportation policy that support local decision-making.

Action 4.35: The City shall pursue funding and site location for a multi-modal transit facility in coordination with VCTC, SCAT, U.P.R.R., Metrolink, Greyhound Bus Lines, and other forms of transportation.

Policy 4D: Protect views along scenic routes.

Action 4.36: Require development along the following roadways – including noise mitigation, landscaping, and advertising – to respect and preserve views of the community and its natural context.

- State Route 33
- U.S. HWY 101
- Anchors Way
- Brakey Road
- Fairgrounds Loop
- Ferro Drive
- Figueroa Street
- Harbor Boulevard
- Main Street
- Navigator Drive
- North Bank Drive
- Poli Street/Foothill Road
- Olivas Park Drive
- Schooner Drive
- Spinnaker Drive
- Summit Drive

- Telegraph Road – east of Victoria Avenue
- Victoria Avenue – south of U.S. 101
- Wells Road

Action 4.37: Request that State Route 126 and 33, and U.S. HWY 101 be designated as State Scenic Highways.

Action 4.38: Continue to work with Caltrans to soften the barrier impact of U.S. HWY 101 by improving signage, aesthetics and undercrossings and overcrossings. 

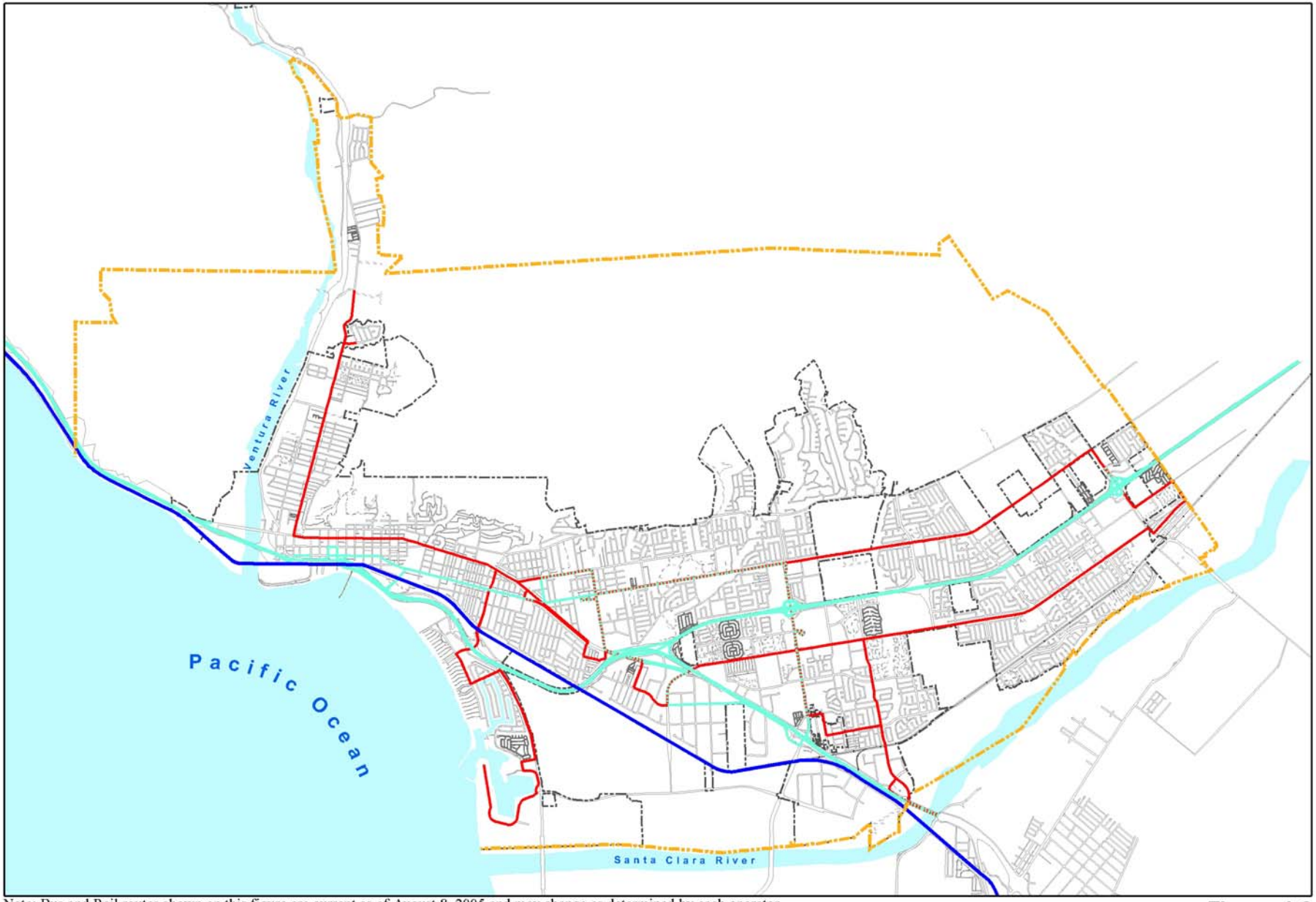
Action 4.39: Maintain street trees along scenic thoroughfares, and replace unhealthy or missing trees along arterials and collectors throughout the City. 

Note: Bike facilities shown on this figure are taken from the 1999 General Bikeway Plan and may change as updates to the General Bikeway Plan are completed.

Figure 4-1
Bicycle Facilities

	Class 1	Class 2	Class 3	Shoulder
Existing	———	———	———	———
Future	• • • • •	• • • • •	• • • • •	
Existing Sidewalk			———	

Other
- City Limits
- Planning Boundary

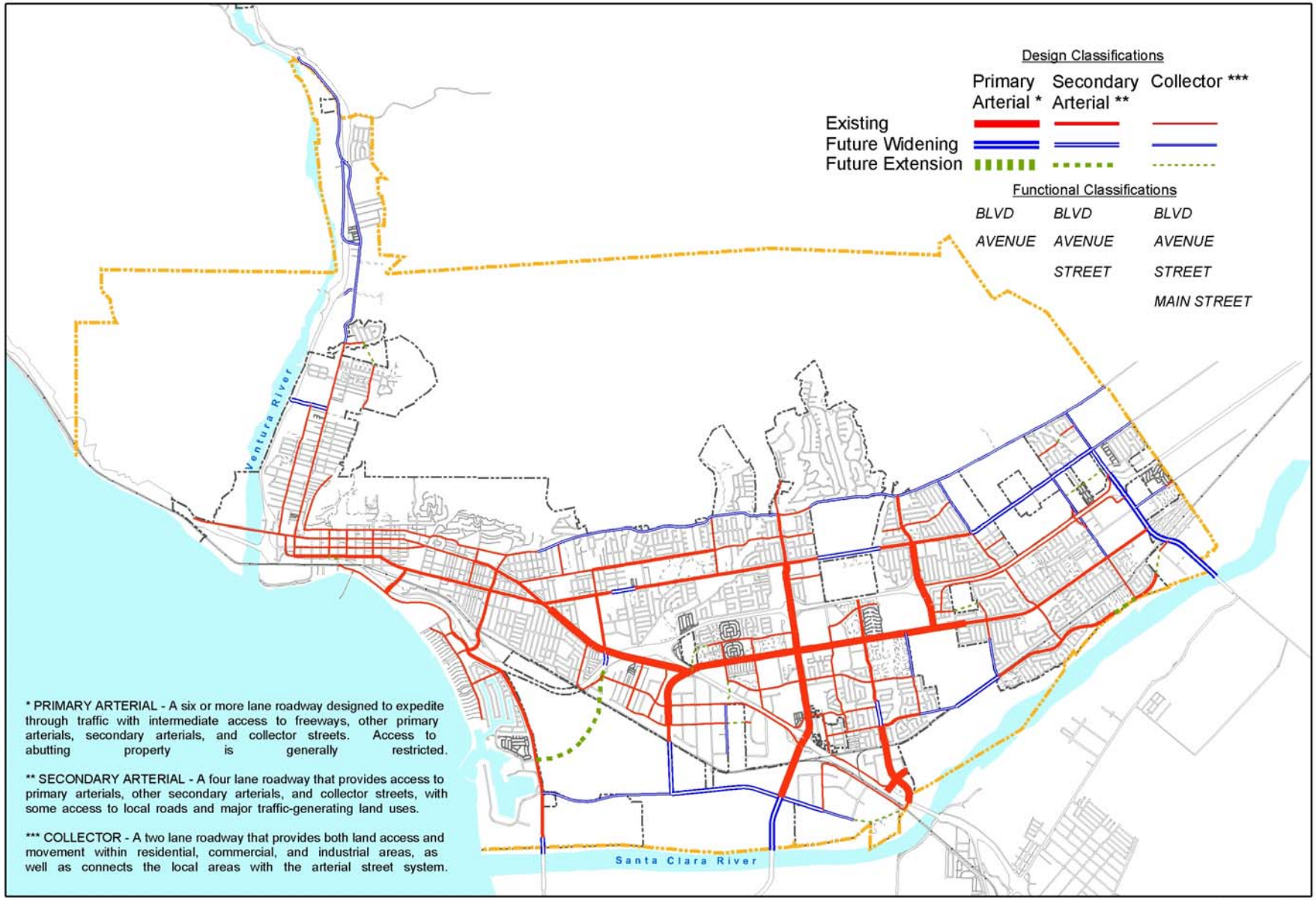


Note: Bus and Rail routes shown on this figure are current as of August 8, 2005 and may change as determined by each operator.

Figure 4-2
Bus and Rail Routes

Routes
- SCAT
- VISTA
- SCAT & VISTA
- RAIL

Other
- City Limits
- Planning Boundary

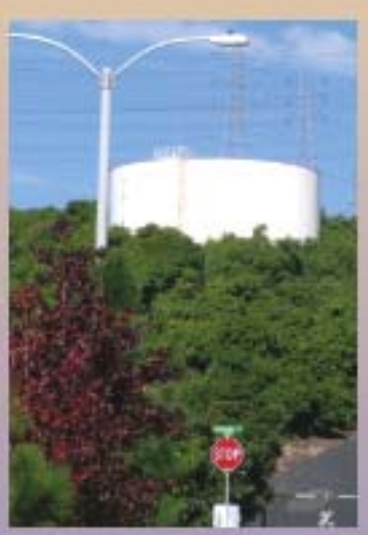


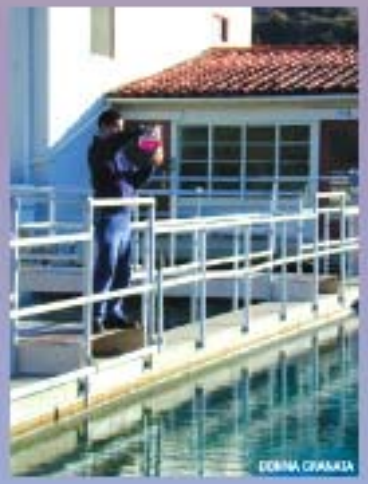
Note: Future extensions shown are conceptual in nature, unless a specific alignment has been approved by the City Council.

Figure 4-3
Roadway Classification Plan

ventura's general plan

OUR SUSTAINABLE INFRASTRUCTURE





"Now, I truly believe, that we in this generation, must come to terms with nature, and I think we're challenged as mankind has never been challenged before to prove our maturity and our mastery, not of nature, but of ourselves."

— Rachel Carson
Biologist, Writer; Ecologist 1907-1964

CITY OF
VENTURA

5. OUR SUSTAINABLE INFRASTRUCTURE

Our goal is to safeguard public health, well-being and prosperity by providing and maintaining facilities that enable the community to live in balance with natural systems.

Essential Support Systems

Infrastructure is an extremely important though largely unnoticed foundation of quality of life in Ventura. Efficient water supply, wastewater treatment, and drainage systems are vital to most daily activities. These facilities on which the community depends need regular maintenance, and they frequently require upgrading both to meet the demands of a growing population and to be sensitive to environmental resources.

To ensure that citizens get high-quality drinking water, the City owns and operates a State-certified laboratory where water quality is tested continuously. Each City treatment plant is also run by State-certified operators who monitor water quality. As a result, City water exceeds State and federal water quality requirements.

The City employs conservation measures and emerging technology in its effort to achieve a high standard for wastewater treatment while protecting natural systems. As a result, treatment capability historically has outpaced community needs, with even peak flows typically reaching only 75 percent of plant capacity. Even so, further expanding the use of reclaimed water and reducing water consumption will be vital to maintaining long-term water supplies.

Much of the storm drain system is aging and in need of repair or replacement, especially corrugated metal pipes in some of the older areas of Ventura. Collecting adequate fees that truly reflect the cost of serving development can help support City efforts to preclude additional deficiencies, and relying on and complementing natural drainage features can both help avoid the need for expensive and environmentally damaging channelization and improve the functioning of the overall drainage system.

Water Supply

The City provides drinking water, and water for fire protection, to households and businesses in Ventura through a complex system with more than 500 miles of distribution mains, 3 water treatment plants, 22 booster pump stations, 25 treated water reservoirs, and 13 wells. Five distinct sources provide surface and ground water to the City supply system:

- Casitas Municipal Water District
- Ventura River surface water intake, subsurface water and wells (Foster Park)
- Mound groundwater basin
- Oxnard Plain groundwater basin (Fox Canyon Aquifer)
- Santa Paula groundwater basin

The City also holds a State Water Project entitlement of 10,000 acre-feet per year;

however, new facilities would need to be constructed to transport this water to the City. The City updates its Urban Water Management Plan every two years (instead of every five years as required by State law) as part of its ongoing effort to ensure that City-managed water supplies will continue to accommodate demand in Ventura.

Meeting future water demands requires saving and reusing every drop possible. The City utilizes recycled water from its reclamation facility (a tertiary wastewater treatment plant) near the Harbor to augment the municipal water supply. Recycled water is used to irrigate City and private landscaping in the area and the Buenaventura and Olivas Park municipal golf courses. The remaining effluent is discharged to the Santa Clara River Estuary.

Largely as a result of conservation efforts, water consumption per city resident has generally declined (see Table 5-1). Projections anticipate that the City will continue to be able to meet consumer needs. Policies and actions in this chapter seek to refine demand management practices and conservation programs to further reduce per capita water use so that Ventura can sustain water resources for many more generations.

Table 5-1
Historic and Projected Water Production (Acre Feet)

Year	Estimated Population Served	Per Capita Use[1]	Treated Water Production	Raw Water Production	Total Water Production
Historic					
1980	73,774	0.236	17,381	4,766	22,147
1990	94,856	0.177	16,831	2,317	19,148
1995	99,668	0.165	16,428	1,602	18,030
1996	100,482	0.180	18,038	1,500	19,538
1997	101,096	0.178	18,002	1,829	19,831
1998	101,610	0.165	16,775	1,769	18,544
1999	102,224	0.192	19,658	1,067	20,725
2000	103,238	0.198	20,437	1,129	21,566
2001	104,153	0.173	18,071	889	18,960
2002	105,267	0.180	18,965	968	19,933
2003	106,782	0.183	19,510	846	20,356
Projected					
2005	109,465	0.179	19,594	1,000	20,594
2010	115,774	0.179	20,724	1,000	21,724
2015	122,447	0.179	21,918	1,000	22,918
2020	129,504	0.179	23,181	1,000	24,181

Sources: City of Ventura Urban Water Management Plan, Dec. 2000, City of Ventura 2004 Biennial Water Supply Report, as amended, September 2004.

[1] Per Capita use excludes raw water.

Wastewater Treatment

Ventura residents generate millions of gallons of wastewater each day, which is carried by more than 450 miles of sewer mains and 12 lift stations to the water reclamation facility in the Harbor area near the mouth of the Santa Clara River. While most residents receive sewer service directly from the City, three other sanitary sewer agencies with their own treatment facilities provide service to some citizens in the Montalvo, Saticoy, and North Ventura Avenue areas. As shown in Table 5-2, all local treatment facilities operate well below capacity.

Table 5-2 Treatment Facilities

Treatment Facilities	Treatment Type	Capacity	Average Daily Flow
Ventura Water Reclamation Facility	Tertiary	14 MGD	9.0 MGD (68% capacity)
Montalvo Municipal Improvement District Treatment Plant	Secondary	0.36 MGD	0.242 MGD (67% capacity)
Saticoy Sanitary District Treatment Plant	Secondary[2]	0.25 MGD	0.16 MGD (64% capacity)
Ojai Valley Sanitary District Treatment Plant	Tertiary	3 MGD	2.0 MGD (71% capacity)

[2] Includes nutrient removal prior to percolation.
Source: Individual agencies listed

About two-thirds of the wastewater treated locally is discharged to the Santa Clara River Estuary, as allowed by the Regional Water Quality Control Board. The remaining effluent is either transferred to recycling ponds, where some is delivered as reclaimed water, or it percolates to underground aquifers or evaporates. The policies and actions in this chapter call for improving treatment system efficiency to reclaim and reuse as much water as possible.

Storm Drainage

Storm runoff travels from the hills above Ventura through the City until it is absorbed into the ground or reaches the Ventura River, the Santa Clara River, or the Pacific Ocean. To convey the occasional high flows associated with storms, the Ventura County Flood Control District oversees about 20 natural or concrete lined barrancas that serve as the major drainage courses for local watersheds. The City has about 20 miles of off-street drain system designed to convey runoff from all but the most severe of storms, in which case water also runs off via city streets.

Maintaining the barrancas and other watercourses that are not already lined with concrete as natural flood channels can help reduce peak flows by limiting water velocity. Incorporating natural features into drainage systems rather than hard treatment devices also can improve water quality and reduce maintenance costs. The policies and actions in this chapter seek to prevent increases in future storm water impacts by incorporating natural drainage and flood control features such as wildlife ponds and wetlands – instead of cement retention basins – into the storm drain system where possible. Such less intensive approaches not only cost less, but they also preserve environmental resources and protect water quality.

Policy 5A: Follow an approach that contributes to resource conservation.

Action 5.1: Require low flow fixtures, leak repair, and drought tolerant landscaping (native species if possible), plus emerging water conservation techniques, such as reclamation, as they become available.

Action 5.2: Use natural features such as bioswales, wildlife ponds, and wetlands for flood control and water quality treatment when feasible.

Action 5.3: Demonstrate low water use techniques at community gardens and city-owned facilities.

Action 5.4: Update the Urban Water Management plan as necessary in compliance with the State 1983 Urban Water Management Planning Act.

Action 5.5: Provide incentives for new residences and businesses to incorporate recycling and waste diversion practices, pursuant to guidelines provided by the Environmental Services Office.

Policy 5B: Improve services in ways that respect and even benefit the environment.

Action 5.6: Require project proponents to conduct sewer collection system analyses to determine if downstream facilities are adequate to handle the proposed development.

Action 5.7: Require project proponents to conduct evaluations of the existing water distribution system, pump station, and storage requirements in order to determine if there are any system deficiencies or needed improvements for the proposed development.

Action 5.8: Locate new development in or close to developed areas with adequate public services, where it will not have significant adverse effects, either individually or cumulatively, on coastal resources.

Action 5.9: Update development fee and assessment district requirements as appropriate to cover the true costs associated with development.

Action 5.10: Utilize existing waste source reduction requirements, and continue to expand and improve composting and recycling options.

Action 5.11: Increase emergency water supply capacity through cooperative tie-ins with neighboring suppliers.

Action 5.12: Apply new technologies to increase the efficiency of the wastewater treatment system.

Action 5.13: Increase frequency of city street sweeping, and post schedules at key points within each neighborhood.

Action 5.14: Develop a financing program for the replacement of failing corrugated metal storm drain pipes in the City.

Action 5.15: Establish assessment districts or other financing mechanisms to address storm drain system deficiencies in areas where new development is anticipated and deficiencies exist.

Action 5.16: Require new developments to incorporate stormwater treatment practices that allow percolation to the underlying aquifer and minimize offsite surface runoff utilizing methods such as pervious paving material for parking and other paved areas to facilitate rainwater percolation and retention/detention basins that limit runoff to pre-development levels.

Action 5.17: Require stormwater treatment measures within new development to reduce the amount of urban pollutant runoff in the Ventura and Santa Clara Rivers and other watercourses.

Action 5.18: Work with the Ventura Regional Sanitation District and the County to expand the capacity of existing landfills, site new landfills, and/or develop alternative means of disposal that will provide sufficient capacity for solid waste generated in the City.

"Leave all the afternoon for exercise and recreation, which are as necessary as reading. I will rather say more necessary because health is worth more than learning."

— Thomas Jefferson
3rd President of the United States
1801-1809

CITY OF
VENTURA

OUR ACTIVE COMMUNITY

ventura's general plan

6. OUR ACTIVE COMMUNITY

Our goal is to add to and enhance our parks and open spaces to provide enriching recreation options for the entire community.

Higher Standards

For many people, spending time outdoors and participating in recreational activities represent some of life's most cherished rewards. Ventura's superb public park, open space, and recreation system offers a myriad of ways to partake in these privileges. The city offers 34 developed parks, 45 miles of linear park and trail network, stellar beaches, specialized play and sports facilities and programs, communitywide events, senior and youth activities, and two 18-hole tournament class public golf courses. Figure 6-1 at the end of this chapter shows the locations of various public facilities in the city.

The City is committed to ensuring that its citizens have ample access to high quality spaces for leisure and active recreation. The City's adopted standard of 10 acres per 1,000 residents has created far more park area than would be possible under the basic State level of 3 acres per 1,000, and also tops the more ambitious National Park and Recreation Association benchmarks for specific park types (see Table 6-1). The City continues to create customized facilities like the Community Park (approved by the voters pursuant to SOAR) to expand opportunities for local residents to enjoy healthy, active lifestyles.

Table 6-1 Park Acreage per 1,000 Population

Park Type	Standards	
	City of Ventura	National Park & Recreation Association
Neighborhood	2 acres	1.5 acres
Community	3 acres	2.5 acres
Citywide	5 acres	5 acres
Total	10 acres	9 acres

Sources: City of Ventura, www.nrpa.org.

City Parks and Open Space

The public park and open space system in Ventura includes neighborhood, community, citywide, and linear parks. As shown in Table 6-2, the City oversees nearly 600 acres of developed park facilities, plus the linear park network, which provides important connections among watersheds for both people and wildlife.

As the City continually strives to improve the quality of leisure and recreation opportunities for everyone in the community, it must address a number of challenges such as:

- modernizing existing facilities,
- finding appropriate land for new facilities,
- developing useful and enjoyable public spaces, such as plazas and mini-parks in urban settings,
- formalizing shared use arrangements for non-City facilities like school playfields,
- meeting increasing demand for athletic courts, fields and pools,
- provide opportunities for passive recreation, and
- providing services needed by youth, seniors, and residents with special needs.

Neighborhood Parks
Typically less than 8 acres each, these smaller parks primarily serve specific residential areas in the community. The 18 neighborhood parks in Ventura cover about 73 total acres. Any future development outside the current city limits will have to provide new neighborhood parks to serve the added population.

Community Parks
These parks are designed to offer specialized opportunities and facilities to residents of more than one neighborhood. Amenities in community parks may include formal athletic fields, courts, recreation buildings, preschool and youth play structures, group and individual picnic areas, and landscaped areas for informal activity or leisure.

Citywide Parks
These parks feature recreational opportunities that draw a wide range of age and interest groups from throughout the city. They offer a variety of attractive amenities, such as large open spaces, unique natural resources, interpretive centers, cultural amenities, group picnic areas, sports facilities, and equestrian, bicycling, and hiking trails. The Ventura Community Park also serves some citywide park functions and attracts visitors from outside the city with its high-quality playing fields and aquatic center.

Linear Parks
Ventura's unique linear park network intersperses trails and picnic areas among a mostly undeveloped web of barranca and riverbanks that provide valuable wildlife habitat and migration corridors. The linear parks also merge with a number of neighborhood and community parks, complementing developed recreation areas with natural riparian qualities. Extending trails through the linear park network can create additional opportunities for low-impact contact with nature, and in some cases even provide pleasant non-automobile commuting options.

Table 6-2 City Park Facilities

Park	Park Size (in acres)				
	Neighborhood Parks	Community Parks	Citywide Parks	Special Use Facilities	Total
Albinger Archaeological Museum				0.9	**0.9**
Arroyo Verde Park	2.0	23.0	104.3		**129.3**
Barranca Vista Park	8.7				**8.7**
Blanche Reynolds Park	3.4				**3.4**
Camino Real Park			38.2		**38.2**
Cemetery Memorial Park	7.1				**7.1**
Chumash Park	6.1				**6.1**
Downtown Mini-Park	0.4				**0.4**
Eastwood Park				0.7	**0.7**
Fritz Huntsinger Youth Sports Complex	4.3	14.0			**18.3**
Grant Park			107.3		**107.3**
Harry A. Lyon Park			10.7		**10.7**
Hobert Park	7.1				**7.1**
Juanamaria Park	5.0				**5.0**
Junipero Serra Park	2.7				**2.7**
Linear Park Network				46.0	**46.0**
Marina Park			15.3		**15.3**
Marion Cannon Park	5.0				**5.0**
Mission Park	1.5				**1.5**
Ocean Avenue Park	1.3				**1.3**
Olivas Adobe Historical Park				22.5	**22.5**
Ortega Adobe Historic Residence				0.3	**0.3**
Plaza Park	3.7				**3.7**
Promenade Park	1.0				**1.0**
Seaside Wilderness Park[1, 2]				24.0	**24.0**
Surfers Point at Seaside Park[1]				3.4	**3.4**
Ventura Community Park		100.0			**100.0**
Westpark	1.5	5.8			**7.3**
Total	**60.8**	**142.7**	**275.8**	**97.8**	**577.1**

Sources: City of Ventura, 2004. Note: several parks serve functions in more than one category.
[1] Acreage varies with ocean high levels.
[2] Acreage varies with fluctuations in Ventura River level.

As with most parks in the city, resources for linear park system improvements typically come through conditions placed on adjacent development. City regulations establish standards for park width, landscaping, fencing, lighting, and tree rows that apply specifically along barrancas, freeways, rivers, the shoreline, harbor, hillsides, and utility rights-of-way.

Recreation Programs

The City operates four neighborhood centers where recreation programs and senior services are available: the Ventura Avenue Adult Center, Senior Recreation Center, Barranca Vista Center, and Westpark Community Center. The City also offers a wide range of sports programs, including youth and adult sports programs, classes, aquatics, and corporate games. Other City-sponsored recreational activities include arts and environmental education, community gardening, recreation programs for special needs residents, and after-school activities and summer camps.

A variety of other recreation opportunities are available in Ventura in addition to City programs. Foremost among these are all of the activities possible at State beaches and developed waterfront areas. Other local non-City facilities include the County Fairgrounds and local golf courses. In addition, joint-use agreements allow city residents to use sports fields, pools, and gymnasiums during certain times at public schools and Ventura College.

The policies and actions in this chapter seek to further expand local park and recreation choices by:

- identifying sites for new parks,
- increasing public access to open space, including via linear park trails,
- collaborating with schools and other local agencies and organizations,
- ensuring universal and equal access to parks and recreation facilities, and
- allowing appropriate revenue-generating activities at City parks.

Policy 6A: Expand the park and trail network to link shoreline, hillside, and watershed areas.

Action 6.1: Develop new neighborhood parks, pocket parks, and community gardens as feasible and appropriate to meet citizen needs, and require them in new development.

Action 6.2: Require higher density development to provide pocket parks, tot lots, seating plazas, and other aesthetic green spaces.

Action 6.3: Work with the County to plan and develop trails that link the City with surrounding open space and natural areas, and require development projects to include trails when appropriate.

Action 6.4: Request Flood Control District approval of public access along unchannelized watercourses for hiking.

Action 6.5: Seek landowner permission to allow public access on properties adjacent to open space where needed to connect trails.

Action 6.6: Update plans for and complete the linear park system as resources allow.

Action 6.7: Work with the County of Ventura to initiate efforts to create public trails in the hillsides.

Action 6.8: Update and require periodic reviews of the Park and Recreation Workbook as necessary to reflect City objectives and community needs.

Action 6.9: Require dedication of land identified as part of the City's Linear Park System in conjunction with new development.

Action 6.10: Evaluate and incorporate, as feasible, linear park segments in the General Bikeway Plan.

Action 6.11: Update standards for citywide public parks and open space to include an expanded menu of shared park types, and identify locations and potential funding sources for acquiring new facilities in existing neighborhoods.

Action 6.12: Update and carry out the Grant Park Master Plan.

Action 6.13: Foster the partnership between the City and Fair Board to improve Seaside Park.

Policy 6B: Ensure equal access to facilities and programs.

Action 6.14: Improve facilities at City parks to respond to the requirements of special needs groups.

Action 6.15: Adjust and subsidize fees to ensure that all residents have the opportunity to participate in recreation programs.

Action 6.16: Update the project fee schedule as necessary to ensure that development provides its fair share of park and recreation facilities.

Policy 6C: Provide additional gathering spaces and recreation opportunities.

Action 6.17: Update and create new agreements for joint use of school and City recreational and park facilities.

Action 6.18: Offer programs that highlight natural assets, such as surfing, sailing, kayaking, climbing, gardening, and bird watching.

Action 6.19: Provide additional boating and swimming access as feasible.

Action 6.20: Earmark funds for adequate maintenance and rehabilitation of existing skatepark facilities, and identify locations and funding for new development of advanced level skatepark facilities.

Policy 6D: Increase funding and support for park and recreation programs.

Action 6.21: Promote the use of City facilities for special events, such as festivals, tournaments, and races.

Action 6.22: Enter into concession or service agreements where appropriate to supplement City services.

Figure 6-1
Public Faciities

ventura's general plan

OUR HEALTHY & SAFE COMMUNITY

"A city, like a living thing, is a united and continuous whole."

— Plutarch
ca. 50-120 AD, author of *Moralia*

CITY OF
VENTURA

7. OUR HEALTHY AND SAFE COMMUNITY

Our goal is to build effective community partnerships that protect and improve the social well-being and security of all our citizens.

Community Wellness

Keeping the small town feel of Ventura depends on working together as a community to look out for the well being of all residents, especially those most at risk. Community wellness requires comprehensive preventative care, as well as careful preparation for and response to dangers within the built environment and to risks posed by natural processes (see Figure 7-1).

Adequate shelter, sufficient medical services, walkable neighborhoods, and proper nutrition create an essential foundation for a healthy community. Reducing as much as possible the threat to people and property from earthquakes, landslides, floods, and fires further enhance the collective wellness of the city. In addition, a healthy Ventura community requires thorough protection from crime, and freedom from pollution, unwanted noise, and the threat of hazardous materials.

***Alquist-Priolo** designation requires a geologic investigation prior to the approval of a development permit to determine if a specific site within the zone is threatened by surface displacement from future fault movement.*

Geologic and Flood Hazards

Ventura lies in an active geologic region and is therefore subject to a variety of seismic hazards, including ground shaking, liquefaction, and slope failure. State law requires the City to regulate development in mapped seismic hazard zones. Major faults in the city include the Ventura-Foothill (a State-designated Alquist-Priolo Earthquake Fault Zone), Oak Ridge, McGrath, Red Mountain and Country Club Faults. Areas closest to these faults are most likely to experience ground shaking or rupture in the event of an earthquake. Liquefaction during an earthquake is most likely to occur in areas with loose, granular soils where the water table lies within 50 feet of the surface. As the soil liquefies, buildings and other objects may tilt or sink.

Hillside stability varies based on slope, soil, rock type and groundwater depth. The hills north of Poli Street/Foothill Road have experienced many historic landslides and are prone to future movement. The City Hillside Management Program limits development in the area to minimize dangers from landsliding, erosion, flooding, and fire, and to retain natural and scenic character.

The Federal Emergency Management Agency regulates development along watercourses based on the likelihood of flooding: the basic benchmark – the 100-year flood – has a one percent chance of occurring in any given year. Although the mapped 100-year flood hazard areas for local rivers and barrancas are fairly limited in size, the largest recorded flood events along the Ventura and Santa Clara Rivers, both following heavy rains in 1969, exceeded the 100-year flood zone. The policies and actions in this Chapter intend to limit harm from geologic and flood events by requiring detailed risk analyses and mitigation prior to development of sites in hazard prone areas.

Fire and Emergency Response

The Ventura Fire Department responds to fire, medical, and disaster calls from six stations in the city. The Department's goal is to reach the scene within 4 minutes 90% of the time. The Department has a reciprocal agreement with the County Fire Protection District to ensure that Ventura residents receive the swiftest service possible. The Department also has a responsibility to provide disaster preparedness for the City. Particular fire department concerns in the City include:

- the need for reliable and sustainable source of fire service revenue,
- lengthy response times to areas farthest from existing stations (See Figure 7-2),
- firefighter and support staffing levels that are far below the .98 firefighter per 1,000 population averages of other municipal fire departments with comparable city size, age, and population,
- the threat of wildland fire entering urban area, and
- the lack of fire protection systems in older structures.

The policies and actions in this Chapter aim to optimize firefighting and emergency response capabilities through oversight of new development, improved facilities, and added staff.

Police Protection

Ventura Police response to crimes in progress or alarm soundings averages less than six minutes, and less than sixteen minutes for most other calls. While the local crime rate is slightly higher than State average, the Department hopes to better engage the community in policing efforts to lower crime levels. As part of a Strategic Planning Process, the Department has established the following goals:

- reduce crime and the fear of crime
- improve the quality of life in neighborhoods
- enhance community and police partnerships
- develop personnel
- continued accountability

One-time grant funding has helped add officers dedicated to community crime prevention, gang control, and youth mentoring programs. As these grants end the City must face the challenge of funding these services. Actions in this Chapter seek to improve the full range of police services to maximize community safety by increasing staffing, outreach efforts, and public access to police services.

Noise

Noise is generally defined as unwanted sound. Its effects can range from annoyance to nuisances to health problems. State law requires the City to identify and address noise sources and establish projected noise levels for roadways, railroads, industrial uses, and other significant generators. The Noise Contours map (Figure 7-3) is used to help guide land use in a way that minimizes exposure of residents to excessive noise.

Vehicle traffic is by far the greatest source of noise affecting Ventura residents. Other sources include the Seaside Park raceway, the Grant Park shooting range, and railroad, commercial, and industrial activity. Homes, schools, hotels, and hospitals are considered sensitive receptors where excessive noise can interfere with normal activities.

Noise intensity is customarily measured on the decibel scale, an index of loudness. Sounds as faint as 10 decibels (dB) are barely audible, while noise over 120 dB can be painful or damaging to hearing (Table 7-1 shows some typical noise levels). A sound 10 dB higher than another is perceived as about twice as loud. A 5 dB change is readily noticeable, but a 3 dB difference is barely perceptible.

As shown in Table 7-2, normally acceptable outdoor noise in residential areas may reach 65 decibels. The Ldn label in the table indicates that sound is averaged over time to account for the fact that sources like traffic or aircraft may cause fluctuations of more than 20 dB over a few seconds. CNEL refers to the fact that 5 dB is added to noise after 7 p.m. and 10 dB added from 10 p.m. to 7 a.m., when quieter conditions make sound more noticeable.

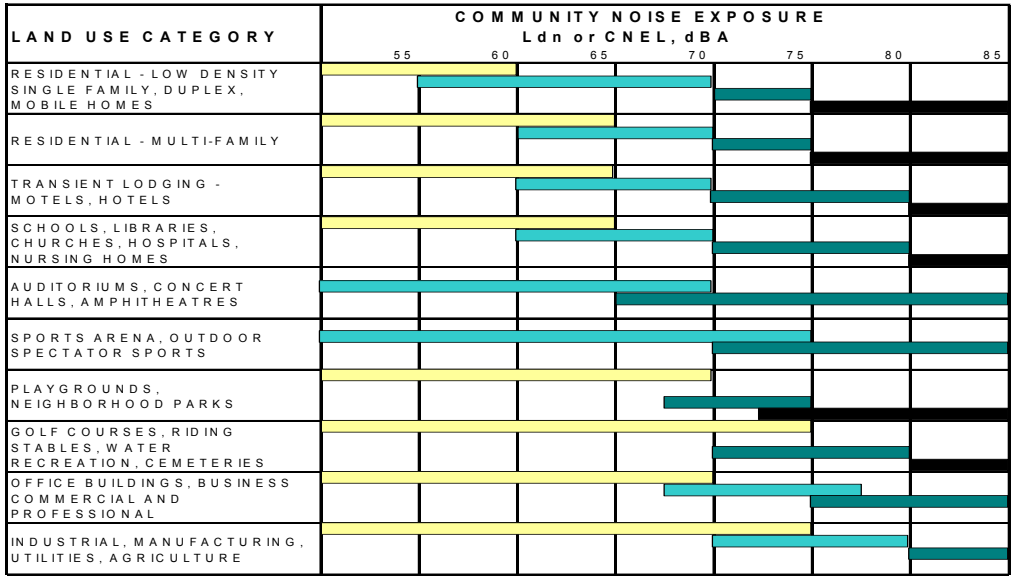
The State Building Code requires an acoustical study whenever outdoor noise would exceed 60 decibels at a proposed duplex, multifamily residence, hotel, motel or other attached dwelling. The study must show that the proposed project design would result in interior noise levels of 45 dB or less.

Although future increases in traffic are not expected to produce a significant change in perceived noise levels, other specific sound generators have been identified as problems in the community. The policies and actions in this chapter look to reduce the exposure of people in Ventura to these noise sources.

Table 7-1. Typical Noise Levels

Type of Noise or Environment	Decibels
Recording Studio	20
Soft Whisper; Quiet Bedroom	30
Busy Open-plan Office	55
Normal Conversation	60-65
Automobile *at 20 mph 25 ft. away*	65
Vacuum Cleaner *10 ft. away*	70
Dump Truck *at 50 mph 50 ft. away*	90
Train Horn *100 ft. away*	105
Claw Hammer; Jet Takeoff *200 ft. away*	120
Shotgun *at shooter's ear*	140

Table 7-2
Acceptable Noise Levels



NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

NORMALLY UNACCEPTABLE
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

Source: General Plan Guidelines, California Office of Planning and Research

Hazardous Materials

Hazardous materials include medical and industrial wastes, pesticides, herbicides, radioactive materials, and combustible fuels. Improper use, storage, transport, or disposal of these materials may result in harm to humans, surface or ground water degradation, air pollution, fire, or explosion. Most of the several hundred facilities in Ventura that use or store hazardous materials lie along Ventura Avenue or in the Arundell industrial district.

The Fire Department maintains a team specially trained and equipped to respond to hazardous materials emergencies. Additional equipment and personnel for large-scale hazardous materials incidents is available from the County Fire Protection District, the City of Oxnard, and the U.S. Naval Construction Battalion Center in Port Hueneme.

The Westside and North Avenue neighborhoods include about 30 brownfields: sites that may possess contaminated soils but also have potential for reuse. Cleanup of these sites will make them more attractive for redevelopment that can improve the neighborhoods and generate employment and tax revenue. The City has established a Brownfield Assessment Demonstration Pilot Program to fund site assessments and initiate remediation. The policies and actions in this chapter intend to minimize the risk of adverse health effects of hazardous materials by regulating their location and seeking funding for cleanup of brownfield sites to encourage their reuse.

Policy 7A: Encourage wellness through care and prevention.

Action 7.1: Work with interested parties to identify appropriate locations for assisted-living, hospice, and other care-provision facilities.

Action 7.2: Provide technical assistance to local organizations that deliver health and social services to seniors, homeless persons, low-income citizens, and other groups with special needs.

Action 7.3: Participate in school and agency programs to:

- provide healthy meals,
- combat tobacco, alcohol, and drug dependency,
- distribute city park and recreation materials through the schools, and
- distribute information about the benefits of proper nutrition and exercise.

Action 7.4: Enhance or create ordinances which increase control over ABC licensed premises.

Action 7.5: Investigate the creation of new land use fees to enhance funding of alcohol related enforcement, prevention and training efforts.

Policy 7B: Minimize risks from geologic and flood hazards.

Action 7.6: Adopt updated editions of the California Construction Codes and International Codes as published by the State of California and the International Code Council respectively.

Action 7.7: Require project proponents to perform geotechnical evaluations and implement mitigation prior to development of any site:

- with slopes greater than 10 percent or that otherwise have potential for landsliding,
- along bluffs, dunes, beaches, or other coastal features
- in an Alquist-Priolo earthquake fault zone or within 100 feet of an identified active or potentially active fault,
- in areas mapped as having moderate or high risk of liquefaction, subsidence, or expansive soils,
- in areas within 100-year flood zones, in conformance with all Federal Emergency Management Agency regulations.

Action 7.8: To the extent feasible, require new critical facilities (hospital, police, fire, and emergency service facilities, and utility "lifeline" facilities) to be located outside of fault and tsunami hazard zones, and require critical facilities within hazard zones to incorporate construction principles that resist damage and facilitate evacuation on short notice.

Action 7.9: Maintain and implement the Standardized Emergency Management System (SEMS) Multihazard Functional Response Plan.

Action 7.10: Require proponents of any new developments within the 100-year floodplain to implement measures, as identified in the Flood Plain Ordinance, to protect structures from 100-year flood hazards (e.g., by raising the finished floor elevation outside the floodplain).

Action 7.11: Prohibit grading for vehicle access and parking or operation of vehicles within any floodway.

Policy 7C: Optimize firefighting and emergency response capabilities.

Action 7.12: Refer development plans to the Fire Department to assure adequacy of structural fire protection, access for firefighting, water supply, and vegetation clearance.

Action 7.13: Resolve extended response time problems by:

- adding a fire station at the Pierpont/Harbor area,
- relocating Fire Station #4 to the Community Park site,
- increasing firefighting and support staff resources,
- reviewing and conditioning annexations and development applications, and
- require the funding of new services from fees, assessments, or taxes as new subdivisions are developed.

Action 7.14: Educate and reinforce City staff understanding of the Standardized Emergency Management System for the State of California.

Policy 7D: Improve community safety through enhanced police service.

Action 7.15: Increase public access to police services by:

- increasing police staffing to coincide with increasing population, development, and calls for service,
- increasing community participation by creating a Volunteers in Policing Program, and,
- require the funding of new services from fees, assessments, or taxes as new subdivisions are developed.

Action 7.16: Provide education about specific safety concerns such as gang activity, senior-targeted fraud, and property crimes.

Action: 7.17: Establish a nexus between police department resources and increased demands associated with new development.

Action 7.18: Continue to operate the Downtown police storefront.

Action 7.19: Expand Police Department headquarters as necessary to accommodate staff growth.

Policy 7D: Minimize exposure to air pollution and hazardous substances.

Action 7.20: Require air pollution point sources to be located at safe distances from sensitive sites such as homes and schools.

Action 7.21: Require analysis of individual development projects in accordance with the most current version of the Ventura County Air Pollution Control District Air Quality Assessment Guidelines and, when significant impacts are

identified, require implementation of air pollutant mitigation measures determined to be feasible at the time of project approval.

Action 7.22: In accordance with Ordinance 93-37, require payment of fees to fund regional transportation demand management (TDM) programs for all projects generating emissions in excess of Ventura County Air Pollution Control District adopted levels.

Action 7.23: Require individual contractors to implement the construction mitigation measures included in the most recent version of the Ventura County Air Pollution Control District Air Quality Assessment Guidelines.

Action 7.24: Only approve projects involving sensitive land uses (such as residences, schools, daycare centers, playgrounds, medical facilities) within or adjacent to industrially designated areas if an analysis provided by the proponent demonstrates that the health risk will not be significant.

Action 7.25: Adopt new development code provisions that ensure uses in mixed-use projects do not pose significant health effects.

Action 7.26: Seek funding for cleanup of sites within the Brownfield Assessment Demonstration Pilot Program and other contaminated areas in West Ventura.

Action 7.27: Require proponents of projects on or immediately adjacent to lands in industrial, commercial, or agricultural use to perform soil and groundwater contamination assessments in accordance with American Society for Testing and Materials standards, and if contamination exceeds regulatory action levels, require the proponent to undertake remediation procedures prior to grading and development under the supervision of the County Environmental Health Division, County Department of Toxic Substances Control, or Regional Water Quality Control Board (depending upon the nature of any identified contamination).

Action 7.28: Educate residents and businesses about how to reduce or eliminate the use of hazardous materials, including by using safer non-toxic equivalents.

Action 7.29: Require non-agricultural development to provide all necessary buffers, as determined by the Agriculture Commissioner's Office, from agricultural operations to minimize the potential for pesticide drift.

Action 7.30: Require all users, producers, and transporters of hazardous materials and wastes to clearly identify the materials that they store, use, or transport, and to notify the appropriate City, County, State and Federal agencies in the event of a violation.

Action 7.31: Work toward voluntary reduction or elimination of aerial and synthetic chemical application in cooperation with local agricultural interests and the Ventura County agricultural commissioner.

Policy 7E: Minimize the harmful effects of noise.

Action 7.32: Require acoustical analyses for new residential developments within the mapped 60 decibel (dBA) CNEL contour, or within any area designated for commercial or industrial use, and require mitigation necessary to ensure that:

- Exterior noise in exterior spaces of new residences and other noise sensitive uses that are used for recreation (such as patios and gardens) does not exceed 65 dBA CNEL, and
- Interior noise in habitable rooms of new residences does not exceed 45 dBA CNEL with all windows closed.

Action 7.33: As funding becomes available, construct sound walls along U.S. 101, SR 126, and SR 33 in areas where existing residences are exposed to exterior noise exceeding 65 dBA CNEL.

Action 7.34: Request that sound levels associated with concerts at the County Fairgrounds be limited to 70 dBA at the eastern edge of that property.

Action 7.35: Request the termination of auto racing at the County fairgrounds.

Action 7.36: Amend the noise ordinance to restrict leaf blowing, amplified music, trash collection, and other activities that generate complaints.

Action 7.37: Use rubberized asphalt or other sound reducing material for paving and re-paving of City streets.

Action 7.38: Update the Noise Ordinance to provide standards for residential projects and residential components of mixed-use projects within commercial and industrial districts.

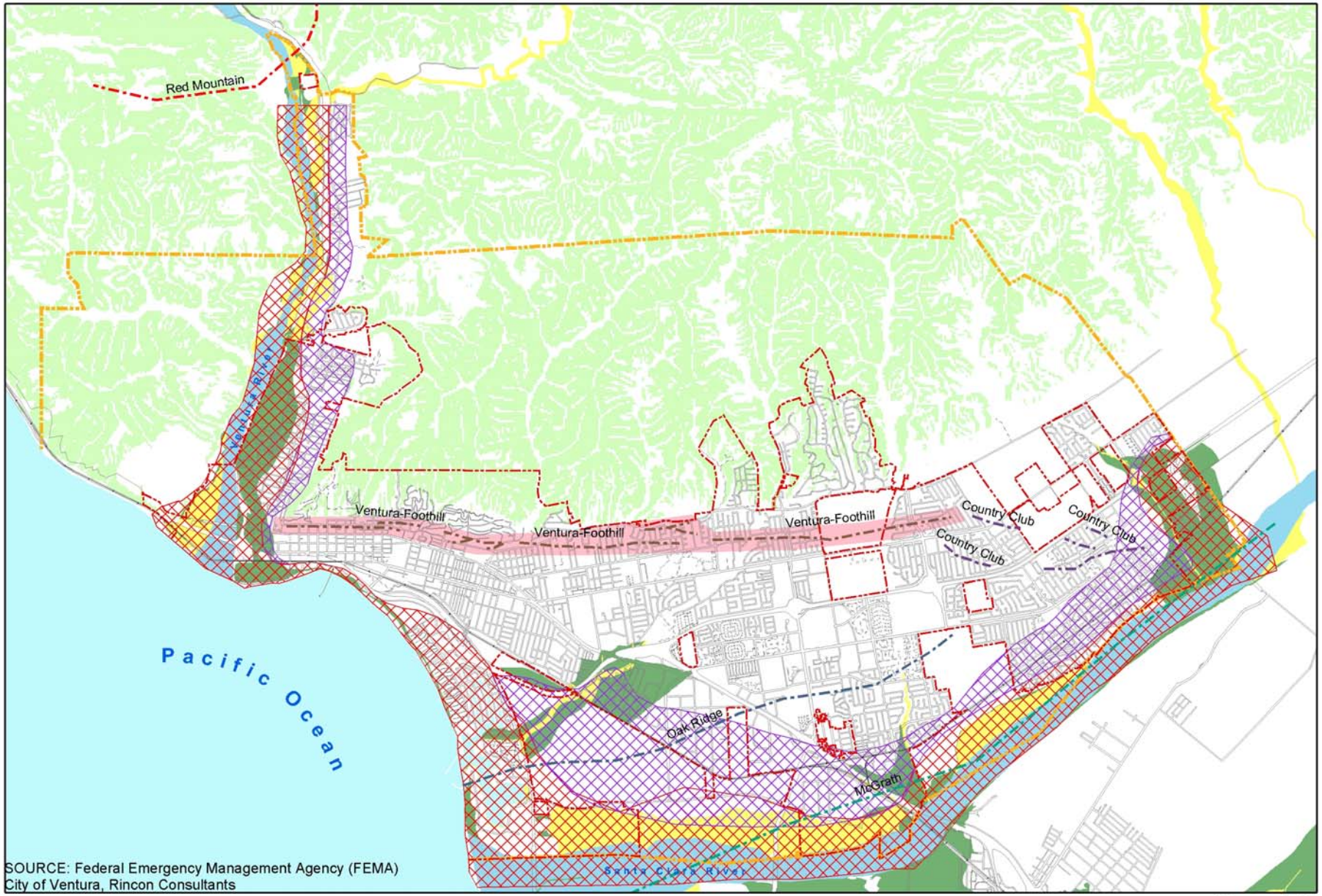


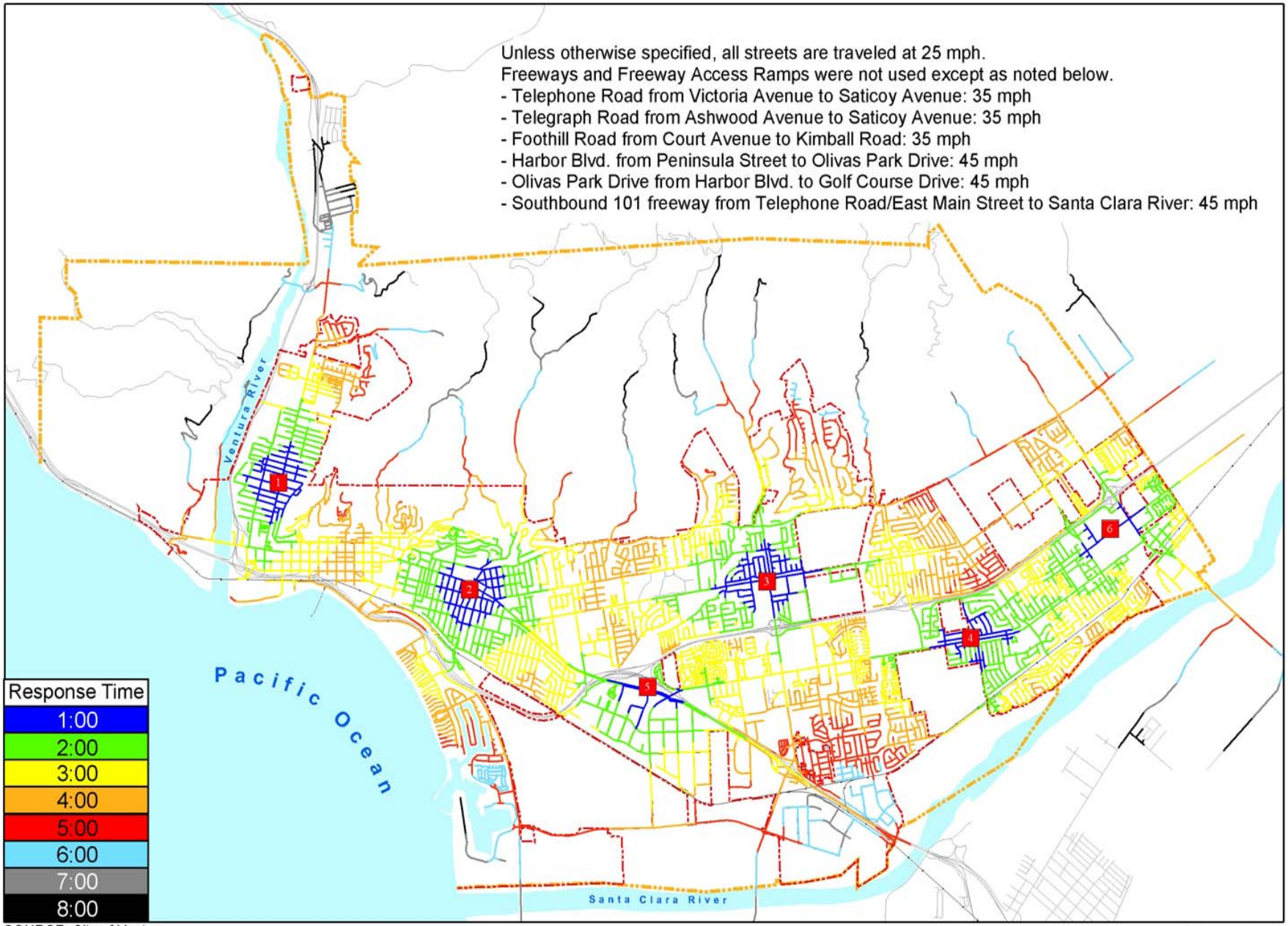
Figure 7-1
Natural Hazards

FEMA Flood Hazard Zones
- A (100-yr floodzone)
- B (500-yr floodzone)
- Floodway

Liquefaction Zones
- High Water Table
- Low Water Table

Major Fault Systems
- Country Club
- McGrath
- Oak Ridge
- Red Mountain
- Ventura-Foothill

Other
- City Limits
- Planning Boundary
- >30% Slope



SOURCE: City of Ventura

City Limits

Planning Boundary

Existing Fire Stations 1-6

Figure 7-2
Fire Response Time

Figure 7-3
Noise Contours

Noise Contours
- 60dBA
- 65dBA
- 70dBA
- 75dBA
- Countoured Streets (Over 5000 ADT)
- Recreation Centers
- Hospitals
- Schools
- Library
- Government Centers
- City Limits
- Planning Boundary

ventura's general plan

OUR EDUCATED COMMUNITY

"A vigorous culture capable of making corrective, stabilizing changes depends heavily on its educated people, and especially upon their critical capacities and depth of understanding."

— Jane Jacobs
Dark Age Ahead

CITY OF
VENTURA

8. OUR EDUCATED COMMUNITY

Our goal is to encourage academic excellence and life-long learning resources to promote a highly-educated citizenry.

Lifelong Learning

Education is more important than ever before as the foundation for the vitality of informed community participation in Ventura. The *Ventura Vision* calls for the city to be "a community dedicated to educational excellence and an emphasis on lifelong learning." A truly educated community is key to achieving most of the goals in this General Plan because:

- In the 21st Century information economy a highly educated and skilled workforce is vital to community prosperity,
- Education and the institutions that provide it are critical to achieving environmental and cultural leadership, and
- An educated and informed citizenry is essential to sound planning and decision-making.

While Ventura has a comparatively well-educated population (see Table 8-1), the high costs of doing business and finding housing in the city will force even greater emphasis on businesses and jobs that require ever-higher levels of skill. The need and desire for lifelong learning will require relentlessly expanding educational resources and access to them in the years ahead. Plus, the assets that strong educational institutions provide are necessary to bring a rich cultural life to the community as well.

Ventura can build on an impressive base of well-regarded public schools, array of private alternatives, major community college, satellite university campuses, expanding media-training institute, law school, and three branch libraries, among other educational resources. The key to becoming renowned as a local "learning community" lies in creating stronger linkages between these existing resources and integrating them into the physical and social landscape of our community.

Leveraging our Assets

Excellence in public education is the top priority for the Ventura Unified School District (whose boundaries extend beyond the city). In Ventura, the District manages 16 elementary schools, four middle schools, three high schools, and one continuation high school, plus independent study and adult education programs.

In addition to District schools, the city also is home to more than a dozen private schools (see Table 8-2), serving 13 percent of elementary and high school students living in Ventura, according to the 2000 Census. Figure 6-1 shows school locations in the city.

Table 8-1
Education Level

Schooling Completed	Percent of Population
High School	21.7
Some College	28.2
Associate Degree only	9.6
Bachelors Degree only	15.4
Graduate Degree	9.3
High School Diploma & Above	***84.1***
Associate Degree & Above	***34.2***

Source: 2001 Ventura County Economic Outlook

Table 8-2
Private Schools

School	Grades
First Baptist Day	K-5
St. Augustine Academy	4-12
Sacred Heart	K-8
Ventura Missionary Christian Day	K-8
College Heights Christian	K-8
St. Bonaventure High School	9-12
Holy Cross	K-8
Our Lady of The Assumption	K-8
St. Paul's Parish Day	K-8
Grace Lutheran Christian Day	K-6
Jameson	K-12
Ventura County Christian	K-12
Hill Road Montessori Preschool	K-3
Wells Road Baptist Academy	K-12

Most public schools operate at or near capacity (see Table 8-3), and continuing growth in Ventura requires the District to search for sites for new schools (see Table 8-4). Developers of new projects are required to dedicate land or pay fees for school purposes, and any major annexation of land outside the city is likely to have to provide a school site to serve new resident children. Still, the scarcity and cost of suitable sites means that greater thought will need to be given to shared facility use and other non-traditional approaches to expanding capacity.

Table 8-3. Ventura Unified School District Enrollment

Schools – No.	Students	Capacity
Elementary – 17	8,093	95%
Middle – 4	4,304	93%
High - 3	4,820	85%
TOTAL	**17,217**	**92%**

Source: Ventura Unified School District, 2003

Table 8-4. Public School Demand

School Type	Students/ School	School Needs	Acres Needed[1]
Elementary	600	4	40
Middle	1,000	1	20
High	2,000	1	40
TOTAL		**6**	**100**

1. Assumes 10 acres for elementary schools, 20 acres for middle schools, and 40 acres for high schools.

Source: Ventura Unified School District, 2003

Ventura is increasingly becoming recognized as a center for higher education. Ventura College is a highly respected two-year school with more than 12,000 students, providing everything from a distinguished transfer opportunity for the University of California to certificates and associates degrees in important fields such as manufacturing and nursing. Students also can obtain four-year degrees in certain fields at the UCSB Ventura Center. Brooks Institute of Photography provides education in photojournalism, filmmaking, and related fields, providing the city with a significant cultural asset. Residents can earn graduate degrees in law, public policy, and education at the Ventura campuses of California Lutheran University, Azusa Pacific University, the Ventura College of Law, and the Southern California Institute of Law. The opening of the nearby California State University Channel Islands has drawn many students and faculty to live in Ventura, especially those in creative fields.

Combined, these institutions of higher learning provide Ventura with tremendous educational assets. Through the policies and actions in this chapter, the City is committed to nurturing these institutions, creating synergy among them, and instilling both cultural and economic opportunities.

Libraries of the Future

The County public library system in Ventura currently operates three branch libraries that serve about 200,000 visits annually (see Table 8-5). But in a digital age where more and more content is available online, the traditional book borrowing function is becoming outmoded. Library administrators and staff, the City's Library Advisory Commission, and patrons have all pointed to needs for adding library space, extending operating hours, and updating and expanding learning resources.

At a more fundamental level, the ideas of what constitutes a library and how it fits the patterns of a learning community need to be reexamined. Integration with school libraries, including the Ventura College Learning Center, is a top priority for this reevaluation, as embodied in the policies and actions in this chapter.

City and Community Programs

Traditional classroom settings alone cannot provide the complete set of educational skills and experience needed by people of all ages. The City provides a variety of learning opportunities, including youth and adult art programs, environmental education, adaptive recreation programs, youth after-school activities, and summer camps. Community organizations also provide a range of classes and experiences, including tours, museums, lectures, and hands-on activities. Expanding venues for such activities and promoting participation in them are key challenges.

Policies and actions in this chapter seek to expand lifelong learning opportunities for everyone in the community.

Table 8-5. Local Libraries

Library	Card-Holders	2003-2004 Patronage	Hours Open Weekly	Facility Size (sq. ft.)
E. P. Foster	48,195	366,134	54	31,000
H. P. Wright			39	12,000
Avenue			25	3,000

Source: Ventura County Library Administration, 2005

Policy 8A: Reach out to institutions and educators to advance lifelong learning.

Action 8.1: Work closely with schools, colleges, and libraries to provide input into site and facility planning.

Action 8.2: Organize a regional education summit to generate interest in and ideas about learning opportunities.

Action 8.3: Adopt joint-use agreements with libraries, schools, and other institutions to maximize use of educational facilities.

Action 8.4: Distribute information about local educational programs.

Policy 8B: Increase the availability and diversity of learning resources.

Action 8.5: Install infrastructure for wireless technology and computer networking in City facilities.

Action 8.6: Establish educational centers at City parks.

Action 8.7: Work with the State Parks Department to establish a marine learning center at the Harbor.

Action 8.8: Work with the Ventura Unified School District to ensure that school facilities can be provided to serve new development.

Policy 8C: Reshape public libraries as 21st Century learning centers.

Action 8.9: Complete a new analysis of community needs, rethinking the role of public libraries in light of the ongoing advances in information technology and the changing ways that individuals and families seek out information and life-long learning opportunities.

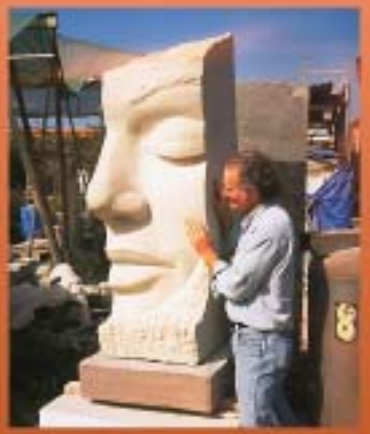
Action 8.10: Reassess the formal and informal relationships between our current three branch public libraries and school libraries – including the new Ventura College Learning Resource Center – as well as joint use of facilities for a broader range or compatible public, cultural, and educational uses.

Action 8.11: Develop a Master Plan for Facilities, Programs, and Partnerships to create an accessible, robust, and vibrant library for the 21st Century system, taking into consideration that circulation of books is no longer the dominant function but will continue to be an important part of a linked network of learning centers.

Action 8.12: Develop formal partnerships, funding, capital strategies, and joint use agreements to implement the new libraries Master Plan.

ventura's general plan

OUR CREATIVE COMMUNITY



"Whatever you can do, or dream you can, begin it. Boldness has genius, power and magic in it."

— Johann Wolfgang von Goethe

CITY OF
VENTURA

9. OUR CREATIVE COMMUNITY

Our goal is to become a vibrant cultural center by weaving the arts and local heritage into everyday life.

A Rich Foundation

Local history, artistic expression, and cultural diversity play vital roles in making Ventura a vibrant and interesting place. The heritage of Chumash civilization, which developed over the course of about 9,000 years, and influences of Mexican settlement establish a rich tableau for the modern development of the city. Art in museums, galleries, and public places, as well as space and energy devoted to the creation of artwork and crafts connect the community in complex and fundamental ways. Cultural expression in the form of festivals and informal gatherings provide additional and essential bonds that strengthen the community.

Historic Context

Abundant food and water, temperate climate, and ample material for tool manufacturing attracted early local inhabitants. Chumash peoples were living in a string of coastal villages when Spanish explorers arrived in 1542. Shisholop village (at the south end of present-day Figueroa Street) was a thriving Chumash provincial capital at the time of the Spanish arrival. Other Chumash villages and burial sites have been found in what are now the North Avenue and Saticoy neighborhoods, as well as north of the Ventura River. Mexican settlers began to arrive in earnest after the founding of Mission San Buenaventura in 1782.

Table 9-1
Key Historical and Cultural Sites

Site	Description
Albinger Museum	Artifacts spanning 3,500 years excavated from a site next to the Mission are on display in this former adobe at 113 East Main Street.
Downtown	Downtown Ventura is home to a variety of 19th Century buildings that house restaurants and retail establishments in a small-town setting with a variety of cultural amenities.
Olivas Adobe Park	Completed in 1849 for the Raymundo ranching family, the well-preserved hacienda at 4200 Olivas Park Road is utilized as concert and banquet facility.
Ortega Adobe	Built in 1857, the adobe is only remaining example of the middle class homes that once lined West Main Street. The building has since been used as a police station and restaurant.
San Buenaventura Mission	Built in 1782, the Mission anchors the western part of the downtown area and is still used for regular Catholic services.
Santa Gertrudis Chapel	The Chapel was originally completed around 1809. The site is located along Highway 33 near Foster Park.
San Miguel Chapel	The site is located at Thompson Boulevard and Palm Street. The original chapel dated back to the early 1800s.
Ventura County Museum of History and Art	The museum at 100 East Main Street houses exhibits featuring local artists and historical artifacts. Expansion plans include a 200-seat auditorium and a gallery with touring exhibits.

Source: City of Ventura

More than 90 historic sites have been identified in the planning area (which includes areas outside the city). Notable ones include the Mission, the Ortega and Olivas Adobes, and the locations of the Santa Gertrudis and San Miguel Chapels (See Table 9-1 and Figure 9-1). Many of the existing buildings in Ventura were constructed between 1880 and 1940, a period that coincided with development of the railroads and harbor. City

Hall (formerly the County Courthouse) and the Mission aqueduct are listed as landmarks on the National Register of Historic Places, and structures in the following historic districts are protected by City architectural controls:

- the grounds within the Mission District,
- the Mitchell block (south of Thompson Boulevard between Chestnut and Fir Streets),
- the Selwyn Shaw block (north of Poli Street between Ann and Hemlock Streets), and
- the Simpson Tract (west of Ventura Avenue between Simpson and Prospect Streets).

Arts and Culture

When the City first adopted a Community Cultural Plan in 1992, Ventura's creative community was in its fledgling stage. Few of the now-thriving professional art and cultural organizations existed (see Table 9-2). A burgeoning visual artist community had made the city its home, but was fairly invisible except to the more intrepid arts supporters and collectors.

Since completion of that plan, the City has either implemented or initiated all of its recommendations, which were developed through extensive public involvement. As a result, the growth of the cultural community has been extraordinary. Now Ventura is home to a wealth of active artists and arts organizations. From 1994-2004, the budgets of arts organizations in Downtown Ventura alone increased from $500,000 to more than $4 million.

Ventura also now has a complement of major cultural institutions unique for a city of its size, including the Ventura Music Festival, the Rubicon Theatre Company, the Ventura County Museum of History and Art, and Focus on the Masters. The individual artists who live and work in the city continue to comprise a major part of its cultural fabric, and are highlighted in popular cultural events like the Downtown ArtWalks.

A strong focus of the City's general is to build the arts infrastructure of Ventura. A strong cultural infrastructure is the foundation of a healthy arts ecosystem: this includes *places* (for arts creation, sales, exhibition, performance, rehearsal, living), *people* (artists, audiences, patrons), and *organizations* (production, support, and presentation).

In keeping with the community's respect for its roots, the Ventura arts scene remains authentic, no small feat in today's competitive environment. While many communities focus on importing Broadway shows or big-name art exhibits to increase their profile, Ventura successfully continues to highlight local artists, architecture, culture, history, and the environment – the unique threads that together comprise the rich tapestry of the Ventura community. Policies and actions in this chapter call for continuing to build the cultural foundations of the community by involving everyone in the production, support, and presentation of art and cultural programs, installing art in public places, providing working and display space for local artists, and identifying a site for an arts and cultural center.

Table 9-2
Art and Cultural Institutions

Name	Description	Years in Operation	Annual Patronage
Buenaventura Arts Association	Fine art gallery in downtown Ventura.	50	5,000
Channelaire Chorus	Women's chorus	42	2,500
City of Ventura Cultural Affairs Division	Supports local arts organizations; produces cultural programs (ArtWalks, Street Fairs, Music Under the Stars, Arts Education classes, grants, public art, etc.)	13	132,000
Focus on the Masters	Documentation of extraordinary artists (photographs, audio and video interviews)	10	15,000
Kids' Art	Ongoing, free kids' creative arts programs	12	350
Music 4 Kids	After school music instruction at Boys & Girls Clubs	4	800
Plexus Dance Theater	Professional modern dance performances	20	1,400
Rubicon Theater	Regional theater – classic and contemporary	6	37,000
San Buenaventura Foundation for the Arts	Arts umbrella organization - supports development of the Cultural Center and produces Arts Explosion	5	5,900
Ventura Area Theater Sports	Live improvisational theater in downtown Ventura	15	5,000
Ventura Artists' Union	Art gallery and weekly arts shows on California Plaza	15	17,000
Ventura College Opera Workshop	Opera and theater company at Ventura College	21	4,500
Ventura County Ballet	Ballet school with twice annual performances	6	11,000
Ventura County Master Chorale	Professional vocal music ensemble	23	6,000
Ventura County Museum of History and Art	Museum featuring exhibits on the history and art of Ventura County	26	55,000
Ventura Music Festival	Annual concert festival presenting international and local performers	11	9,000

Policy 9A: Increase public art and cultural expression throughout the community.

Action 9.1: Require works of art in public spaces per the City's Public Art Program Ordinance.

Action 9.2: Sponsor and organize local art exhibits, performances, festivals, cultural events, and forums for local arts organizations and artists.

Action 9.3: Expand outreach and publicity by:

- promoting locally produced art and local cultural programs
- publishing a monthly calendar of local art and cultural features,
- distributing the *State of the Arts* quarterly report, and
- offering free or subsidized tickets to events.

Action 9.4: Support the creative sector through training and other professional development opportunities.

Action 9.5: Work with the schools to integrate arts education into the core curriculum.

Action 9.6: Promote the cultural and artistic expressions of Ventura's underrepresented cultural groups.

Action 9.7: Offer ticket subsidy and distribution programs and facilitate transportation to cultural offerings.

Policy 9B: Meet diverse needs for performance, exhibition, and workspace.

Action 9.8: Increase the amount of live-work development, and allow its use for production, display, and sale of art.

Action 9.9: Work with community groups to locate sites for venues for theater, dance, music, and children's programming.

Policy 9C: Integrate local history and heritage into urban form and daily life.

Action 9.10: Provide incentives for preserving structures and sites that are representative of the various periods of the city's social and physical development.

Action 9.11: Organize and promote multi-cultural programs and events that celebrate local history and diversity.

Action 9.12: Allow adaptive reuse of historic buildings.

Action 9.13: Work with community groups to identify locations for facilities that celebrate local cultural heritage, such as a living history Chumash village and an agricultural history museum.

Policy 9D: Ensure proper treatment of archeological and historic resources.

Action 9.14: Require archaeological assessments for projects proposed in the Coastal Zone and other areas where cultural resources are likely to be located.

Action 9.15: Suspend development activity when archaeological resources are discovered, and require the developer to retain a qualified archaeologist to oversee handling of the resources in coordination with the Ventura County Archaeological Society and local Native American organizations as appropriate.

Action 9.16: Pursue funding to preserve historic resources.

Action 9.17: Provide incentives to owners of eligible structures to seek historic landmark status and invest in restoration efforts.

Action 9.18: Require that modifications to historically-designated buildings maintain their character.

Action 9.19: For any project in a historic district or that would affect any potential historic resource or structure more than 40 years old, require an assessment of eligibility for State and federal register and landmark status and appropriate mitigation to protect the resource.

Action 9.20: Seek input from the City's Historic Preservation Commission on any proposed development that may affect any designated or potential landmark.

Action 9.21: Update the inventory of historic properties.

Action 9.22: Create a set of guidelines and/or policies directing staff, private property owners, developers, and the public regarding treatment of historic resources that will be readily available at the counter.

Action 9.23: Complete and maintain historic resource surveys containing all the present and future components of the historic fabric within the built, natural, and cultural environments.

Action 9.24: Create a historic preservation element.

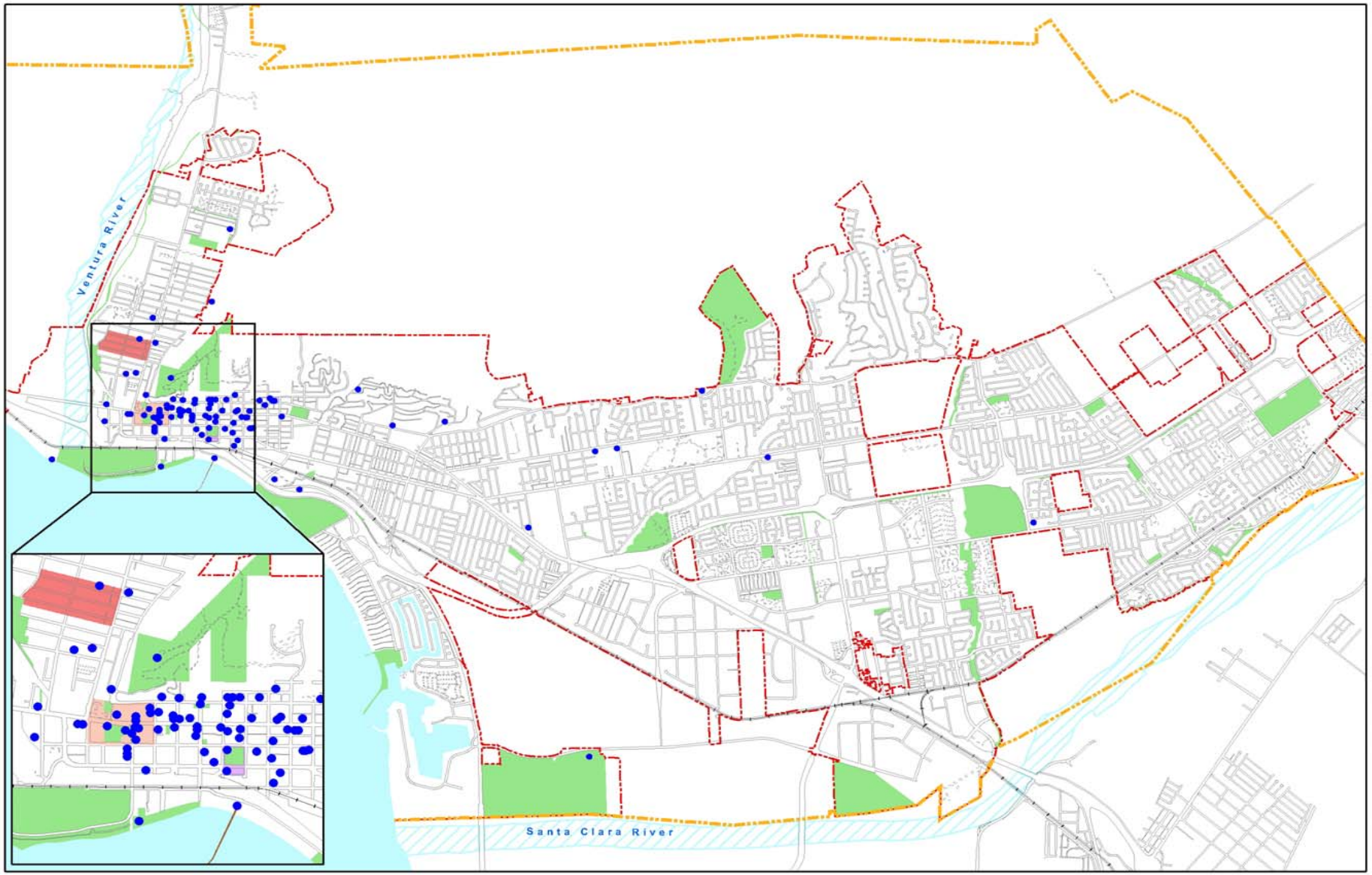
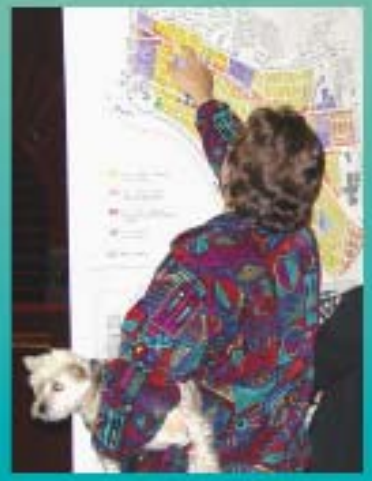


Figure 9-1
Historic Districts and Sites



"Never believe that a few caring people can't change the world. For indeed, that's all who ever have."

— Margaret Mead
Renowned Anthropologist

CITY OF
VENTURA

OUR INVOLVED COMMUNITY

ventura's general plan

10. OUR INVOLVED COMMUNITY

Our goal is to strive to work together as a community to achieve the Ventura Vision through civic engagement, partnerships, and volunteer service.

Civic Engagement

It is not enough to have a vision of smart growth for Ventura. Achieving that vision requires the active and ongoing participation of an engaged and active community. Fortunately, Ventura builds on a strong foundation: thousands of Ventura citizens are involved in their schools and places of worship and give their time to civic, cultural, and charitable organizations. City Commissions, the Community Councils, the Chamber of Commerce and other well-established avenues provide opportunities for community leadership.

This is what Alexis De Toqueville celebrated in his famous book, *Democracy in America*, calling our nation, "the one country in the world, day in and day out, that makes use of an unlimited freedom of association." Yet today in Ventura, as all across America, there is concern about the health of our democracy. Sociologist Robert Putnam gained national attention with his research showing that "by almost every measure, Americans' direct engagement in politics and government has fallen steadily and sharply over the last generation."

Among the symptoms in Ventura have been a decline in voter turnout in recent local elections – (a 36% drop from 1995 through 2003.) Over those years, the ability to build consensus about future development has been undermined by sharply polarized divisions, showdowns at the ballot box, and often rancorous public hearings. The complaint often recurs that planning decisions are made without adequate notice or consideration of the views of those affected. Many citizens criticize the City decision-making process as convoluted and counterproductive.

Moreover, ongoing participation of an engaged community requires civic places where citizens can come together. It is not insignificant that a decline in public participation and the quality of civic discourse has paralleled the loss of civic places in our cities. Historically, governments provided open spaces and buildings that were at the center of a community, physically and symbolically. Town squares and plazas, often faced by a hall for formal gathering and civic engagement, have all but disappeared. The poverty of American public places was apparent after the Columbine High School shooting in Colorado, when citizens gathered to mourn, not in a shared place for people, but in a parking lot.

Nearly everyone agrees we can and should do better. The best model for doing this was the citywide effort to craft the *Ventura Vision*. Thousands participated in a year-long partnership encompassing City government, non-profit organizations, community groups, business,

schools and individual residents to chart the community's future.

The vision of an "involved community" was described in the *Ventura Vision* report as: seeking "broad community collaboration; more widely publicizing city government services, planning processes and policies; better involvement of typically under-represented groups such as youth, seniors and ethnic minorities in community planning; and developing public parks, plazas, neighborhood greenways and other spaces that promote civic interaction and events."

Since that vision was adopted by the City Council in 2000, the City has worked to implement it, building on existing community assets and strengthening the linkages and interconnections that already exist among people, organizations, and shared community goals. A remarkable example of broad community collaboration earned attention throughout Southern California in late 2004. Facing the prospect of winter flooding, the City undertook to evacuate homeless people living in the channel of the Ventura River. This was accomplished by a partnership involving non-profit social service agencies, faith-based organizations, City staff, business leaders, community volunteers and the affected homeless population.

There are many more models of successful community collaboration in Ventura, including: the restoration of the pier, the community's rich array of after-school programs, the implementation of the 1992 Cultural Plan, the 2004 Downtown Charrette, the 2005 Midtown Design Charrette and the establishment of conservancies to preserve the Grant Park cross and Ventura's cherished hillsides.

City government has learned from these efforts to reach broadly and deeply into the community. Civic engagement and trust are built when City representatives actively seek to involve everyone in positive and transparent partnerships. That goal requires a continually evolving effort to promote participation:

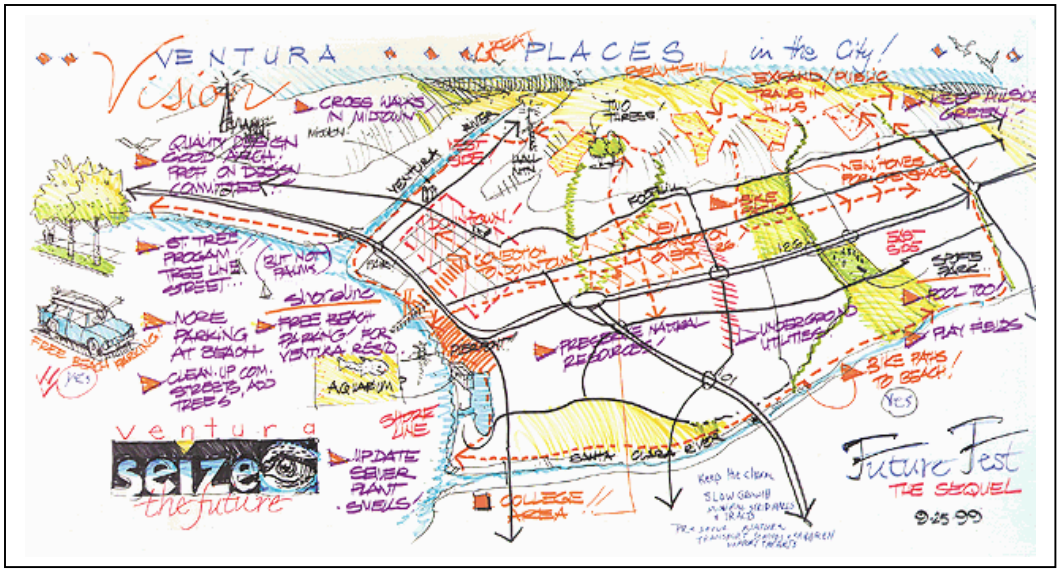
- through proactive and interactive media outreach in the press, on the web, on radio and television,
- by striving to include everyone in decision making and making it convenient for them to participate by seeking them out in their neighborhoods and gathering places like schools, houses of worship and public spaces, and
- through community dialogues, workshops, charrettes, town hall forums, and community councils, in addition to formal public hearings.

More effort needs to be put into building consensus about future growth and change upfront through community planning, rather than waiting until specific development projects are proposed. That effort will continue with the work to craft a citywide "form-based code" and concentrated planning efforts for specific neighborhoods and districts.

Focused attention should be paid to making our public decision-making processes easier to understand and participate in. Citizens have little time or patience for complicated planning and entitlement processes that drag on for years. By establishing clearer rules and public processes for applying them, the policies and actions in this chapter will enable more citizens to feel that they will be heard and their contributions valued. By involving a wider range of the community in clearly setting Ventura's planning goals and standards of quality, we can devote more time to achieving those goals and less time wrangling over specific proposals.

Ventura also needs to reestablish places for civic discourse. While the City will continue to encourage the use of our beautiful City Hall for its historic role of government by and for the people, we also need a hierarchy of civic spaces citywide that are strategically located in neighborhood centers and accessible by pedestrians (see Chapter Three, Action 3.8). Every neighborhood should have access to a physical location designated for public gathering and civic purposes.

Our long-range vision is to build an ethic and a fabric of robust civic engagement – what De Toqueville called "the habits of the heart." His phrase evokes what the Ventura Vision called "direct engagement in public affairs" through "participation, hard work and collaboration . . . sustaining Ventura as an exceptional place." The policies and actions in this chapter aim to do just that.



Policy 10A: Work collaboratively to increase citizen participation in public affairs.

Action 10.1: Conduct focused outreach efforts to encourage all members of the community – including youth, seniors, special needs groups, and non-English speakers – to participate in City activities.

Action 10.2: Obtain public participation by seeking out citizens in their neighborhoods and gathering places such as schools, houses of worship and public spaces.

Action 10.3: Invite civic, neighborhood, and non-profit groups to assist with City project and program planning and implementation.

Action 10.4: Provide incentives for City staff to participate in community and volunteer activities.

Action 10.5: Invite seniors to mentor youth and serve as guides at historical sites.

Action 10.6: Offer internships in City governance, and include youth representatives on public bodies.

Action 10.7: Continue to offer the Ambassadors program to obtain citizens assistance with City projects.

Policy 10B: Raise awareness of City operations and be clear about City objectives.

Action 10.8: Utilize the City website as a key source of information and expand it to serve as a tool for civic engagement.

Action 10.9: Publish an annual report that evaluates City performance in such areas as conservation, housing, and economic development.

Action 10.10: Continue to improve the user-friendliness of the media that communicate information about the City, including the website, cable channels, newsletters, kiosks, and water billing statements.

Policy 10 C: Work at the neighborhood level to promote citizen engagement.

Action 10.11: Establish a clear policy toward the scope, role, boundaries, and jurisdiction of neighborhood Community Councils citywide, with the objectives of strengthening their roles in decision-making.

Action 10.12: Establish stronger partnerships with neighborhood Community Councils to set area priorities for capital investment, community policing, City services, commercial investment, physical planning, education, and other concerns, to guide both City policies and day-to-day cooperation and problem-solving.

Action 10.13: Recognizing that neighborhood empowerment must be balanced and sustained by overall City policies and citywide vision and resources – establish a citywide Neighborhood Community Congress where local neighborhood Community Councils can collaborate and learn from each other.

Action 10.14: Establish clear liaison relationships to foster communication, training, and involvement efforts between the City, neighborhood Community Councils and other community partners, including the Ventura Unified School District and business, civic, cultural and religious groups.

ventura's general plan

APPENDICES

"Individual commitment to a group effort, that is what makes a team work, a company work, a society work, a civilization work."

— Vince Lombardi
Author of *What it Takes To Be #1*, 2001

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VENTURA

KEY TO ABBREVIATIONS	
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= Action included in the Land Use Plan of the City's Local Coastal Program	

Number	Action	Lead Entity	Timeframe
1.1	Adhere to the policies and directives of the California Coastal Act in reviewing and permitting any proposed development in the Coastal Zone.	CD [CP]	Ongoing
1.2	Prohibit non-coastal-dependent energy facilities within the Coastal Zone, and require any coastal-dependent facilities including pipelines and public utility structures to avoid coastal resources (including recreation, habitat, and archaeological areas) to the extent feasible, or to minimize any impacts if development in such areas is unavoidable.	CD [CP]	Ongoing
1.3	Work with the State Department of Parks and Recreation, Ventura County Watershed Protection Agency, and the Ventura Port District to determine and carry out appropriate methods for protecting and restoring coastal resources, including by supplying sand at beaches under the Beach Erosion Authority for Control Operations and Nourishment (BEACON) South Central Coast Beach Enhancement program.	PW [E]	Ongoing
1.4	Require new coastal development to provide non-structural shoreline protection that avoids adverse impacts to coastal processes and nearby beaches.	CD [CP]	Ongoing
1.5	Collect suitable material from dredging and development, and add it to beaches as needed and feasible.	PW [E]	Ongoing
1.6	Support continued efforts to decommission Matilija Dam to improve the sand supply to local beaches.	PW [U]	Long-term
1.7	Update the Hillside Management Program to address and be consistent with the Planning Designations as defined and depicted on the General Plan Diagram.	CD [LRP]	Short-term

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Number	Action	Lead Entity	Timeframe
1.8	Buffer barrancas and creeks that retain natural soil slopes from development according to state and Federal guidelines.	CD [LD]	Ongoing
1.9	Prohibit placement of material in watercourses other than native plants and required flood control structures, and remove debris periodically.	PW [MS/P]	Ongoing
1.10	Remove concrete channel structures as funding allows, and where doing so will fit the context of the surrounding area and not create unacceptable flood or erosion potential.	PW [MS/P]	Long-term
1.11	Require that sensitive wetland and coastal areas be preserved as undeveloped open space wherever feasible and that future developments result in no net loss of wetlands or "natural" areas.	CD [LRP]	Short-term
1.12	Update the provisions of the Hillside Management Program as necessary to ensure protection of open space lands.	CD [LRP]	Mid-term
1.13	Recommend that the City's Sphere of Influence be coterminous with existing City limits in the hillsides in order to preserve the hillsides as open space.	CD [LRP]	Short-term
1.14	Work with established land conservation organizations toward establishing a Ventura hillsides preserve.	PW [P]	Long-term
1.15	Actively seek local, state, and Federal funding sources to achieve preservation of the hillsides.	PW [P]	Mid-term
1.16	Comply with directives from regulatory authorities to update and enforce stormwater quality and watershed protection measures that limit impacts to aquatic ecosystems and that preserve and restore the beneficial uses of natural watercourses and wetlands in the city.	PW	Ongoing

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Number		Action	Lead Entity	Timeframe
1.17		Require development to mitigate its impacts on wildlife through the development review process.	CD [CP]	Ongoing
1.18		Require new development adjacent to rivers, creeks, and barrancas to use native or non-invasive plant species, preferably drought tolerant, for landscaping.	CD [CP] PW [P]	Ongoing
1.19		Require projects near watercourses, shoreline areas, and other sensitive habitat areas to include surveys for State and/or federally listed sensitive species and to provide appropriate buffers and other mitigation necessary to protect habitat for listed species.	CD [LRP]	Long-term
1.20		Conduct coastal dredging in accordance with the U.S. Army Corps of Engineers and California Department of Fish and Game requirements in order to avoid impacts to sensitive fish and bird species.	PW [E]	Ongoing
1.21		Work with State Parks on restoring the Alessandro Lagoon and pursue funding cooperatively.	PW [P]	Long-term
1.22		Adopt development code provisions to protect mature trees as defined by minimum height, canopy, and/or tree trunk diameter.	CD [LRP]	Short-term
1.23		Require, where appropriate, the preservation of healthy tree windrows associated with current and former agricultural uses, and incorporate trees into the design of new developments.	CD [CP]	Short-term
1.24		Require new development to maintain all indigenous tree species or provide adequately sized replacement native trees on a 3:1 basis.	CD [CP]	Ongoing
1.25		Purchase and use recycled materials and alternative and renewable energy sources as feasible in	AS [P]	Ongoing

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Number	Action	Lead Entity	Timeframe
	City operations.		
1.26	Reduce pesticide use in City operations.	PW [P]	Mid-term
1.27	Utilize green waste as biomass/compost in City operations.	PW [P]	Mid-term
1.28	Purchase low-emission City vehicles, and convert existing gasoline-powered fleet vehicles to cleaner fuels as technology becomes available.	PW [MS]	Mid-term
1.29	Require all City funded projects that enter design and construction after January 1, 2006 to meet a design construction standard equivalent to the minimum U.S. Green Building Council LEED™ Certified rating in accordance with the City's Green Building Standards for Private and Municipal Construction Projects.	FD [IS]	Short-term
1.30	Provide information to businesses about how to reduce waste and pollution and conserve resources.	PW [MS]	Short-term
1.31	Provide incentives for green building projects in both the public and private sectors to comply with either the LEED™ Rating System, California Green Builder, or the Residential Built Green program and to pursue registration and certification; incentives include "Head-of-the-Line" discretionary processing and "Head-of-the-Line" building permit processing.	FD [IS]	Short-term
1.32	Apply for grants, rebates, and other funding to install solar panels on all City-owned structures to provide at least half of their electric energy requirements.	PW	Ongoing

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Number	Action	Lead Entity	Timeframe
1.33	Publicly acknowledge individuals and businesses that implement green construction and building practices.	FD [IS]	Ongoing
2.1	Track economic indicators for changes that may affect City land resources, tax base, or employment base, such as terms and conditions of sale or lease of available office, retail, and manufacturing space.	CD [ED]	Ongoing
2.2	Prepare an economic base analysis that identifies opportunities to capture retail sales in sectors where resident purchasing has leaked to other jurisdictions.	CD [ED]	Short-term
2.3	Maintain and update an Economic Development Strategy to implement City economic goals and objectives.	CD [ED]	Ongoing
2.4	Map priority locations for commercial and industrial development and revitalization, including a range of parcel sizes targeted for high-technology, non-durables manufacturing, finance, business services, tourism, and retail uses.	CD	Short-term
2.5	Share economic and demographic information with organizations that may refer businesses to Ventura.	CD [ED]	Ongoing
2.6	Encourage intensification and diversification of uses and properties in districts, corridors, and neighborhood centers, including through assembly of vacant and underutilized parcels.	CD [ED]	Ongoing

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Number	Action	Lead Entity	Timeframe
2.7	Partner with local commerce groups to recruit companies and pursue funding for business development and land re-utilization.	CD [ED]	Ongoing
2.8	Carry out Housing Element programs that provide housing to all segments of the local workforce.	CD	Ongoing
2.9	Expedite review for childcare facilities that will provide support to local employees.	CD [CP]	Short-term
2.10	Expedite review of the entitlement process for installation of infrastructure necessary to support high technology and multimedia companies.	CA	Mid-term
2.11	Allow mixed-use development in commercial and industrial districts as appropriate.	CD [LRP]	Short-term
2.12	Allow uses such as conference centers with resort amenities on appropriately sized and located parcels.	CD [LRP]	Short-term
2.13	Market the city to businesses that link agriculture with high technology, such as biotechnology enterprises.	CD [ED]	Ongoing
2.14	Partner with local farms to promote farmers markets and high quality locally grown food.	CS	Ongoing
2.15	Provide incentives for use of waterfront parcels for recreation, visitor-serving commerce, restaurant, marina, and fishing uses.	CD [ED]	Short-term
2.16	Work with the State to create year-round commercial opportunities at the fairgrounds.	CD [ED]	Long-term

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Number	Action	Lead Entity	Timeframe
2.17	Partner with the Harbor District and National Park Service to promote Channel Islands tours and develop a marine learning center.	CS	Long-term
2.18	Prioritize uses within the Harbor Specific Plan area as follows: (1) coastal dependent, (2) commercial fishing, (3) coastal access, and (4) visitor serving commercial and recreational uses.	CD	Short-term
2.19	Partner with hotels and the Chamber of Commerce to promote city golf courses.	CS [GS/AS]	Long-term
2.20	Promote outdoor recreation as part of an enhanced visitor opportunity strategy.	CS	Mid-term
3.1	Preserve the stock of existing homes by carrying out Housing Element programs.	CD	Ongoing
3.2	Enhance the appearance of districts, corridors, and gateways (including views from highways) through controls on building placement, design elements, and signage.	CD [LRP]	Short-term
3.3	Require preservation of public view sheds and solar access.	CD [CP]	Short-term
3.4	Require all shoreline development (including anti-erosion or other protective structures) to provide public access to and along the coast, unless it would duplicate adequate access existing nearby, adversely affect agriculture, or be inconsistent with public safety, military security, or protection of fragile coastal resources.	CD [CP]	Ongoing
3.5	Establish land development incentives to upgrade the appearance of poorly maintained or	FD [IS]	Mid-term

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Number	Action	Lead Entity	Timeframe
	otherwise unattractive sites, and enforce existing land maintenance regulations.		
3.6	Expand and maintain the City's urban forest and thoroughfare landscaping, using native species, in accordance with the City's Park and Development Guidelines and Irrigation and Landscape Guidelines.	PW [P]	Ongoing
3.7	Evaluate whether lot coverage standards should be changed based on neighborhood character.	CD [LRP]	Short-term
3.8	Adopt new development code provisions that designate neighborhood centers, as depicted on the General Plan Diagram, for a mixture of residences and small-scale, local-serving businesses.	CD [LRP]	Short-term
3.9	Adopt new development code provisions that designate areas within districts and corridors for mixed-use development that combines businesses with housing and focuses on the redesign of single-use shopping centers and retail parcels into walkable, well connected blocks, with a mix of building types, uses, and public and private frontages.	CD [LRP]	Short-term
3.10	Allow intensification of commercial areas through conversion of surface parking to building area under a districtwide parking management strategy in the Downtown Specific Plan.	CD [LRP]	Short-term
3.11	Expand the downtown redevelopment area to include parcels around future transit areas and along freeway frontage.	CD [RDA]	Mid-term
3.12	The City will work with the hospitals on the new Development Code treatment for the Loma Vista corridor, which includes both hospitals.	CD [LRP]	Short-term

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3.13	Assess whether the City's Affordable Housing Programs respond to current needs, and modify them as necessary within State mandated Housing Element updates	CD	Ongoing
3.14	Utilize infill development, to the extent possible, to accommodate the targeted number and type of housing units described in the Housing Element	CD [LRP]	Ongoing
3.15	Adopt new development code provisions that ensure compliance with Housing Element objectives.	CD [LRP]	Short-term
3.16	Renew and modify greenbelt agreements as necessary to direct development to already urbanized areas.	CD [LRP]	Long-term
3.17	Continue to support the Guidelines for Orderly Development as a means of implementing the General Plan, and encourage adherence to these Guidelines by all the cities, the County of Ventura, and the Local Agency Formation Commission (LAFCO); and work with other nearby cities and agencies to avoid sprawl and preserve the rural character in areas outside the urban edge.	CD [LRP]	Ongoing
3.18	Complete community or specific plans, subject to funding, for areas such as Westside, Midtown, Downtown, Wells, Saticoy, Pierpont, Harbor, Loma Vista/Medical District, Victoria Corridor, and others as appropriate. These plans will set clear development standards for public and private investments, foster neighborhood partnerships, and be updated as needed.	CD [LRP]	Ongoing
3.19	Preparation of the new Development Code will take into account existing or proposed community or specific plans to ensure efficient use of City resources and ample citizen input.	CD [LRP]	Short-term

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Number	Action	Lead Entity	Timeframe
3.20	Pursuant to SOAR, adopt development code provisions to "preserve agricultural and open space lands as a desirable means of shaping the City's internal and external form and size, and of serving the needs of the residents."	CD [LRP]	Short-term
3.21	Adopt performance standards for non-farm activities in agricultural areas that protect and support farm operations, including requiring non-farm uses to provide all necessary buffers as determined by the Agriculture Commissioner's Office.	CD [LRP]	Short-term
3.22	Offer incentives for agricultural production operations to develop systems of raw product and product processing locally.	CD [ED]	Mid-term
3.23	Develop and adopt a form-based Development Code that emphasizes pedestrian orientation, integration of land uses, treatment of streetscapes as community living space, and environmentally sensitive building design and operation.	CD [LRP]	Short-term
3.24	Revise the Residential Growth Management Program (RGMP) with an integrated set of growth management tools including: • Community or specific plans and development codes based on availability of infrastructure and transit that regulate community form and character by directing new residential development to appropriate locations and in ways that integrate with and enhance existing neighborhoods, districts and corridors; • appropriate mechanisms to ensure that new residential development produces high-quality	CD [LRP]	Short-term

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	designs and a range of housing types across all income levels; and, • numeric limitations linked to the implementation of community or specific plans and development codes and the availability of appropriate infrastructure and resources; within those limitations, the RGMP should provide greater flexibility for timing new residential development.		
3.25	Establish first priority growth areas to include the districts, corridors, and neighborhood centers as identified on the General Plan Diagram; and second priority areas to include vacant undeveloped land when a community plan has been prepared for such (within the City limits).	CD [LRP]	Short-term
3.26	Establish and administer a system for the gradual growth of the City through identification of areas set aside for long-term preservation, for controlled growth, and for encouraged growth.	CD [LRP]	Mid-term
3.27	Require the use of techniques such as digital simulation and modeling to assist in project review.	CD [CP]	Short-term
3.28	Revise the planning processes to be more user-friendly to both applicants and neighborhood residents in order to implement City policies more efficiently.	CD [CP]	Short-term
4. OUR ACCESSIBLE COMMUNITY			
4.1	Direct city transportation investment to efforts that improve user safety and keep the circulation system structurally sound and adequately maintained. First priority for capital funding will go to our pavement management program to return Ventura streets to excellent conditions.	PW [E]	Ongoing

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4.2	Develop a prioritized list of projects needed to improve safety for all travel modes and provide needed connections and multiple route options.	PW [E]	Short-term
4.3	Provide transportation services that meet the special mobility needs of the community including youth, elderly, and disabled persons.	PW [E]	Ongoing
4.4	Combine education with enforcement to instill safe and courteous use of the shared public roadway.	CS	Ongoing
4.5	Utilize existing roadways to meet mobility needs, and only consider additional travel lanes when other alternatives are not feasible.	CD [LRP]	Ongoing
4.6	Require new development to be designed with interconnected transportation modes and routes to complete a grid network.	CD [CP]	Short-term
4.7	Update the traffic mitigation fee program to fund necessary citywide circulation system and mobility improvements needed in conjunction with new development.	CD [LD]	Short-term
4.8	Implement the City's Neighborhood Traffic Management Program and update as necessary to improve livability in residential areas.	PW [E]	Ongoing
4.9	Identify, designate, and enforce truck routes to minimize the impact of truck traffic on residential neighborhoods.	PW [E]	Ongoing
4.10	Modify traffic signal timing to ensure safety and minimize delay for all users.	PW [E]	Short-term

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4.11	Refine level of service standards to encourage use of alternative modes of transportation while meeting state and regional mandates.	PW [E]	Short-term
4.12	Design roadway improvements and facility modifications to minimize the potential for conflict between pedestrians, bicycles, and automobiles.	PW [E]	Ongoing
4.13	Require project proponents to analyze traffic impacts and provide adequate mitigation in the form of needed improvements, in-lieu fee, or a combination thereof.	CD [LD]	Ongoing
4.14	Provide development incentives to encourage projects that reduce automobile trips.	CD [CP]	Short-term
4.15	Encourage the placement of facilities that house or serve elderly, disabled, or socioeconomically disadvantaged persons in areas with existing public transportation services and pedestrian and bicycle amenities.	CD [CP]	Ongoing
4.16	Install roadway, transit, and alternative transportation improvements along existing or planned multi-modal corridors, including primary bike and transit routes, and at land use intensity nodes.	PW [E]	Ongoing
4.17	Prepare and periodically update a Mobility Plan that integrates a variety of travel alternatives to minimize reliance on any single mode.	CD [LRP]	Short-term
4.18	Promote the development and use of recreational trails as transportation routes to connect housing with services, entertainment, and employment.	PW [P]	Ongoing
4.19	Adopt new development code provisions that establish vehicle trip reduction requirements for all development.	CD [LRP]	Short-term

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4.20	Develop a transportation demand management program to shift travel behavior toward alternative modes and services.	PW [E]	Mid-term
4.21	Require new development to provide pedestrian and bicycle access and facilities as appropriate, including connected paths along the shoreline and watercourses.	PW [E/P]	Short-term
4.22	Update the General Bikeway Plan as needed to encourage bicycle use as a viable transportation alternative to the automobile and include the bikeway plan as part of a new Mobility Plan.	PW [E]	Mid-term
4.23	Upgrade and add bicycle lanes when conducting roadway maintenance as feasible.	PW [E]	Ongoing
4.24	Require sidewalks wide enough to encourage walking that include ramps and other features needed to ensure access for mobility-impaired persons.	PW [E]	Short-term
4.25	Adopt new development code provisions that require the construction of sidewalks in all future projects, where appropriate.	CD [LRP]	Short-term
4.26	Establish a parking management program to protect the livability of residential neighborhoods, as needed.	CD [LRP]	Short-term
4.27	Extend stubbed-end streets through future developments, where appropriate, to provide necessary circulation within a developing area and for adequate internal circulation within and between neighborhoods. Require new developments in the North Avenue area, where applicable, to extend Norway Drive and Floral Drive to connect to Canada Larga Road; and connect the existing segments of Floral Drive. Designate the extension of Cedar Street between Warner Street and	PW [E]	Mid-term

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	south of Franklin Lane and the linking of the Cameron Street segments in the Westside community as high priority projects.		
4.28	Require all new development to provide for citywide improvements to transit stops that have sufficient quality and amenities, including shelters and benches, to encourage ridership.	PW [E]	Short-term
4.29	Develop incentives to encourage City employees and local employers to use transit, rideshare, walk, or bike.	HR	Mid-term
4.30	Work with public transit agencies to provide information to riders at transit stops, libraries, lodging, and event facilities.	PW [E]	Ongoing
4.31	Work with public and private transit providers to enhance public transit service.	PW [E]	Mid-term
4.32	Coordinate with public transit systems for the provision of additional routes as demand and funding allow.	PW [E]	Long-term
4.33	Work with Amtrak, Metrolink, and Union Pacific to maximize efficiency of passenger and freight rail service to the City and to integrate and coordinate passenger rail service with other transportation modes.	PW [E]	Mid-term
4.34	Lobby for additional transportation funding and changes to Federal, State, and regional transportation policy that support local decision-making.	PW [E]	Ongoing
4.35	The City shall pursue funding and site location for a multi-modal transit facility in coordination with VCTC, SCAT, U.P.R.R., Metrolink, Greyhound Bus Lines, and other forms of	PW [E]	Mid-term

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Number	Action	Lead Entity	Timeframe
	transportation.		
4.36	Require development along the following roadways – including noise mitigation, landscaping, and advertising – to respect and preserve views of the community and its natural context. • State Route 33 • U.S. HWY 101 • Anchors Way • Brakey Road • Fairgrounds Loop • Ferro Drive • Figueroa Street • Harbor Boulevard • Main Street • Navigator Drive • North Bank Drive • Poli Street/Foothill Road • Olivas Park Drive • Schooner Drive	CD [CP]	Ongoing

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	• Spinnaker Drive • Summit Drive • Telegraph Road – east of Victoria Avenue • Victoria Avenue – south of U.S. 101 • Wells Road		
4.37	Request that State Route 126 and 33, and U.S. HWY 101 be designated as State Scenic Highways.	CD [LRP]	Short-term
4.38	Continue to work with Caltrans to soften the barrier impact of U.S. HWY 101 by improving signage, aesthetics and undercrossings and overcrossings.	PW [E/P]	Ongoing
4.39	Maintain street trees along scenic thoroughfares, and replace unhealthy or missing trees along arterials and collectors throughout the City.	PW [P]	Ongoing
5. OUR SUSTAINABLE INFRASTRUCTURE			
5.1	Require low flow fixtures, leak repair, and drought tolerant landscaping (native species if possible), plus emerging water conservation techniques, such as reclamation, as they become available.	CD [CP]	Ongoing
5.2	Use natural features such as bioswales, wildlife ponds, and wetlands for flood control and water quality treatment when feasible.	PW [MS/P]	Ongoing
5.3	Demonstrate low water use techniques at community gardens and city-owned facilities.	PW [U/P]	Mid-term

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5.4	Update the Urban Water Management plan as necessary in compliance with the State 1983 Urban Water Management Planning Act.	PW [U]	Ongoing
5.5	Provide incentives for new residences and businesses to incorporate recycling and waste diversion practices, pursuant to guidelines provided by the Environmental Services Office.	PW [MS]	Ongoing
5.6	Require project proponents to conduct sewer collection system analyses to determine if downstream facilities are adequate to handle the proposed development.	PW [U]	Ongoing
5.7	Require project proponents to conduct evaluations of the existing water distribution system, pump station, and storage requirements in order to determine if there are any system deficiencies or needed improvements for the proposed development.	PW [U]	Ongoing
5.8	Locate new development in or close to developed areas with adequate public services, where it will not have significant adverse effects, either individually or cumulatively, on coastal resources.	CD [LRP]	Ongoing
5.9	Update development fee and assessment district requirements as appropriate to cover the true costs associated with development.	AS	Mid-term
5.10	Utilize existing waste source reduction requirements, and continue to expand and improve composting and recycling options.	PW [MS]	Mid-term
5.11	Increase emergency water supply capacity through cooperative tie-ins with neighboring suppliers.	PW [U]	Mid-term
5.12	Apply new technologies to increase the efficiency of the wastewater treatment system.	PW [U]	Mid-term

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5.13	Increase frequency of city street sweeping, and post schedules at key points within each neighborhood.	PW [MS]	Mid-term
5.14	Develop a financing program for the replacement of failing corrugated metal storm drain pipes in the City.	PW [MS]	Short-term
5.15	Establish assessment districts or other financing mechanisms to address storm drain system deficiencies in areas where new development is anticipated and deficiencies exist.	PW [MS]	Mid-term
5.16	Require new developments to incorporate stormwater treatment practices that allow percolation to the underlying aquifer and minimize offsite surface runoff utilizing methods such as pervious paving material for parking and other paved areas to facilitate rainwater percolation and retention/detention basins that limit runoff to pre-development levels.	CD [LD]	Ongoing
5.17	Require stormwater treatment measures within new development to reduce the amount of urban pollutant runoff in the Ventura and Santa Clara Rivers and other watercourses.	CD [LD]	Ongoing
5.18	Work with the Ventura Regional Sanitation District and the County to expand the capacity of existing landfills, site new landfills, and/or develop alternative means of disposal that will provide sufficient capacity for solid waste generated in the City.	PW [MS]	Long-term

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6. OUR ACTIVE COMMUNITY			
6.1	Develop new neighborhood parks, pocket parks, and community gardens as feasible and appropriate to meet citizen needs, and require them in new development.	PW [P]	Long-term
6.2	Require higher density development to provide pocket parks, tot lots, seating plazas, and other aesthetic green spaces.	CD [CP]	Short-term
6.3	Work with the County to plan and develop trails that link the City with surrounding open space and natural areas, and require development projects to include trails when appropriate.	PW [P]	Ongoing
6.4	Request Flood Control District approval of public access to unchannelized watercourses for hiking.	PW [P]	Mid-term
6.5	Seek landowner permission to allow public access on properties adjacent to open space where needed to connect trails.	PW [P]	Ongoing
6.6	Update plans for and complete the linear park system as resources allow.	PW [P]	Long-term
6.7	Work with the County of Ventura to initiate efforts to create public trails in the hillside area.	PW [P]	Mid-term
6.8	Update and require periodic reviews of the Park and Recreation Workbook as necessary to reflect City objectives and community needs.	PW [P]	Mid-term
6.9	Require dedication of land identified as part of the City's Linear Park System in conjunction with new development.	PW [P]	Ongoing

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6.10	Evaluate and incorporate, as feasible, linear park segments in the General Bikeway Plan.	PW [E]	Ongoing
6.11	Update standards for citywide public parks and open space to include an expanded menu of shared park types, and identify locations and potential funding sources for acquiring new facilities in existing neighborhoods.	PW [P]	Short-term
6.12	Update and carry out the Grant Park Master Plan.	PW [P]	Mid-term
6.13	Foster the partnership between the City and Fair Board to improve Seaside Park.	CD [ED]	Ongoing
6.14	Improve facilities at City parks to respond to the requirements of special needs groups.	PW [P]	Mid-term
6.15	Adjust and subsidize fees to ensure that all residents have the opportunity to participate in recreation programs.	CS [CR]	Short-term
6.16	Update the project fee schedule as necessary to ensure that development provides its fair share of park and recreation facilities.	PW [P]	Short-term
6.17	Update and create new agreements for joint use of school and City recreational and park facilities.	CS [CR] PW [P]	Mid-term
6.18	Offer programs that highlight natural assets, such as surfing, sailing, kayaking, climbing, gardening, and bird watching.	CS [CR]	Ongoing
6.19	Provide additional boating and swimming access as feasible.	PW	Long-term

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6.20	Earmark funds for adequate maintenance and rehabilitation of existing skatepark facilities, and identify locations and funding for new development of advanced level skatepark facilities.	PW [P]	Mid-term
6.21	Promote the use of City facilities for special events, such as festivals, tournaments, and races.	CS [CA]	Ongoing
6.22	Enter into concession or service agreements where appropriate to supplement City services.	PW	Ongoing
7. OUR HEALTHY AND SAFE COMMUNITY			
7.1	Work with interested parties to identify appropriate locations for assisted-living, hospice, and other care-provision facilities.	CS [SS]	Short-term
7.2	Provide technical assistance to local organizations that deliver health and social services to seniors, homeless persons, low-income citizens, and other groups with special needs.	CS [SS]	Ongoing
7.3	Participate in school and agency programs to: ♦ provide healthy meals, ♦ combat tobacco, alcohol, and drug dependency, ♦ distribute city park and recreation materials through schools, and ♦ distribute information about the benefits of proper nutrition and exercise.	CS [SS]	Ongoing
7.4	Enhance or create ordinances which increase control over ABC licensed premises.	PD	Mid-term
7.5	Investigate the creation of new land use fees to enhance funding of alcohol related enforcement, prevention and training efforts.	PD	Mid-term

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7.6	Adopt updated editions of the California Construction Codes and International Codes as published by the State of California and the International Code Council respectively.	FD [IS]	Ongoing
7.7	Require project proponents to perform geotechnical evaluations and implement mitigation prior to development of any site: • with slopes greater than 10 percent or that otherwise have potential for landsliding, • along bluffs, dunes, beaches, or other coastal features • in an Alquist-Priolo earthquake fault zone or within 100 feet of an identified active or potentially active fault, • in areas mapped as having moderate or high risk of liquefaction, subsidence, or expansive soils, • in areas within 100-year flood zones, in conformance with all Federal Emergency Management Agency regulations.	CD [CP/LD]	Ongoing
7.8	To the extent feasible, require new critical facilities (hospital, police, fire, and emergency service facilities, and utility "lifeline" facilities) to be located outside of fault and tsunami hazard zones, and require critical facilities within hazard zones to incorporate construction principles that resist damage and facilitate evacuation on short notice.	FD	Ongoing
7.9	Maintain and implement the Standardized Emergency Management System (SEMS) Multihazard Functional Response Plan.	FD	Ongoing

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Number	Action	Lead Entity	Timeframe
7.10	Require proponents of any new developments within the 100-year floodplain to implement measures, as identified in the Floodplain Ordinance, to protect structures from 100-year flood hazards (e.g., by raising the finished floor elevation outside the floodplain).	FD [IS]	Ongoing
7.11	Prohibit grading for vehicle access and parking or operation of vehicles within any floodway.	FD [IS]	Ongoing
7.12	Refer development plans to the Fire Department to assure adequacy of structural fire protection, access for firefighting, water supply, and vegetation clearance.	CD [CP]	Ongoing
7.13	Resolve extended response time problems by: • adding a fire station at the Pierpont/Harbor area, • relocating Fire Station #4 to the Community Park site, • increasing firefighting and support staff resources, • reviewing and conditioning annexations and development applications, and • require the funding of new services from fees, assessments, or taxes as new subdivisions are developed.	FD	Long-term
7.14	Educate and reinforce City staff understanding of the Standardized Emergency Management System for the State of California.	FD	Ongoing
7.15	Increase public access to police services by: • increasing police staffing to coincide with increasing population, development, and calls for	PD	Ongoing

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Number	Action	Lead Entity	Timeframe
	service, • increasing community participation by creating a Volunteers in Policing Program, and • require the funding of new services from fees, assessments, or taxes as new subdivisions are developed.		
7.16	Provide education about specific safety concerns such as gang activity, senior-targeted fraud, and property crimes.	PD	Ongoing
7.17	Establish a nexus between police department resources and increased service demands associated with new development.	PD	Mid-term
7.18	Continue to operate the Downtown police storefront.	PD	Ongoing
7.19	Expand Police Department headquarters as necessary to accommodate staff growth	PD	Mid-term
7.20	Require air pollution point sources to be located at safe distances from sensitive sites such as homes and schools.	FD [IS]	Short-term
7.21	Require analysis of individual development projects in accordance with the most current version of the Ventura County Air Pollution Control District Air Quality Assessment Guidelines and, when significant impacts are identified, require implementation of air pollutant mitigation measures determined to be feasible at the time of project approval.	FD [IS]	Ongoing
7.22	In accordance with Ordinance 93-37, require payment of fees to fund regional transportation demand	CD [LD]	Ongoing

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Number	Action	Lead Entity	Timeframe
	management (TDM) programs for all projects generating emissions in excess of Ventura County Air Pollution Control District adopted levels.		
7.23	Require individual contractors to implement the construction mitigation measures included in the most recent version of the Ventura County Air Pollution Control District Air Quality Assessment Guidelines.	PW [E]	Ongoing
7.24	Only approve projects involving sensitive land uses (such as residences, schools, daycare centers, playgrounds, medical facilities) within or adjacent to industrially designated areas if an analysis provided by the proponent demonstrates that the health risk will not be significant.	CD [CP]	Ongoing
7.25	Adopt new development code provisions that ensure uses in mixed-use projects do not pose significant health effects.	CD [LRP]	Short-term
7.26	Seek funding for cleanup of sites within the Brownfield Assessment Demonstration Pilot Program and other contaminated areas in West Ventura.	CD [ED]	Mid-term
7.27	Require proponents of projects on or immediately adjacent to lands in industrial, commercial, or agricultural use to perform soil and groundwater contamination assessments in accordance with American Society for Testing and Materials standards, and if contamination exceeds regulatory action levels, require the proponent to undertake remediation procedures prior to grading and development under the supervision of the County Environmental Health Division, County Department of Toxic Substances Control, or Regional Water Quality Control Board (depending	FD [IS]	Ongoing

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Number	Action	Lead Entity	Timeframe
	upon the nature of any identified contamination).		
7.28	Educate residents and businesses about how to reduce or eliminate the use of hazardous materials, including by using safer non-toxic equivalents.	PW [MS]	Ongoing
7.29	Require non-agricultural development to provide buffers, as determined by the Agriculture Commissioner's Office, from agricultural operations to minimize the potential for pesticide drift.	CD [CP]	Short-term
7.30	Require all users, producers, and transporters of hazardous materials and wastes to clearly identify the materials that they store, use, or transport, and to notify the appropriate City, County, State and Federal agencies in the event of a violation.	FD [IS]	Ongoing
7.31	Work toward voluntary reduction or elimination of aerial and synthetic chemical application in cooperation with local agricultural interests and the Ventura County agricultural commissioner.	FD [IS]	Mid-term
7.32	Require acoustical analyses for new residential developments within the mapped 60 decibel (dBA) CNEL contour, or within any area designated for commercial or industrial use, and require mitigation necessary to ensure that: • Exterior noise in exterior spaces of new residences and other noise sensitive uses that are used for recreation (such as patios and gardens) does not exceed 65 dBA CNEL, and • Interior noise in habitable rooms of new residences does not exceed 45 dBA CNEL with all windows closed.	FD [IS]	Ongoing

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Number	Action	Lead Entity	Timeframe
7.33	As funding becomes available, construct sound walls along U.S. 101, SR 126, and SR 33 in areas where existing residences are exposed to exterior noise exceeding 65 dBA CNEL.	PW [E]	Long-term
7.34	Request that sound levels associated with concerts at the County Fairgrounds be limited to 70 dBA at the eastern edge of that property.	CS	Short-term
7.35	Request the termination of auto racing at the County fairgrounds	CS	Short-term
7.36	Amend the noise ordinance to restrict leaf blowing, amplified music, trash collection, and other activities that generate complaints.	FD [IS]	Short-term
7.37	Use rubberized asphalt or other sound reducing material for paving and re-paving of City streets.	PW [E]	Ongoing
7.38	Update the Noise Ordinance to provide standards for residential projects and residential components of mixed-use projects within commercial and industrial districts.	CD [LRP]	Short-term
8.1	Work closely with schools, colleges, and libraries to provide input into site and facility planning.	CS	Ongoing
8.2	Organize a regional education summit to generate interest in and ideas about learning opportunities.	CS	Mid-term
8.3	Adopt joint-use agreements with libraries, schools, and other institutions to maximize use of educational facilities.	CS	Mid-term
8.4	Distribute information about local educational programs.	CS	Mid-term

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Number	Action	Lead Entity	Timeframe
8.5	Install infrastructure for wireless technology and computer networking in City facilities.	AS	Short-term
8.6	Establish educational centers at City parks.	PW [P] CS	Mid-term
8.7	Work with the State Parks Department to establish a marine learning center at the Harbor.	PW [P]	Long-term
8.8	Work with the Ventura Unified School District to ensure that school facilities can be provided to serve new development.	CD [LRP]	Ongoing
8.9	Complete a new analysis of community needs, rethinking the role of public libraries in light of the ongoing advances in information technology and the changing ways that individuals and families seek out information and life-long learning opportunities.	CS	Mid-term
8.10	Reassess the formal and informal relationships between our current three branch public libraries and school libraries – including the new Ventura College Learning Resource Center – as well as joint use of facilities for a broader range or compatible public, cultural, and educational uses.	CS	Mid-term
8.11	Develop a Master Plan for Facilities, Programs, and Partnerships to create an accessible, robust, and vibrant library for the 21st Century system, taking into consideration that circulation of books is no longer the dominant function but will continue to be an important part of a linked network of learning centers.	CS	Mid-term
8.12	Develop formal partnerships, funding, capital strategies, and joint use agreements to implement the	CS	Ongoing

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Number	Action	Lead Entity	Timeframe
	new libraries Master Plan.		
9. OUR CREATIVE COMMUNITY			
9.1	Require works of art in public spaces per the City's Public Art Program Ordinance.	CD [CP]	Mid-term
9.2	Sponsor and organize local art exhibits, performances, festivals, cultural events, and forums for local arts organizations and artists.	CS	Ongoing
9.3	Expand outreach and publicity by: ♦ promoting locally produced art and local cultural programs, ♦ publishing a monthly calendar of local art and cultural features, ♦ distributing the *State of the Arts* quarterly report, and ♦ offering free or subsidized tickets to events.	CS	Ongoing
9.4	Support the creative sector through training and other professional development opportunities.	CS	Short-term
9.5	Work with the schools to integrate arts education into the core curriculum	CS	Short-term
9.6	Promote the cultural and artistic expressions of Ventura's underrepresented cultural groups.	CS	Mid-term
9.7	Offer ticket subsidy and distribution programs and facilitate transportation to cultural offerings.	CS	Ongoing
9.8	Increase the amount of live-work development, and allow its use for production, display, and sale of	CD [LRP]	Ongoing

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Number	Action	Lead Entity	Timeframe
	art.		
9.9	Work with community groups to locate sites for venues for theater, dance, music, and children's programming.	CS [CR]	Mid-term
9.10	Provide incentives for preserving structures and sites that are representative of the various periods of the city's social and physical development.	CD [LRP]	Mid-term
9.11	Organize and promote multi-cultural programs and events that celebrate local history and diversity.	CS [CA]	Ongoing
9.12	Allow adaptive reuse of historic buildings.	CD [LRP]	Short-term
9.13	Work with community groups to identify locations for facilities that celebrate local cultural heritage, such as a living history Chumash village and an agricultural history museum.	CS [CA]	Long-term
9.14	Require archaeological assessments for projects proposed in the Coastal Zone and other areas where cultural resources are likely to be located.	CD [CP]	Ongoing
9.15	Suspend development activity when archaeological resources are discovered, and require the developer to retain a qualified archaeologist to oversee handling of the resources in coordination with the Ventura County Archaeological Society and local Native American organizations as appropriate.	CD [CP]	Ongoing
9.16	Pursue funding to preserve historic resources.	CS	Ongoing

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Number	Action	Lead Entity	Timeframe
9.17	Provide incentives to owners of eligible structures to seek historic landmark status and invest in restoration efforts.	CD [LRP]	Short-term
9.18	Require that modifications to historically-designated buildings maintain their character.	CD [CP]	Ongoing
9.19	For any project in a historic district or that would affect any potential historic resource or structure more than 40 years old, require an assessment of eligibility for State and federal register and landmark status and appropriate mitigation to protect the resource.	CD [CP]	Ongoing
9.20	Seek input from the City's Historic Preservation Commission on any proposed development that may affect any designated or potential landmark.	CD [CP]	Ongoing
9.21	Update the inventory of historic properties.	CD [LRP]	Ongoing
9.22	Create a set of guidelines and/or policies directing staff, private property owners, developers, and the public regarding treatment of historic resources that will be readily available at the counter.	CD [LRP]	Short-term
9.23	Complete and maintain historic resource surveys containing all the present and future components of the historic fabric within the built, natural, and cultural environments.	CD [LRP]	Ongoing
9.24	Create a historic preservation element.	CD [LRP]	Long-term
10. OUR INVOLVED COMMUNITY			
10.1	Conduct focused outreach efforts to encourage all members of the community – including youth, seniors, special needs groups, and non-English speakers – to participate in City activities.	CM [CE]	Short-term

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Number	Action	Lead Entity	Timeframe
10.2	Obtain public participation by seeking out citizens in their neighborhoods and gathering places such as schools, houses of worship and public spaces.	CM [CE]	Ongoing
10.3	Invite civic, neighborhood, and non-profit groups to assist with City project and program planning and implementation.	CD	Ongoing
10.4	Provide incentives for City staff to participate in community and volunteer activities.	HR	Short-term
10.5	Invite seniors to mentor youth and serve as guides at historical sites.	CS	Short-term
10.6	Offer internships in City governance, and include youth representatives on public bodies.	CS	Mid-term
10.7	Continue to offer the Ambassadors program to obtain citizens assistance with City projects.	PW	Ongoing
10.8	Utilize the City website as a key source of information and expand it to serve as a tool for civic engagement.	CM [CE]	Short-term
10.9	Publish an annual report that evaluates City performance in such areas as conservation, housing, and economic development.	CD	Mid-term
10.10	Continue to improve the user-friendliness of the media that communicate information about the City, including the website, cable channels, newsletters, kiosks, and water billing statements.	CM [CE]	Short-term
10.11	Establish a clear policy toward the scope, role, boundaries, and jurisdiction of neighborhood Community Councils citywide, with the objectives of strengthening their roles in decision-making.	CD [LRP]	Mid-term

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Number	Action	Lead Entity	Timeframe
10.12	Establish stronger partnerships with neighborhood Community Councils to set area priorities for capital investment, community policing, City services, commercial investment, physical planning, education, and other concerns, to guide both City policies and day-to-day cooperation and problem-solving.	CD [LRP]	Ongoing
10.13	Recognizing that neighborhood empowerment must be balanced and sustained by overall City policies and citywide vision and resources – establish a citywide Neighborhood Community Congress where local neighborhood Community Councils can collaborate and learn from each other.	CM[CE]	Mid-term
10.14	Establish clear liaison relationships to foster communication, training, and involvement efforts between the City, neighborhood Community Councils and other community partners, including the Ventura Unified School District and business, civic, cultural and religious groups.	CM [CE]	Short-term

ORDINANCE NO. 95-33

AN ORDINANCE OF THE PEOPLE OF THE CITY OF SAN BUENAVENTURA ADOPTING AN ORDINANCE AMENDING THE COMPREHENSIVE PLAN WITH RESPECT TO THE PRESERVATION OF AGRICULTURAL LANDS.

The people of the City of San Buenaventura do hereby ordain as follows:

Section 1. Findings and Purpose.

A. The protection of existing agricultural and watershed lands is of critical importance to present and future residents of the City of San Buenaventura (City of Ventura). Agriculture has been and remains the major contributor to the economy of the City and County of Ventura, creating employment for many people, directly and indirectly, and generating substantial tax revenues for the City.

B. In particular, the City of Ventura and surrounding area, with its unique combination of soils, micro-climate and hydrology, has become one of the finest growing regions in the world. Vegetable and fruit production from the County of Ventura and in particular production from the soils and silt from the Santa Clara and Ventura rivers have achieved international acclaim, enhancing the City's economy and reputation.

C. Uncontrolled urban encroachment into agricultural and watershed areas will impair agriculture and threaten the public health, safety and welfare by causing increased traffic congestion, associated air pollution, and potentially serious water problems, such as pollution, depletion, and sedimentation of available water resources. Such urban encroachment would eventually result in both the unnecessary, expensive extension of public services and facilities and inevitable conflicts between urban and agricultural uses.

D. The unique character of the City of Ventura and quality of life of City residents depend on the protection of a substantial amount of open space lands. The protection of such lands not only ensures the continued viability of agriculture, but also protects the available water supply and contributes to flood control and the protection of wildlife, environmentally sensitive areas, and irreplaceable natural resources.

E. The Resolution by which the City of Ventura adopted its Comprehensive Plan on August 28, 1989, Resolution No. 89-103, at page 4, contains in part the following "mitigation measures" in recognition of the importance of preserving agriculture resources:

> "Any potential significant adverse impacts are mitigated by substantially limiting the amount of agricultural land converted from an agricultural land use designation limiting the amount of prime farmland converted, and by making the various agricultural land areas designated for potential development subject to conditions which narrowly limit the possible land use."

F. The Comprehensive Plan sets out as Objective 4 (at II-9) the desire to:

"Continue to preserve agricultural and other open space lands within the City's Planning Area."

And, the Comprehensive Plan describes as the first Goal of its Resource Element (at II-3) the objective to:

> "Preserve agricultural and open space lands as a desirable means of shaping the City's internal and external form and size, and of serving the needs of residents."

G. The purpose of this initiative is to ensure that the Goals and Objectives of the Comprehensive Plan are inviolable by transitory short-term political decisions and that agricultural, watershed and open space lands are not prematurely or unnecessarily converted to other non-agricultural or non-open space uses without public debate and a vote of the people. Accordingly, the initiative ensures that until December 31, 2030, the general plan provisions governing agricultural land use designation and intent may not be change except by vote of the people. In addition, the initiative provides that any lands designated as "Agriculture Use", referring to both "Agricultural Use (not to be reconsidered until after the Year 2010" and Agricultural/Institutional" on the City of Ventura's General Plan "Land Use Plan Map" adopted by the City Council by Resolution 89-103 on August 28, 1989, as amended through February 1, 1995, will remain designated as Agricultural Use until December 31, 2030, unless the land is redesignated to another land use category by vote of the people, or redesignated by the City Council for the City of San Buenaventura pursuant to the procedures set forth in this initiative.

H. This initiative allows the City Council to redesignate agriculture lands only if certain if certain findings can be made, including (among other things) that the land is proven to be unsuitable for any form of agriculture and redesignation is necessary to avoid an unconstitutional taking of property without just compensation.

Section 2. General Plan Amendment.

The Agricultural Lands Preservation Initiative hereby reaffirms and readopts until December 31, 2030, The "Agricultural Use" designations as defined in the City of San Buenaventura Comprehensive Plan adopted August 28, 1989, as amended through February 1, 1995, at pages III-25 and III-26, with the modification that the "target date" is extended from 2010 until after December 31, 2030.

The following terminology shall replace the current "Agricultural Use" designation defined at page III-25 of The Plan:

Agricultural Use

The Agricultural Use (not to be reconsidered until after the Year 2030) category identifies those lands that are designated for agricultural use on the Land Use Plan Map.

The target date of 2030 associated with the Agricultural Use designation indicates a review date after which agriculturally designated lands may be reconsidered for urban uses. However, during the life of this plan as amended by initiative, it is intended that only agricultural uses are permitted on these lands, except as such lands may be appropriate to public open space and recreational usage. Furthermore, any updates to this Plan are not intended to imply that development would necessarily be appropriate at hat time.

In addition, the initiative hereby reaffirms and readopts until December 31, 2030, the "Agricultural" designations set forth on the of the City of Ventura Comprehensive Plan "Land Use Plan Map" adopted by the City Council on August 28, 1989, as amended through February 1, 1995, which map is incorporated herein by reference, modified, as appropriate, to delete the reference year 2010 and replace it with the reference year 2030.

Finally, the text of the Amendment Procedures of the City of Ventura Comprehensive Plan adopted August 28, 1989, as amended through February 1, 1995, (at XI-I) shall be amended to add a new subsection which provides:

Limitation on General Plan Amendments Relating to "Agricultural Use"

a) Until December 31, 2030, the provisions and designations governing the intent for lands designated "Agricultural Use" of the Land Use Element and Resource Element adopted on August 28, 1989, as amended through February 1, 1995, shall not be amended unless such amendment is approved by vote of the people.

b) All those lands designated as "Agricultural Use" in the City of Ventura Comprehensive Plan "Land Use Plan Map" adopted by the City Council on August 28, 1989 as amended through February 1, 1995, shall remain so designated until December 31, 2030 unless redesignated to another general plan land use category by vote of the people, or redesignated by the City Council pursuant to the procedures set forth in subsections c) or d), below.

c) Except as provided in subsection d), below, land designated as "Agricultural Use" may be redesignated by the City Council to a land use other than "Agricultural Use" as defined by the Comprehensive Plan adopted by the City Council on August 28, 1989, as amended through February 1, 1995, only if the City Council makes all of the following findings supported by the evidence:

   i) The land is immediately adjacent to areas developed in a manner comparable to the proposed use;

   ii) Adequate public services and facilities are available and have the capacity and capability to accommodate the proposed use;

   iii) The proposed use is compatible with agricultural uses, does not interfere with accepted agricultural practices, and does not adversely affect the stability of land use patterns in the area;

   iv) The land proposed for redesignation has not been used for agricultural purposes in the past 2 years and is unusable for agriculture due to its topography, drainage, flooding, adverse soil conditions or other physical reasons; and

v) The land proposed for redesignation pursuant to this subsection (c) does not exceed 40 acres for any one landowner in any calendar year, and one landowner may not obtain redesignation in the Comprehensive Plan of "Agricultural Use" land pursuant to this subsection (c) more often than every other year. Landowners with any unity of interest are considered one landowner for purposes of this limitation.

d) Land designated as "Agricultural Use" on the Land Use Plan Map may be redesignated to another land use category by the City Council if each of the following conditions are satisfied:

i) The City Council makes a finding that the application of the provisions of Section 2 (a) would constitute an unconstitutional taking of the landowners' property; and

ii) In permitting the redesignation, the City Council allows additional land uses only to the extent necessary to avoid said unconstitutional taking of the landowner's property.

e) Approval by a vote of the people is accomplished when a Comprehensive Plan amendment is placed on the ballot through any procedure provided for in the Election Code, and a majority of the voters vote in favor of it. Whenever the City Council adopts an amendment requiring approval by a vote of the people pursuant to the provisions of this subsection, the City Council's action shall have no effect until after such a vote is held and a majority of the voters vote in favor of it. The City Council shall follow the provisions of the Election Code in all matters pertaining to such an election.

Section 3. Implementation.

A. Upon the effective date of this initiative, the initiative shall be deemed inserted in the City of Ventura's Comprehensive Plan as an amendment thereof; except, that if the four amendments of the mandatory elements of the general plan permitted by state law for any given calendar year have already been utilized in 1995, prior to the effective date of this initiative, this Comprehensive Plan amendment shall be deemed inserted in the City's General Plan on January 1, 1996. At such time as this Comprehensive Plan amendment is deemed inserted in the City's Comprehensive Plan (hereinafter, the "insertion date") any provisions of the City's Zoning Ordinance inconsistent with that amendment shall not be enforced to the extent of the inconsistency. Within 180 days of the insertion date, the City shall complete

such revisions of its Comprehensive Plan, including, but not limited to, the Comprehensive Plan Land Use Plan Map adopted by the City Council on August 28, 1989, (as amended through February 1, 1995) and accompanying test, as are necessary to achieve consistency with all provisions of this initiative. Also, within 180 days of the insertion date, the City Council shall complete such revisions of its Zoning Ordinance and other land use regulations as are necessary to conform to and be consistent with all provisions of this initiative.

B. The provisions of this initiative shall prevail over any revisions to the City of Ventura's Comprehensive Plan as amended through February 1, 1995, or to the City of Ventura's Land Use Plan Map as amended through February 1, 1995 which conflict with the initiative. Except as provided in Section 4 below, upon the specific plans, tentative or final subdivision maps, parcel maps, conditional use permits, building permits or other ministerial or discretionary entitlements for use not yet approved or issued shall not be approved or issued unless consistent with the policies and provisions of this initiative.

Section 4. Exemptions for Certain Projects.

This initiative shall not apply to or affect any property owner whose property has acquired any of the following prior to its effective date:

A. A vested right pursuant to state law;

B. A validly approved and fully executed development agreement with the City; or

C. Approval of a vesting tentative map.

Section 5. Severability.

If any portion of this initiative is declared invalid by a court, the remaining portions are to be considered valid.

Section 6. Amendment or Repeal.

This initiative may be amended or repealed only by the voters at a general election.

STATE OF CALIFORNIA)
COUNTY OF VENTURA) ss
CITY OF SAN BUENAVENTURA)

I, BARBARA J. KAM, City Clerk of the City of San Buenaventura, California, do hereby certify that the foregoing Ordinance was adopted by the voters of the City of San Buenaventura at the General Municipal Election held on November 7, 1995 and subsequently declared adopted by the City Council of the City of San Buenaventura on November 27, 1995. The Ordinance shall take effect December 7, 1995. This ordinance shall not be repealed or amended except by a vote of the people, unless provision is otherwise made in the original ordinance.

Dated this 30th day of November, 1995.

Barbara J. Kam, CMC
City Clerk

Ventura Hillside Voter Participation Measure

The people of the City of San Buenaventura do ordain as follows:

Section 1. Title

This measure shall be known as the Ventura Hillside Voter Participation Measure.

Section 2. Purpose

The overall purpose of this measure is to allow City voters to participate in the review process relating to non-exempt development projects that may be proposed in a certain portion of the "Hillside Area" of the City as defined in the City's Comprehensive Plan Update to the Year 2010 (hereafter the "Comprehensive Plan"). The portion of the Hillside Area under consideration lies generally north of the City, constitutes an area approximately 9108 acres in size, and is further depicted as the "Hillside Voter Participation Area" indicated in Exhibit "A" attached hereto and made a part hereof. The proposed Hillside Voter Participation Area (also referred to from time to time hereafter as "HVP Area" or "HVPA") is outside the Ventura City limits, but it is within the "Planning Area" of the City of San Buenaventura as further indicated on Exhibit "A." The Comprehensive Plan Land Use Map currently designates the properties within the proposed Hillside Voter Participation Area as "Hillside Planned Residential" or "HPR" rather than "Agricultural" and, therefore, these properties are not subject to the Save Our Agricultural Resources ("SOAR") Initiative adopted by the voters in 1995.

In the recent past, some property owners within the proposed Hillside Voter Participation Area have publicly presented initial proposals to develop those properties with a combination of residential uses and open space and recreational areas proposed to include, among other things, hiking and equestrian trails for use by the public. In the course of public meetings and informational workshops discussing these proposals, it has become apparent that there is a high level of public concern over potential issues of scenic resource protection, open space and recreational opportunities, infrastructure needs, traffic circulation, and other development-related issues arising from any proposed changes in the use of this important part of the City's Planning Area. This measure, in recognition of this heightened public concern, is intended to provide the electorate of the City of San Buenaventura with an opportunity to vote on the approval of any such development proposals or any similar proposals to extend urban services to the Hillside Voter Participation Area or develop property in the Hillside Voter Participation Area with urbanized land uses.

More particularly, this measure proposes to amend the Comprehensive Plan of the City of San Buenaventura by adding a requirement that approvals for extensions of "urban services" (defined in the City's Hillside Management Program as the provision of domestic water and sewers) or any proposed "urbanized uses of land" (as defined herein) in the Hillside Voter Participation Area cannot be granted without prior approval by a majority vote of the electorate.

Section 3. Comprehensive Plan Amendment

The following text shall be inserted into the Land Use Element of the Comprehensive Plan at page 111-8 thereof:

Hillside Voter Participation Area

The electorate of the City of Ventura has adopted a Hillside Voter Participation Area (Ventura HVP Area). Its purpose, principles, implementation procedures, and methodologies for amendment are set forth in this Comprehensive Plan amendment.

A. PURPOSE

The City of Ventura Hillside Area, with its unique topography, viewsheds, watershed lands; its unique microclimate and hydrology, and its diversity of plant and wildlife resources, is one of the finest scenic resources in the Southern California region. The Comprehensive Plan recognizes the unique and important qualities and potential of the Hillside Area in, among other provisions, the declaration of specialized Objectives and Policies for the Hillside Area in the Resources Element of the Plan and the Plan's requirements for continuing operation of, and compliance with, the City's Hillside Management Program.

This Comprehensive Plan amendment is intended to provide for an increased level of public awareness and participation in the development review process applicable to that portion of the Hillside Area described and depicted in Exhibit "A" as the "Hillside Voter Participation Area." It is further intended to provide assurance to the public that any proposed development in the Hillside Voter Participation Area appropriately takes into account the Area's unique combination of viewshed, watershed, open space, scenic area, and environmentally sensitive habitat, and that agricultural, viewshed, watershed, and open space lands in the Hillside Voter Participation Area are not converted to urban or other non-open space uses without public discussion and a vote of the people. Increasing citizen participation in the development review process through the establishment of a Hillside Voter Participation Area enhances the City's sense of community, allows for development unique to the City of Ventura, and promotes the efficient use of the City's infrastructure.

More specifically, this Comprehensive Plan amendment is intended to provide an opportunity for the public to be involved in insuring that any development projects proposed in the Hillside Voter Participation Area, shall, at a minimum:

1. Maintain the scenic character of the hillsides in areas of future development, by preserving significant natural landmarks and scenic ridgelines and slopes.

2. Provide increased recreational opportunities for existing and future hillside and other City residents, by improving access to existing parks and establishing additional parks or open, non-developed areas in conjunction with future hillside development.

3. Maximize public access to hillside open space and recreation areas, by establishing a system of linear parks and hiking trails along scenic ridges and barrancas.

4. Minimize the impact of hillside development on sensitive natural habitats and historical or archaeological resources.

B. PRINCIPLES

Inappropriate urban encroachment into Hillside open space, viewshed, watershed, scenic areas, and biological resource areas would have the potential to impact sensitive environmental areas, unwarrantedly intrude on open space, diminish the quality of life and threaten the public health, safety and welfare by leading to increased traffic congestion, associated air pollution, erosion, alteration of sensitive lands in watershed areas and causing potentially serious water problems, such as pollution, depletion and sedimentation of available water resources not only for the City of Ventura, but for its jurisdictional neighbors. Inappropriate urban encroachment could further result in the unwarranted extension of public services and facilities into sensitive areas.

The unique character of the City of Ventura and quality of life of City residents depends on the appropriate protection of the Hillside Area's substantial amount of open space, viewshed, watershed, scenic resources, and biological resources. The increased public awareness and involvement in the fate of such lands through the implementation of this Comprehensive Plan amendment will provide the public a special opportunity to assure that future generations of Ventura citizens will not be deprived of the benefits of access to a viable water supply, flood and erosion control, protection of viewsheds, wildlife, environmentally sensitive areas, open space and recreational areas, and irreplaceable natural resources.

C. IMPLEMENTATION

(1) There is hereby established a Ventura Hillside Voter Participation Area (Ventura HVP Area). The Ventura HVP Area is that portion of the Hillside Area delineated and depicted in Exhibit "A" of this Comprehensive Plan amendment (hereafter, the "HVP Area Map"). As shown on the HVP Area Map, the southern boundary of the HVP Area generally follows the northern segment of the City's incorporated limit as established by the Local Agency Formation Commission for the City of Ventura, except as the HVP boundary line runs northerly of some small residential lots on or near Foothill Road west of Arroyo Verde Park as further depicted on Exhibit "A." East of Harmon Barranca, the HVP Area boundary generally follows the alignment of Foothill Road eastward to the boundary of the City's Planning Area. The northerly boundary of the HVP Area continues, generally, as the northern boundary of the City's Planning Area. The westerly boundary of the HVP Area alternately follows the City limit boundary or Sphere of Influence boundary easterly of the North Avenue area. The foregoing narrative description is intended to be general in nature and all of the foregoing is more particularly depicted and described in Exhibit "A'

Insofar as the HVP Area boundary described and depicted in this Comprehensive Plan amendment, including Exhibit "A" hereto, is said or shown to be coterminous with either the City's incorporated limit or the City's Sphere of Influence boundary, or with the boundary of the City's Planning Area, such references are intended to be, and shall be construed to be, the location of the City limit boundary or Sphere of Influence boundary or boundary of the City's Planning Area. as applicable, as each of those boundaries are established for the City of Ventura as of January 1, 2001. Although the HVP Area boundary is established, in part, in generally the same location as the City limit boundary, or in some instances, the Sphere of Influence boundary, the establishment of the HVP Area boundary is not intended to and shall in no way inhibit the Local Agency Formation Commission from changing or altering the City limit boundary or Sphere of Influence boundary in accordance with State law. The boundary of the HVP Area, although incidentally coterminous as of one point in time with the City limit boundary or Sphere of Influence boundary or boundary of the City's Planning Area, is independent from these boundaries in legal significance and purpose. While the City limit boundary or Sphere of Influence boundary may be, from time to time, altered by the Local Agency Formation Commission, or the boundary of the City's Planning Area may be changed, the HVP Area boundary shall not be changed except as provided herein.

(2) Until December 31, 2030, the City of Ventura shall not extend urban services into, and shall not authorize urbanized uses of land within, the Ventura Hillside Voter Participation Area unless otherwise authorized by a vote of the people, except for the purpose of construction of public potable water facilities, public parks or other city government facilities or as otherwise provided or excepted herein. Upon the effective date of this Hillside Voter Participation Area Comprehensive

Plan amendment, the City and its departments, boards, commissions, officers and employees shall not grant, or by inaction allow to be approved by operation of law, any Comprehensive Plan amendment, rezoning, specific plan, subdivision map, conditional use permit, building permit or any other ministerial or discretionary entitlement, which is inconsistent with the purposes of this Comprehensive Plan amendment, unless in accordance with the amendment procedures of Section 4 of this Comprehensive Plan amendment.

(3) "Urbanized uses of land" shall mean any development that would require the establishment of new community sewer systems or the significant expansion of existing community sewer systems; or, would result in the creation of residential densities greater than one primary residential unit per 40 acres in area; or, would result in the establishment of commercial or industrial uses that are neither agriculturally-related nor related to the production of mineral resources.

(4) The Land Use Map is amended to reflect the existence of the Ventura Hillside Voter Participation Area as generally described in paragraph (1) above and as depicted in Exhibit "A," attached hereto.

(5) The Hillside Voter Participation Area, as defined herein, may not be amended, altered, revoked or otherwise changed prior to December 31, 2030, except by vote of the people or by the City Council pursuant to the procedures set forth in Section 4 of this Comprehensive Plan amendment. For purposes of this Ordinance, approval by a vote of the people is accomplished when a Comprehensive Plan amendment is placed on the ballot through any procedure provided for in the Election Code, and a majority of the voters vote in favor of it. Whenever the City Council adopts an amendment requiring approval by a vote of the people pursuant to the provisions of this subsection, the City Council's action shall have no effect until after such a vote is held and a majority of the voters vote in favor of it. The City Council shall follow the provisions of the Election Code in all matters pertaining to such an election.

Section 4. Changes to Area: Procedures.

Until December 31, 2030, the foregoing Purposes, Principles and Implementation provisions of this Comprehensive Plan amendment, and the Hillside Voter Participation Area may be amended only by a vote of the people commenced pursuant to the initiative process by the public, or pursuant to the procedures set forth below:

A. The City Council may amend the boundary of the Hillside Voter Participation Area depicted on Exhibit "A" if it finds such amendment to be in the public interest, provided that the amended boundary enlarges said Hillside Voter Participation Area established by this Comprehensive Plan amendment.

B. The City Council, following at least one public hearing for presentation by an applicant and the public, and after compliance with the California Environmental Quality Act, may amend the Hillside Voter Participation Area described herein, based on substantial evidence in the record, if the City Council makes each of the following findings:

(1) Application of the provisions of subsections (A) or (B) of the amendment procedures set forth in this Section 4 are unworkable and failure to amend the Hillside Voter Participation Area would constitute an unconstitutional taking of a landowner's property for which compensation would be required or would deprive the landowner of a vested right; and

(2) The amendment and associated land use designations will allow additional land uses only to the minimum extent necessary to avoid said
unconstitutional taking of the landowner's property or to give effect to the vested right.

C. The City Council, following at least one public hearing for presentations by an applicant and the public, and after compliance with the California Environmental Quality Act, may place any amendment to the Hillside Voter Participation Area or the provisions of this Comprehensive Plan amendment on the ballot pursuant to the mechanisms provided by state law.

D. The Comprehensive Plan may be reorganized and individual provisions, including the provisions of this ordinance, maybe renumbered or reordered in the course of ongoing updates of the Comprehensive Plan in accordance with the requirements of state law.

Section 5. No Changes to Save Our Agricultural Resources Initiative

Any restrictions imposed upon the City of San Buenaventura limiting the City's ability to redesignate, or allow development of, property designated "Agricultural" that are in effect as a result of the "SOAR" initiative approved by the voters in 1995 and adopted by the City Council as Ordinance No. 95-33 shall remain in full force and effect and shall not be amended, modified, altered, or abridged by the adoption of this ordinance.

Section 6. Exemptions:

The provisions of this ordinance do not apply to:

A. Construction or reconstruction of, or related to, public potable water facilities, public: parks or other city government facilities; or

B. Construction or reconstruction of no more than one residential dwelling unit, and incidental uses or structures related thereto, on an individual parcel of land that is lawfully established of record as of the effective date of this Comprehensive Plan amendment and that is contiguous to the City's incorporation boundary but only to the extent that such a legally established parcel is developed with, or proposed to be developed with, no more than one residential dwelling unit; or

C. Any development that would result in the creation of residential densities equal to or less than one primary residential unit per 40 acres in area; or, would result in the establishment of commercial or industrial uses that are agriculturally-related or related to the production of mineral resources; or

D. Any development project that has obtained, as of the effective date of this Comprehensive Plan amendment, a vested right pursuant to state or local law; or

E. Uses that are "incidental' (as the City's Zoning Ordinance defines "incidental uses") to uses lawfully established as of the effective date of this Comprehensive Plan amendment.

Section 7. Interpretation

This ordinance shall be broadly construed in order to achieve the purposes stated in this ordinance. It is the intent of the voters that the provisions of this measure shall be interpreted by the City and others in a manner that promotes public participation in decision-making relating to future development proposals within in the Hillside Voter Participation Area.

Section 8. Insertion Date

A. Upon the effective date of this ordinance, Sections 3, 4, 5, 6, and 7 of this ordinance shall be deemed inserted in the Comprehensive Plan and the Land Use Map referred to in Part C of Section 3 shall be deemed amended even though the reprinting may not occur until it can be carried out by the staff of the City of San Buenaventura.

B. The Comprehensive Plan in effect at the time the City Council decided to place this measure on the ballot, and the Comprehensive Plan as amended by this ordinance, comprise an integrated, internally consistent and compatible statement of policies for the City of San Buenaventura. In order to ensure that the Comprehensive Plan remains an integrated, internally consistent and compatible statement of policies and to ensure that the actions of the voters in enacting this ordinance are given effect, any provision of the Comprehensive Plan that is adopted between July 23, 2001 and the effective date of this ordinance, to the extent that such provision is inconsistent with this ordinance, shall be amended as soon as possible and in the manner and time required by state law to ensure consistency between such provision and Section 3 of this ordinance. In the alternative, such interim-enacted inconsistent provisions shall be repealed.

Section 9. Amendment or Repeal

This ordinance may be amended or repealed only by the voters of the City of San Buenaventura at an election held in accordance with state law, except as expressly provided by Section 4 herein.

The people of the City of San Buenaventura do ordain as follows:

Section 1. Title

This measure shall be known as the Ventura Community Park SOAR Amendment.

Section 2. Purpose

The purpose of this measure is to allow the City to develop a Community Park on a parcel of property located at the northwest corner of the intersection of Kimball Road and Telephone Road. The subject property, which is approximately 100 acres in size, is further described in Exhibit "A," attached hereto and made a part hereof, and is hereafter referred to as the "Property." Most of the Property is outside the Ventura City limits but within the "Planning Area" of the City of San Buenaventura and therefore covered by the City's Comprehensive Plan Update to the Year 2010 (hereafter the "Comprehensive Plan"). The Property is currently designated "Agricultural" under the Comprehensive Plan and, therefore, also subject to the 1995 Save Our Agricultural Resources ("SOAR") Initiative.

The City is proposing to develop the Property with community-oriented public park facilities that may include, among other things, athletic fields, an aquatic facility, a community center and other related buildings and structures for use by the public. If this measure is approved, the City may also construct and operate a fire station on a portion of the Property.

This initiative proposes to amend the Comprehensive Plan of the City of San Buenaventura, by changing the designation of the Property in the Comprehensive Plan Land Use Plan Map from "Agricultural" (or "A") to "Parks" (or "P"). This will allow the City of San Buenaventura to potentially develop the Property with a Community Park without being restricted by the SOAR Initiative.

Section 3. Comprehensive Plan Amendment

Part A.

The following paragraph titled “Parks Uses” is hereby added to the Land Use Element of the Comprehensive Plan, more particularly, to the provisions of the Serra Community Intent and Rationale Statement on page III-96, to read as follows:

“Parks Uses: The Parks Land Use Plan designation is applied to an approximately 100-acre site at the northwest corner of Kimball Road and Telephone Road for the purpose of developing a multi-purpose community-oriented public park on this site. It is further intended that this site should be zoned to the “P” (Parks) zone if and when it is annexed to the City. Design Review should be carried out by the City's Planning Commission prior to the development of any Recreation Services use types on the site to assure that the range of community park uses potentially permitted on the site by the "P" zone are well integrated on the site and compatible with adjacent land uses.”

Part B.

The Property is deleted from the discussion of “Agricultural Uses” in the Serra Community provisions of the Land Use Element of the Comprehensive Plan. To that end, the final paragraph with the heading “Agricultural Use” beginning at the bottom of page III-95 and ending at the top of page III-96 is hereby revised to read as follows:

“Agricultural Use: A 297-acre area between Telephone Road and the Southern Pacific Railroad and a 172-acre area between Bristol Road and the Santa Clara River are designated Agricultural Use, not to be reconsidered until after the Year 2010, to preserve their existing agricultural character.”

Part C.

The Land Use Plan Map incorporated in the Comprehensive Plan is hereby amended, and official copies thereof shall be revised by City staff, to reflect the foregoing amendments to the text of the Land Use Element.

Section 4. Zoning

Upon annexation to the City of San Buenaventura, the zoning classification for the Property shall be "P" (Parks) and the Official Zoning District Map incorporated in the Zoning Ordinance shall, by this Measure, be amended, and official copies thereof shall be revised by City staff, to reflect the foregoing zone change to the Property.

Section 5. Save Open-Space and Agricultural Resources

Any restrictions imposed upon the City of San Buenaventura limiting the City's ability to redesignate, or allow development of, property designated "Agricultural" that are in effect on the day that this Initiative is approved by the voters shall remain in full force and effect except as to the Property. The City of San Buenaventura may allow development of a community park on the Property in accordance with this ordinance.

Section 6. Interpretation

This ordinance shall be broadly construed in order to achieve the purposes stated in this ordinance. It is the intent of the voters that the provisions of this ordinance shall be interpreted by the City of San Buenaventura and others in a manner that facilitates the development of a community park on the Property in accordance with the purposes of this ordinance.

Section 7. Insertion Date

Part A. Upon the effective date of this ordinance, Part A and Part B of Section 3 of this ordinance shall be deemed inserted in the Comprehensive Plan and the Land Use Map referred to in Part C of Section 3 shall be deemed amended even though the reprinting may not occur until it can be carried out by the staff of the City of San Buenaventura.

Part B. The Comprehensive Plan in effect at the time the City Council decided to place this measure on the ballot, and the Comprehensive Plan as amended by this ordinance, comprise an integrated, internally consistent and compatible statement of policies for the City of San Buenaventura.

In order to ensure that the Comprehensive Plan remains an integrated, internally consistent and compatible statement of policies and to ensure that the actions of the voters in enacting this ordinance are given effect, any provision of the Comprehensive Plan that is adopted between [the date the City Council decided to place this measure on the ballot] and the effective date of this ordinance, to the extent that such provision is inconsistent with this ordinance, shall be amended as soon as possible and in the manner and time required by state law to ensure consistency between such provision and Section 3 of this ordinance. In the alternative, such interim-enacted inconsistent provisions shall be repealed.

Section 8. Amendment or Repeal

Section 3 and Section 4 of this ordinance may be amended or repealed only by the voters of the City of San Buenaventura at an election held in accordance with state law.

The people of the City of San Buenaventura do ordain as follows:

Section 1. Title

This ordinance shall be known as the First Assembly of God Land Initiative.

Section 2. Purpose

The purpose of this ordinance is to allow the First Assembly of God (hereafter "Church") to develop a property located at the northwest corner of the intersection of Montgomery Avenue and Northbank Drive. Such property is 25.59 acres and is further described in Exhibit A, attached hereto and made a part hereof, and is hereafter referred to as "Property". The Church wishes to develop the Property in accordance with City of San Buenaventura Ordinance No 95-33 (commonly known as "SOAR") guidelines for a sanctuary, related Church buildings, and athletic fields for use by the community of San Buenaventura.

Since the Property is within the sphere of influence of the City of San Buenaventura, this ordinance (1) amends the Comprehensive Plan Update to the Year 2010 (hereafter the "General Plan") of the City of San Buenaventura, and (2) prezones the Property to the R-1 Single Family zone with a subzone of R-1-1AC. This will allow the City of San Buenaventura to annex the Property with a restricted land use that is compatible with the Church's development of the Property.

Section 3. General Plan Amendment

Part A.

The second paragraph under the heading "Residential Uses" appearing on page III-94 of the General Plan describes the areas that may be used for low-density, single family homes in the Serra Community area of the City of San Buenaventura. The single family use (designated as SF in the General Plan) is the most restrictive land use that will allow the Church to build a sanctuary, related church buildings, and athletic fields. Section 4 of this initiative will further restrict the Property by pre-zoning the Property and requiring a minimum of one acre for each parcel. This will make the Property unattractive for single family development but still acceptable for the Church sanctuary, related Church buildings, and athletic fields. This ordinance adds the Church's 25.59 acre parcel to the SF land use.

The second paragraph under the heading "Residential Uses" appearing on page III-94 of the General Plan is hereby amended to read as follows:

"The SF category is applied to an approximately 3-acre site at the southeast corner of Henderson and Petit Avenue, a 1.7-acre site southerly of Darling Road extended, and a 25.59-acre site located at the northwest corner of Montgomery Avenue and Northbank Drive."

Part B.

The final paragraph with the heading "Agricultural Use" beginning at the bottom of page III-95 and ending at the top of page III-96 of the General Plan describes that portion of the Serra Community area of the City of San Buenaventura which may only be used for agricultural uses. This ordinance deletes the Church's 25.59 acre parcel from the agricultural use category.

The final paragraph with the heading "Agricultural Use" beginning at the bottom of page III-95 and ending at the top of page III-96 of the General Plan is hereby amended to read as follows:

"Agricultural Use: A 100-acre site at the northwest corner of Kimball Road and Telephone, a 297-acre area between Telephone Road and the Southern Pacific Railroad except for the 25.59-acre site located at the northwest corner of Montgomery Avenue and Northbank Drive, and a 172-acre area between Bristol Road and the Santa Clara River are designated Agricultural Use, not to be reconsidered until after the Year 2010, to preserve their existing agricultural character."

Part C.

The map of the Land Use Plan contained in the General Plan shall be redrafted to reflect the foregoing amendments.

Section 4. Zoning

The most restrictive zoning in the City of San Buenaventura which will allow the Church to build a sanctuary, related Church buildings, and athletic fields on the Property is an R-1 Single Family zone with a subzone of R-1-1AC. The R-1-1AC subzone restricts the Property by requiring a minimum of one acre for each parcel. This will make the Property unattractive for single family development but still acceptable for the Church's sanctuary, related Church buildings, and athletic fields.

Therefore, upon annexation of the Property to the City of San Buenaventura the zoning designation for the Property shall be the R-1 Single Family zone with a subzone of R-1-1AC.

Section 5. Save Open-Space and Agricultural Resources

Any restrictions imposed upon he City of San Buenaventura limiting the City's ability to annex property and allow development of such property shall remain in full force and effect except as to the 25.59-acres of the Property.

Section 6. Construction

This ordinance shall be broadly construed in order to achieve the purposes stated in this ordinance. It is the intent of the voters that the provisions of this ordinance shall be interpreted by the City of San Buenaventura and others in a manner that facilitates the development of the Property in accordance with the purposes of this ordinance.

Section 7. Insertion Date

Part A. Upon the effective date of this ordinance, Part A and Part B of Section 3 of this ordinance shall be deemed inserted in the General Plan and the Land Use Map referred to in Part C of Section 3 shall be deemed amended even though the reprinting may not occur until deemed convenient by the City of San Buenaventura.

Part B. The General Plan in effect at the time the Notice of Intention to circulate this initiative was submitted to the City Clerk of the City of San Buenaventura, and the General Plan as amended by this ordinance, comprise an integrated, internally consistent and compatible statement of policies for the City of San Buenaventura. In order to ensure that the General Plan remains an integrated, internally consistent and compatible statement of policies and to ensure that the actions of the voters in enacting this ordinance are given effect, any provision of the General Plan that is adopted between the Notice of Intention and the effective date of this ordinance, to the extent that such provision is inconsistent with this ordinance, shall be amended as soon as possible and in the manner and time required by state law to ensure consistency between such provision and Section 3 of this ordinance. In the alternative, such interim-enacted inconsistent provisions shall be repealed.

Section 8. Amendment or Repeal

Section 3 and Section 4 of this ordinance may be amended or repealed only by the voters of the City of San Buenaventura at an election held in accordance with state law.

EXHIBIT "A"

PARCEL 1:

That portion of Subdivision 98 of Rancho Santa Paula y Saticoy, in the county of Ventura, state of California, as per map recorded in book "A" pag3 290 of Miscellaneous Records (Transcribed Records from Santa Barbara County), in the office of the county recorder of said county, described as follows:

Beginning at the point of intersection of the centerline of the right of way of the Southern Pacific Railroad and the boundary line between Subdivisions 98 and 99 of said Rancho Santa Paula y Saticoy; thence from said point of beginning,

1st: - North 10° 30' West 9.482 chains, more or less, to the southeast corner of that certain Parcel of land conveyed to Charles H. Fowler, by deed dated March 18, 1892, recorded in book 36 page 86 of Deeds; thence,

2nd: - South 79º 30' West 19.25 chains, along the south line of said lands of Charles H. Fowler, to the northeast corner of that certain Parcel of land as conveyed to Emma J. Tyler, by deed dated June 20, 1894, recorded in book 43 page 90 of Deeds; thence,

3rd: - South 10º 30' East 18.982 chains, more or less, along the east line of said lands of Emma J. Tyler, to a point in the centerline of the right of way of the Southern Pacific Railroad; thence along same,

4th: - North 53º 15' East 22.57 chains, more or less, to the point of beginning.

EXCEPT a strip of parcel of land 50 feet wide lying adjoining and immediately west of the east line of the above described land, conveyed to the County of Ventura, as a public highway, by deed recorded July 12, 1889, in book 28 page 338 of Deeds.

ALSO EXCEPT that portion thereof conveyed to the Southern Pacific Railroad Company by deed recorded January 27, 1887 in book 18 page 146 of Deeds.

RESERVING unto the grantor herein, all oil, gas and mineral rights in and to said land, without however, any right of surface entry in and to a depth of 500 feet.

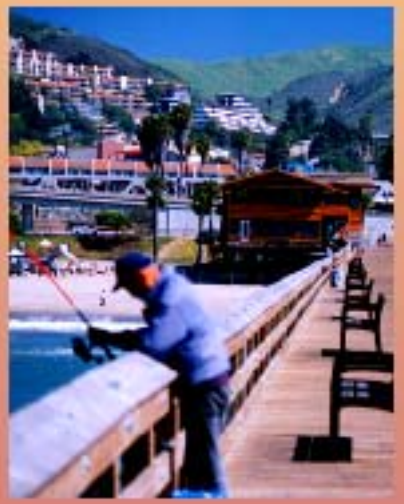
PARCEL 3:

That certain parcel in Lot 99 of the Rancho Santa Paula y Saticoy, marked “not a part of this subdivision” on the map of Tract No. 1333-1, in the City of San Buenaventura, county of Ventura, state of California, as per map recorded in book 30 page 51 of Maps, in the office of the county recorder of said county, and lying northwesterly of the Southern Pacific Railroad right of way, easterly of Bristol Road and southwesterly of Montgomery Avenue, as shown on said map.

RESERVING unto the grantor herein, all oil, gas and mineral rights in and to said land, without however, any right of surface entry in and to a depth of 500 feet from the surface thereof.

ventura's general plan

ATTACHMENTS



"The desire for community is a constant of human nature."

— Steven Price
Urban Advantage
Berkeley, California

CITY OF
VENTURA

21ST CENTURY TOOL KIT

Prelude

The 2005 Ventura General Plan envisions a new direction to protect and preserve its citizens' quality of life. This direction is based on the recognition that zoning and land development, as practiced for the past several decades, has not served our citizens, our city, or our environment as well as it should.

Currently, the two most successful movements created to alleviate this situation are "Smart Growth" and "New Urbanism." Smart Growth is a government initiated approach against sprawl that addresses underlying policy from the top-down, and is primarily marketed by government and similar agencies. New Urbanism is a grass roots, market response to outdated zoning and land use policy as it impacts development and the physical properties of the public realm. Its chief advocates are architects and town designers.

Smart Growth grew out of early New Urbanist work, and both are concerned with the real outcomes of the built environment and how it affects communities environmentally, economically, culturally, and socially.

The Ahwahnee Principles and the Charter for the New Urbanism, listed below, were created early on as "constitutions" that governed these movements. Both are valuable tools that Ventura would be wise to include in it's 21st Century Tool Kit to understand and solve long-standing problems associated with growth and change.

AHWAHNEE PRINCIPLES

Preamble:

Existing patterns of urban and suburban development seriously impair our quality of life. The symptoms are: more congestion and air pollution resulting from our increased dependence on automobiles, the loss of precious open space, the need for costly improvements to roads and public services, the inequitable distribution of economic resources, and the loss of a sense of community. By drawing upon the best from the past and the present, we can plan communities that will more successfully serve the needs of those who live and work within them. Such planning should adhere to certain fundamental principles.

Community Principles

1. All planning should be in the form of complete and integrated communities containing housing, shops, work places, schools, parks and civic facilities essential to the daily life of the residents.

2. Community size should be designed so that housing, jobs, daily needs and other activities are within easy walking distance of each other.
3. As many activities as possible should be located within easy walking distance of transit stops.
4. A community should contain a diversity of housing types to enable citizens from a wide range of economic levels and age groups to live within its boundaries.
5. Businesses within the community should provide a range of job types for the community's residents.
6. The location and character of the community should be consistent with a larger transit network.
7. The community should have a center focus that combines commercial, civic, cultural and recreational uses.
8. The community should contain an ample supply of specialized open space in the form of squares, greens and parks whose frequent use is encouraged through placement and design.
9. Public spaces should be designed to encourage the attention and presence of people at all hours of the day and night.
10. Each community or cluster of communities should have a well-defined edge, such as agricultural greenbelts or wildlife corridors, permanently protected from development.
11. Streets, pedestrian paths and bike paths should contribute to a system of fully-connected and interesting routes to all destinations. Their design should encourage pedestrian and bicycle use by being small and spatially defined by buildings, trees and lighting; and by discouraging high speed traffic.
12. Wherever possible, the natural terrain, drainage and vegetation of the community should be preserved with superior examples contained within parks or greenbelts.
13. The community design should help conserve resources and minimize waste.
14. Communities should provide for the efficient use of water through the use of natural drainage, drought tolerant landscaping and recycling.
15. The street orientation, the placement of buildings and the use of shading should contribute to the energy efficiency of the community.

Regional Principles

1. The regional land-use planning structure should be integrated within a larger transportation network built around transit rather than freeways.
2. Regions should be bounded by and provide a continuous system of greenbelt/wildlife corridors to be determined by natural conditions.
3. Regional institutions and services (government, stadiums, museums, etc.) should be located in the urban core.
4. Materials and methods of construction should be specific to the region, exhibiting a continuity of history and culture and compatibility with the climate to encourage the development of local character and community identity.

Implementation Principles

1. The general plan should be updated to incorporate the above principles.
2. Rather than allowing developer-initiated, piecemeal development, local governments should take charge of the planning process. General plans should designate where new growth, infill or redevelopment will be allowed to occur.

3. Prior to any development, a specific plan should be prepared based on these planning principles.
4. Plans should be developed through an open process and participants in the process should be provided visual models of all planning proposals.

CONGRESS FOR THE NEW URBANISM

THE CONGRESS FOR THE NEW URBANISM views disinvestment in central cities, the spread of placeless sprawl, increasing separation by race and income, environmental deterioration, loss of agricultural lands and wilderness, and the erosion of society's built heritage as one interrelated community building challenge.

WE STAND for the restoration of existing urban centers and towns within coherent metropolitan regions, the reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of our built legacy.

WE RECOGNIZE that physical solutions by themselves will not solve social and economic problems, but neither can economic vitality, community stability, and environmental health be sustained without a coherent supportive physical framework.

WE ADVOCATE the restructuring of public policy and development practices to support the following principles: neighborhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice.

WE REPRESENT a broad-based citizenry, composed of public and private sector leaders, community activists, and multidisciplinary professionals. We are committed to reestablishing the relationship between the art of building and the making of community, through citizen-based participatory planning and design.

WE DEDICATE ourselves to reclaiming our homes, blocks, streets, parks, neighborhoods, districts, towns, cities, regions, and environment.

We assert the following principles to guide public policy, development practice, urban planning, and design:

The region: Metropolis, city, and town

1. Metropolitan regions are finite places with geographic boundaries derived from topography, watersheds, coastlines, farmlands, regional parks, and river basins. The metropolis is made of multiple centers that are cities, towns, and villages, each with its own identifiable center and edges.

2. The metropolitan region is a fundamental economic unit of the contemporary world. Governmental cooperation, public policy, physical planning, and economic strategies must reflect this new reality.

3. The metropolis has a necessary and fragile relationship to its agrarian hinterland and natural landscapes. The relationship is environmental, economic, and cultural. Farmland and nature are as important to the metropolis as the garden is to the house.

4. Development patterns should not blur or eradicate the edges of the metropolis. Infill development within existing urban areas conserves environmental resources, economic investment, and social fabric, while reclaiming marginal and abandoned areas. Metropolitan regions should develop strategies to encourage such infill development over peripheral expansion.

5. Where appropriate, new development contiguous to urban boundaries should be organized as neighborhoods and districts, and be integrated with the existing urban pattern. Noncontiguous development should be organized as towns and villages with their own urban edges, and planned for a jobs/housing balance, not as bedroom suburbs.

6. The development and redevelopment of towns and cities should respect historical patterns, precedents, and boundaries.

7. Cities and towns should bring into proximity a broad spectrum of public and private uses to support a regional economy that benefits people of all incomes. Affordable housing should be distributed throughout the region to match job opportunities and to avoid concentrations of poverty.

8. The physical organization of the region should be supported by a framework of transportation alternatives. Transit, pedestrian, and bicycle systems should maximize access and mobility throughout the region while reducing dependence upon the automobile.

9. Revenues and resources can be shared more cooperatively among the municipalities and centers within regions to avoid destructive competition for tax base and to promote rational coordination of transportation, recreation, public services, housing, and community institutions.

The neighborhood, the district, and the corridor

1. The neighborhood, the district, and the corridor are the essential elements of development and redevelopment in the metropolis. They form identifiable areas that encourage citizens to take responsibility for their maintenance and evolution.

2. Neighborhoods should be compact, pedestrian-friendly, and mixed-use. Districts generally emphasize a special single use, and should follow the principles of neighborhood design when possible. Corridors are regional connectors of neighborhoods and districts; they range from boulevards and rail lines to rivers and parkways.

3. Many activities of daily living should occur within walking distance, allowing independence to those who do not drive, especially the elderly and the young. Interconnected networks of streets should be designed to encourage walking, reduce the number and length of automobile trips, and conserve energy.

4. Within neighborhoods, a broad range of housing types and price levels can bring people of diverse ages, races, and incomes into daily interaction, strengthening the personal and civic bonds essential to an authentic community.

5. Transit corridors, when properly planned and coordinated, can help organize metropolitan structure and revitalize urban centers. In contrast, highway corridors should not displace investment from existing centers.

6. Appropriate building densities and land uses should be within walking distance of transit stops, permitting public transit to become a viable alternative to the automobile.

7. Concentrations of civic, institutional, and commercial activity should be embedded in neighborhoods, and districts, not isolated in remote, single-use complexes. Schools should be sized and located to enable children to walk or bicycle to them.

8. The economic health and harmonious evolution of neighborhoods, districts, and corridors can be improved through graphic urban design codes that serve as predictable guides for change.

9. A range of parks, from tot-lots and village greens to ball fields and community gardens, should be distributed within neighborhoods. Conservation areas and open lands should be used to define and connect different neighborhoods and districts.

The block, the street, and the building

1. A primary task of all urban architecture and landscape design is the physical definition of streets and public spaces as places of shared use.

2. Individual architectural projects should be seamlessly linked to their surroundings. This issue transcends style.

3. The revitalization of urban places depends on safety and security. The design of streets and buildings should reinforce safe environments, but not at the expense of accessibility and openness.

4. In the contemporary metropolis, development must adequately accommodate automobiles. It should do so in ways that respect the pedestrian and the form of public space.

5. Streets and squares should be safe, comfortable, and interesting to the pedestrian. Properly configured, they encourage walking and enable neighbors to know each other and protect their communities.

6. Architecture and landscape design should grow from local climate, topography, history, and building practice.

7. Civic buildings and public gathering places require important sites to reinforce community identity and the culture of democracy. They deserve distinctive form, because their role is different from that of other buildings and places that constitute the fabric of the city.

8. All buildings should provide their inhabitants with a clear sense of location, weather and time. Natural methods of heating and cooling can be more resource-efficient than mechanical systems.

9. Preservation and renewal of historic buildings, districts, and landscapes affirm the continuity and evolution of urban society.

Congress of the New Urbanism, 140 S. Dearborn St., Suite 310, Chicago, IL, 60603, (312) 551-7300
For information, visit www.cnu.org

GLOSSARY OF TERMS IN THE 2005 VENTURA GENERAL PLAN

Abbreviations

ADT: Average number of vehicle trips per day
CEQA: California Environmental Quality Act
CIP: Capital Improvements Program
CNEL: Community Noise Equivalent Level
dB: Decibel
DOF: California Department of Finance
EIR: Environmental Impact Report
FAR: Floor Area Ratio
FEMA: Federal Emergency Management Agency
LAFCo: Local Agency Formation Commission
Ldn: Day and Night Average Sound Level
Leq: Sound Energy Equivalent Level
LOS: Traffic Intersection Level of Service
RDA: City of Ventura Redevelopment Agency
SCAG: Southern California Association of Governments
SOI: Sphere of Influence
TDM: Transportation Demand Management
TOD: Transit-Oriented Development
VCOG: Ventura County Council of Governments

Definitions

Acre: Approximately 43,560 square feet.

Acres, Gross: The entire acreage of a site calculated to the centerline of proposed bounding streets and to the edge of the right-of-way of existing or dedicated streets.

Acres, Net: The portion of a site that can actually be built upon. The following generally are not included in the net acreage of a site**:** public or private road rights-of-way, public open space, and flood ways.

Action: A strategy carried out in response to adopted policy to achieve a specific goal or objective. Policies and action statements establish the "who," "how" and "when" for carrying out the "what" and "where" of goals and objectives.

Adaptive Reuse: The conversion of obsolescent or historic buildings from their original or most recent use to a new use; for example, the conversion of former hospital or school buildings to residential use, or the conversion of a historic single-family home to office use.

Affordable Housing: Housing capable of being purchased or rented by a household with very low, low, or moderate income, based on a household's ability to make monthly payments necessary to obtain housing. Housing is considered affordable when a household pays less than 30 percent of its gross monthly income (GMI) for housing including utilities.

Alley: A narrow service way, either public or private, which provides a permanently reserved but secondary means of public access not intended for general traffic circulation. Alleys typically are located along rear property lines.

Ambient: Surrounding on all sides; used to describe measurements of existing conditions with respect to traffic, noise, air and other environments.

Annex, *v*: To incorporate a land area into an existing district or municipality, with a resulting change in the boundaries of the annexing jurisdiction.

Aquifer: An underground, water-bearing layer of earth, porous rock, sand, or gravel, through which water can seep or be held in natural storage. Aquifers generally hold sufficient water to be used as a water supply.

Arterial: Medium-speed (30-40 mph), medium-capacity (10,000-35,000 average daily trips) roadway that provides intra-community travel and access to the county-wide highway system. Access to community arterials should be provided at collector roads and local streets, but direct access from parcels to existing arterials is common.

Bicycle Lane (Class II): A corridor expressly reserved for bicycles, existing on a street or roadway in addition to any lanes for use by motorized vehicles.

Bicycle Path (Class I): A paved route not on a street or roadway and expressly reserved for bicycles traversing an otherwise unpaved area. Bicycle paths may parallel roads but typically are separated from them by landscaping.

Bicycle Route (Class III): A facility shared with motorists and identified only by signs, a bicycle route has no pavement markings or lane stripes.

Buffer: An area of land separating two distinct land uses that acts to soften or mitigate the effects of one land use on the other.

Building: Any structure used or intended for supporting or sheltering any use or occupancy.

Building Type: a structure category determined by function, disposition on the lot, and configuration, including frontage and height. For example, a rowhouse is a type, not a style.

Buildout: Development of land to its full potential or theoretical capacity as permitted under current or proposed planning or zoning designations.

California Environmental Quality Act (CEQA): Law requiring State and local agencies to regulate activities with consideration for environmental protection. If a proposed activity has the potential for a significant adverse environmental impact, an Environmental Impact Report (EIR) must be prepared and certified before taking action on the proposed project.

Capital Improvements Program (CIP): A program that schedules permanent City improvements at least five years ahead to fit projected fiscal capability. The CIP is reviewed annually.

Channelization: The straightening and/or deepening of a watercourse for purposes of runoff control or ease of navigation; often includes lining banks with retaining material such as concrete.

Character: Special physical characteristics of a structure or area that set it apart from its surroundings and contribute to its individuality.

Charrette: An interactive, multi-day public process in which the community works together with planning and design professionals and City staff and officials to create and support a feasible plan for a specific area of the City that will produce positive and transformative community change.

City: When capitalized, refers to the governmental entity; "city" refers to the geographic area.

Civic: the term defining not-for-profit organizations dedicated to the arts, culture, education, recreation, government, transit, and municipal parking.

Clustered Development: Buildings placed close together with the purpose of retaining open space area.

Co-housing: A residential development with dwelling units for grouped around a common kitchen, gathering room, and child-care facilities. Co-housing developments normally are organized as condominiums.

Collector: Relatively-low-speed (25-30 mph), relatively low-volume (5,000-10,000 average daily trips) street that provides circulation within and between neighborhoods. Collectors usually serve short trips and are intended for collecting trips from local streets and distributing them to the arterial network.

Commerce; Commercial: The buying and selling of commodities and services.

Community Noise Equivalent Level (CNEL): A 24-hour energy equivalent level derived from a variety of single-noise events, with weighting factors of 5 and 10 dBA applied to the evening (7 PM to 10 PM) and nighttime (10 PM to 7 AM) periods, respectively, to allow for the greater sensitivity to noise during these hours.

Community Park: Land with full public access intended to provide recreation opportunities beyond those supplied by neighborhood parks. Community parks are larger in scale than neighborhood parks but smaller than regional parks.

Corridor: Linear features that may form boundaries, as well as connections, between neighborhoods. Corridors frequently encompass major access routes, especially ones with commercial destinations. Corridors also can incorporate parks or natural features such as streams or canyons.

dB: Decibel; a unit used to express the relative intensity of a sound as it is heard by the human ear.

dBA: The "A-weighted" scale for measuring sound in decibels; weighs or reduces the effects of low and high frequencies in order to simulate human hearing. Every increase of 10 dBA doubles the perceived loudness though the noise is actually ten times more intense.

Dedication: The turning over by an owner or developer of private land for public use, and the acceptance of land for such use by the governmental agency having jurisdiction over the public function for which it will be used. Dedications for roads, parks, school sites, or other public uses often are made conditions for approval of a development by a city or county.

Density, Residential: The number of permanent residential dwelling units per gross acres of land.

Density Bonus: The allocation of development rights that allow a parcel to accommodate additional square footage or additional residential units beyond the maximum for which the parcel is zoned, usually in exchange for the provision or preservation of an amenity at the same site or at another location. Under California law, a housing development that provides 20 percent of its units for lower income households, or 10 percent of its units for very low-income households, or 50 percent of its units for seniors, is entitled to a density bonus.

Design Review: The comprehensive evaluation of a development and its impact on neighboring properties and the community as a whole, from the standpoint of site and landscape design, architecture, materials, colors, lighting, and signs, in accordance with a set of adopted criteria and standards.

Detention Basin: A structure constructed to retard flood runoff and minimize the effect of sudden floods. Water is temporarily stored and released through an outlet structure at a rate that will not exceed the carrying capacity of the channel downstream. Basins often are planted with grass and used for open space or recreation in periods of dry weather.

Developer: An individual or business that prepares raw land for the construction of buildings or causes to be built physical space for use primarily by others, and in which the preparation of the land or the creation of the building space is in itself a business and is not incidental to another business or activity.

Development: The physical extension and/or construction of urban land uses, including: subdivision of land; construction or alteration of structures, roads, utilities, and other facilities; installation of septic systems; grading; deposit of refuse, debris, or fill materials; and clearing of natural vegetative cover (with the exception of agricultural activities). Routine repair and maintenance activities are exempted.

Development Fee: (See "Impact Fee.")

District: An area of the city that has a unique character identifiable as different from surrounding areas because of distinctive architecture, streets, geographic features, culture, landmarks, activities, and/or land uses. A neighborhood or parts of neighborhoods can form a district. Districts consist of streets or areas emphasizing specific types of activities. A corridor may also be a district, as when a major shopping avenue runs between adjoining neighborhoods.

Dwelling Unit: A room or group of rooms (including sleeping, eating, cooking, and sanitation facilities, but not more than one kitchen), which constitutes an independent housekeeping unit, occupied or intended for occupancy by one household on a long-term basis.

Encourage, *v*: To stimulate or foster a particular condition through direct or indirect action by the private sector or government agencies.

Enhance, *v*: To improve existing conditions by increasing the quantity or quality of beneficial uses or features.

Environment: The existing physical conditions in an area that will be affected by a proposed project, including land, air, water, mineral, flora, fauna, noise, and objects of historic or aesthetic significance.

Environmental Impact Report (EIR): A report required by CEQA that assesses all the environmental characteristics of an area and determines what effects or impacts will result if the area is altered or disturbed by a proposed action.

Fault: A fracture in the earth's crust forming a boundary between rock masses that have shifted.

Flood, 100-Year: The magnitude of a flood expected to occur on the average every 100 years, based on historical data. The 100-year flood has a one percent chance of occurring in any given year.

Floodplain: The relatively level land area on either side of the banks of a stream regularly subject to flooding. That part of the flood plain subject to a one percent chance of flooding in any given year is designated as an "area of special flood hazard" by the Federal Insurance Administration.

Floodway: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the "base flood" without cumulatively increasing the water surface elevation more than one foot. No development is allowed in floodways.

General Plan: A compendium of city or county policies regarding its long-term development, in the form of maps and accompanying text. The General Plan is a legal document required by the State of California Government Code Section 65301 and adopted by the City Council.

Gateway: A point along the edge of a city at which a person gains a sense of having left the environs and entered the city.

Goal: A general, overall, and ultimate purpose, aim, or end toward which the City will direct effort.

Green: A whole-building and systems approach to siting, design, construction, and operation that employs techniques that minimize environmental impacts and reduce the energy consumption of buildings while contributing to the health and productivity of occupants.

Hazardous Material: Any substance that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. The term includes, but is not limited to, hazardous substances and hazardous wastes.

Hillside Area: All that area north of Foothill and Poli Street, and east of Cedar Street and within City limits. This area is subject to the Hillside Management Program.

Hillside Open Space: One of the 19 distinct communities within the City's Planning Area; coterminous with the Hillside Voter Participation Area; generally referred to as "hillsides".

Hillside Voter Participation Area or HVPA: The area subject to the "Hillside Voter Participation Act" (also known as Measure "P") as set forth in Appendix X and coterminous with the "Hillside Open Space" area depicted on the Land Use Diagram.

Hillsides: Synonymous and coterminous with HVPA and "Hillside Open Space".

Historic: Noteworthy for significance in local, state, or national history or culture, architecture or design, or housing works of art, memorabilia, or artifacts.

Household: Persons who occupy a housing unit.

Housing Element: A separately published State-mandated general plan element that assesses existing and projected housing needs of all economic segments of the community, identifies potential sites adequate to provide the amount and kind of housing needed, and contains adopted goals, policies, and implementation programs for the preservation, improvement, and development of housing. The Housing Elements is updated every five years.

Housing Unit: A rooms or a rooms intended for occupancy, separate from any other living space, with direct access from outside or through a common area.

Impact: The direct or indirect effect of human action on existing physical, social, or economic conditions.

Impact or Development Fee: A fee levied on the developer of a project as compensation for otherwise-unmitigated impacts the project will produce, not to exceed the estimated reasonable cost of providing the service for which the fee is charged.

Industry/Industrial: The manufacture, production, and processing of consumer goods. Industrial is often divided into "heavy industrial" uses, such as construction yards, quarrying, and factories; and "light industrial" uses, such as research and development and less intensive warehousing and manufacturing.

Infill: Development of vacant and/or underutilized land within areas already largely developed with urban uses.

Infrastructure: Public services and facilities, such as sewage-disposal systems, water-supply systems, and other utilities.

In-lieu Fee: Payment that substitutes for required dedication of land or provision of structures or amenities.

Institutional: Uses such as hospitals, museums, schools, places of worship, and nonprofit activities of a welfare, educational, or philanthropic nature that cannot be considered residential, commercial, or industrial activities.

Landmark: (1) A building, site, object, structure, or significant tree, having historical, architectural, social, or cultural significance and marked for preservation by the local, state, or federal government. (2) A visually prominent or outstanding structure or natural feature that functions as a point of orientation or identification.

Ldn: Day-Night Average Sound Level. The A-weighted average sound level for a given area (measured in decibels) during a 24-hour period with a 10 dB weighting applied to night-time sound levels. The Ldn is approximately numerically equal to the CNEL for most environmental settings.

Leq: The energy equivalent level, defined as the average sound level on the basis of sound energy (or sound pressure squared). The Leq is a "dosage" type measure and is the basis for the descriptors used in current standards, such as the 24-hour CNEL used by the State of California.

Lease: A contractual agreement by which an owner of real property (the lessor) gives the right of possession to another (a lessee) for a specified period of time (term) and for a specified consideration (rent).

Level of Service, Intersection (LOS): A scale that measures the amount of traffic an intersection is capable of handling. Levels range from A, representing free-flow, to F corresponding to significant stoppage.

Liquefaction: The transformation of loose water-saturated granular materials (such as sand or silt) from a solid into a liquid state, which can lead to ground failure during an earthquake.

Live-Work: A dwelling unit that contains, to a limited extent, a commercial component. A live-work unit is a fee-simple unit on its own lot with the commercial component limited to the ground level. (see Work-Live)

Local Agency Formation Commission (LAFCo): A commission in each county that reviews and evaluates proposals for formation of special districts, incorporation of cities, annexation to special districts or cities, consolidation of districts, and merger of districts with cities. LAFCo members include two county supervisors, two city council members, and one member representing the general public.

Local Coastal Program (LCP): A combination of City land use plans, zoning regulations, and zoning district maps that control land use in the Coastal Zone established under the California Coastal Act of 1976.

Local Street: Relatively low-volume, low-speed streets (not shown on the Roadway Classifications map), whose primary purpose is to provide access to fronting properties.

Lot: A legally-recognized parcel with frontage on a public or City-approved private street.

Low Income: Households with annual income 80 percent of the County median or less.

Maintain: Keep in an existing state. (See “Preserve.”)

Median: The dividing area between opposing lanes of traffic.

Mitigate: Alleviate or avoid to the extent feasible.

Mixed Use: Properties on which various uses, such as office, commercial, and institutional, are combined with residences in a single building or site in an integrated development project with significant functional interrelationships and a coherent physical design. A single site may include contiguous properties.

Neighborhood: The basic building blocks of a community that together comprise the city. Each neighborhood is limited in physical area, with a defined edge and a center. The size of a neighborhood is usually based on the distance that a person can walk in five minutes from the center to the edge – a quarter-mile. Neighborhoods have a fine-grained mix of land uses, providing places to live, work, shop, and be entertained.

Neighborhood Center: The focal point of a neighborhood, commonly featuring places for work, shopping, services, entertainment, leisure, recreation, and social and civic interaction.

Neighborhood Park: A facility intended to serve the recreation needs of people living or working within a one-half mile radius of the park.

Noise: Sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying.

Noise Contour: A line connecting points of equal noise level as measured on the same scale. Noise levels greater than the 60 Ldn contour (measured in dBA) require mitigation in residential development.

Office: Professional or consulting services in fields such as accounting, architecture, design, engineering, finance, law, insurance, medicine, real estate, and similar types of work.

Open Space: An area of land or water that is essentially unimproved and devoted to outdoor recreation and/or the preservation of natural resources.

Outdoor Recreation: Recreation in an urbanized outdoor setting (active recreation) or open-space outdoor setting (passive recreation).

(a) *Active outdoor recreation* includes participant sports or other activities conducted in open or partially enclosed or screened recreational activities facilities. Typical uses include driving ranges, miniature golf courses, golf courses, amusement parks, swimming pools, and tennis courts and usually rely on permanent above-ground improvements, including, but not limited to, playing fields or courts, restrooms, and tables.

(b) *Passive outdoor recreation* includes recreational activities, usually of an individual or small group nature, such as sunbathing, walking, hiking, bird watching, or nature study, conducted in an open-space setting and which, generally, do not rely on the use of permanent aboveground improvements or involve motorized vehicle use.

Parcel: A lot, or contiguous group of lots, in single ownership or under single control, usually considered a unit for purposes of development.

Parks: Open space lands whose primary purpose is recreation.

Parkway: The area between curb and sidewalk, usually planted with ground cover and/or trees.

Pedestrian Shed: an area defined by the average distance that may be traversed at and easy walking pace from its edge to its center. This distance is applied to determine the size of a neighborhood or extent of a community. A standard Pedestrian Shed is one quarter of a mile radius or 1,320 feet. With transit available or proposed, a long Pedestrian Shed has an average walking distance of ½-mile or 2,640 feet. Pedestrian Sheds should be conceived as oriented toward a central destination containing one or more important intersections, meeting places, civic spaces, civic buildings, and the capacity to accommodate a T5 Transect Zone in the future. Sometimes called a Walkshed.

Planning Area: The land area addressed by the General Plan, which includes the City Limits, potentially annexable land in the Sphere of Influence, and neighboring open space and agricultural areas of Ventura County that the City desires to remain in rural condition.

Policy: A statement of principle that anticipates specific actions to be undertaken to meet City goals.

Pollution: The presence of matter or energy whose nature, location, or quantity produces undesired environmental effects.

Preserve: Keep intact and safe from destruction or decay.

Protect: Maintain and preserve beneficial uses in their present condition.

Public and Quasi-public Facilities: Institutional, academic, governmental and community service uses, either publicly owned or operated by non-profit organizations.

Public Art: Signs, other monuments, sculptures, murals, statues, fountains, and other artistic installations in spaces accessible to the general public that accentuate or draw attention to a particular place or feature of the city, provide a focal point for public gathering, and/or serve a specific function, such as to provide seating.

Recreation, Active: A type of recreation that requires organized play areas, such as softball, baseball, football and soccer fields, tennis and basketball courts and various forms of children's play equipment.

Recreation, Passive: Recreation that does not require organized play areas.

Recycling: The process of extracting and reusing materials from waste products.

Redevelop: To demolish existing buildings, or increase the overall floor area existing on a property, or both, irrespective of whether a change occurs in land use.

Redevelopment Agency: The City division created under California Redevelopment Law for the purpose of planning, developing, re-planning, redesigning, clearing, reconstructing, and/or rehabilitating all or part of a specified area with residential, commercial, industrial, and/or public (including recreational) structures and facilities.

Regional: Pertaining to activities or economies at a scale greater than that of a single jurisdiction and affecting a broad geographic area.

Regional Park: A park typically 150-500 acres in size focusing on activities and natural features not included in most other types of parks and often based on a specific scenic or recreational opportunity.

Restore: Renew, rebuild, or reconstruct to a former state.

Ridesharing: Vehicle travel other than driving alone.

Ridgeline: A line connecting the highest points along a ridge and separating drainage basins or small-scale drainage systems from one another.

Right-of-way: Land intended to be occupied by transportation and public use facilities such as roadways, railroads, and utility lines.

Riparian: Areas adjacent to perennial and intermittent streams delineated by the existence of plant species normally found near fresh water.

Runoff: The portion of precipitation that does not percolate into the ground.

Seismic: Caused by or subject to earthquakes or earth vibrations.

Sidewalk: the paved layer of the public frontage dedicated exclusively to pedestrian activity.

Specific Plan: A legal tool allowed by State Government Code Section 65450 et seq. that prescribes detailed regulations, conditions, programs, and/or proposed legislation for a defined area of the city.

Sphere of Influence: The probable ultimate physical boundaries and service area of the city, as determined by LAFCo.

Streetscape: the urban element that establishes the major part of the public realm. The streetscape is composed of thoroughfares (travel lanes for vehicles and bicycles, parking lanes for cars, and sidewalks or paths for pedestrians) as well as the visible private frontages (building facades and elevations, porches, yards, fences, awnings, etc.), and the amenities of the public frontages (street trees and plantings, benches, and streetlights, etc.).

Structure: Anything constructed or erected that requires location on the ground (excluding swimming pools, fences, and walls used as fences).

Subdivision: The division of a land into defined lots or condominiums that can be separately conveyed by sale or lease.

Sustainable: Meeting the needs of the present without compromising the ability of future generations to meet their needs, and successfully balancing economic, environmental, and social equity concerns.

Tourism: The business of providing services for persons traveling for pleasure.

Transect: a system of ordering human habitats in a range from the most natural to the most urban. Based upon six Transect Zones that describe the physical character of place at any scale, according to the density and intensity of land use and urbanism.

Transit-Oriented Development (TOD): Relatively high-density development located within an easy walk of a major transit stop, generally with a mix of residential, employment, and shopping designed primarily for pedestrians.

Transit, Public: A system of regularly-scheduled buses and/or trains available to the public on a fee-per-ride basis.

Transportation Demand Management (TDM): Strategies for reducing the number of vehicle trips by increasing ridesharing, transit use, walking, and biking.

Trip: A one-way journey that proceeds from an origin to a destination via a single mode of transportation.

Truck Route: A route required for all vehicles exceeding set weight or axle limits, which follows major arterials through commercial or industrial areas and avoids sensitive areas.

Underutilized: Non-vacant properties that have not been fully developed with improvements that reach the allowed density and/or floor area.

Urban Design: The attempt to give form, in terms of both beauty and function, to selected urban areas or to whole cities. Urban design is concerned with the location, mass, and design of various urban components and combines elements of urban planning, architecture, and landscape architecture.

Use Permit: The discretionary and conditional review of an activity or function or operation on a site or in a building or facility.

Very Low Income: Households with annual income 50 percent of the County median or less.

View Corridor: The line of sight of an observer looking toward an object of significance (e.g., ridgeline, river, historic building, etc.).

Viewshed: The area within view from a defined point.

Watercourse: Presently or once naturally perennially or intermittently flowing water, including rivers, streams, barrancas, and creeks. Includes waterways that have been channelized, but not ditches or underground drainage and sewage systems.

Watershed: The total area above a given point on a watercourse that contributes water to its flow; also, the entire region drained by a watercourse.

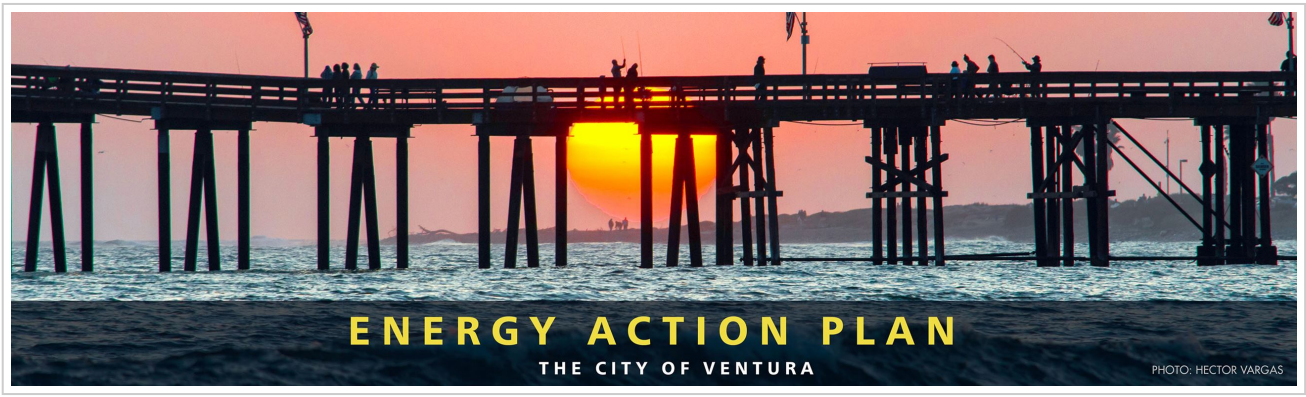
Wetlands: Transitional areas between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water. Federal agencies establish hydrology, vegetation, and soil criteria to define wetlands.

Work-Live: A dwelling unit that contains a commercial component. A Work-Live unit is a fee-simple unit on a lot with the commercial component anywhere within the unit. (see Live-Work)

Yield Street: A street whereby by two vehicles, going in opposite directions, one car will often have to pull over slightly and yield to the other vehicle, depending on how many cars are parked on the street. A standard residential street.

Zoning: The regulation of building forms and land uses throughout the city.

Energy Action Plan



Energy Action Plan

An Energy Action Plan (EAP) is a strategic planning document that lays out goals and possible actions to reduce energy consumption by increasing energy efficiency and procuring more renewable energy. The EAP will establish energy reduction targets in 5 year increments relative to the community's total energy consumption from the 2010 baseline year. To achieve these goals, an EAP outlines the most cost-effective and impactful strategies the City and community may take to re consumption.

The EAP will outline a pathway to accomplish many other objectives, including:

- Increase energy efficiency and lower utility costs
- Lower harmful greenhouse gas emissions and improve air quality
- Adopt local renewable energy projects
- Support a fair transition from fossil fuels
- Strengthen energy reliability and community safety in the event of an outage
- Accelerate the development of local sustainability projects and plans

Community Engagement

City staff and partners are working with the community to make EAP development and engagement open and accessible to all that wish to contribute. Because the EAP will outline goals and strategies for reducing electricity use for the next 10 years in Ventura, it will incorporate the ideas and preferences of the community. This will help the EAP be most effective in creating a smooth transition to a more sustainable community.

Surveys

Round 1 Surveys are now closed. The survey results helped inform the development of the initial energy action plan strategies. These strategies are currently being analyzed for feasibility and practicality of implementation. Please help us refine these strategies by completing our Round 2 Survey for the City of Ventura in either English or Spanish. Your voice and insight is a vital component to creating a sustainable future. Please offer your input and enter for a chance to win tickets to the Wild and Scenic Film Festival. Or, visit the VCREA booth at the Ventura EcoFest to win solar lights or a compost bin. If you'd like to stay involved, please see our recommended steps below.

Calendar

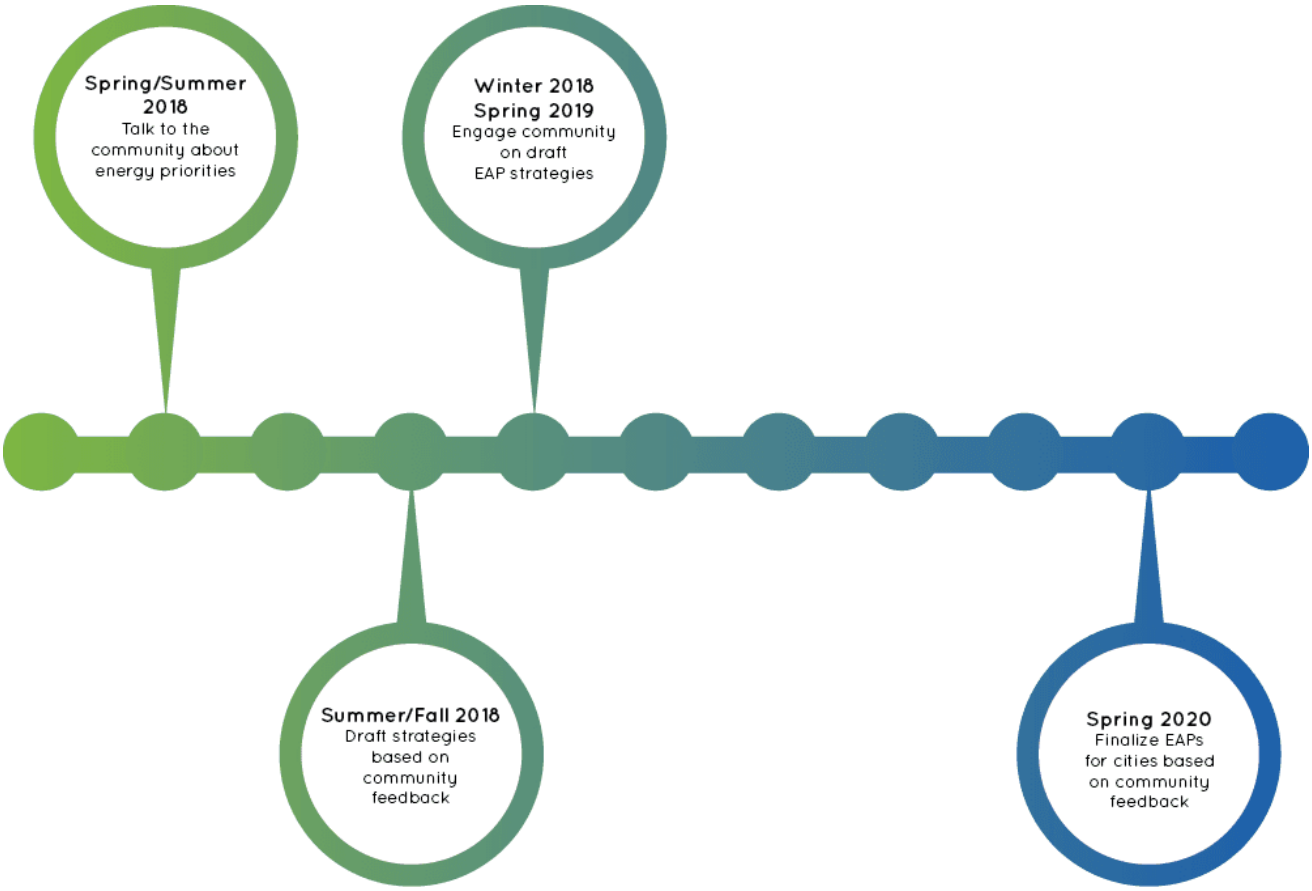
Community-based meetings and workshops will be the primary sources for the community's contribution to the development of the City's EAP. We welcome you to exercise your public power of speech!

At the events below, you will be able to discuss your ideas with City Staff, community partners and energy experts. At all workshops, free Pizza and snacks will be provided to participating community members. At all tabling events, there will be opportunities to get involved with raffles, surveys, games and other interactive exercises.

Ventura Earth Day Eco Fest
Saturday, April 27, 2019
10 AM to 4 PM
Ventura Plaza Park

Community Outreach Meeting
Saturday, June 8, 2019
10 AM to 12 PM
Community Meeting Room - Ventura City Hall

<u>Ventura's 4th July Street Fair & Pushem-Pullem Parade</u>
Wednesday, July 4, 2019
10 AM to 5 PM
Ventura's Downtown Cultural District



Climate Action and Resilience Plan

Public Review Draft October 2022

CITY OF VENTURA
OUR VISION, OUR FUTURE

City of Ventura

Climate Action and Resilience Plan

Public Review Draft October 2022

Climate Action and Resilience Plan Acknowledgements

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We would like to thank all the businesses, organizations, and residents who were generous with their time and ideas.

DISCLAIMER

This Climate Action and Resilience Plan (CARP) articulates broad policies to achieve equitable climate action. The CARP does not approve, fund, or authorize implementation of any specific projects. Each implementation program will be reviewed and approved over time and follow protocols for adoption, which may require additional public review, review by City Council, and/or environmental review under the California Environmental Quality Act.

Table of Contents

Table of Figures

Table of Tables

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Chapter 1

Overview

Over the past several decades, communities around the State and country have taken local action to address climate change. This Climate Action and Resilience Plan (CARP) proposes focused solutions to reduce greenhouse gas emissions while advancing related goals associated with community resilience and climate adaptation.

Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes include heatwaves, heavy precipitation, droughts, and hurricanes.[1] California and Ventura are already experiencing the effects of a changing climate.[2] Both gradual climate change (e.g., sea level rise) and climate hazard events (e.g., extreme heat days) expose people, infrastructure, buildings and properties, and ecosystems to a wide range of stress-inducing and hazardous situations.[3] These hazards and their impacts disproportionately affect the most sensitive populations in the city.[4]

The extent to which Ventura is impacted by climate change is dependent on our actions today. By curbing greenhouse gas emissions and adapting our community to the already changing environment, we can significantly reduce the damages incurred from climate change. The City is in a unique position to become a regional climate leader by implementing city-wide policies, incentives, and education programs to deploy innovative technologies, to pilot regulatory mechanisms, and spark behavioral change to meet the deep greenhouse gas reduction targets established by the State of California. Ventura has prepared this CARP to be a guide for the community's response to challenges posed by climate change, and to build on the City's ongoing efforts to mitigate and adapt to the impacts of climate change.

[1] Intergovernmental Panel on Climate Change 2021. Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.

[2] Hall, Alex, Neil Berg, Katharine Reich. (University of California, Los Angeles). 2018. Los Angeles Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-007.

[3] State of California. California Climate Adaptation Strategy. 2021. Retrieved from https://climateresilience.ca.gov/

[4] Ibid

A History of Action

The City of Ventura has a strong history of taking environmental action. Residents, businesses, and community groups maintain a strong environmental ethic and work to conserve the ecological wealth of the community. While the City of Ventura has historically been a good steward of the environment, efforts to address greenhouse gas emissions have been decentralized. The City of Ventura's Environmental Sustainability Division was created in 2009 to bring all stakeholders to the table to create a plan for a more resilient, equitable, and energy-efficient future. Table 1 lists the plans, policies, and programs in place to enhance sustainability and become more resilient to climate hazards. More detailed plan and program descriptions are included in Appendix A.

Ventura Green Business Program

Table 1. Ventura's Key Actions to Support Sustainability and Greenhouse Gas Reductions

Year	Key Action
2007	City Council passed the "**Green Initiative,**" a ten-point action plan designed to reduce environmental impacts
2012	**Environmental Sustainability Strategy** (ESS) was developed
2012	Launched **Green Business Program**
2015	Published **Climate on the Move** report, which included a community-level GHG emissions inventory and a CAP template for the City
2018	Joined the **Clean Power Alliance**
2019	Created **Electric Vehicle Accelerator Plan**
2020	Adopted **City Tree Master**
2021	Established **Water Efficiency Plan**
2022	Preparing an **Active Transportation Plan**

What is a Climate Action and Resilience Plan?

The CARP is the City's strategic planning document that serves two distinct functions:

1. Acts as the City's **greenhouse gas reduction program**
   - Inventories current emissions, estimates future emissions, and establishes greenhouse gas reduction measures
   - Assesses the effectiveness of greenhouse gas reduction measures at meeting State targets
2. Defines **climate adaptation measures** consistent with the Multi-jurisdiction Hazard Mitigation Plan
   - Describes climate changes and identified potential vulnerabilities from climate hazards
   - Defines specific policies and actions for the City to implement to address those vulnerabilities.

Mitigation

Actions that are taken to reduce and curb greenhouse gas emissions

Adaptation

Actions to reduce vulnerability to the effects of climate change

The CARP establishes a shared vision for climate action. It is a short-range (5-10 year) implementation focused plan that outlines the strategies, policies, and programs that the City and community need to implement to reduce greenhouse emissions in line with State goals, and to build resilience to the impacts of climate change. It builds on the City's existing climate work from the General Plan, Active Transportation Plan, and Hazard Mitigation Plan and incorporates new and innovative practices.

Development of the CARP has been partially funded by the California Proposition 84 Integrated Climate Action and Resilience (ICARP) program. Starting in January of 2017, the Governor's Office of Planning and Research (OPR) built a Climate Adaptation Clearinghouse, which includes a library of case studies showing how local and regional partners are responding to climate change. The City of Ventura CARP development process will be utilized as a case study to the ICARP Climate Adaptation Clearinghouse about how and why communities, businesses, and organizations are responding to climate change impacts.

CEQA Qualified Plan

The greenhouse gas reduction targets specified by the State are consistent with substantial scientific evidence published by the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC) regarding the need to reduce global greenhouse gas emissions to 80% below 1990 levels by 2050. This consistency is important for creating a "qualified" CAP. The concept of having a "qualified" CAP means that a CAP meets the criteria specified in CEQA

Guidelines Section 15183.5(b) for a plan for the reduction of greenhouse gas emissions, such that a "qualified" CAP may then be used for the specific purpose of streamlining the analysis of greenhouse gas emissions in subsequent projects. Local governments have discretion on what levels or targets are established in a "qualified" CAP, provided they address adopted policies and are based on substantial evidence. Most often, local targets align with the California Senate Bill 32 reduction requirement of a 40% reduction below 1990 levels by 2030 to achieve qualified status. The CARP greenhouse gas reduction program has demonstrated the ability to achieve a 40% reduction by 2030, if implemented as outlined in Chapter 4 of the CARP.

Relation to Other Planning Efforts

Development of the CARP complements Ventura's other long-range planning efforts including the General Plan Update, Active Transportation Plan, and Multi-jurisdictional Hazard Mitigation Plan. Measures in the CARP will be consistent with the relevant climate and resilience policies outlined in those documents.

- **General Plan Update**. The General Plan Update (GPU) is a long-range policy document that maps out how the City of Ventura serves its community. California law requires that every city and county in the state develop and maintain a General Plan. The GPU sets forth a shared 20-year vision for the future. It builds on community strengths and assets, while tackling new and emerging challenges like climate change. The CARP's greenhouse gas forecast and analysis is based on the GPU's growth projections.
- **Energy Action Plan.** The City of Ventura was in the process of developing an Energy Action Plan (EAP) in partnership with the Ventura County Regional Energy Alliance (VCREA) and the Community Environmental Council when the CARP process initiated. Focused on planning for greenhouse gas emissions reductions associated with the generation and consumption of energy, including electricity and natural gas, the analysis, policies, and implementation actions initially developed for the EAP have been integrated directly into the CARP. The EAP received funding from the California Energy Commission (CEC), Southern California Edison (SCE), and Southern California Gas Company (SoCalGas).

  Analysis, policies, and actions initially developed for the EAP have been integrated into the relevant sections of the CARP along with additional measures to round out the City's climate action approach.
- **Active Transportation Plan**. The City is developing an Active Transportation Plan (ATP) to incorporate bicycle and pedestrian mobility, suggested Routes to School (SRTS), and Complete Streets components, in an ambitious path toward increasing mobility options for all City residents. The ATP outcomes will feed directly into the City's General Plan update and are critical measures to reduce community transportation-related emissions as outlined in the transportation sector of the CARP.
- **Multi-Jurisdiction Hazard Mitigation Plan**. The Ventura County Multi-Jurisdiction Hazard Mitigation Plan describes hazard mitigation policies for landslides, flooding, wildfires, sea level rise, and drought. The CARP will include policies and strategies from this plan to increase the City's resilience to the climate hazards outlined in the Ventura Climate Vulnerability Assessment (Appendix C). Furthermore, incorporating these resilience measures into the CARP and GPU will satisfy the requirements of SB 379.

Community Engagement

The City of Ventura understands how crucial community input is in understanding and addressing climate change mitigation, resilience, and adaptation. Community members – residents, businesses, visitors, and others – offer unique knowledge, perspectives, and experiences navigating the impacts of climate shocks and stressors in the city. Community members will also be called upon to be active participants in climate mitigation and resilience measure implementation. The City created and executed a public participation plan to ensure that community members and other stakeholders had a diversity of opportunities to share their opinions and take part in the development of the CARP. This section describes the community engagement activities and the key themes heard during the process.

6
number of community engagement events

109
engagement event participants

1,925
survey participants

See Appendix B for detailed summaries of the engagement events.

Community Engagement Activities

The community engagement strategy included a multi-pronged approach to ensure participation of a wide range of stakeholders and community groups. Community engagement opportunities included in-person and virtual community workshops, online surveys, stakeholder meetings, and focus groups.

Project Website

The CARP information was part of the City's PlanVentura.com website for the GPU. The website was regularly updated throughout the CARP development process to include announcements of upcoming events, online survey links, and to share results and summaries of past events.

Online Surveys

Two web-based surveys were distributed to solicit information from the community at two distinct stages in the CARP development process. The first survey, distributed in fall 2021, was about the community experience with natural disasters and climate change. The second survey, distributed in summer 2022, was about greenhouse gas reduction measures. The surveys were available in English and Spanish and garnered a total of 1,925 responses.

Central Coast Alliance United for a Sustainable Economy (CAUSE) conducted targeted outreach and in-person canvassing with the survey to Spanish-speaking community members on the Westside.

Community Workshops

The City hosted two in-person and one virtual workshop in summer 2022. The first objective was to educate the community about climate change, the community's greenhouse emissions, and potential climate hazards and vulnerabilities in Ventura. The second was to receive input on the greenhouse reduction and climate adaptation and resilience measures to include in the CARP. There were forty-five attendees at the two in-person workshops and

thirty-five attendees at the online workshop, along with City staff members and members of the consultant team.

The in-person workshops included a series of boards about introduction to climate change, vision, greenhouse gas reduction sectors, and adaptation and resilience with activities facilitated by City and consultant staff. The online workshop included a presentation followed by small group discussions in breakout rooms. It featured live translation in Spanish and was recorded and uploaded to the website for those who could not attend.

Focus Groups

CAUSE conducted focus groups in summer 2022 to hear community members' thoughts on Clean Energy and Buildings and Land Use and Transportation measures. CAUSE hosted two focus group sessions, one specifically for youth and one for Spanish-speaking adults, which had a combined total of twenty-nine attendees. The sessions included a brief presentation on what contributes to climate change, and the different issues that contribute to climate change locally in their communities. Participants were then broken into two groups to have facilitated discussions about clean energy and buildings and land use/transportation challenges and solutions.

Social Media and Newsletters

The City used its social media channels (Instagram, Facebook) and email newsletters to disseminate information throughout the CARP development process. This included notice of upcoming meetings and invitations to participate in surveys. The City also used Instagram Live to host a live interview with R+A staff about the CARP.

Energy Action Plan Engagement

Engagement about energy efficiency, conservation, and generation was also conducted from 2018-2019 as part of the EAP. This process helped identify and refine goals, strategies, and actions for reducing energy consumption, increasing energy efficiency, and using more renewable energy. Community outreach and engagement activities included community surveys, a community workshop, tabling events, and stakeholder meetings.

Youth Focus Group

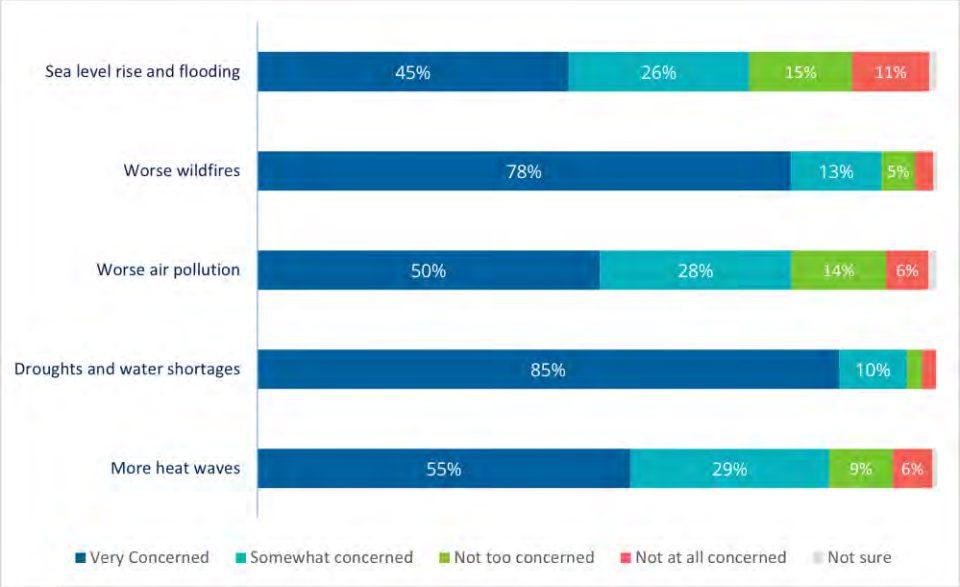
In-Person Open House

Summary of Community Engagement

Climate Hazards and Resilience

Community members expressed their experiences with recent natural disasters, thoughts on preparation for potential future natural disasters, and knowledge about climate change through the first online survey. Droughts and water shortages and worse wildfires were the most concerning climate change impacts for community members. Figure 1 shows the climate impacts of most concern to the community.

Figure 1. Most Concerning Climate Impacts



Source: Community Survey on Natural Hazards and Climate Change: Summary of Results

The most common impacts of wildfire experienced by community members was loss of power, cell phone reception, groceries, and work or income. Health impacts including mental health issues and cardiovascular illness from smoke were also reported. To improve the City's disaster response and preparedness, community members highlighted the need to expand the emergency communications network, developing local battery storage infrastructure to prevent power outages, and improving evacuation routes.

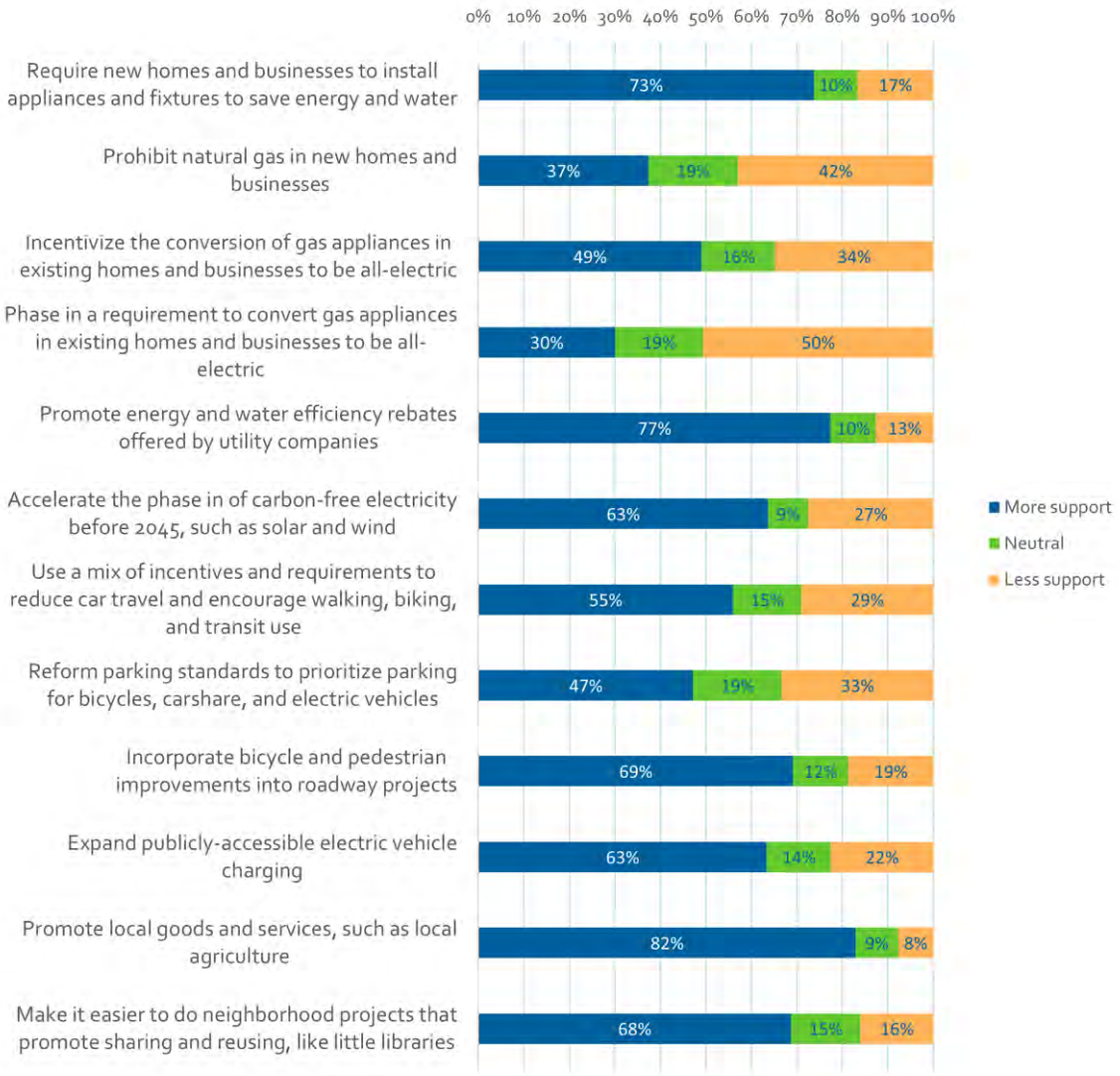
Community members identified habitat conservation and regulations for new development in shoreline areas subject to sea level rise as priority adaptation and resilience actions. Regarding shoreline regulations, community members stressed that they must be applied with nuance for diverse kinds of land use and infrastructure. Community members shared that they desire more education about local climate change impacts and specific actions they can take at home and in their communities. They also expressed their desire for City leaders to demonstrate climate leadership to guide and motivate them (especially Ventura's youth).

Greenhouse Gas Reduction

Community members favored the City taking a bold approach to meet or exceed State greenhouse gas emissions reduction goals. Community members prefer a mix of voluntary incentives and mandatory programs - or only voluntary programs and incentives - to encourage action. Highly supported energy policies include promoting water and energy rebates from utilities and requiring new development to install energy and water efficient appliances.

If the [Spanish-speaking] community was better informed about the Clean Power Alliance – what it is, how it works, and the benefits to our health and our environment – that more people would be willing to make the switch even if it's a bit more expensive. Adults also shared that the term "clean energy" is something they had not heard before.

Figure 2. Level of Support for Greenhouse Gas Reduction Policies



Source: Community Survey on Greenhouse Gas Reduction in the City of Ventura: Summary of Results

Equity and Affordability Considerations

Community members highlighted the challenges renters, low-income households, and Spanish-speaking individuals could face when implementing CARP greenhouse gas reduction measures. The main concern is about the cost to implement various upgrades especially related to building improvements. Another issue that arose is that renters have little agency over their homes and must rely on a landlord to implement improvements.

Making the transition [to electric] seemed particularly difficult for low-income families who are already struggling financially due to the housing crisis and high inflation. Participants also worried that costs for landlords required to upgrade their appliances would be passed down to renters via higher rent costs in a time when rent costs are alarmingly high.

As a result, the CARP includes funding and financing mechanisms to reduce the burden on disadvantaged communities. Additionally, through implementation of the CARP and ATP, the City will develop infrastructure that meets the needs of all and is inviting to everyone. For example, transit, walking, and biking infrastructure need to create a safe environment for all users.

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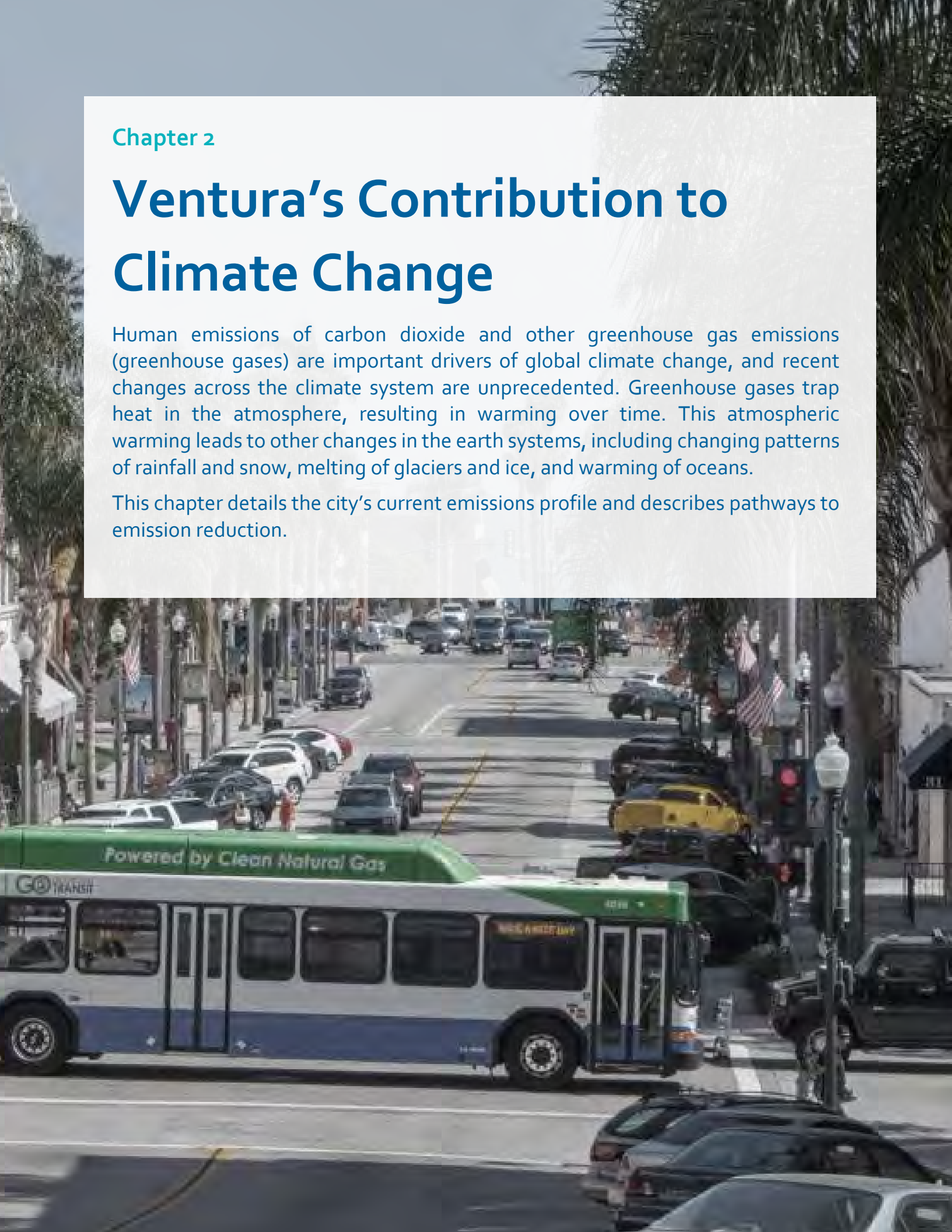
Chapter 2

Ventura's Contribution to Climate Change

Human emissions of carbon dioxide and other greenhouse gas emissions (greenhouse gases) are important drivers of global climate change, and recent changes across the climate system are unprecedented. Greenhouse gases trap heat in the atmosphere, resulting in warming over time. This atmospheric warming leads to other changes in the earth systems, including changing patterns of rainfall and snow, melting of glaciers and ice, and warming of oceans.

This chapter details the city's current emissions profile and describes pathways to emission reduction.



Current Emissions Profile

The 2019 community inventory serves as the foundation for projecting emission trends and informing measures and actions that the City needs to implement to achieve carbon neutrality by 2045. The City conducted its first inventory in 2015.The 2019 City of Ventura greenhouse gas emissions inventory captures communitywide emissions generated from transportation, energy consumption in homes and buildings, solid waste, water, and off-road transportation (e.g., emissions from construction, landscaping equipment) within the city. It was developed using the ICELI Global Protocol for Community-Scale Greenhouse Gas Emission Inventories.

The 2019 total community emissions were 546,513 metric tons of carbon dioxide equivalent ($MTCO_2e$), a 9% decrease from 2015 emissions of 598,478 $MTCO_2e$. This inventory is an estimate based on the best available data. As in 2015, on-road transportation was the largest contributor to total greenhouse gas emissions with an estimated 263,148 $MTCO_2e$ or 48% of the City's total 2019 emissions. Energy use including residential and nonresidential electricity and natural gas was the second largest sector with estimated emissions of 190,539 $MTCO_2e$ or 35% of emissions. The remaining 17% of emissions include solid waste, water, off-road transportation, and process and fugitive emissions (see Table 2).[5] Figure 3 depicts the proportion of emissions by sector for 2019.

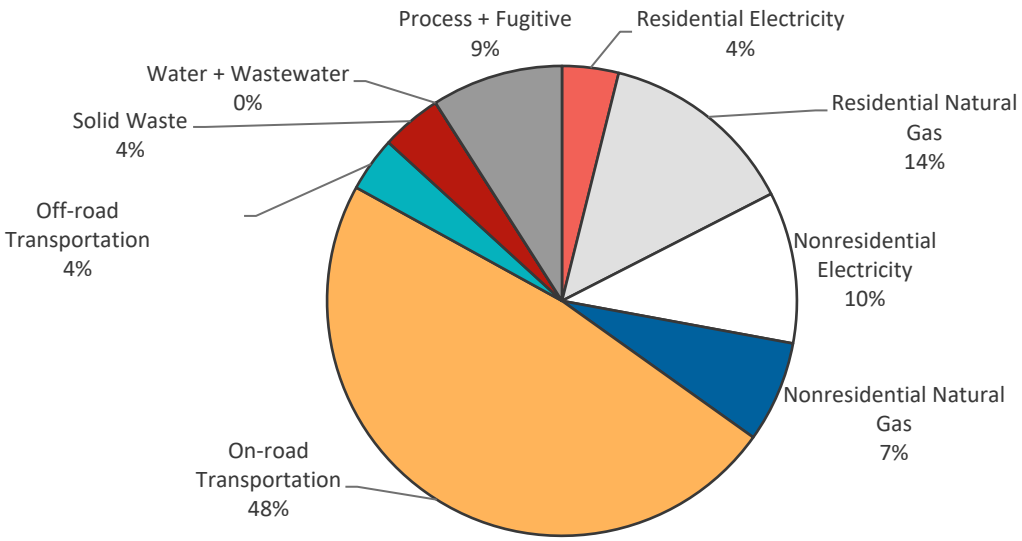
Table 2. Total Annual Community Greenhouse Gas Emissions by Sector in 2019

Emissions Sector	Subsector	Subsector Emissions ($MTCO_2e$)	Total Sector Emissions ($MTCO_2e$)	Percent of Total
Transportation	On-road Transportation	263,148	283,707	48%
	Off-road Transportation	20,559		4%
Residential Energy	Electricity	21,233	95,503	4%
	Natural Gas	74,270		14%
Nonresidential Energy	Electricity	56,989	95,036	10%
	Natural Gas	38,047		7%
Solid Waste		22,826	22,826	4%
Water + Wastewater		20	20	< 1%
Process + Fugitive		49,420	49,420	9%

Source: 2019 City of Ventura Community Emissions Inventory (2022)

[5] Process emissions generally include emissions from chemical transformation of raw materials and fugitive emissions. The chemical transformation of raw materials often releases greenhouse gases such as CO_2, CH_4, and N_2O. These processes include iron and steel production, cement production, petrochemical production, and nitric acid production, among others. Fugitive emissions refer to emissions of gases due to leaks or other unintended or irregular releases (US EPA 2008).

Figure 3. Total Annual Community Greenhouse Gas Emissions by Sector in 2019



Source: 2019 City of Ventura Community Emissions Inventory (2022)

In addition to a 9% decrease in overall emissions from 2015 to 2019, annual per service population emissions decreased by 9% from 3.6 $MTCO_2e$ in 2015 to 3.3 $MTCO_2e$ in 2019, while the service population increased less than 1%. The service area population is a sum of the populations that live and/or work in the city (population and jobs). These numbers show that despite consistent population and employment within the city, State, federal, and local greenhouse mitigation programs are achieving the desired reductions.

Pathways to Emissions Reductions

The bold targets set forth in this plan demonstrate Ventura's commitment to mitigating climate change and the adverse impacts it causes. Ventura has set the following greenhouse reduction targets to align with the State climate goals:

- 40% below 1990 levels by 2030 (Senate Bill 32)
- 80% reduction by 2040 (Interim)
- Carbon neutrality by 2045 (Executive Order B-55-18)

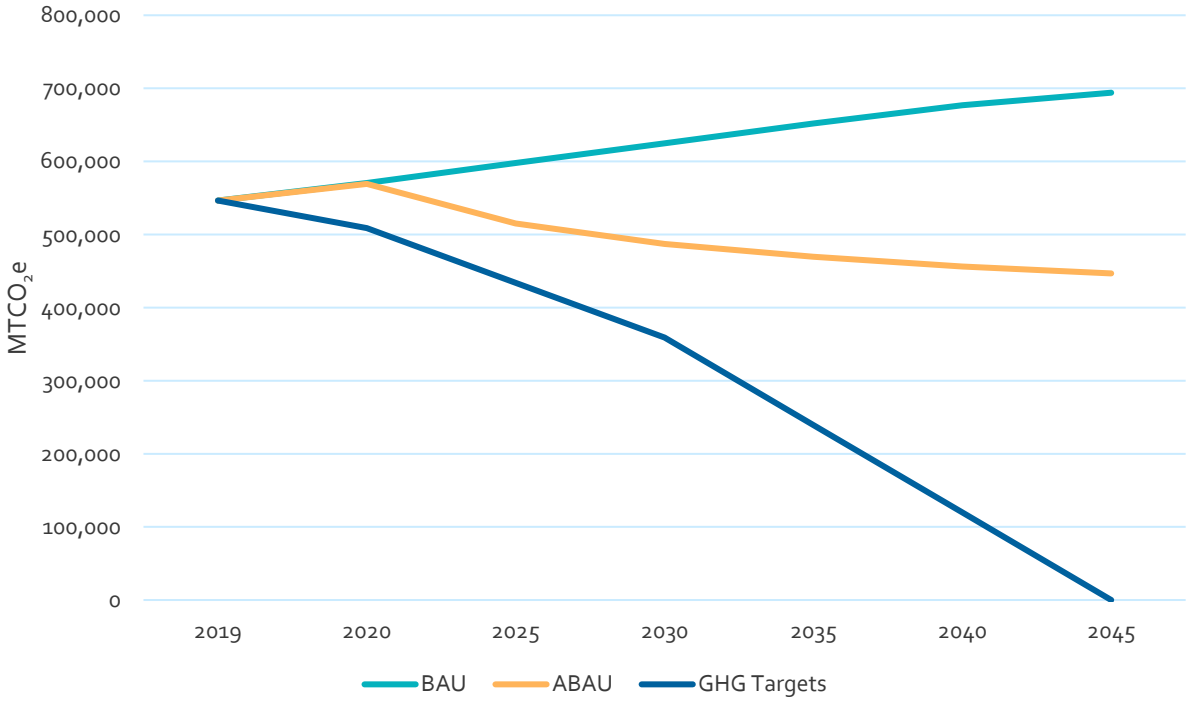
This CARP includes innovative strategies and actions to significantly reduce greenhouse gas emissions into the future—but technological constraints may prevent reducing emissions to absolute zero by 2045. The CARP will need to be updated in the future to reflect technological advancements, changes in State policy, and local attitudes and conditions.

Greenhouse Gas Emissions Projections

Two emissions forecasts were prepared to estimate Ventura's emissions from 2020-2045 as presented in Figure 4. These forecasts show the emissions reductions the CARP actions will need to achieve to become carbon neutral by 2045.

- **Business-As-Usual (BAU).** The BAU scenario projects future emissions based on current population and regional growth trends, climate patterns and their impacts on energy use, and regulations (federal, State, and local) introduced before the 2019 inventory year. BAU projections demonstrate the expected growth in greenhouse gas emissions if no further action is taken by the State or at the local level after 2019. Under this "do nothing" scenario, the City's emissions are estimated to increase by 29% by 2045.
- **Adjusted Business-as-Usual (ABAU).** The ABAU forecast shows how Ventura's emissions are anticipated to change accounting for the impacts of adopted State climate-related policies if no action is taken at the local level. Based on the results of the ABAU forecast, emissions are expected to decrease 18% by 2045.

Figure 4. Greenhouse Gas Emissions Reductions from CARP Mitigation Measures



Chapter 3

Our Changing Climate

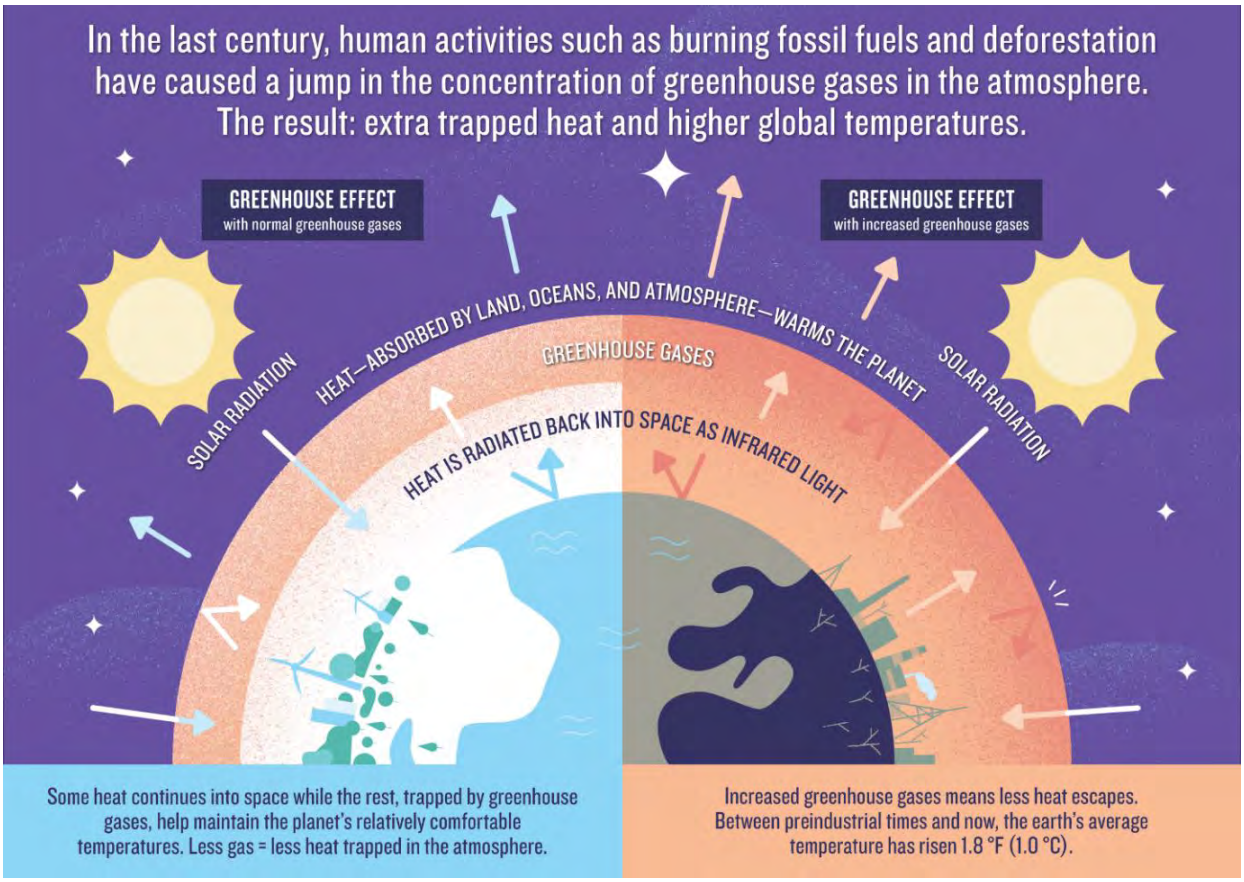
The City of Ventura recognizes that climate change is altering local climatic conditions and requires planning across sectors and industries to prepare for and mitigate impacts. Climate change is causing more severe temperatures and prolonged droughts, among other impacts. These circumstances can trigger dangerous events that imperil life and property, such as the Thomas Fire.

One of the primary objectives of this CARP is to prepare the community of Ventura for the impacts of climate change. This chapter summarizes the climate hazards the City is facing and will continue to face and the resilience and adaptation measures and sub-actions to reduce vulnerability to the effects of climate change.

Climate Change

Climate is the long-term behavior of the atmosphere – typically represented as averages – for a given time of year. This includes average annual temperature, snowpack, or rainfall. Human emissions of carbon dioxide and other greenhouse gas emissions (greenhouse gases) are important drivers of global climate change, and recent changes across the climate system are unprecedented. Greenhouse gases trap heat in the atmosphere, resulting in warming over time. This atmospheric warming leads to other changes in the earth systems, including changing patterns of rainfall and snow, melting of glaciers and ice, and warming of oceans. Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes include heatwaves, heavy precipitation, droughts, and hurricanes.[6]

Figure 3. The Greenhouse Effect



Source: NRDC (2019).

[6] Intergovernmental Panel on Climate Change 2021. Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.

California and Ventura are already experiencing the effects of a changing climate. Both gradual climate change (e.g., sea level rise) and climate hazard events (e.g., extreme heat days), which expose people, infrastructure, buildings and properties, and ecosystems to a wide range of stress-inducing and hazardous situations. These hazards and their impacts disproportionately affect the most sensitive populations in the city, including children and elderly adults, low-income populations, renters, immigrants, and BIPOC residents, among others.

While climate projections cannot predict what will happen at a certain date in the future, projections can provide cities with information about what to expect from the climate in the future. For example, climate projections can estimate how much warmer the temperature will be in summer or how many more extreme weather events are likely to occur in the future. Climate projections, however, cannot forecast with precision when those events will occur.

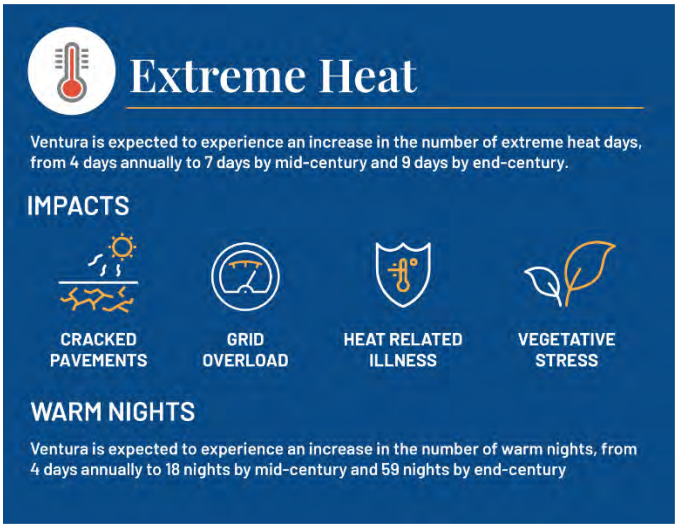
Future climate projections are created using global climate models. These models simulate climate conditions both in the past and in the future. Climate scientists can use these models to assess how the climate will change (or not) based on scenarios of greenhouse gas emissions.

Climate Hazards in Ventura

This section presents information on projected changes to natural hazards, including extreme heat and warm nights, drought, wildfire, landslides, riverine and stormwater flooding, air quality, and sea level rise, which result from changes to climate drivers.

Extreme Heat

Extreme heat events are defined as days in which the daily maximum temperature exceeds the 98thpercentile value of the historical average.[7] For Ventura, the threshold temperature is 91.9°F.[8] Increased frequency of extreme heat days can result in increased public health risks, which tend to be disproportionate for vulnerable populations such as those experiencing homelessness, outdoor workers, older adults, children, and individuals with underlying chronic diseases. Ventura has historically experienced four warm nights a year and is projected to experience a mid-century total of 25 nights (RCP 8.5) and an end-century total of 26 (RCP 4.5) to 59 nights (RCP 8.5).[9] Extreme heat can also damage roadways, overload electrical grid systems, and result in vegetation die-off or stress.



Source: City of Ventura Climate Change Vulnerability Assessment (2022)

[7] California Energy Commission (CEC). Cal-Adapt Local Climate Change Snapshot for Ventura. 2021. https://cal-adapt.org/tools/local-climate-change-snapshot/
[8] Ibid.
[9] Ibid.

Drought

Climate change will increase the likelihood that low-precipitation years will coincide with above-average temperature years. In California's highly variable climate setting, climate models project less frequent but more extreme daily precipitation, with year-to-year precipitation becoming more volatile and the number of dry years increasing.[10] Drought can affect vulnerable populations as can suppress economic productivity throughout the Ventura region. Vulnerabilities for natural resources can include stressed vegetation and habitat depletion and populations may be more vulnerable to heat stress and dehydration.[11] Additionally, sustained drought conditions can lead to dry, dusty conditions which can impact health.

Wildfire

Wildfire events are a product of temperature increases compounded with precipitation declines creating wildfire prone conditions. Ventura County's wildfires are influenced by Santa Ana Winds, downed power lines, and fuel availability.[12] Wildfires can create risk of injury, death, or financial hardship if private property is damaged as well as physical damage to all other assets creating cascading risks for vulnerable populations when infrastructure is damaged or off-line. For example, individuals with chronic health conditions who rely on medical equipment for critical health care could be severely impacted by a wildfire-caused power outage. Since 2005 there have been fourteen federal disaster declarations for Wildfire events in Ventura County, including the 2017 Thomas Fire which burned numerous structures and residences in the City of Ventura.

Source: City of Ventura Climate Change Vulnerability Assessment (2022)

Worsening air quality due to climate change can create respiratory issues for vulnerable populations and impact indoor areas without adequate air filtration systems. Air quality decline sources include dust, smog, fewer natural filtrations, and wildfire smoke.

[10] Hall, Alex, Neil Berg, Katharine Reich. (University of California, Los Angeles). 2018. Los Angeles Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-007.
[11] Ibid.
[12] Ibid.

2017 Thomas Fire

The Thomas Fire started in December 2017 and burned in Ventura and Santa Barbara Counties. The fire burned a total of 281, 893 acres and destroyed 1,063 structures, becoming one of California's largest and most destructive wildfires.[13] In the City of Ventura alone, the fire destroyed 535 buildings, 504 of which were residences.[14] Additionally, the fire left burn scars on many surrounding hillsides leaving them susceptible to mudslides. Fire season in California used to run from April to October; however, according to CALFIRE, California continues to experience longer wildfire seasons as a direct result of climate change.[15] Sparking in December, the Thomas Fire illustrates the year-round fire season California and Ventura are now experiencing.

According to survey results, almost three quarters of respondents experienced disaster(s) in recent years. Seventy-two percent of respondents reported experiencing the impacts of the Thomas Fire and/or the subsequent mudslides. Reported impacts of the Thomas Fire in Ventura included: loss of income/work, loss of power, loss of cell service, respiratory and cardiovascular illness due to smoke, mandatory evacuation, and mental health impacts.

The survey also suggested that individuals and the City could be better prepared for future large-scale natural disasters by expanding the emergency communication network, improving evacuation routes, and developing local solar plus storage projects to reduce the impacts of power outages. The CARP, GPU, and Multi-Jurisdiction Hazard Mitigation Plan include complementary measures and sub-actions to reduce the risks associated with wildfires and prepare the community through a combination of robust community engagement and physical hardening strategies.

[13] CALFIRE. (2020). Thomas Fire Incident Report. Accessed from: https://www.fire.ca.gov/incidents/2017/12/4/thomas-fire/.
[14] Mitchell, Carmel, Nick Pivaroff, Vijay Mepani, and Tiffany Meyer. (2017) Thomas Incident Damage Inspection Report CAVNC 103156. Accessed from: https://www.documentcloud.org/documents/4434210-Final-Damage-Report.html.
[15] CALFIRE. (2022). Incidents. Accessed from: https://www.fire.ca.gov/incidents/.

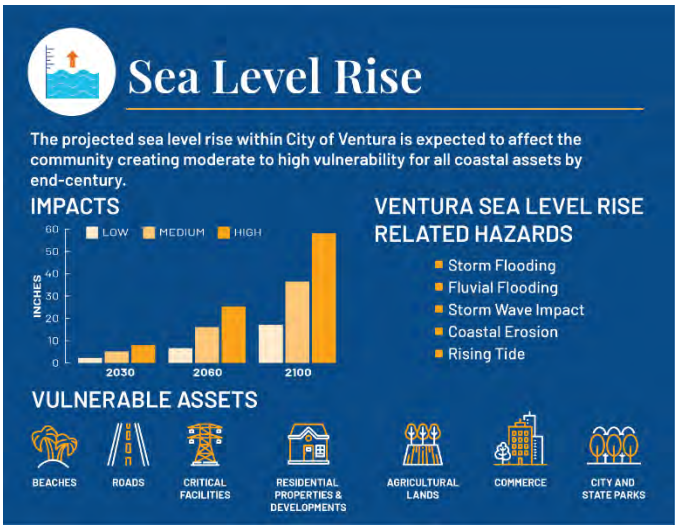
Landslides

Triggered by extreme bouts of precipitation or wildfires, the susceptibility of the larger Ventura region to landslides is projected to increase as precipitation variability increases and wildfires increase in frequency, area, and severity.[16] The Ventura County Multi-Jurisdictional Hazard Mitigation Plan ranks the risk for landslides as the highest of all other climate hazards for the City of Ventura. The projected increase in precipitation extremes, alone and in combination with the projected increase in wildfires, creates increased overall potential for floods, mudslides, and debris flows in the City.

Flooding and Sea Level Rise

Climate change may cause low-lying areas throughout Ventura to experience more frequent flooding. Stormwater systems may be overwhelmed more frequently as more extreme rain events occur, causing localized flooding. The Multi-Jurisdictional Hazard Mitigation Plan for Ventura County identifies flooding as a medium risk, and notes that numerous areas of the City are subject to flooding during periods of high rain. The impact of the flooding includes street closures, and damage to property, vehicles, and buildings, and can also have cascading effects on power, wastewater, and storm drainage infrastructure, exacerbating public health concerns.[17]

Sea levels in California are expected to rise in the coming decades because of climate change. By 2030, sea level is expected to rise 2.3" (in a low modeling scenario), 5.2" (in a medium outcome scenario), and 8.0" (in a high outcome scenario).[18] By 2060, sea level is expected to rise 7.4" (low), 16.1" (medium), and 25.3" (high).[19] By 2100, sea level is expected to rise 17.1" (low), 36.5" (medium), and 58.1" (high).[20] Ventura sea level rise related hazards include storm flooding, fluvial flooding, storm wave impacts, coastal erosion, and rising tides.



Source: City of Ventura Climate Change Vulnerability Assessment (2022)

[16] Hall, Alex, Neil Berg, Katharine Reich. (University of California, Los Angeles). 2018. Los Angeles Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-007.
[17] Ibid.
[18] The Nature Conservancy. n.d.-b. Ventura County Coastal Resilience Project. https://coastalresilience.org/project/ventura-county/
[19] Ibid.
[20] Ibid.

Climate Change Vulnerability

This section highlights the critical vulnerabilities across multiple hazards and sectors. Existing plans, policies, and programs that contribute to the adaptive capacity is summarized throughout. An impact score and an adaptive capacity score is identified for each asset by climate hazard, along with an overall vulnerability score consistent with the scoring methodology described in Appendix D.

Social Vulnerability and Disadvantaged Populations

These hazards and their impacts disproportionately affect the most vulnerable and marginalized populations in the city. Historical policies have caused certain populations to bear a disproportionate share of the consequences of natural hazards and climate change. Although climate hazards have the potential to affect all Ventura residents, the severity of impacts is heavily shaped by demographic factors like race, socioeconomic status, gender, housing status, and more. Moreover, sensitive populations have less capacity to adapt to climate hazards, because of long-standing structural and institutional inequities. Based on the Climate Vulnerability Assessment, populations in the City of Ventura are most vulnerable to extreme heat/warm nights, drought, wildfire, landslides, air quality, and sea level rise as shown in Table 3.

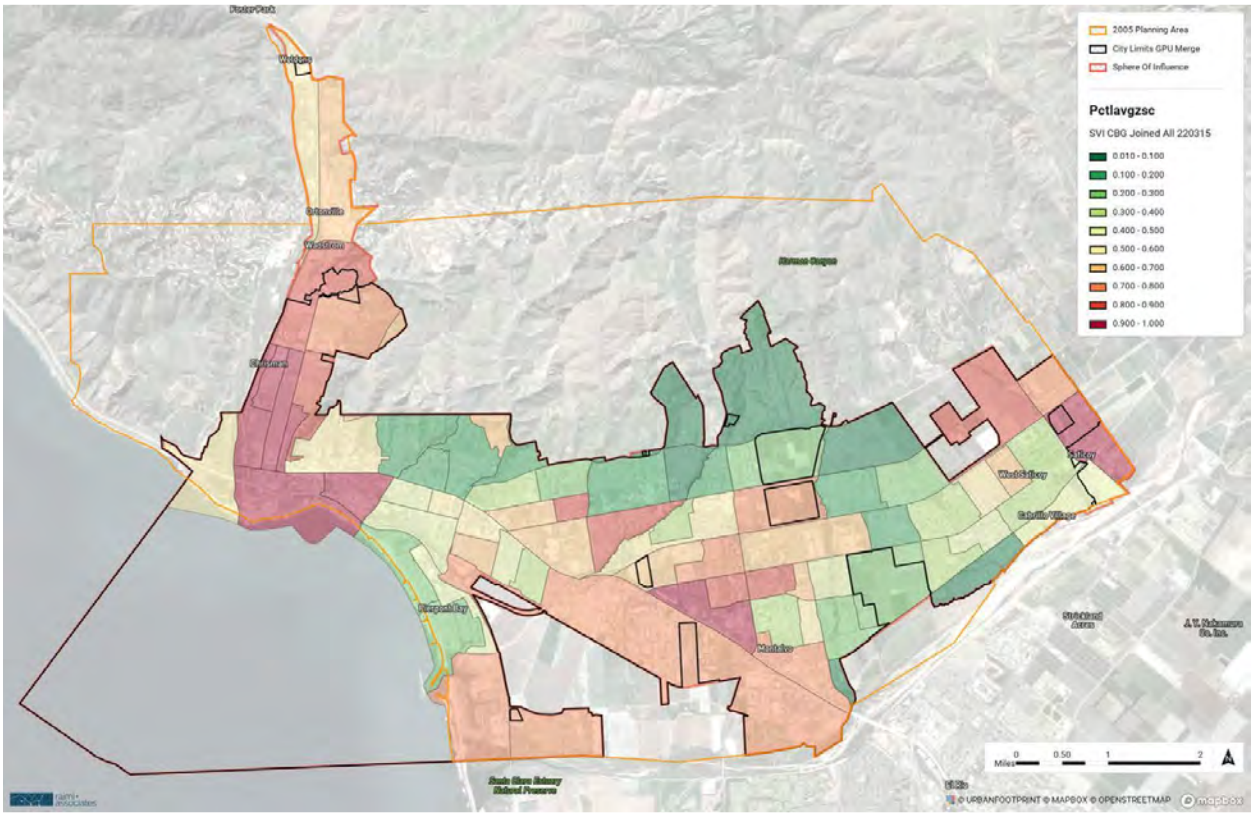
Table 3. Vulnerability Score for Populations

Climate Hazard	Impact Score	Adaptive Capacity Score	Vulnerability Score
Extreme Heat	High	Medium	**4-High**
Drought	Medium	Medium	**3-Medium**
Wildfire	High	Medium	**4-High**
Landslides	Medium	Low	**4-High**
Riverine and Stormwater Flooding	Medium	Medium	**3-Medium**
Air Quality	High	Low	**5-High**
Sea Level Rise	High	Low	**5-High**

Source: City of Ventura Climate Change Vulnerability Assessment (2022)

Citywide, the sub-areas of Saticoy, Thille, and Westside have the greatest social vulnerability to climate impacts while the sub-areas of Foothill, Pierpont, and College Area have the lowest social vulnerability to climate impacts (see Figure 5). The areas with the highest social vulnerability index (SVI) scores correspond to the disadvantaged communities (DACs) identified by the GPU process. The Social Vulnerability Assessment outlines vulnerable populations in the city in more detail (Appendix C).

Figure 5. Social Vulnerability Assessment in Ventura



Source: Social Vulnerability Assessment (2022)

Natural Resources

Primary vulnerabilities for natural resources are associated with climate hazard-caused stress and physical damage to resource types within this asset group. Compounding climate hazards stress natural ecosystems past their ability to absorb individual climate hazards. Wildlife will seek out more conducive habitats during climate hazards such as extreme heat or drought which tend to be where people recreate (USDA 2018). Impacts related to habitat shifts are exacerbated in comparison with rural communities, as densely populated and isolated open space areas have limited opportunities for natural re-seeding or re-habitation from adjacent areas. Both natural resources (beaches, hillsides, rivers and barrancas, riparian and freshwater marshes, biodiversity) and managed resources (parks and agricultural lands) in the City of Ventura, are highly affected by and vulnerable to the effects of climate change. Natural and managed resources are most vulnerable to extreme heat/warm nights, drought, landslides, wildfire, and sea level rise as shown in Table 4.

Table 4. Vulnerability Score for Natural and Managed Resources

Climate Hazard	Impact Score	Adaptive Capacity Score	Vulnerability Score
Extreme Heat/Warm Nights	High	Low	**4-High**
Drought	High	Low	**4-High**
Wildfire	High	Medium	**4-High**
Landslides	High	Low	**4-High**
Riverine and Stormwater Flooding	High	Medium	**3-Medium**
Air Quality	Medium	Medium	**3-Medium**
Sea Level Rise	High	Medium	**4-High**

Source: City of Ventura Climate Change Vulnerability Assessment (2022)

Buildings and Facilities

Vulnerabilities within this asset category primarily concern physical exposure and damages to residential areas, commercial and industrial buildings, and educational facilities in relation to climate hazards. Buildings and facilities in the City of Ventura are most vulnerable to wildfires as shown in Table 5.

Table 5. Vulnerability Score for Buildings and Facilities

Climate Hazard	Impact Score	Adaptive Capacity Score	Vulnerability Score
Extreme Heat/Warm Nights	Low	Low	**3-Medium**
Drought	Low	Low	**3-Medium**
Wildfire	High	Medium	**4-High**
Landslides	Medium	Medium	**3-Medium**
Riverine and Stormwater Flooding	Medium	Medium	**3-Medium**
Air Quality	Low	Low	**3-Medium**
Sea Level Rise	Medium	Medium	**3-Medium**

Source: City of Ventura Climate Change Vulnerability Assessment (2022)

Critical Services and Infrastructure

Overall vulnerabilities associated with this asset category involve structural preparedness and service reliability in the face of climate change. This section is concerned with the cascading impacts physical damages to buildings and facilities can have on services and infrastructure. Table 6 shows that critical services and infrastructure in the City of Ventura are most vulnerable to extreme heat/warm nights, drought, landslides, riverine and stormwater flooding, and air quality.

Table 6. Vulnerability Score for Critical Services and Infrastructure

Climate Hazard	Impact Score	Adaptive Capacity Score	Vulnerability Score
Extreme Heat/Warm Nights	High	Low	**5-High**
Drought	High	Medium	**4-High**
Wildfire	High	High	**3-Medium**
Landslides	Medium	Low	**4- High**
Riverine and Stormwater Flooding	High	Low	**5-High**
Air Quality	Medium	Low	**4-High**
Sea Level Rise	Medium	Medium	**3-Medium**

Source: City of Ventura Climate Change Vulnerability Assessment (2022)

Chapter 4

Our Adaptation Strategy

The City intends to implement a suite of adaptation strategies to increase the resilience of the City's community members, natural resources, managed resources, critical facilities, infrastructure, and services from the impacts associated with climate change hazards, as identified in the Climate Change Vulnerability Assessment, and summarized in Chapter 3. These strategies address assets with the highest vulnerability to climate change.

To guide the development of adaptation strategies, the following criteria were established to increase the likelihood of implementation, allow for equitable distribution of benefits, and prioritize proven and effective strategies to increasing resilience:

- Establish structural changes within governance plans and processes to facilitate implementation of adaptation actions.
- Identify needed funding, establish funding mechanisms, and allocate adequate and equitable funding to support adaptation implementation.
- Conduct meaningful and continuous engagement and education with the most impacted communities.
- Employ adaptive and flexible governance approaches by utilizing collaborative partnerships across jurisdictional boundaries and between institutional sectors to accelerate effective problem solving and implementation.
- Prioritize actions that promote equity, foster community resilience, and protect the City's most vulnerable populations. Intentionally prioritize the needs of communities that are disproportionately vulnerable to climate impacts.
- Assess feasibility to understand the best path or obstacles of implementing an action.

The following strategies and actions collectively work toward building the resilience and capacity for the community to better cope and prepare for the effects of climate change in the City of Ventura.

The strategies and actions are presented in the following sectors:

- Extreme Heat Resilience
- Wildfire Mitigation
- Debris Flow Mitigation
- Flood Mitigation
- Drought Mitigation
- Sea Level Rise Mitigation
- City Capacity and Coordination
- Community Awareness
- Emergency Response

Each measure contains at least one action that meets the adaptation criteria listed above and is identified in parenthesis in the tables below.

Table Key

Climate Hazard Addressed: The climate hazard the measures and actions address based on the Climate Vulnerability Assessment.

Responsible City Departments: The City department or entity that will lead the implementation of the action.

Cost Key:

$ - Low Cost (e.g., municipal code updates, plan updates, changes to internal protocols or existing programs)

$$ - Medium (e.g., new plans and studies and innovative programs)

$$$ - High (e.g., capital projects)

Performance Metrics

- Number of air quality retrofits (filters installed) for eligible homes
- Number of retrofits to city-owned facilities and infrastructure at risk to wildfire
- Number of community workshops on wildfire mitigation practices
- Number of trees planted in disadvantaged neighborhoods
- Tree canopy in disadvantaged neighborhoods
- Amount of protected coastal open space
- Number of people signed up for emergencies notifications

Extreme Heat Resilience

EH 1.1 Public Outreach and Warnings

Expand public outreach and warning systems to increase preparedness for extreme heat events.

Implementation Actions:

1. In collaboration with Ventura County Public Health, establish local early heat warning system that provides public health alerts (Education, Partnership).
2. Develop protocols to improve outreach and assistance to vulnerable populations before and during extreme heat events (Education).

Climate Hazard Addressed	Extreme Heat
Cost	$
Responsible Departments	Fire, Office of Emergency Preparedness

EH 1.2 Cool Pavement

Explore opportunities to incorporate cool pavement practices into new streetscape or urban design.

Implementation Actions:

1. Complete an assessment that evaluates new cool pavement technology, cost/benefits, and challenges and opportunities. (Feasibility)
2. Based on the results of the assessment, consider conducting a pilot project of cool pavement application at one location in a neighborhood with a high number of socially vulnerable populations. (Feasibility)

Climate Hazard Addressed	Extreme Heat
Cost	$$$
Responsible Departments	Public Works

EH 1.3 Cool Roofs

Promote the use of cool roofs to reduce the urban heat island effect.

Implementation Actions:

1. Provide under-resourced populations with incentives such as expedited permitting or reduced fees to decrease barriers associated with installing cool roofs. (Equity)
2. Include a requirement of cool roofs for new construction in the building code. (Structure Change)
3. Develop educational materials for roofing contractors and building owners regarding the benefits of cool roofs. (Education)
4. Establish a partnership with a community group such as the Ventura County Contractors association to help promote the use of cool roofs. (Partnership)

Climate Hazard Addressed	Extreme Heat
Cost	$$
Responsible Departments	Community Development, Public Works

EH 1.4 Resources for DACs

Provide disadvantaged communities (DACs) with resources to mitigate impacts from extreme heat and associated power outages.

Implementation Actions:

1. Increase outreach and education around Southern California Edison (SCE) programs that subsidize cooling costs and back-up power devices for low-income households. (Equity, Education)

Climate Hazard Addressed	Extreme Heat
Cost	$$
Responsible Departments	Community Development, Public Works

EH 1.5 Increase Tree Canopy

Increase urban tree canopy citywide to mitigate extreme heat.

Implementation Actions:

1. Conduct an urban canopy study to identify areas in Ventura that have the lowest proportions of canopy coverage and implement a tree planting program focusing on communities with high social vulnerability. (Equity, Feasibility)

Climate Hazard Addressed	Extreme Heat
Cost	$$
Responsible Departments	Parks

2. Identify and apply for State (e.g., California RedLeaf, Affordable Housing and Sustainable Communities Program (AHSC), Urban and Community Forestry Program) and federal (e.g., USDA) tree planting project funding. (Funding)
3. Prioritize tree implementation in areas with populations most at risk to extreme heat impacts (seniors, children, outdoor workers, individuals with disabilities, transit dependent individuals, and individuals with chronic health conditions). (Equity)
4. Provide educational guidance to landowners on anticipated climate change impacts to urban forests including decreased water availability, more arid conditions, and increased non-native pests and diseases. (Education)
5. Identify the number of trees needed to mitigate extreme heat impacts in the City. (Feasibility)
6. Develop and implement a plan to plant the trees, monitor their health, and support their health and replace, as necessary. (Structural Change)

EH 1.6 Protect Open Space

Protect and enhance the City's open space areas to maximize ecosystem services and mitigate extreme heat.

Implementation Actions:

1. Partner with Ventura County Resource Conservation District to conduct a study on open space areas in the City to identify areas with greatest cooling magnitude and areas to maximum preservation and enhancement efforts. (Feasibility)
2. Identify trees, grasses, and shrubs with greatest cooling benefits and plant them in prioritized open spaces. (Structure Change)
3. Identify opportunities to apply compost at City open spaces to improve water-holding capacity and filtration to combat extreme heat. (Feasibility)

Climate Hazard Addressed	Extreme Heat
Cost	$$
Responsible Departments	Parks, Public Works

Wildfire Mitigation

WM 2.1 Wildfire Communications

Provide streamlined communication to the public on wildfire preparedness, mitigation, and evacuation.

Implementation Actions:

1. Develop a communication program and materials to educate the public on wildfire preparedness, mitigation, and evacuation. (Education)
2. Require that wildfire mitigation, safety, and evacuation communications be provided in Spanish to support non or limited English speakers. (Equity, Education)

Climate Hazard Addressed	Wildfires
Cost	$
Responsible Departments	Fire and Office of Emergency Preparedness

WM 2.2 Wildfire Community Engagement

Increase community engagement and involvement in wildfire risk reduction.

Implementation Actions:

Climate Hazard Addressed	Wildfires
Cost	$
Responsible Departments	Fire and Office of Emergency Preparedness

1. Continue to conduct on-going workshops on defensible space, vegetation management, and home-hardening techniques based upon most up to date CAL FIRE management guidelines and policies for landowners in fire hazard severity zones. (Education)
2. Provide home hardening, defensible space, and fire-safe landscaping guidance materials online and hard copies in Spanish to support non or limited English speakers. (Education, Equity)
3. Partner with the Ventura Regional Fire Safe Council on wildfire mitigation efforts that advance key strategies outlined in the Ventura County Community Wildfire Protection Plan. Focus continued efforts on existing vegetation management activities that reduce risk in wildland urban interface (WUI) areas, developing wildfire safety education efforts for structure and property owners in the WUI areas on wildfire prevention, defensible space, fire-safe landscaping, reduction of structural ignitability, and ensuring safe evacuation through streamlined communications and protocol. (Partnership)
4. Partner with Ventura Regional Fire Safe Council to help them secure grant funding for mitigation activities. (Partnership, Funding)

WM 2.3 Low-Income Air Quality Subsidy

Develop a subsidy program to improve air quality in the homes of low-income residents to mitigate impacts from wildfire smoke.

Implementation Actions:

Climate Hazard Addressed	Wildfires
Cost	$$
Responsible Departments	Fire and Office of Emergency Preparedness

1. Identify funding sources for the home air quality improvement subsidy program (Funding)
2. Develop criteria for eligible program beneficiaries. (Equity)
3. Partner with CBOs, such as the Westside Community Council, to implement, promote the program, and provide informational material on the benefits of air improvement options. (Partnership, Education)

WM 2.4 Defensible Space

Enforce defensible space and home hardening standards to mitigate structure ignitions from wind blow embers.

Implementation Actions:

1. Educate landowners and residents on how structures ignite, the role of embers, and which building materials, designs, and retrofits reduce wildfire risk. (Education)
2. Continue to track new and ignition-resistant construction technologies and promote increasingly fire safe building standards through ordinance updates. (Structure Change)
3. Partner with Ventura County to provide funding incentives to promote fire safe retrofits of existing structures that meet ignition-resistant building codes. (Partnership, Funding)

Climate Hazard Addressed	Wildfires
Cost	$
Responsible Departments	Fire and Office of Emergency Preparedness

WM 2.5 Water Supply

Require adequate water supplies for fire suppression.

Implementation Actions:

1. Coordinate with Casitas Municipal Water District and Ventura Water to conduct an annual assessment of current water supplies and verify that adequate water supply systems and flows meet fire suppression needs throughout the City. (Partnership, Feasibility)

Climate Hazard Addressed	Wildfires
Cost	$
Responsible Departments	Fire, Ventura Water

WM 2.6 Fire Hardening of City Facilities

Upgrade or retrofit City-owned facilities and infrastructure located in the fire hazard severity zone to increase resilience to power outages and wildfires.

Implementation Actions:

1. Conduct a built asset vulnerability assessment to identify which City-owned facilities and infrastructure have the highest risk to wildfire impacts. (Structure Change)
2. Identify necessary upgrades and retrofits. (Feasibility)
3. Identify funding (e.g., CAL FIRE or FEMA) to implement upgrades or retrofits. (Funding)

Climate Hazard Addressed	Wildfires
Cost	$$$
Responsible Departments	Public Works, Ventura Water

WM 2.7 Reduce Fire Risk in Wildfire Urban Interface Zone

Continue to coordinate with CAL FIRE, Ventura County Fire, Ventura Regional Fire Safe Council, and neighboring jurisdictions on wildfire risk reduction activities in the Wildland Urban Interface (WUI) and open space areas in and adjacent to the City.

Implementation Actions:

1. Coordinate with responsible stakeholders to develop and update annual fuels management activities and cost estimates. (Structure Change)
2. Engage with SCE to reduce fuels and potential ignitions adjacent to power lines. (Partnership)
3. Partner with Ventura County Air Pollution Control District and Ventura County Prescribed Burn Association to continue and grow prescribed burning activities. (Partnership)

Climate Hazard Addressed	Wildfires
Cost	$$
Responsible Departments	Fire

WM 2.7 Housing for the Displaced

Provide community members displaced by wildfire with temporary housing options in the City.

Implementation Actions:

1. Partner with Housing Authority of the City of San Buenaventura to conduct a study that estimates potential displacement impacts associated with wildfire impacts. (Partnership, Feasibility)
2. Assess current City capacity to house displaced residents including facilities, infrastructure, services, and community programs. (Feasibility)
3. Establish a working group to develop designated temporary housing options for wildfire displaced residents to live in for up to two years after their home was destroyed or severely damaged. (Structural Change)

Climate Hazard Addressed	Wildfires
Cost	$$$
Responsible Departments	Public Works, Community Development

Debris Flow Mitigation

DF 3.1 Reduce Consequences of Debris Flow

Reduce the potential for injury, property damage, and loss of life resulting from debris flow.

Implementation Actions:

Climate Hazard Addressed	Debris Flows
Cost	$$$
Responsible Departments	Public Works

1. Mitigate debris flow risks in high hazard areas with measures such as reconstructing retaining walls, improving drainage, installing vegetation and netting, avoiding clear cutting, and stabilizing the soil after vegetative clearing, with compost or mulch. (Structure Change)
2. Update and revise design standards to incorporate the most up to date available information and technology related to debris flow. (Structure Change)
3. Minimize risks from debris flows by requiring that new developments be sited outside of hazards areas, when possible, and incorporating design that minimize the potential for damage. (Structure Change)
4. Regularly inspect most at risk locations, directly following major storm or atmospheric river events (Structure Change).
5. Partner with Ventura Regional Safe Council to conduct post fire assessments for landowners in burned areas two to five years after a wildfire, to assess risk for post-wildfire post debris flow. (Partnerships, Structural Change)

Flood Mitigation

FM 4.1 Reduce Stormwater Runoff

Reduce stormwater runoff through a variety of natural and built infrastructure projects.

Implementation Actions:

Climate Hazard Addressed	Flood
Cost	$$$
Responsible Departments	Public Works

1. Design streets to incorporate vegetation, soil, and engineered systems to slow, filter, and cleanse stormwater runoff (e.g., Incorporate green stormwater infrastructure including bioswales into roadways designs where feasible, incorporate previous pavements into sidewalks, street furniture zones, and entire roadways/portions). (Structure Change)
2. Continue hillside monitoring and stabilization efforts after heavy rain events in areas at risk of landslides (e.g., install landslide monitoring equipment in Landslide Susceptibility Areas, build natural infrastructure to reduce the risk of landslides, such as hillside revegetation). (Structure Change)

FM 4.2 Multi-Family Education

Provide education and information for renters and landlords.

Implementation Actions:

Climate Hazard Addressed	Flood
Cost	$$
Responsible Departments	Office of Emergency Preparedness

1. Provide renters with flood insurance flyers and educate renters in the coastal zone on coastal flooding. (Education)
2. Encourage landlords to consider how to prepare their properties for flooding by providing retrofit informational resources and educate them on prioritizing low-impact stormwater best practices. (Education)
3. Create educational campaigns and target vulnerable populations to increase awareness and knowledge of how to mitigate and weather flooding. (Equity)
4. Create evacuation procedures for vulnerable populations in partnership with Community-based organizations (CBOs) and facilities that serve identified populations. (Equity)
5. Identify subsidy programs to retrofit existing structures and low-income households. (Equity)

FM 4.3 Stormwater Quality

Improve water quality of stormwater runoff.

Implementation Actions:

Climate Hazard Addressed	Flood
Cost	$$$
Responsible Departments	Public Works

1. Conduct an analysis of protective stormwater needs for the Santa Clara and Ventura Rivers. (Feasibility)
2. Implement low-impact stormwater best practices in areas neighboring the Santa Clara and Ventura Rivers. (Structure Change)

FM 4.4 Low-Impact Development

Prioritize low-impact development stormwater best practices.

Implementation Actions:

Climate Hazard Addressed	Flood
Cost	$
Responsible Departments	Public Works

1. Develop or amend the community's stormwater ordinance to prioritize low-impact stormwater best practices for private realm properties. (Structure Change)
2. Adopt or modify the community's floodplain management ordinance so there is no-net-loss of floodplain storage through development restrictions (Structure Change)
3. Adopt or modify the community's floodplain management ordinance so that there is no-net-loss of floodplain storage through development restrictions (Structure Change)

Drought Mitigation

DM 5.1 Agricultural Resilience

Increase drought resilience of agricultural operations and crops.

Implementation Actions:

Climate Hazard Addressed	Drought
Cost	$$
Responsible Departments	Communications

1. Partner with Farm Bureau of Ventura County to develop and physically and electronically promote educational material in multiple languages for agricultural stakeholders, promoting best practices on water conserving irrigation methods. (Partnership, Education)
2. Partner with UC Cooperative Extension Ventura County to provide educational information on anticipated climate changes such as hardier pests, reduced water availability, new weeds, and altered growing seasons. (Partnership, Education)

DM 5.2 DAC Water Conservation

Provide disadvantaged communities with guidance and cost saving incentives to increase water conservation and lessen rate burdens.

Implementation Actions:

Climate Hazard Addressed	Drought
Cost	$$
Responsible Departments	Ventura Water

1. Consider creating a focused water reduction education campaign targeting low-income households with high utility bill burdens, to highlight water conservation practices and incentive programs. (Equity, Education)
2. Expand outreach to increase participation in existing rebates offered to all customers for toilets, lawn removal, hot water recirculation pumps, smart irrigation controllers, low-flow sprinkler heads, etc. (Funding)

DM 5.3 Recycled Water

Increase recycled water efforts in the City.

Implementation Actions:

1. Implement proposed water reuse projects through the VenturaWaterPure project, beginning in 2023, to create a new local water supply. (Structural Change)

Climate Hazard Addressed	Drought
Cost	$$$
Responsible Departments	Ventura Water, Public Works

DM 5.4 Drought Tolerant Landscaping

Promote drought-tolerant landscaping city-wide.

Implementation Actions:

1. Partner with CBOs to increase participation in the City's water conservation gardening classes. (Partnership)
2. Promote drought-tolerant flora through distribution of best practices flyers and through online social media posts. (Education)

Climate Hazard Addressed	Drought
Cost	$
Responsible Departments	Ventura Water

Sea Level Rise Mitigation

SLR 6.1 Reduce SLR Impacts on Socially Vulnerable Populations

Decrease the inequitable impacts of sea level rise on socially vulnerable populations.

Implementation Actions:

1. Establish annual budgets for projects within and benefiting vulnerable populations (2016, Assembly Bill 1550), including seniors, individuals with disabilities, children, low-income communities, and communities in low-lying areas. (Equity)

Climate Hazard Addressed	Sea Level Rise
Cost	$
Responsible Departments	Public Works

SLR 6.2 Regional Sediment Management

Implement a Regional Sediment Management program.

Implementation Actions:

Climate Hazard Addressed	Sea Level Rise
Cost	$$$
Responsible Departments	Public Works

1. Support development and implementation of a Regional Sediment Management (RSM) program in partnership with Ventura County and local organizations (e.g., BEACON), which includes strategies designed to allow the use of natural processes to solve engineering problems. To be most effective, the RSM programs should consider the entire watershed, account for the effects of human activities on sediment, protect and enhance coastal ecosystems, and maintain safe access to beaches for recreational purposes. (Partnership, Structural Change)
2. Implement Sediment Opportunistic Placement Programs by developing policies for the Local Coastal Programs or as part of Coastal Development Permits that can lower the cost and facilitate delivery of opportunistic sand to nearby beaches where needed. (Structural Change)

SLR 6.3 Coastal Open Space

Improve and expand the existing coastal open space to address sea-level rise.

Implementation Actions:

Climate Hazard Addressed	Sea Level Rise
Cost	$$$
Responsible Departments	Ventura Water, Public Works, Parks

1. Identify replacement opportunities or otherwise plan for how to replace recreational areas and accessways that will be lost due to inundation or damage associated with sea level rise. It might be done through the designation and zonation of lands into a Local Coastal Program. (Structure Change)
2. Plan for future coastal recreational space and parkland by protecting open space adjacent to coastal habitats, allowing the beach and habitats to migrate into these spaces (Structure Change).
3. In collaboration with Ventura County and state agencies, develop sea level rise retreat strategy with coastal restoration projects and public access that would enhance coastal ecosystems (e.g., re-establishing native coastal dune habitats, wetlands, and lagoons) and increase coastal recreational opportunities. (Partnership, Structure Change)
4. Identify subsidy programs for educating vulnerable populations regarding climate change and sea level rise, and for developing programs that guarantee vulnerable populations and disadvantaged communities' access to coastal recreational resources. (Equity)

SLR 6.4 Coastal Resilience Funding

Research external funding opportunities to implement coastal resilience and coastal restoration projects.

Implementation Actions:

Climate Hazard Addressed	Sea Level Rise
Cost	$$$
Responsible Departments	Public Works

1. Research external funding opportunities, including grants to support coastal resilience, coastal restoration projects, or beach nourishment (e.g., Living Shoreline and Nature-based solution projects). Examples of grantee agencies are California Coastal Conservancy, California Ocean Protection Council, NOAA, California Division of Boating and Waterways). (Funding)
2. Implement nature-based solutions projects, which have co-benefits for the protection of transportation facilities, such as groundwater recharge, stormwater management, and flood prevention, mitigation of the urban heat island effect, neighborhood beautification, and a more pleasant environment for pedestrians and bicyclists. (Structure Change)

SLR 6.5 Agricultural Protection Program

Establish Sea level rise strategies as part of an agricultural protection program.

Implementation Actions:

Climate Hazard Addressed	Sea Level Rise
Cost	$$$
Responsible Departments	Public Works

1. In partnership with Ventura County and state agencies, establish sea level rise strategies as part of an agricultural protection program to identify, acquire, incentivize, and manage areas appropriate for new/renewed agricultural use and/or for the protection of current and/or future agricultural uses. (Partnership, Structure Change)
2. Identify and designate inland areas suitable for agricultural production to replace agricultural production areas that could be lost to sea level rise. (Feasibility)

SLR 6.6 Phased and Trigger-Based Measures

Implement phased and trigger-based adaptation measures.

Implementation Actions:

Climate Hazard Addressed	Sea Level Rise
Cost	$$
Responsible Departments	Public Works

1. In coordination with Caltrans and local public works/transportation agencies, consider phased and trigger-based adaptation measures when planning for the adaptation of transportation infrastructure to sea level rise impacts over time. Design phases to address expected amounts of sea level rise and associated impacts to coastal resources, and to minimize impacts on access and mobility as well as on environmental, recreational, and public access resources over the planning horizon. The design shall contemplate specific triggers for implementing each subsequent phase. For example, phased measures may include hard shoreline protective devices for limited periods of time, elevation, and/or relocation, if otherwise consistent with relevant Local Coastal Program and, if applicable, Coastal Act policies. (Partnerships, Structure Change).

SLR 6.7 Wastewater Treatment Facility Resilience

Increase the wastewater treatment facility's resilience to sea level rise and stronger storms.

Implementation Actions:

Climate Hazard Addressed	Sea Level Rise
Cost	$$$
Responsible Departments	Ventura Water

1. Collaborate with the Los Angeles Regional Water Quality Control Board to increase the facility's resilience to sea level rise and stronger storms. For example, conduct feasibility studies from technical experts, retrofitting, relocating, or eliminating outfalls deemed "at risk." (Partnership)
2. Identify, redesign, or eliminate septic systems in hazardous areas that can be potentially impacted by sea level rise. (Structure Change)

SLR 6.8 Coastal Critical Facilities

Provide access to critical facilities (e.g., medical buildings) and coastal areas impacted by coastal hazards and flooding.

Implementation Actions:

Climate Hazard Addressed	Sea Level Rise
Cost	$$$
Responsible Departments	Public Works

1. Provide alternate routes and ensure redundancy of critical transportation routes, as possible, to allow for continued access and movement to and along the coast in instances in which sections of roadways may become temporarily impassible because of coastal hazards. (Structure Change)
2. Inform residents and visitors about alternate routes to coastal areas. (Education)

City Capacity and Coordination

CC 7.1 CARP Measure Integration

Support the implementation of the CARP by integrating measures and actions into existing plans and programs, internal protocols, and codes.

Implementation Actions:

Climate Hazard Addressed	All Hazards
Cost	$
Responsible Departments	Public Works, Community Development

1. Include climate adaptation measures that involve capital projects in the capital improvement plan process, prioritizing investments in areas with high number of socially vulnerable populations. (Structure Change)
2. Integrate and regularly update best available climate science, projections, and potential impacts into relevant local plans, codes, and planning documents, including the Local Coastal Program, Municipal Code, Emergency Operations Plan, and Capital Improvement Program. (Structure Change)

CC 7.2 CARP Administrative Support

Provide administrative support and dedicate staff time for grant writing and funding tracking for climate adaptation and resilience projects.

Implementation Actions:

Climate Hazard Addressed	All Hazards
Cost	$
Responsible Departments	Public Works, Finance

1. Work with SCE and Clean Power Alliance to identify funding and financing opportunities to help residents and businesses pay for building electrification, weatherization, and battery backups. (Funding)
2. Research external funding opportunities to implement high-cost climate adaptation implementation projects, including infrastructure developments or upgrades. (Funding)
3. Prioritize funding and financing opportunities for high socially vulnerable populations. (Equity)

CC 7.3 Regional Coordination

Continue to coordinate with State agencies, Central Coast Climate Collaborative, Beach Erosion Authority for Clean Oceans and Nourishment (BEACON), Ventura County, Southern California Edison, Clean Power Alliance, local businesses, and other local and regional partners to streamline regional climate adaptation planning efforts.

Implementation Actions:

Climate Hazard Addressed	All Hazards
Cost	$
Responsible Departments	Public Works, Finance

1. Continue to improve collaboration and information sharing between local, regional, and State entities to provide socially vulnerable populations with resources to prepare for, cope with, and recover from climate change hazards. (Partnership, Equity)
2. Attend local and regional conferences and climate collaborative meetings to stay up to date with climate science and potential impacts and align climate adaptation efforts with other neighboring jurisdictions. (Partnerships)
3. Collaborate with businesses in the City to better understand shared climate risks and identify opportunities to provide resources and guidance that advances climate resilience priorities. (Partnerships)

Community Awareness

CA 8.1 Community Engagement Campaign

Develop a community-wide engagement campaign to educate the public on anticipated near and long-term climate impacts, community vulnerabilities, and opportunities for adaptation.

Implementation Actions:

Climate Hazard Addressed	All Hazards
Cost	$$
Responsible Departments	Public Works, Community Development, PIO

1. On the City's website, develop a virtual resilience hub that provides residents with education information on Ventura specific project climate impacts, community vulnerabilities, and adaptation programming and resources including resilience hub locations and preparedness guides and trainings. (Education)
2. Partner with community-based organizations (CBOs) to provide informational materials on climate change hazard preparedness, safety, and risk reduction strategies; Specifically target vulnerable populations including seniors, children, individuals with chronic health conditions, outdoor workers, and individuals with disabilities. (Partnership Equity)
3. Partner with local schools and youth facilities to host engaging activities and presentations on projected climate change impacts. (Partnership, Education)
4. Incorporate climate adaptation outreach and engagement into the Ventura's Block by Block program. (Education)

Emergency Response

ER 9.1 Resilient Energy Infrastructure for Vulnerable Populations

Provide vulnerable populations with resilient resources and energy infrastructure.

Implementation Actions:

Climate Hazard Addressed	All Hazards
Cost	$$$
Responsible Departments	Office of Emergency Preparedness

1. Partner with Clean Power Alliance and Southern California Edison and emergency management services to establish backup power and energy grid shutdown protocols that protect the most vulnerable populations (e.g., seniors, individuals with chronic health conditions, children, individuals with disabilities). (Partnership, Equity)
2. Support development of community-serving microgrids and prioritize areas with high social vulnerability. (Equity)

ER 9.2 Emergency Notifications

Increase community member participation in emergency notification and preparedness systems.

Implementation Actions:

1. Partner with CBOs to conduct a recruitment campaign with community events and online and physical materials to increase diversity and overall membership of Ventura CERT. (Partnerships)
2. Increase participation in emergency notification systems including VC Alert and SCE Automated System through social media campaigns and physical flyer distribution. (Structure Change)

Climate Hazard Addressed	All Hazards
Cost	$$
Responsible Departments	Fire, Police, Office of Emergency Preparedness

ER 9.3 CBO Partnerships

Partner with community-based organizations (CBOs) and community facilities to develop evacuation procedures specifically for vulnerable populations.

Implementation Actions:

1. Conduct an assessment to identify CBOs and community facilities that support and service vulnerable populations. (Feasibility)
2. Host focus groups with selected CBOs and community facility staff to identify evacuation needs for their service population. (Partnerships)
3. Provide CBOs with support and resources to develop climate disaster emergency response and preparedness procedures. (Partnerships)

Climate Hazard Addressed	All Hazards
Cost	$$
Responsible Departments	Fire, Police, Office of Emergency Preparedness

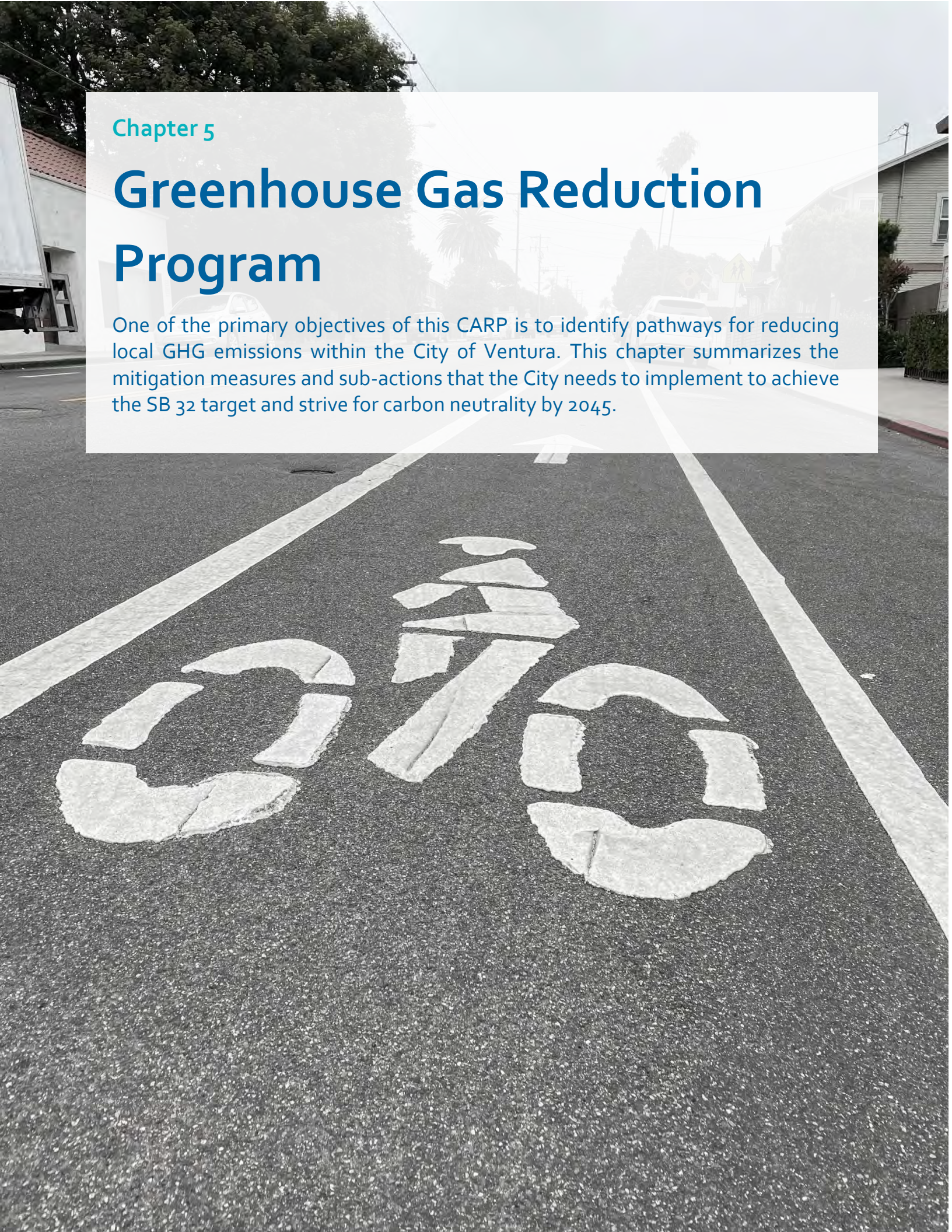
ER 9.4 Resilience Hubs

Expand the City's cooling centers to serve as resilience hubs for community members before, during, and after climate hazard events including extreme heat events, poor air quality, and severe weather events.

Implementation Actions:

Climate Hazard Addressed	All Hazards
Cost	$$$
Responsible Departments	Public Works

1. Conduct an assessment on the effectiveness of current City cooling center operations to evaluate current amenities and resources available and verify that the needs of vulnerable populations are met during climate hazard events. (Feasibility)
2. Require that the City's resilience hubs have adequate backup power sources and battery storage to mitigate service disruptions and provide redundancy in the event of a power outage. (Structural Change)
3. Provide essential resources such as health programming and resources, food, refrigeration, charging stations, basic medical supplies, and other emergency supplies at all City resilience hubs. (Structural Change).



Chapter 5

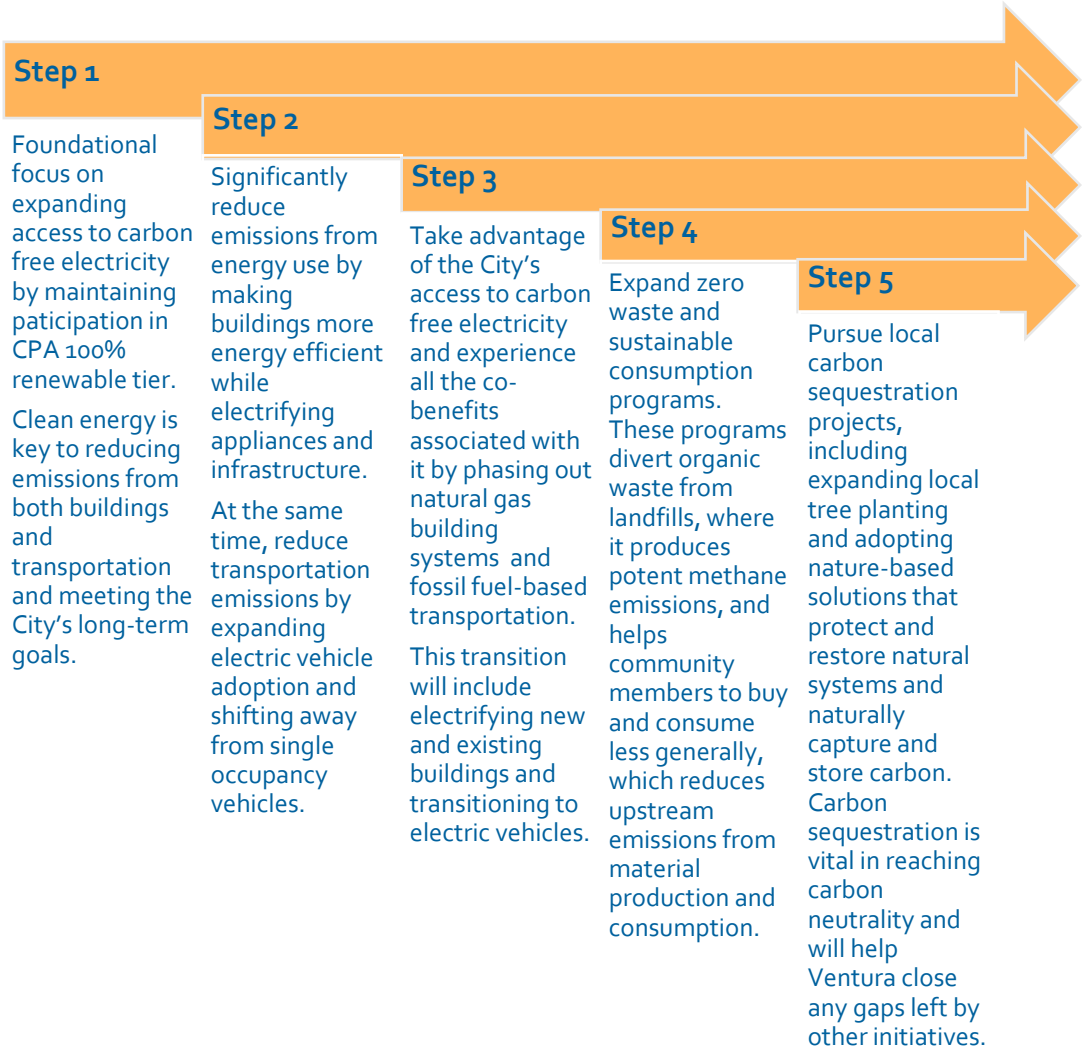
Greenhouse Gas Reduction Program

One of the primary objectives of this CARP is to identify pathways for reducing local GHG emissions within the City of Ventura. This chapter summarizes the mitigation measures and sub-actions that the City needs to implement to achieve the SB 32 target and strive for carbon neutrality by 2045.

Reduction Approach

Ventura will work to achieve carbon neutrality by 2045 by building upon the progress the City has already made and adopting new emissions reduction strategies and actions. Together, these strategies and actions: (1) provide a framework for reaching the SB 32 target of a 40% reduction below 1990 emissions level by 2030 and carbon neutrality; (2) make Ventura more resilient to future climate impacts; and (3) have important social and economic benefits, such as addressing historic inequities, creating green jobs, increasing community green spaces, and improving public health. Figure 6 outlines the City's five step approach to reducing community GHG emissions.

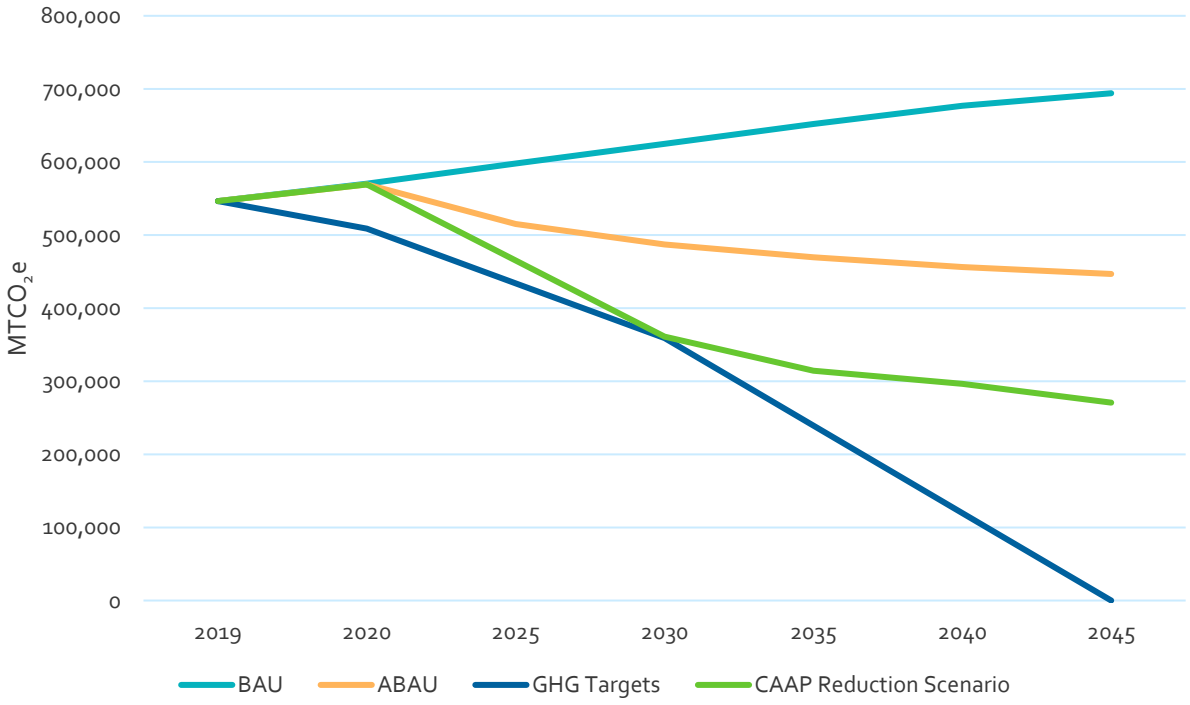
Figure 6. Approach to Reduce Greenhouse Gas Emissions



Greenhouse Gas Emissions Reduction Pathway

As illustrated in Figure 7, the City will need to proactively take local climate action to reduce and offset greenhouse gas emissions to achieve State greenhouse gas reduction targets. State and regional policies and regulations are projected to reduce 2030 BAU emissions by 22%. In addition to the reductions realized through State policies, implementing the CARP mitigation measures can achieve the SB 32 goal of a 40% reduction in mass emissions by 2030 and puts the City on the path to achieving the long-term goal of carbon neutrality by 2045. These strategies achieve a 40% mass emissions reduction compared to 1990 levels in 2030 and a 61% reduction in 2045. However, additional climate action will be needed to close the gap of 270,749 MTCO2e to achieve carbon neutrality by 2045.

Figure 7. Greenhouse Gas Emissions Reductions from CARP Mitigation Measures



Reduction Strategies and Action Plans

To mitigate greenhouse gas emissions and adapt to a changing climate, the City intends to move forward with fifty-five mitigation strategies organized into seven sectors. Each sector includes a series of broad strategies and specific implementation actions for the City. The strategies and actions are organized into the following sectors:

- Clean Energy
- Built Environment
- Transportation
- Solid Waste
- Water and Wastewater
- Community Education and Partnerships
- City Leadership

Implementing these strategies will put Ventura on the path to carbon neutrality by 2045. This section presents the mitigation measures and implementation actions, GHG emission reduction potential, co-benefits, implementation costs, and lead City department.

GHG Reductions Key:

- Supportive – no direct emissions reductions but aid the implementation of measures with direct emissions reductions.
- Low – less than 15,000 $MTCO_2e$
- Medium – 16,000 – 40,000 $MTCO_2e$
- High – more than 40,000 $MTCO_2e$

Cost Key:

- $ - less than $100,000
- $$ - $100,000-$500,000
- $$$ - $500,000 - $2,500,000
- $$$$ - over $2,500,000

The following strategies and actions collectively work toward achieving the near team goal of 40% reduction in greenhouse gas emissions by 2030 and carbon neutrality by 2045.

Clean Energy

Residential and nonresidential energy use, including electricity and natural gas, account for 35% of Ventura's greenhouse gas emissions. These emissions are driven by the burning of fossil fuel natural gas, which accounts for 59% of energy-related emissions in the city. The proportion of natural gas to overall energy use is expected to increase because the City has joined Clean Power Alliance (CPA), which supplies up to 100% carbon-free electricity to its customers. See Table 7 for the February 2022 participation rates in CPA.

Table 7. 2022 Participation Rates in CPA Tiers

CPA Tier	Residential Customers	Nonresidential Customers
Remained in SCE	5.2%	4.2%
Lean – 40% renewable	4.5%	6.2%
Clean – 50% renewable	1.1%	1.8%
Green – 100% renewable	89.2%	87.8%

Clean grid electricity, including the installation of distributed energy resources (DERs), such as local solar projects, is a keystone effort being led by the State to achieve its climate goals. Senate Bill 100's renewable portfolio standard will require that supplied energy not only be 100% carbon-free by 2045 but also 100% generated from renewable sources like wind, solar, and local biogas.

Additionally, having access to clean electricity makes supporting the transition to electric vehicles across Ventura more beneficial. To date, the City has adopted an EV Accelerator Plan and is installing electric vehicle charging stations in public parking facilities.

Performance Metrics

- Participation rate in CPA 100% Green tier
- Number of (or size of) solar installations on commercial buildings
- Number of battery storage systems installed

Clean Energy - Alternative Energy Sources

CE 1.1 Community Solar Programs and Projects

Support SCE and CPA's development of residential and commercial community solar and storage programs and projects.

Implementation Actions:

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Resilience
Responsible Departments	Environmental Sustainability Division, PIO/Comms

1. Collaborate with CBOs to expand on existing solar programs, such as Community Environmental Council's Solarize and Grid Alternative's low-cost renewable energy installations, by providing resources to assist in the installation of single family and multi-family solar and energy storage projects.
2. Identify sites for the possible installation of community solar.
3. Assess the feasible locations identified in the communitywide renewable energy generation analysis under CEQA.
4. Set a goal for the number of commercial energy storage projects within the city and provide regular updates on meeting the goal.
5. Work with City Council to support community solar projects.
6. Support commercial pilot projects utilizing thermal energy storage, energy storage, dispatchable storage, back-up power at critical facilities, and microgrid development. Support includes outreach for completed projects.
7. Share data as needed to develop successful projects and programs.
8. Collaborate with CBOs and Housing Authority of the city of San Buenaventura to attain and use grant funding, such as the Community Development Block Grants, to cover both labor and equipment for renewable energy and energy storage at affordable housing projects.
9. Conduct outreach to residents about subscription to community solar projects through the City's Environmental Sustainability website, Sustainable Ventura Newsletter, social media, press releases, City Council, and staff attendance at ribbon cutting events.

CE 1.2 Approval Processes for Solar, Battery Storage Systems, and EV Charging

Establish a streamlined approval process for solar, battery storage system, and EV charging and reduce or eliminate permitting fees to encourage the addition of battery storage.

Implementation Actions:

1. Review current permitting procedures. Work with Ventura City Fire Department and other relevant agencies to review their policies to determine if they negatively affect local renewable integration and installation of energy storage projects. If problematic policies are identified, explore opportunities for revisions that would allow for more of these types of energy projects.
2. Determine eligibility criteria for systems that qualify for expedited permitting and provide permitting checklist.
3. Explore the potential to allow for digital signatures and online permit application submittals.
4. Shorten the inspection process to one inspection for qualifying systems.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Resilience
Responsible Departments	Community Development, Environmental Sustainability Division

CE 1.3 Solar Reach Code for Nonresidential New Construction

Investigate and implement a reach code to establish minimum kilowatt (kW) of solar installation requirements for nonresidential new construction above a specific size.

Implementation Actions:

1. Engage with stakeholders including City staff and officials, and external stakeholders, such as local developers regarding the purpose and impact of the reach code.
2. Conduct a cost effectiveness study or utilize studies developed by the CEC.
3. Develop and draft an ordinance.
4. Submit the adopted ordinance to the California Energy Commission (CEC) and California Building Standards Commission (CBSC).

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Resilience
Responsible Departments	Community Development, Environmental Sustainability Division

Clean Energy - Carbon Free Electricity

CE 2.1 CPA Participation

Maintain City membership in Clean Power Alliance (CPA) and continue to work to maintain a minimum of 95% of private property owner participation in CPA at the 100% Green tier.

Implementation Actions:

1. Conduct outreach to identify barriers for large users and/or sectors to participate at the 100% Green Power Tier or SCE equivalent.
2. Partner with CPA to develop and conduct a robust awareness and education campaign to boost enrollment.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO/Comms

New Construction

Buildings are the primary users of energy within the city and the main vehicle to reduce energy-related emissions. Electricity use in residential and nonresidential buildings accounts for 14% of community emissions and natural gas use accounts for 20% of community emissions. There are two main approaches to reduce emissions in buildings. The first is improved energy efficiency of new and existing buildings and the second is through the electrification of buildings. Electrification removes natural gas systems from buildings and uses electric alternatives to take advantage of the 100% carbon-free electricity provided by CPA.

The number of employees and residents in Ventura is expected to grow through 2045, and this growth will result in the construction of new residential and commercial buildings. New construction is governed by the California Building Code and must meet the California Green Building Standards (CALGreen), which include requirements for energy performance. The building code is updated every three years to reflect industry best practices and increase the sustainability of new construction. However, to avoid developing greenhouse gas-emitting buildings and infrastructure with useful lives beyond the City's emissions reduction goals, the City will make enhanced green building the standard for all new construction and major remodels. Going beyond CALGreen includes promoting all-electric new construction for both residential and nonresidential buildings by adopting a reach code.

Performance Metrics

- Number of all-electric new development projects
- Citywide natural gas use
- Number of new development projects that exceed CALGreen energy efficiency standards

Built Environment, New Construction – Improved Energy Efficiency of New Construction

BNC 1.1 Green Building Design Guidelines

Develop design guidelines for new residential and nonresidential construction that include passive design strategies (i.e., minimizing solar reflectivity, implementing cool roofs, placing trees or vegetation to maximize shading, orienting building for ideal climate conditions including daylighting) and for maximizing solar resources (e.g., photovoltaic capacity of roof space, south facing windows).

Implementation Actions:

1. Draft green design guidelines and educational materials.
2. Include green building resources in permit application packets or permit incomplete letters.
3. Promote green design guidelines to internal stakeholders including Building and Planning, and external stakeholders including developers, property owners and managers.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Resilience
Responsible Departments	Community Development

BNC 1.2 CALGreen Tier 1 or 2 Energy Requirements for New Development

Encourage new development to meet CALGreen Tier 1 or 2 energy efficiency requirements through a combination of financial and development process incentives (e.g., expedited permitting, FAR increases, etc.).

Implementation Actions:

1. Conduct outreach to determine effective incentives and explain the benefits of enhanced building performance.
2. Develop incentive program during next zoning ordinance update.
3. Develop and distribute educational materials.

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Resilience, air quality, public health
Responsible Departments	Community Development

BNC 1.3 CALGreen Tier 1 or 2 Energy Requirements for Remodels

Encourage alterations or addition at least 50% of the size of the original building to meet CALGreen Tier 1 or 2 energy efficiency requirements through a combination of financial and development process incentives (e.g., expedited permitting, FAR increases, etc.).

Implementation Actions:

1. Conduct outreach to determine effective incentives and explain the benefits of enhanced building performance.
2. Develop incentive program during next zoning ordinance update.
3. Develop and distribute educational materials.

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Resilience, air quality, public health
Responsible Departments	Community Development

BNC 1.4 Energy-Use Data

Update the City's Development Review and Building Permit forms to request voluntary energy-related data, e.g., Home Energy Rating System (HERS) ratings for homes, Title 24, Part 6 compliance percentage, LEED certification level, etc. The City should update permitting software so Development Review and Building Permit staff can input energy-related data for CARP implementation tracking.

Implementation Actions:

1. Determine appropriate energy related information to track.
2. Update Development Review and Building Permit forms.
3. Update permitting software so Development Review and Building Permit staff can input energy-related data for CARP implementation tracking.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Resilience, air quality, public health
Responsible Departments	Community Development

Built Environment, New Construction – All-Electric New Construction

BNC 2.1 Minimum Panel Capacity

Set minimum electric panel capacity standards for single family residential new construction at 200 amps.

Implementation Actions:

1. Amend building code to require a minimum panel capacity of 200 amps for low rise residential new construction.
2. File amendments with the California Building Standards Commission (CBSC).

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Resilience, air quality, public health
Responsible Departments	Community Development

BNC 2.2 Residential All-Electric New Construction

Investigate and implement a localized reach code for new residential construction to prohibit or disincentivize connection to natural gas lines.

Implementation Actions:

1. Engage with stakeholders including City staff and officials, and external stakeholders, such as local developers regarding the purpose and impact of the reach code.
2. Conduct a cost effectiveness study or utilize studies developed by the California Energy Commission (CEC).
3. Develop and draft an ordinance.
4. Submit the adopted ordinance to the CEC and California Building Standards Commission (CBSC).

GHG Reduction Potential	Medium
Cost	$
Co-Benefits	Resilience, air quality, public health
Responsible Departments	Community Development

Existing Buildings

Buildings are the primary users of energy within the city and the main vehicle to reduce energy-related emissions. Electricity use in residential and nonresidential buildings accounts for 14% of community emissions and natural gas use accounts for 20% of community emissions. There are two main approaches to reduce emissions in buildings. The first is improved energy efficiency of new and existing buildings and the second is through the electrification of buildings. Electrification removes natural gas systems from buildings and uses electric alternatives to take advantage of the 100% carbon-free electricity provided by CPA.

Most building-related emissions are attributable to the existing building stock, which is much less efficient than new construction due to being built before building energy standards. Decarbonizing existing buildings is critical to meeting emissions reduction goals. There are many challenges associated with improving the performance of existing buildings including costs, rental/ownership status and split incentives, and technological constraints. However, benefits include healthier indoor air quality, reduced energy use and lower utility bills, and more resilient building systems. Improving existing buildings in Ventura would focus on electrification and promoting existing energy efficiency programs offered by utility companies.

Performance Metrics

- Number of electric panel upgrades
- Number of building electrification retrofits
- Number and type of retrofits in disadvantaged communities
- Citywide natural gas use

Built Environment, Existing Buildings – Improved Energy Efficiency of Existing Buildings

BE 1.1 Energy and Water Benchmarking

Adopt energy and water benchmarking ordinance for commercial buildings over a specified square footage.

Implementation Actions:

1. Conduct a study to determine the appropriate square footage threshold to capture additional buildings than AB 802.
2. Engage with stakeholders including City staff, nonresidential property owners and managers.
3. Draft and adopt an ordinance.

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Lower utility costs
Responsible Departments	Community Development

BE 1.2 Green Building Labeling Program

Collaborate with 3C-REN, Associations of Realtors, and other similar organizations to develop, and promote the benefits of, a real estate Green Building Labeling Program that recognizes residential and nonresidential properties that are energy efficient, have good HERS score, and incorporate green building techniques.

Implementation Actions:

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Lower utility costs, improved climate literacy
Responsible Departments	Environmental Sustainability Division

1. Engage with stakeholders including residential and nonresidential property owners, managers, real estate agents, leasing brokers, and Chamber of Commerce to explain the benefits of providing a Home Energy Score.
2. Develop and distribute educational materials.
3. Encourage properties to take steps to improve their Energy Score through utility energy efficiency programs and other streamline permitting process.
4. Partner with Associations of Realtors to provide information on IOU and CPA energy efficiency incentives and rebates to residential and nonresidential property sellers and buyers. Support should be provided to sellers and buyers when they are submitting rebate and incentive applications during point-of-sale transactions.

BE 1.3 Energy Efficiency Programs and Incentives

Promote existing IOU and state agency financing programs like the Residential Energy Efficiency Loan program that is designed to help homeowners and renters access competitive financing solutions for energy efficiency projects.

Implementation Actions:

1. Collaborate with property management firms to develop a Green Commercial Lease Agreement Checklist to support shared landlord-tenant agreements that facilitate financing for energy efficient retrofits to renter-occupied buildings.
2. Partner with utilities to promote and implement energy efficiency programs.
3. Track and report community participation.
4. Investigate the feasibility of developing a Qualified Low-income Home Rehabilitation Loan program to finance home repairs eliminating health and safety hazards, increasing energy efficiency, and maintaining local housing stock.
5. Investigate developing a revolving loan fund or on-bill financing to help bring down the cost of residential and nonresidential energy efficiency retrofits and renewable energy projects not covered by IOUs or CPA.

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Lower utility costs
Responsible Departments	Community Development, Environmental Sustainability Division

BE 1.4 Energy and Climate Education and Incentives

Develop energy and climate education and incentive outreach materials in partnership with local contractors, energy leaders, IOUs, CPA, VCREA, and 3C-REN.

Implementation Actions:

1. Partner with utilities to develop and promote existing and new energy efficiency programs and educational materials.
2. Offer these outreach materials at City planning and building counters, during meetings, and public events within the City of Ventura.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Lower utility costs, improved climate literacy
Responsible Departments	Environmental Sustainability Division

Built Environment, Existing Buildings – Electrify Existing Buildings

BE 2.1 Existing Building Electrification Plan

Adopt a phased in electrification plan for existing buildings that promotes and as needed requires the retrofit of existing buildings to all electric starting with incentives, adopting a burnout ordinance, and the eventual adoption of a date-certain ordinance.

Implementation Actions:

GHG Reduction Potential	High
Cost	$$
Co-Benefits	Lower utility costs, improved climate literacy
Responsible Departments	Environmental Sustainability, Community Development

1. Engage with stakeholders including City staff and officials, and external stakeholders, such as local developers regarding the purpose and impact of the requirements.
2. Draft and adopt plan including phasing timeline of requirements starting with a burnout ordinance.
3. Conduct CEQA analysis, as needed.
4. Provide technical resources, including hosting workforce development trainings for installers and building owners/operators to discuss benefits and technical requirements of decarbonization and carbon-free energy sources.
5. Develop a tracking process to track natural gas and electric appliance/system installations.
6. Provide education around cooking with electric appliances, including demonstrations from chefs and/or local restaurants.
7. Promote the cost and environmental benefits of decarbonization and carbon-free energy sources to builders, property owners, and contractors on the City website and at the City permit counters.
8. Work with SoCalGas to identify opportunities for natural gas infrastructure pruning to reduce the chance of stranded assets, provide potential funding, and establish an efficient transition to carbon neutral buildings.

Transportation

Transportation-related emissions are the largest contributor to communitywide emissions, accounting for 48%. There are two main levers to reduce emissions associated with transportation. The first is to "clean" vehicle miles traveled (VMT) through vehicle electrification and access to carbon-free electricity from CPA. Second, is to reduce VMT through transportation demand programs and policies. Vehicle electrification can result in immediate emissions reductions because of the availability of carbon-free electricity in the city. However, EV adoption is not directly within the City's control. Transportation demand measures (TDMs) to reduce VMT, on the other hand, take longer to implement but can generate many co-benefits in addition to reducing greenhouse gas emissions.

Performance Metrics

- Transit, walk, and bike trips account for 38% of all trips
- Transit ridership
- Number of EV registrations
- Number of EV charging installations

Transportation – Clean VMT through Electrification

TL 1.1 Affordable Housing Electric Vehicle Charging

Partner with the local Housing Authority and CBOs to increase EV charging stations and EV car adoption at affordable housing projects.

Implementation Actions:

1. Partner with Housing Authority to connect affordable housing developers, property managers, and residents with EV charger installation resources and programs, and EV purchasing resources.
2. Develop and distribute educational materials.
3. Investigate the feasibility of the Housing Authority to host an EV carshare pilot project for a multifamily housing project.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Air quality, public health
Responsible Departments	Environmental Sustainability Division

TL 1.2 EV Charging Reach Code

Investigate and implement a reach code to require all new nonresidential and multi-family housing construction to install EV charging stations.

Implementation Actions:

1. Engage with stakeholders including City staff and officials, and external stakeholders, such as local developers regarding the purpose and impact of the reach code.
2. Conduct a cost effectiveness study or utilize studies developed by the CEC.
3. Develop and draft an ordinance.
4. Submit the adopted ordinance to the California Building Standards Commission (CBSC).

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Air quality, public health
Responsible Departments	Community Development

TL 1.3 Partnerships to Encourage Electric Vehicle Charger Installation

Increase installation of private EV charging stations by promoting federal, state, SCE, CPA, and local rebates and incentive.

Implementation Actions:

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Air quality, public health, reduced congestion
Responsible Departments	Environmental Sustainability Division

1. Partner with utilities, VCREA and Electric Drive 805 to develop and promote existing and new EV programs and educational materials.
2. Expand public-private partnerships to support outreach efforts that will increase awareness of EV models and their benefits, through activities such as green car shows and test-drive events.
3. Offer these outreach materials at City planning and building counters, during meetings, public events within the City of Ventura, on city website.
4. Collaborate with VCREA, Community Environmental Council, EV Advocates of Ventura County, Electric Drive 805, and other EV advocacy groups to identify EV infrastructure funding sources, identify and remove local barriers to EV charging station installations, and recommend consistent affordable rate structures for public charging stations.
5. Increase installation of private EV charging stations by promoting federal, state, SCE, CPA, and local rebates and incentives through existing communication channels such as the City, VCREA, and Electric Drive 805 websites, social media, and additional methods as identified by the City.

Transportation – Reduced VMT through Mode Shift

TL 2.1 TDM Program

Adopt a mandatory TDM program for new construction and develop incentives to encourage existing businesses and multifamily developments to participate.

Implementation Actions:

GHG Reduction Potential	Medium
Cost	$-$$
Co-Benefits	Air quality, public health, reduced congestion
Responsible Departments	Community Development, Public Works

1. Develop options for a mandatory TDM policy that includes trip reduction requirements (including penalties for noncompliance), regular monitoring and reporting, and dedicated city staff for new development.
2. Conduct focus groups with large employers, small employers, and housing developers on their opportunities and challenges of implementing a TDM program.
3. Adopt a TDM ordinance that requires employers and housing developments of a certain size to submit an emissions reduction plan that includes:
    - Site analysis
    - Annual vehicle ridership survey results
    - Emissions reduction options
    - Employee trip reduction program with a menu of options such as transit information, guaranteed ride home program, commuter choice program, transit pass program, carpool preferential parking, secure bike parking, vanpool program, parking charge, telecommuting, prize incentives, transportation allowance, etc.
4. Explore increasing staffing capacity or establishing a Transportation Management Authority (TMA) to administer citywide TDM and VMT reduction programs.
5. Explore incentives for existing businesses and multifamily housing to join.
6. Establish a city employee TDM program with mode shift targets for staff.
7. Establish annual reporting requirements to the City Council.

TL 2.2 Improve Curb Management

Evaluate the current and best use of curb space in the city's activity centers and repurpose space to maximize people served (i.e., for loading, bikeways, bike parking, bus lanes, EV charging, or parklets).

Implementation Actions:

1. Reevaluate the City's micromobility ban by engaging City Council, businesses, and residents about needs and impacts.
2. Conduct a curb space use plan to identify and assess competing priorities.
3. Conduct community outreach and promote the program.

GHG Reduction Potential	Supportive
Cost	$$
Co-Benefits	Improved air quality
Responsible Departments	Community Development, Public Works

TL 2.3 Land Use and Transportation Coordination

Manages land use change to support greenhouse gas reduction targets by focusing development in location efficient places, creating complete communities, and increasing density. Complete, mixed-use neighborhoods allow residents to access most of their everyday needs within a short walk, bike, or transit trip.

Implementation Actions:

1. Identify appropriate transit corridors in conjunction with Gold Coast Transit, VCTC, and SCAG.
2. Determine criteria for increased density and increased density allowances.
3. Evaluate new approval and permit streamlining for new housing that exceeds inclusionary and sustainability requirements.
4. Establish additional incentives in the zoning code to facilitate affordable housing in transit-rich areas.
5. Update the zoning code to ensure a diverse use of services and amenities are allowed in each neighborhood, including childcare, healthy food, community gardens, and other amenities. Increase the types of home-based businesses allowed in residential neighborhoods
6. Engage with stakeholders including City staff and officials, and external stakeholders, such as local developers regarding the purpose and impact of the requirements.
7. Update General Plan Land Use Designations and Zoning Districts.

GHG Reduction Potential	Medium
Cost	$
Co-Benefits	Air quality, public health, reduced congestion
Responsible Departments	Community Development, Public Works

TL 2.4 Active Transportation Plan

Prioritize, fund, and implement the Active Transportation Plan (ATP).

Implementation Actions:

1. Prioritize and implement all policy recommendations included in the ATP to improve pedestrian, bicycle networks, and increase transit ridership based on the established timeframes.
2. Align implementation with CIP funding cycles.
3. Identify additional funding sources, such as grant funding or a revised Transportation Mitigation Fee program for ATP implementation.
4. Establish tracking, reporting, and update requirements for the ATP.

GHG Reduction Potential	Medium
Cost	$$$$
Co-Benefits	Air quality, public health, reduced congestion, safety
Responsible Departments	Public Works

TL 2.5 Transit Service Levels

Expand and improve transit and shared mobility services to be more accessible, affordable, and timely.

Implementation Actions:

1. Work with Gold Coast Transit, VCTC, and Metrolink to conduct a transit service gaps analysis to determine how service can be improved.
2. Partner with transit agencies to implement service improvements.
3. Identify additional funding sources, such as a revised Transportation Mitigation Fee program or Measure O funding for improved transit service levels.
4. Conduct community outreach and promote the service improvements.

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Air quality, public health, reduced congestion, safety
Responsible Departments	Public Works

TL 2.6 First Mile-Last Mile

Leverage public-private partnerships to increase transit ridership and improve transit station access by incorporating first/last mile bus, shuttle, and active transportation connections between employment hubs and regional transit stations.

Implementation Actions:

1. Work with Gold Coast Transit, VCTC, and Metrolink to improve access to transit stations / stops for active transportation modes.
2. Complete ATP projects connecting to transit stations / stops.
3. Evaluate mobility hubs to determine the financial costs, infrastructural needs, and economic feasibility to support first-last mile service.

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Resilience, air quality, public health
Responsible Departments	Public Works, Community Development

TL 2.7 Transit Fares

Collaborate with transit agencies and shuttle providers to scale service levels in growing areas and leverage private sector subsidies of transit fares to support ridership.

Implementation Actions:

1. Work with private partners including businesses, employers, and housing developments to subsidize transit fares through TDM plan implementation. Consider expanding existing college subsidy program to include high school and possibly middle school students.
2. Identify additional funding sources, such as a revised Transportation Mitigation Fee program or Measure O funding for improved transit service levels.
3. Conduct community outreach and promote the service improvements.

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Resilience, air quality, public health
Responsible Departments	Public Works

Solid Waste

Solid waste accounts for 4% of Ventura's overall emissions. By consuming less materials, recycling, and composting more, the community will be able to reduce the amount of waste sent to landfill and eventually become a zero-waste city. Specifically, diverting organic material including food waste is a crucial step to meeting long-term goals, because landfilled organic materials produce methane, which is a more potent GHG than carbon dioxide. The State adopted Senate Bill 1383, the Short-Lived Climate Pollutants Act, which requires jurisdictions to divert 75% of food waste from landfills by 2025, and jurisdictions must also recover food waste that can be repurposed. Moreover, organics recycling can provide useful byproducts including compost and biogas, which can further reduce emissions and provide economic benefits.

Performance Metrics

- Communitywide waste generation
- Tons of food waste diverted from landfill
- Tons of edible food recovered and redistributed

Solid Waste – Increased Diversion from Landfill

SW 1.1 SB 1383 Compliance

Adopt an SB 1383 compliant zero-waste plan for municipal operations and the community that includes: mandatory residential and commercial recycling and collection of organics/food waste, mandatory commercial edible food recovery program, and updated trash enclosure space and access requirements based on hauler recommendations to accommodate all waste streams (e.g., recycling, trash, and organics).

Implementation Actions:

1. Partner with waste hauler to:
   - Provide for organic waste collection from mixed waste containers are transported to a high diversion organic waste processing facility
   - Provide quarterly route reviews to identify prohibited contaminants potentially found in containers that are collected along route.
   - Identify contaminated waste generators in need of technical assistance
   - Develop and distribute educational materials and in-person assistance
   - Clearly label all new containers indicating which materials are accepted in each container, and by January 1, 2025, place or replace labels on all containers.
2. Modify development waste plan requirements to update enclosure standards to include space for food waste receptacles.

GHG Reduction Potential	Medium
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division

SW 1.2 Single-Use Food Service Ware

Expand the City's polystyrene ban to include single use food service ware.

Implementation Actions:

1. Engage stakeholders including restaurants, businesses, local shipping/delivery companies, and the Chamber of commerce on the impact, alternative products, and benefits of the ordinance.
2. Draft and adopt ordinance.
3. Work with waste hauler and economic development to establish monitoring and enforcement process as necessary

GHG Reduction Potential	Low
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division

SW 1.3 C&D Diversion Requirements

Require 85% of construction and demolition (C&D) debris be recycled.

Implementation Actions:

1. Research local disposal facility diversion rates to determine potential for additional diversion.
2. If possible, draft and adopt ordinance.
3. Submit the adopted ordinance to the California Building Standards Commission (CBSC).
4. Conduct community outreach about new diversion requirements.

GHG Reduction Potential	Low
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, Community Development

SW 1.4 Sustainable Construction Materials

Explore modifications to the building code that would require certain products to be locally sourced and/or contain a percentage of recycled content.

Implementation Actions:

1. Reach out to US Green Building Council, Los Angeles (USGBC-LA) to determine appropriate materials and % recycled content.
2. Engage with stakeholders including City staff and officials, and external stakeholders, such as local developers regarding the purpose and impact of the policy.

GHG Reduction Potential	Supportive
Cost	$$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, Community Development

SW 1.5 Lifecycle Climate Impacts and Extended Producer Responsibility

Advocate at the appropriate governmental level for goods and services to disclose lifecycle climate impacts. Advocate for more robust extended producer responsibility policies statewide.

Implementation Actions:

1. Work with the City Attorney to support advocacy efforts lead by environmental groups pursuing this issue.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, Public Works, Finance

Water and Wastewater

Water is a critical resource in California and Ventura. Regional water supplies are already being adversely affected by climate change induced drought and decreased snowpack. Ventura meets the city's demand with locally pumped groundwater, Lake Casitas and the Ventura River. Climate change may impact local hydrology and affect natural recharge to the local groundwater aquifers and the quantity of groundwater that could be pumped sustainably over the long-term. Lower rainfall and/or more intense runoff, increased evaporative losses, and warmer and shorter winter seasons can alter natural recharge of groundwater.

Water related emissions in Ventura account for less than 1% of the communitywide total emissions, because of being treated and distributed locally using clean electricity from CPA. Ecosystem and quality of life benefits that reliable clean water provide are important to protect. Thus, reducing indoor and outdoor water use through fixture upgrades and climate-appropriate landscaping for both residential and nonresidential buildings is important. However, an important trade off of water conservation and drought is that the Ventura Water Reclamation Facility will be impacted by lower flows to the facility and challenges with treating highly concentrated wastewater streams.

Performance Metrics

- Gallon per capita per day (GPCD)
- Number of WELO compliant landscape renovations
- Number of plumbing fixture upgrades

Water and Wastewater – Reduce Water Use

WW 1.1 Water Efficiency Requirements

Adopt CALGreen Tier 1 or 2 water efficiency requirements for new construction or additions of 50% the size of the original building.

Implementation Actions:

1. Develop and draft an ordinance modifying the building code to make Tier 1 or 2 water requirements mandatory for new development and remodels.
2. Submit the adopted ordinance to the California Building Standards Commission (CBSC).

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Resilience, lower utility costs
Responsible Departments	Community Development, Ventura Water

WW 1.2 Landscaping Efficiency Requirements

Modify Model Water Efficient Landscape Ordinance (MWELO) to require all landscape projects to obtain a landscape permit, decrease the size threshold to capture all landscape renovations, add prescriptive irrigation, plant lists, or water budget requirements.

Implementation Actions:

1. Engage with stakeholders including City staff and officials, and external stakeholders, such as local developers regarding the purpose and impact of the requirements.
2. Draft and adopt ordinance.

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Resilience, lower utility costs
Responsible Departments	Community Development, Ventura Water

WW 1.3 Greywater Systems

Create a streamlined permit process for laundry-to-landscape greywater systems.

Implementation Actions:

1. Review current permitting procedures and reach out to industry experts.
2. Determine eligibility criteria for systems that qualify for expedited permitting and provide permitting checklist.
3. Explore the potential to allow for digital signatures and online permit application submittals.
4. Shorten the inspection process to one inspection for qualifying systems.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Resilience, lower utility costs
Responsible Departments	Environmental Sustainability, Community Development

WW 1.4 Alternative Water Supplies

Explore alternative water supplies including local groundwater, recycled water, etc.

Implementation Actions:

1. Identify potential sources of water including groundwater and recycled water.
2. Conduct feasibility assessment of potential sources.
3. Include water source development in water system/CIP budget and schedule.

GHG Reduction Potential	Supportive
Cost	$-$$$
Co-Benefits	Resilience
Responsible Departments	Ventura Water

Community Education and Partnerships

Continued community outreach, engagement, and education is important for the successful implementation of the CARP and the realization of Ventura's climate goals. Regular engagement with the community builds climate literacy, improves understanding of various mitigation strategies, and better equips the community to prepare for and adapt to the impacts of climate change.

Measures in this sector also highlight important partnerships that the City should develop to enhance its capacity to conduct outreach and engage a broader swath of the Ventura community. These partnerships include capitalizing on existing utility programs, regional and county climate organization efforts, and existing communications structures.

The following measures are included as part of the CARP to support the implementation of the measures in sectors above. The greenhouse gas reduction potential of the community education measures is not quantified but is stated as supportive in that implementing these measures aids in implementation of related measures and help achieve their greenhouse gas reduction potential.

Performance Metrics

- Number of annual CARP community events
- Number of people engaged annually
- Participation rates in City CARP and utility rebate programs

City of Ventura Environmental Outreach

The City of Ventura has a robust environmental outreach program that engages schools, businesses, and residents in the City of Ventura. Utilizing resources such as newsletters, social media profiles, press releases, website pages, billboards and more, the City successfully reaches tens of thousands of residents on an annual basis with its environmental messages.

The Green Schools program offers education and resources to schools in an effort to bolster their sustainability efforts. VUSD has partnered with the City for over a decade to provide classroom presentations. In 2019, Environmental Sustainability and Ventura Water offered presentations to over 8,000 students at 27 different schools.

The City's environmentally focused video content receives hundreds of thousands of views annually between the various social media platforms. Topics ranging from composting and public parks to water efficiency and energy conservation gather viewers from all demographics throughout the City and beyond city limits.

The City also has a robust Green Business Program that supports businesses in reducing energy, water, waste, and operating costs while facilitating certification through the California Green Business Network. This program reaches dozens of businesses annually and has resulted in over 80 certified green businesses in the City of Ventura.

The City partners with local organizations, such as the Community Environmental Council, VCREA, and the Central Coast Green Building Council to offer educational workshops and presentations to residents. These topics range from the Solarize program, the EAP, Green Building Speaker Series, and more.

COM 1.1 Environmental Sustainability Website and Outreach Methods

Regularly update the City's Environmental Sustainability website, social media, and other outreach methods with greenhouse gas reduction and energy-focused resources including programs, rebates, and incentives offered by IOUs, CPA, VCREA, 3C-REN and other energy-focused organizations. Case studies and best practices highlighting successful energy improvements and greenhouse gas mitigation should also be included in the outreach materials.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO

COM 1.2 Community Updates on CARP and Energy Reduction Goals

Regularly update the City's Environmental Sustainability website, Sustainable Ventura Newsletter, social media, and other outreach methods showing the community's progress towards achieving local energy and greenhouse gas reduction and climate goals.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO

COM 1.3 Sustainable Ventura Newsletter

Dedicate a portion of the Sustainable Ventura Newsletter to green business operations, including programs, case studies, and opportunities to reduce energy consumption and capitalize on financing programs like Property Assessed Clean Energy (PACE) and IOU-sponsored on-bill financing.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO

COM 1.4 Community Workshop Series

Partner with key community stakeholders, IOUs, CPA, VCREA, and other climate and energy focused organizations to develop a quarterly workshop series to engage and educate the public on rebates and incentives, programs, partnerships, and other opportunities to enrich energy and climate education.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO

COM 1.5 Green Building Trainings

Support 3C-REN, AIA Ventura Chapter, Central Coast Green Building Council, and other green building organizations in developing green building trainings, sharing case studies, and offering other educational opportunities. Explore development of a Green Building Awards Competition.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO

COM 1.6 Energy Storage Outreach Program

Collaborate with Community Environmental Council and VCREA to develop and implement an energy storage outreach and education program. Program offerings could include hosting community energy storage workshops and developing informational materials on the benefits of and available incentives for energy storage.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO

COM 1.7 Home Energy Savings Do-It-Yourself Toolkit Promotion

Partner with 3C-REN, VCREA, and the Ventura County Library System to promote Home Energy Savings Do-It-Yourself Toolkits. Each kit includes tools to help measure a home's current energy use, along with helpful tips on ways to make a home more energy smart. The kits also include free items to keep like light-emitting diode (LED) lightbulbs, low-flow showerheads, and other things to help homes use less energy and water.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO

COM 1.8 Electric Vehicle Outreach

Partner with VCREA, Community Environmental Council, EV Advocates of Ventura County, Electric Drive 805, and other EV advocacy groups to develop and implement an EV outreach and education program. Program offerings could include hosting events like EV "lunch and learns" and developing informational materials on the benefits of EV ownership.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO

COM 1.9 Ventura Unified School District Engagement

Continue partnership with Ventura Unified School District (VUSD) to empower students to be leaders in reducing greenhouse gas emissions, lowering energy consumption, and utilizing EVs in their community through in-class education, internships, and other programs.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO

COM 1.10 Energy Outreach Targeting

Partner with 3C-REN and Community Action of Ventura County to conduct focused homeowner and renter outreach to the city's disadvantaged and low-income communities, using Energy Atlas data and maps to guide outreach.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division, PIO

City Leadership

The ability to meet Ventura's goals of mitigating carbon emissions and adapting to the effects of climate change will be demonstrated by City actions. The City will implement a series of actions that will both reduce carbon emissions from municipal operations and enhance resiliency. These actions include energy and water efficiency upgrades for City facilities, parks, and landscapes, sustainable new construction, the electrification of buildings and fleet vehicles, supporting electric vehicle adoption through charger installation, and the installation of resilience measures as discussed in Chapter 4: Our Adaptation Strategy. These policies will not only reduce emissions but create community benefits through leading by example.

Performance Metrics

- Number of City buildings retrofitted to eliminate natural gas use
- Percent of City fleet powered by clean energy
- Reduction in GHG emissions from City operations

Municipal Measures

CL 1.1 City Facilities Decarbonization Plan

Develop a decarbonization plan for City facilities that aligns with the CIP process.

Implementation Actions:

GHG Reduction Potential	Low
Cost	$-$$
Co-Benefits	Resilience
Responsible Departments	Environmental Sustainability Division

1. Conduct an energy audit of all City facilities.
2. Identify energy efficiency upgrades to be installed.
3. Identify potential for DERs at City facilities, including those identified in the 2012 ESS.
4. Establish a funding source and timeline to meet the goal for streetlight upgrades as described in the 2018 Public Works Strategic Plan of converting the 1,000 city-owned and maintained streetlights to LEDs by 2025 to reduce costs and improve quality.
5. Investigate establishing a funding source and timeline to attain ownership of SCE owned streetlights and update those lights to LEDs.
6. Upgrade the energy management system to better track the energy consumption of municipal facilities.
7. Develop and implement a green revolving loan fund (RLF) to finance energy projects at municipal facilities and reinvest the money saved from lowered utility bills into future energy projects.
8. Pursue funding opportunities to finance energy upgrade projects identified in energy audits and renewable energy feasibility assessments.
9. Conduct feasibility analysis for installing renewable energy projects at all City-owned and operated facilities that were identified as viable solar sites in the ESS and identified as critical facilities.
10. Develop policy to require re-roofing projects on government facilities to evaluate the feasibility of incorporating solar or "solar ready" features, including mounting posts for panels and roof penetrations for conduit and/or pipes for facilities.
11. Align improvements timeline with CIP process including utility available incentive programs.
12. Draft and adopt plan.

CL 2.1 Public Electric Vehicle Charger Installations

Collaborate with VCREA, Community Environmental Council, EV Advocates of Ventura County, Electric Drive 805, and other EV advocacy groups to build upon the EV Infrastructure Interactive Map by identifying new preferred locations for Level 2 and DC Fast Chargers.

Implementation Actions:

1. Conduct an EV charger gap analysis to identify locations in need of additional chargers.
2. Partner with utilities, VCREA and Electric Drive 805 to develop to install, maintain, and operate publicly accessible EV chargers.
3. Update interactive map with new charger locations.

GHG Reduction Potential	Low
Cost	$
Co-Benefits	Air quality, public health
Responsible Departments	Environmental Sustainability Division

CL 3.1 ZEV Fleet Transition

Establish a vehicle procurement approach that favors EVs for new fleet purchases and build charging infrastructure.

Implementation Actions:

1. Set a goal to transition one eighth of the City fleet to Evs by 2030.
2. Establish a ZEV policy requiring City Departments to purchase light-duty vehicles, if available and cost effective, according to the following priority structure: (1) pure ZEVs, (2) plug-in hybrid Evs, and (3) hybrids.
3. Centralize fleet procurement authority so one staff will review all vehicle procurements and require revisions of selected vehicles if the justification for non-ZEV or hybrid options is lacking.
4. Track the California Division of Measurement Standards updates to proposed regulations for EV charging rates to ensure the charging rates are not burdensome to EV drivers.
5. Install Level 2 charging infrastructure at City public parking lots and investigate the feasibility of installing DC Fast Chargers in these lots.
6. Explore the feasibility of utilizing City owned smart charging stations to earn credit revenue by participating in the California Low Carbon Fuel Standards (LCFS) program.

GHG Reduction Potential	Low
Cost	$$
Co-Benefits	Air quality, public health
Responsible Departments	Public Works

CL 4.1 Sustainability Purchasing Policy

Adopt a municipal sustainable purchasing policy

Implementation Actions:

1. Work with City Manager's office and Finance Department to develop a list of preferred purchasing options
2. Conduct outreach to all city staff about sustainable purchasing policy; include as part of new employee orientation

GHG Reduction Potential	Low
Cost	$
Co-Benefits	
Responsible Departments	Environmental Sustainability Division

CL 5.1 CPA Leadership

Utilize the City's seat on the CPA Board of Directors to advance programs and policies in line with best practices towards decarbonization, electrification, and equity for ratepayers.

Implementation Actions:

1. Advocate for programs and rebates to encourage adoption of Evs, energy efficiency measures, energy storage, and renewable energy systems based on other successful CCE and IOU programs.
2. Encourage programs and rebates to have special consideration for low-medium income residents.
3. Advocate for net energy metering policies that are favorable for solar customers (higher kWh purchase rates than SCE for net surplus generating customers) and the establishment of community solar programs that benefit renters or other customers that cannot install solar where they live or conduct business.
4. Advocate for development of distributed energy resources including solar, energy storage, and microgrid within Ventura County that are designed to improve regional grid resilience and reliability.

GHG Reduction Potential	Supportive
Cost	$
Co-Benefits	Air quality, public health
Responsible Departments	Mayor or City Council

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Chapter 6

Implementing the CARP

The CARP directs City staff to develop and implement specific policies, plans, programs, and projects over the next 10 years to achieve the City's climate goals. Successful implementation of the CARP strategies will require commitment and coordination from staff throughout the City. Although the City will initiate climate action, community involvement is an essential component of the CARP implementation process, as many strategies depend on active participation by residents and businesses.

Priority Implementation Actions

Through an extensive community engagement process, the initial longlist of strategies and actions were prioritized based on their greenhouse reduction potential, co-benefits, and financial resources. These priority actions lay the foundation for future action, contribute to the elimination of greenhouse gas emissions by 2045, and make Ventura more resilient, especially those most at-risk and vulnerable to impacts of climate change.

Table 8. Priority Strategies

Number	Strategy
EH 1.5	**Increase Tree Canopy**. Increase urban tree canopy citywide to mitigate extreme heat.
WM 2.7	**Reduce Fire Risk in WUI.** Continue to coordinate with CAL FIRE, Ventura County Fire, Ventura Regional Fire Safe Council, and neighboring jurisdictions on wildfire risk reduction activities in the Wildland Urban Interface (WUI) and open space areas in and adjacent to the City.
SLR 6.4	**Coastal Resilience Funding**. Research external funding opportunities to implement coastal resilience and coastal restoration projects.
CA 8.1	**Community Engagement Campaign**. Develop a community-wide engagement campaign to educate the public on anticipated near and long-term climate impacts, community vulnerabilities, and opportunities for adaptation.
CE 2.4	**CPA Participation**. Maintain City membership in Clean Power Alliance (CPA) and continue to work to maintain a minimum of 95% of private property owner participation in CPA at the 100% Green tier.
BNC 2.2	**Residential All-Electric New Construction**. Investigate and implement a localized reach code for new residential construction to prohibit or disincentivize connection to natural gas lines.
BE 1.3	**Energy Efficiency Programs and Incentives**. Promote existing IOU and state agency financing programs like the Residential Energy Efficiency Loan program that is designed to help homeowners and renters access competitive financing solutions for energy efficiency projects.
TL 1.3	**Partnerships to Encourage Electric Vehicle Charger Installation**. Increase installation of private EV charging stations by promoting federal, state, SCE, CPA, and local rebates and incentive.
TL 2.4	**Active Transportation Plan**. Prioritize, fund, and implement the Active Transportation Plan (ATP).
COM 1.1	**Environmental Sustainability Website and Outreach Methods.** Regularly update the City's Environmental Sustainability website, social media, and other outreach methods with greenhouse gas reduction and energy-focused resources including programs, rebates, and incentives offered by IOUs, CPA, VCREA, 3C-REN and other energy-focused organizations.

Cost Estimates and Funding Sources

Cost Effectiveness

There are many different approaches to establishing implementation cost estimates for CARP strategies. Implementation costs include both administrative and programmatic costs to the City, and equipment and services costs to residents and businesses. Costs can be expressed as relative costs to a determined baseline, up-front first costs or the direct costs of implementation, or long-term cost effectiveness, the total cost of action implementation over time accounting for cost savings over the lifetime of the intervention. These estimates differ. Table 9 shows the estimated up-front unit cost of implementing CARP strategies and the estimated greenhouse gas emissions reductions based on the modeled level of implementation needed to achieve the City's targets. These cost estimates may change as the market adjusts to future technological adoption and advancements or additional climate measures are pursued.

Table 9. Relative Cost-Effectiveness of Greenhouse Gas Mitigation Measures

Sector	Sub-Category	Cost	GHG Reduction Potential	Relative Cost Effectiveness (GHG Reduction / Cost)
Clean Energy	Local Renewables	High	Low	Low
	Clean Energy – CPA	Low	High	High
Buildings	Existing Building Energy Efficiency	Medium	Low	Medium
	New Building Electrification	Low	Medium	Medium
	Existing Building Electrification	High	High	Low
Transportation	Electric Vehicles	Medium	Medium	Medium
	Mode Shift	High	High	High
Solid Waste	SB 1383	Low	Low	Low
Water	Water Use	Low	Low	High

Funding Opportunities

The actions in this CARP do not necessarily represent the lowest cost pathway to achieve Ventura's GHG targets. Instead, the actions were chosen to reflect local conditions and priorities, address equity, and to create multiple benefits in addition to emissions reductions. However, implementing the CARP can also provide economic benefits across the city including expanding the local green economy, job creation, and reducing costs for Ventura residents and businesses. For example, making walking and biking safer and transit more accessible can reduce the costs of traveling around Ventura, while promoting an active lifestyle that can help improve health outcomes.

Below is a list of potential funding sources as well as available incentive programs to help reduce the cost of implementing CARP actions:

- **City's General Fund.** This is the primary source of funding for City operations and can be used for any public purpose. It is allocated as part of the overall City budget, approved by City Council. The substantial number of competing priorities for General Fund dollars requires that the City seek out other sources of funding wherever possible to increase the likelihood of successful implementation for each action.
- **Measure O Funding.** Measure O is a general sales tax measure approved in 2016. The twenty-five year measure to support public services.
- **Bonds**. Local governments can sell bonds to investors that raise capital for a specific objective. Bonds must be approved by voter and may have additional oversight or administration requirements.
- **Taxes**. Taxes generate revenue to support local, regional, and state operations. Taxes can be used either for general purposes (e.g., any city service as needed) or specific purposes (e.g., climate change mitigation) but require voter approval. Examples of taxes include:
    - Utility User Tax
    - Real Estate Transfer Tax
    - Parcel Tax
- **Revolving Loan Fund**. Ventura Water could partner with a third-party funding entity to finance energy upgrades. The third-party funding entity would be responsible for loan processing and tracking, and receive a service fee from Ventura Water, separate of the initial capital. Ventura Water would facilitate repayment of these loans to the revolving fund via the water bill and ensure a low interest rate. The City would ensure a low interest rate by establishing a fixed rate in the program contract (e.g., 1.5%), enough to grow the revolving fund but keep loans affordable for residents.
- **State and Federal Grants**. Grants are usually given without expectation of repayment, but often require either matching funds from the City and/or staff time to administer the grants. Grants often fund new and innovative programs. However, grants are also competitive and are not guaranteed source of funding. The following agencies offer climate related grants:
    - Department of Energy
    - California Energy Commission
    - Southern California Edison
    - Southern California Gas Company
    - Ventura County Air Pollution Control District
    - Electrify America
    - FTA Planning Grants
    - CARB
    - CalFire
    - FEMA
    - CDFA Healthy Soils Initiative
    - CalRecycle
- **Incentives and Rebates**. Incentives and rebates are usually monetary motivators that can help cover the cost of implementing specific programs or equipment. Many utilities have incentive

programs to help spur investment, pay for equipment, and expand various markets for newer technologies. Existing programs include:

- CPA Residential and Commercial Rebates
- 3C-Ren Home+ Rebates
- Ventura County Regional Energy Alliance
- California Water Service rebates
- CA Clean Vehicle Rebate Project
- Electric Drive 805
- Single-family Solar Affordable Solar Housing (SASH) Program
- Multifamily Affordable Solar Housing (MASH) Program
- Residential and Commercial Federal ITC for solar photovoltaics
- New local incentives programs as needed

Equitable Program Implementation

Though equity is like equality, they are not the same thing. Equality means everyone receives the same thing regardless of any other factors. Equity, on the other hand, is about ensuring that people have access to the same opportunities to thrive and succeed. A climate equity lens recognizes that people may have different starting points and may need diverse types and levels of support to adapt to climate change to achieve fairness in climate outcomes. Thus, climate equity is achieved when socioeconomic and environmental factors, such as race, income, education, or place, can no longer be used to predict the health, economic, or other wellbeing outcomes from climate change. For the purposes of the CARP, the following dimensions of equity will be considered during program implementation:

- **Procedural.** Create processes that are transparent, fair, and inclusive in developing and implementing any climate program, plan, or policy. This dimension of equity focuses on ensuring that all people are treated openly and fairly, and on increasing opportunities for engagement and ownership in decision-making in all phases of climate resilience planning and CARP implementation.
- **Structural**. Address the underlying structural and institutional systems that are the root causes of social and racial inequities. It is a dimension of equity that makes a commitment to correct past harms and prevent future unintended consequences from climate-related decision-making, such as in the CARP implementation.
- **Distributional**. Fairly distribute resources, benefits, and burdens. This dimension of equity focuses on prioritizing resources for communities that experience the greatest climate and environmental inequities, disproportionate impacts, and have the greatest unmet environmental health needs.

Achieving climate equity will require careful design and execution of policies and programs to improve outcomes for disadvantaged populations in all stages of CARP implementation. When equity is prioritized, climate strategies can address and lessen existing social, racial, and health disparities. Implementation of this CARP will be guided by two equity guardrails:

1. Many of the local benefits resulting from CARP implementation will be focused on disadvantaged communities by meeting priority community needs, improving public health, building on community assets and values, and increasing community resilience.
2. Required measures do not present an undue cost burden on those least able to afford implementation. Financial and technical assistance will be prioritized for disadvantaged communities and sensitive populations, including renters, to allow them to participate in CARP programs and fully realize all benefits.

Monitoring and Evaluation

Monitoring of the CARP's performance involves tracking the performance of individual strategies and estimating the GHG emissions reductions resulting from their implementation. The performance metrics identified for each strategy will be tracked using readily accessible data that is useful for estimating emissions reductions. Periodic re-inventorying of local government and community-wide emissions will also be needed to validate overall progress toward the City's GHG reduction targets.

- **Implementation Checklists**. The City will develop CARP consistency checklists to ensure compliance with CARP strategies when reviewing City plans, programs, and activities including Capital Improvement Projects as well as community development projects. The checklists will help City staff and community development project applicants plan for and approve work that support the City's sustainability goals.
- **Annual CARP Progress Report.** City staff will prepare annual progress reports on CARP implementation to be presented to City Council and other stakeholders as needed. The report will evaluate the successes and challenges in meeting the City's GHG reduction targets (as they become known or apparent), provide the status of implementing actions for each reduction and resilience strategy in the CARP (e.g., initiated, ongoing, completed), assess the effectiveness of each strategy, and recommend adjustments to programs or actions as needed.
- **GHG Inventory.** Staff will update the City's community and municipal operations emissions inventory every five years. Inventory updates will encompass all inventory sectors (residential energy, commercial/industrial energy, large industrial energy, on- and off-road transportation, solid waste, wastewater, water, and municipal operations).
- **CARP Updates.** A comprehensive revision of the CARP should occur at least every five years to monitor progress of greenhouse reductions against the 2030 target and 2045 goal of carbon neutrality, to account for the impact of new legislation and state programs on greenhouse gas targets and emissions reductions, and to adjust strategies and actions as needed to reach the targets. In preparation for the 2030 update and annual reporting to the Planning Commission and City Council, staff will use greenhouse gas inventories and CARP measure implementation to track Ventura's progress in reducing emissions, VMT, waste generation, and energy use over time using readily available data.

Oversight and Accountability

Options for an ongoing structure for oversight in CARP implementation and long-term plan updates:

- Create an internal CARP Implementation Team (led by the Environmental Sustainability Division) to assist in coordinating and implementing actions across departments, identifying synergies/collaboration opportunities, and identifying funding sources.
- Develop and maintain a community-facing CARP Tracking Dashboard for transparency.
- Prepare annual updates for the Planning Commission and City Council on CARP progress, as defined above.

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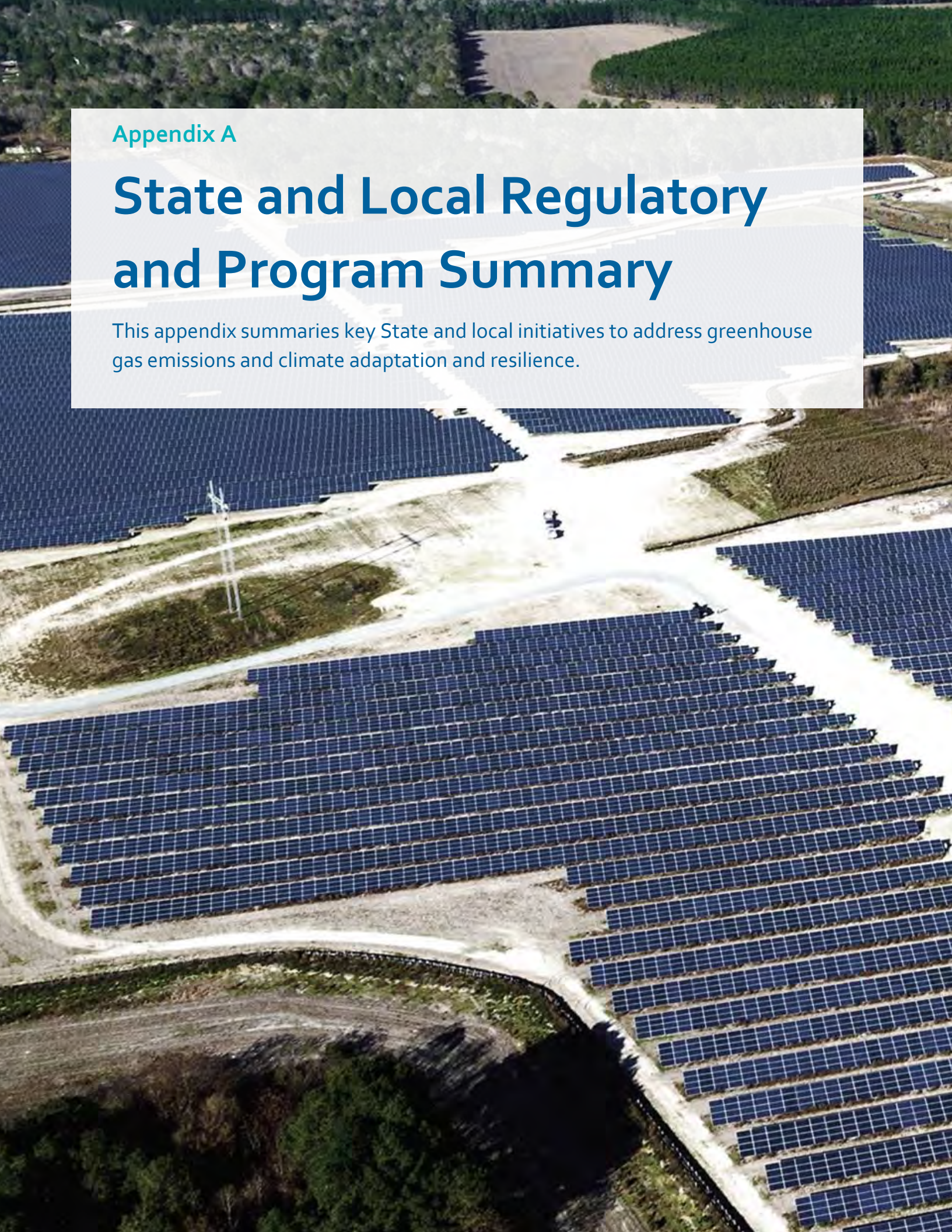


Appendix A

State and Local Regulatory and Program Summary

This appendix summaries key State and local initiatives to address greenhouse gas emissions and climate adaptation and resilience.

State Regulatory Framework

California has established itself as a national leader on climate action. The following section describes key elements of the legislative and regulatory context in California that aids local governments in reducing their GHG emissions. This legislative framework guided the development of the CARP and GHG forecasting.

Table A-1. State Regulatory Framework

Program	Description
Climate Action Targets	
Executive Order B-55-18 (2018): Carbon neutrality by 2045	This Executive Order set a target of statewide carbon neutrality by 2045 and to maintain net negative emissions thereafter.
Senate Bill 32 (2016): Greenhouse Gas emission reduction target for 2030	This Senate Bill establishes a statewide greenhouse gas (GHG) emission reduction target of 40% below 1990 levels by 2030.
Assembly Bill 32 (2006): California Global Warming Solutions Act of 2006.	This Assembly Bill requires the California Air Resources Board (CARB) to adopt a statewide greenhouse gas emissions limit equivalent to the statewide greenhouse gas emissions levels in 1990 to be achieved by 2020. It was California's first GHG reduction target.
Climate Change Scoping Plan (2017)	The Climate Change Scoping Plan was approved by CARB in December 2008 and outlines the State's plan to achieve the GHG reductions required in AB 32. The plan directed municipal governments to reduce their emissions by at least 15% by 2020 compared to 2008 levels or earlier. The Scoping Plan was updated in 2017 to reflect the SB 32 target of reducing emissions by 40% under 1990 levels by 2030.
Clean Energy	
Senate Bill 100 (2018): Renewable Portfolio Standard	This Senate bill requires that 100% of all electricity within California be carbon-free by 2040. Electricity providers must procure from eligible renewable energy sources, with interim goals of 40% by 2024 and 50% by 2030.
Transportation	
Senate Bill 375 (2008): Greenhouse Gas emission reduction targets for vehicles	The Sustainable Communities & Climate Protection Act of 2008 requires CARB to develop regional greenhouse gas emission reduction targets for passenger vehicles. CARB is to establish targets for 2020 and 2035 for each region covered by one of the State's 18 metropolitan planning organizations.

Program	Description
Senate Bill 743 (2013): Transportation Impacts	Introduces a new performance metric, vehicle miles travelled (VMT), as a basis for determining significant transportation impacts under CEQA. Projects that are projected to increase VMT may mitigate their impacts through measures such as car-sharing services, unbundled parking, improved transit, and enhanced pedestrian and bicycle infrastructure.
Executive Order N-79-20 (2020): Zero Emission Vehicles	In line with the carbon neutrality goal, this Executive Order requires the elimination of new, internal combustion passenger vehicles by 2035.
Assembly Bill 2127 (2018): EV charging infrastructure	The California Energy Commission is required to prepare and biennially update a statewide assessment of the electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption for the state to meet its goal of putting at least 5 million zero-emission vehicles on California roads by 2030.
Advanced Clean Truck Rule (2020): Zero emission trucks	CARB adopted this rule requiring manufacturers of heavy-duty, on-road trucks to sell an increasing number of zero-emission trucks. By 2035, zero-emission truck/chassis sales would need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 vocational truck sales, and 40% of Class 7-8 truck tractor sales.
Innovative Clean Transit (2018): Zero emission bus fleets	CARB adopted this rule requiring public transit agencies to gradually transition to 100% zero-emissions bus fleets by 2040. This regulation applies to all transit agencies that own, operate, or lease buses with GVWR above 14,000 lbs.
Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule (2018)	The U.S. Environmental Protection Agency (US EPA) and the National Highway Traffic Safety Administration (NHTSA) issued the SAFE Vehicles Rule. This rule set a vehicle fleet efficiency standard increase of 1.5% per year above 2020 standards through 2026.
Solid Waste	
Senate Bill 1383 (2016): Short-lived Climate Pollutants – Organic Waste Reductions	This Senate Bill establishes a statewide target to reduce the disposal of organic waste by 75% by 2025 to reduce methane emissions from organic material in landfills.
Assembly Bill 341 (2012) and Assembly Bill 1826 (2016): Mandatory Recycling	AB 341 requires all commercial businesses and public entities that generate 4 cubic yards or more of waste per week and all multi-family apartments with five or more units are also required to have a recycling program in place to help meet the state's recycling goal of 75% diversion by 2020. AB 1826 requires all commercial businesses to

Program	Description
	collect yard trimmings, food scraps, and food-soiled paper for composting.
Adaptation and Resilience	
Senate Bill 379 (2015): Adaptation and Resiliency Planning	California Senate Bill (SB) 379 requires cities and counties within the state to consider and address climate change and resiliency within the Safety Element of their General Plans. The Bill requires local agencies to perform a vulnerability assessment that identifies the potential impacts to the community associated with climate change. Further, cities and counties must utilize the vulnerability assessment to develop goals and policies to facilitate climate adaptation and minimize the risks associated with climate impacts.
Disaster Mitigation Act of 2000: Hazard Mitigation Plan	FEMA's Disaster Mitigation Act is intended to "reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters." Under this legislation, state, tribal, and local governments must develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance through the Hazard Mitigation Assistance Programs.

Environmental Action in Ventura

The City of Ventura has a strong history of taking environmental action. Residents, businesses, and community groups maintain a strong environmental ethic and work to conserve the ecological wealth of the community. While the City of Ventura has historically had a strong environmental ethic, efforts to address GHG emissions have been decentralized. The City of Ventura's Environmental Sustainability Division was created in2009 to bring all stakeholders to the table to create a plan for a more resilient, equitable, and energy-efficient future. Table A-2 list the plans, policies, and programs in place to enhance sustainability and become more resilient to climate hazards.

Table A-2. Program, Plans, and Policies to Reduce Greenhouse Gas Emissions

Existing Initiatives	Description
Municipal Operations	
Green Initiative	In 2007 City Council passed the "Green Initiative", a ten-point action plan designed to reduce environmental impacts from the City's municipal operations. The plan includes reducing energy and vehicle fuel use; developing a green purchasing policy; educating employees about green practices; and forming a Green Team to help implement these programs.
Environmental Sustainability Strategy	In 2012, the Environmental Sustainability Strategy (ESS) was developed to improve Ventura's municipal environmental performance and reduce operating costs by improving the City's operational efficiency and reducing resource consumption. The ESS identifies strategies and projects that reduce energy, fuel, chemical and water use; reduces solid waste and hazardous waste generation; and increases the purchase of environmentally preferable products. The ESS consolidates the efforts of individual City divisions into a single document, establishes goals and strategies, and provides a process for tracking progress over time.
Climate on the Move GHG Inventory	In 2015, the City of Ventura Environmental Sustainability Division and VCREA worked collaboratively to develop the Climate on the Move report, which included a community-level GHG emissions inventory and a CAP template for the City. Climate on the Move provides city-specific community GHG emission data from 2010 through 2012, 2020 emission forecasts, and GHG reduction target options.
Clean Energy and Buildings	
Green Business Certification Program	The City also launched their Green Business Program in 2012, to support local businesses in adopting environmentally responsible practices. Between 2012 and 2020, the City's Green Business Program certified eighty-three businesses.
Clean Power Alliance (CPA)	In 2018 the City joined CPA, a community choice energy program, at the 100% renewable default tier; meaning that electricity customers within the City would automatically be enrolled in the new program and receive 100% renewable electricity.
Transportation	

Existing Initiatives	Description
EV Accelerator Plan	In 2019 the City of Ventura Environmental Sustainability Division worked with VCREA and Community Environmental Council to create an EV Accelerator Plan for the City. The City's Accelerator Plan was included in a larger EV Ready Blueprint for Ventura County, which creates a step-by-step plan for electrifying the Region's transportation sector. The City's Accelerator Plan details the infrastructure needed for EVs to be one-eighth of all registered vehicles in the City by 2030. Ventura has City chargers: 16 publicly accessible EV Chargers at 6 locations.
Active Transportation Plan (in progress)	The City is working on an Active Transportation Plan to incorporate bicycle and pedestrian mobility, Suggested Routes to School (SRTS), and Complete Streets components, in an ambitious path toward increasing mobility options for all City residents. The Plan outcomes will feed directly into the City's General Plan update.
Water and Natural Systems	
Water Efficiency Plan (WEP)	Adopted in 2021, the Water Efficiency Plan provides a description of current conservation efforts and establishes a path to achieve greater water use efficiency. With the uncertainty of climate impacts on local water resources in the future, the WEP outlines specific measures Ventura will use to achieve efficiency and ensure the reliability of ventura's water supply.
City Tree Master Plan	Adopted in 2020, the City Tree Master is a guide to the essentials of effective administration and management of a comprehensive Urban Forest program in the City. The benefit that street trees offer is immeasurable and considered one of the most valuable long-term assets that cities have. The City is home to over 30,000 public trees.
Adaptation and Resilience	
Ventura County Contingency Plan for Heat/Cold Weather Events	This document outlines responses to an extended heat wave or cold weather that could endanger the lives of citizens of Ventura County, especially those who are medically fragile, those living alone, and disabled individuals. Some considerations discussed include community centers as refuges from weather, creation of Voluntary Relief Centers, and proposed establishment of Cooling Centers.

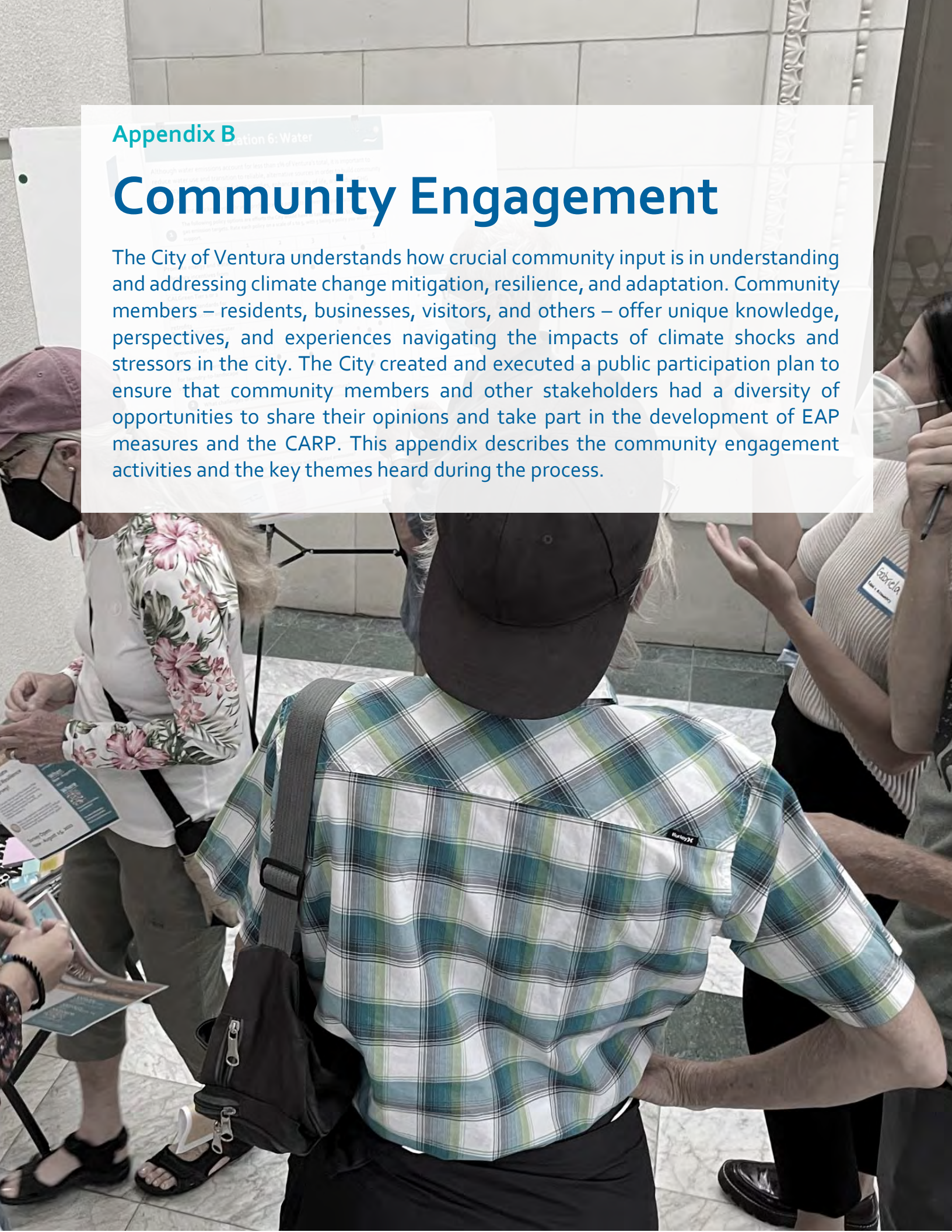
Existing Initiatives	Description
Heatwave Safety	The City of Ventura webpage under emergency preparedness provides information about extreme heat and how to prepare for a heat emergency. The page Includes resources for shelter from extreme heat and signs of heat-related illnesses.
Surfers Point Managed Retreat Project	This project focuses on moving infrastructure away from the beach to preserve the beach and surf break. Instead of building coastal armor such as a seawall, this project will move the parking lot, pedestrian path, and bike path away from the tideline. The project also includes planting and maintaining native vegetation within sand dunes and bioswales.
2020 Draft Urban Water Management Plan for the City of San Buenaventura	The 2020 Urban Water Management Plan for the City of San Buenaventura includes descriptions of the community's water supply sources, projected water demands, and supply reliability during normal water years, single dry years, and five-dry years. The plan includes a discussion of the potential impacts of climate change on the system as well as reliability planning and a water shortage event contingency plan. The Urban Water Management Plan does not include strategies for mitigation and adaptation.
Coastal Resilience Ventura Project	This program uses a web-based mapping tool to help identify Ventura County's vulnerability from coastal hazards. Vulnerable populations are identified under various climatic scenarios. Critical infrastructure in coastal zones is identified under various sea level rise and storm surge scenarios as well.
Ventura Community Wildfire Protection Plan	The County's Community Wildfire Protection Plan (CWPP) identifies wildfire risks and clarifies priorities for funding and programs to reduce impacts of wildfire on communities at risk. Some actions include vegetation management, wildfire safety education programs, and establishment and maintenance of evacuation routes.
2005 Ventura General Plan	The 2005 City of Ventura General Plan includes actions that assess wildfires, flood hazards, air quality, water supply, and emergency response practices. General Plan policies include actions to optimize firefighting and minimize exposure to air pollution associated with point sources, project design review, land use compatibility, and compliance with the Ventura County Air Pollution Control District requirements. The General Plan also describes the water supply and system including the Casitas Municipal Water District, Ventura River surface water intake, subsurface water, and wells (Foster Park), Mound groundwater

Existing Initiatives	Description
	basin, Oxnard Plain groundwater basin (Fox Canyon Aquifer), and Santa Paula groundwater basin. The General Plan includes policies for resource conservation, policies to minimize flood hazards and mitigation for new development within flood hazard zones.
Ventura County Multi-Jurisdiction Hazard Mitigation Plan	The Ventura County Multi-Jurisdiction Hazard Mitigation Plan describes hazard mitigation policies for landslides, flooding, wildfires, sea level rise, and drought. The policies within the plan are regarding FEMA 100-year tide and sea level rise, compliance with NFIP, flood plain management, and long-term resilience to sea level rise and extreme storms for communities and critical assets adjacent to San Buenaventura Beach, Santa Clara River, Ventura River, and nearby areas of the shoreline. The plan also describes the County's StormReady program, Ventura Water Pure Program, Hall Canyon Channel Drainage Basin Improvement Project, and wildfire awareness program.
City of Ventura Emergency Response Team (CERT) Program	The CERT program trains volunteers in basic first aid, light search and rescue, and small fire suppression, and is strongly associated with Ventura's Fire Department. CERT volunteers may assist neighbors and other emergency personnel in times of emergency, and support evacuations along with other responsibilities.
City of Ventura Emergency Operations Plan (City of Ventura 2021)	Ventura's Emergency Operations Plan details protocols to improve emergency preparedness, response, and recovery from natural disasters. The plan provides a system for the effective management of emergency situations and identifies lines of authority and responsibility. The plan reviews the hazards most likely to impact the City, especially those exacerbated by climate change including drought, extreme heat, wildfire, flooding, and severe winter storms.

Appendix B

Community Engagement

The City of Ventura understands how crucial community input is in understanding and addressing climate change mitigation, resilience, and adaptation. Community members – residents, businesses, visitors, and others – offer unique knowledge, perspectives, and experiences navigating the impacts of climate shocks and stressors in the city. The City created and executed a public participation plan to ensure that community members and other stakeholders had a diversity of opportunities to share their opinions and take part in the development of EAP measures and the CARP. This appendix describes the community engagement activities and the key themes heard during the process.



Energy Action Plan Community Engagement

The City conducted public outreach and engagement to provide residents, business owners, stakeholders, City staff, partner organizations, and individuals with the opportunity to participate in the planning process for drafting the Energy Action Plan (EAP). The goals of outreach and engagement were to:

1. Raise awareness of EAP development
2. Educate the public and other organizations about this plan
3. Provide opportunities for input at the various steps of plan development
4. Provide opportunities to influence decision-making.

Photo Taken by City of Ventura Staff

Specifically, the community outreach and engagement process helped identify and refine goals, strategies, and actions for reducing energy consumption, increasing energy efficiency, and using more renewable energy. Community outreach and engagement comprised a variety of methods, including community surveys, a community workshop, tabling events, and stakeholder meetings.

Outreach Surveys

The City developed two community surveys to gather input from residents to help the City further understand community needs and preferences for the EAP.

Community Engagement Round 1 Survey

The first survey was designed to identify community priorities for energy improvements across residential and commercial sectors. The survey also asked participants about the importance of planning for climate change and resiliency through energy improvements. The survey was in both English and Spanish and was available electronically and in hard copy format. The online survey was hosted on VCREA's and the City's webpages between March and July 2018. Hard copy surveys were also distributed to residents at community meetings including the Neighborhood Community Council and Housing Authority of the City of Buenaventura meetings, tabling events including Ventura EcoFest and Fourth of July Street Fair, social media posts, and through the City's monthly e-newsletter. Of the 316 responses received from residents and businesses, several community attitudes about energy became clear:

1. The City should prioritize climate and energy programs for both municipal operations and the community.
2. Energy planning should include strategies that are achievable, reduce emissions, improve environmental health, support the local economy, and keep the city resilient toward natural disasters and the future impacts of climate change.
3. The City should take steps to reduce resource and knowledge barriers for residents and businesses to implementing energy efficiency and renewable energy projects

4. The commercial sector represents an opportunity for education on energy policy and financing for greening projects.
5. Commercial and residential tenants need assistance to implement energy measures in their offices and homes.

Community Engagement Round 2 Survey

The second survey was designed to gather community feedback on some specific strategy ideas for improving energy performance in residential and commercial buildings. The survey also asked respondents to identify priorities for increasing EV infrastructure and electrified public transportation. The survey was in both English and Spanish and was hosted on VCREA's and the City's webpage for ten weeks in the early summer of 2019. Similar outreach methods were used to advertise the survey, including emails to previous email respondents. Ninety residents responded to the second survey.

The responses to both surveys were incorporated into the final strategy design. Round 1 and Round 2 Survey Reports are included in Appendix E.

Community Energy Workshop

On June 8, 2019, the City hosted a Community Energy Workshop at City Hall. With approximately forty members of the public in attendance, the workshop opened with a presentation that introduced the concept of energy action planning and educated attendees about potential strategies. After the presentation, attendees split off into several breakout groups to discuss draft strategies that were featured in the Round 2 outreach survey. VCREA and Community Environmental Council staff recorded community input on strategies including solar and energy storage, citywide actions, and energy efficiency initiatives. A summary of feedback from this event is available in Appendix E.

Tabling Events

City and VCREA staff hosted EAP focused booths at the annual Ventura EcoFest and Fourth of July Street Fair in 2018 and 2019. The booths attracted hundreds of community members with EAP-related games and prizes and provided a venue to discuss EAP strategies with residents.

Photo by VCREA Staff

Contractor Lunch

To vet some strategies with the local energy contractor community, the City hosted a lunch for local contractors that work in solar, energy storage, HVAC, EV infrastructure, and other relevant tradespeople. The event featured conversations with City staff from the Building and Safety and Environmental Sustainability Divisions, and a review of draft EAP strategies. About a dozen energy professionals attended the lunch. A summary of feedback from this event is available in Appendix E.

Environmental Sustainability Division Social Media Outreach

The City utilized its Facebook and e-newsletter to publicize events relating to EAP planning efforts. Staff published articles online and posted about the Community Energy Workshop, Community Engagement Surveys, tabling events, and a free energy audit and benchmarking program for commercial businesses known as kWh Countdown.

kWh Countdown Business Engagement

The kWh Countdown program, funded through the Local Government Challenge grant, served to support EAP development by informing the development of the business-focused energy strategies. The program, which began in July 2018, provided businesses with free energy benchmarking and ASHRAE Level II audits to help business owners analyze their energy usage, save money on utility bills, identify funding sources for energy upgrades, and prioritize energy efficiency projects. In addition, effective June 2018, state law (AB 802) requires buildings larger than 50,000 square feet to conduct benchmarking and disclose their energy usage. kWh Countdown helped businesses fulfill these requirements at no cost.

The Project Team, in partnership with the City's Green Business Program, recruited businesses, and reviewed energy audits. Working closely with businesses to analyze their energy usage provided the Project Team insight into the needs and challenges of business owners trying to effectively reduce utility bills and increase overall performance, health, and safety of their business facility.

ASHRAE Level II Audit

These audits analyze how a whole building is functioning and identify projects that will provide the greatest energy reduction at the best return on investment. The audit involves interviews with facility staff, review of utility bills, and walkthrough of the facility. Data is compiled and used to complete a report describing energy efficiency measures and potential capital improvements with detailed energy calculations and financial analysis of proposed measures.

THE CITY OF VENTURA

ROUND 1 COMMUNITY ENGAGEMENT

SURVEY RESULTS AND ANALYSIS

The City of Ventura is developing an Energy Action Plan (EAP). This plan is designed to help the Ventura Community lower harmful greenhouse gas emissions. Through strategic policies and programs, the EAP aims to increase energy efficiency and local renewable energy generation. This plan benefits multiple sectors, promotes reliable energy to your home or business, and builds resilience so the community can bounce back in the event of a natural disaster.

To ensure that this plan empowers and supports every Ventura community member, the EAP team has been working with residents to fully gauge how to best support and empower a resilient and sustainable Ventura for years to come. You've voiced your needs and shared your valuable experience, here are the results.

KEY TAKEAWAYS

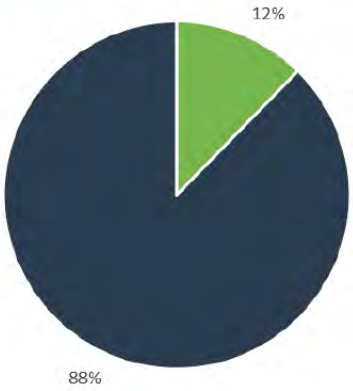
316 residents shared their insight and values by responding to the survey.

88% of the respondents feel it's important for the City to support a clean energy economy, public health, and resilience.

96% of the 45 student respondents feel that it is important for their school to run on renewable energy.

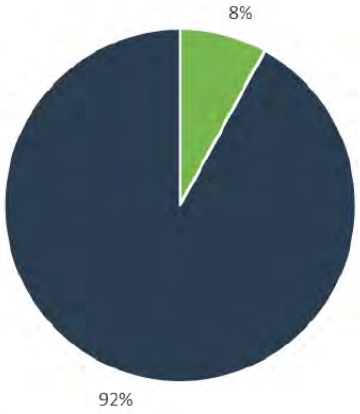
RESIDENTIAL SURVEY HIGHLIGHTS

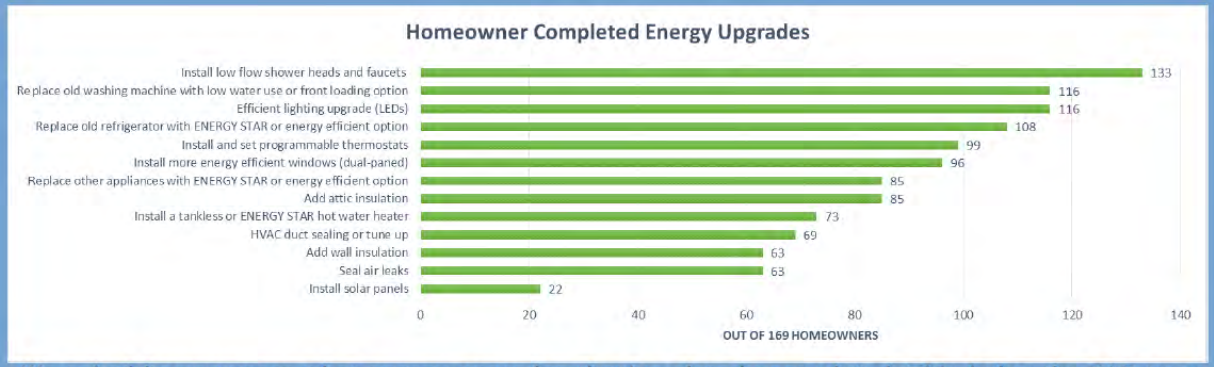
HOMEOWNERS AND RENTERS PROVIDED VALUABLE INSIGHT TO HELP INFORM STRATEGIES THAT WILL INCREASE ENERGY EFFICIENCY AND LOCAL RENEWABLE ENERGY GENERATION.



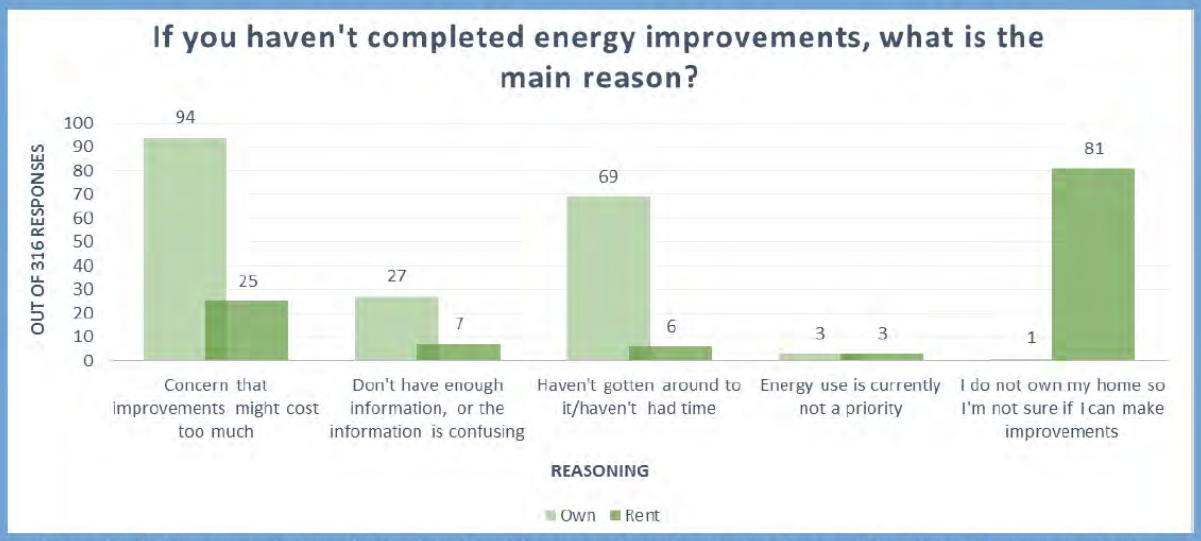
88% OF RESPONDENTS FEEL THE CITY SHOULD BE PROACTIVE IN THINKING AND PLANNING FOR CLIMATE CHANGE IMPACTS.

92% OF RESPONDENTS WOULD LIKE TO SEE THE CITY TAKE STEPS TO STRENGTHEN ENERGY RELIABILITY AND SAFETY IN THE EVENT OF AN OUTAGE OR NATURAL DISASTER.





We asked homeowners what energy upgrades they've already completed. This helps the EAP team identify hard-to-complete upgrades and strategize how to help homeowners make these improvements in a cost-effective way.

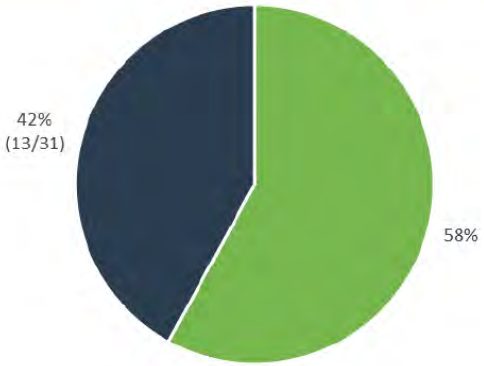


We asked homeowners and renters the reasons they have not been able to make some energy efficiency upgrades. This helps identify gaps in energy efficiency support. The EAP will address these gaps with strategies that help homeowners and renters.

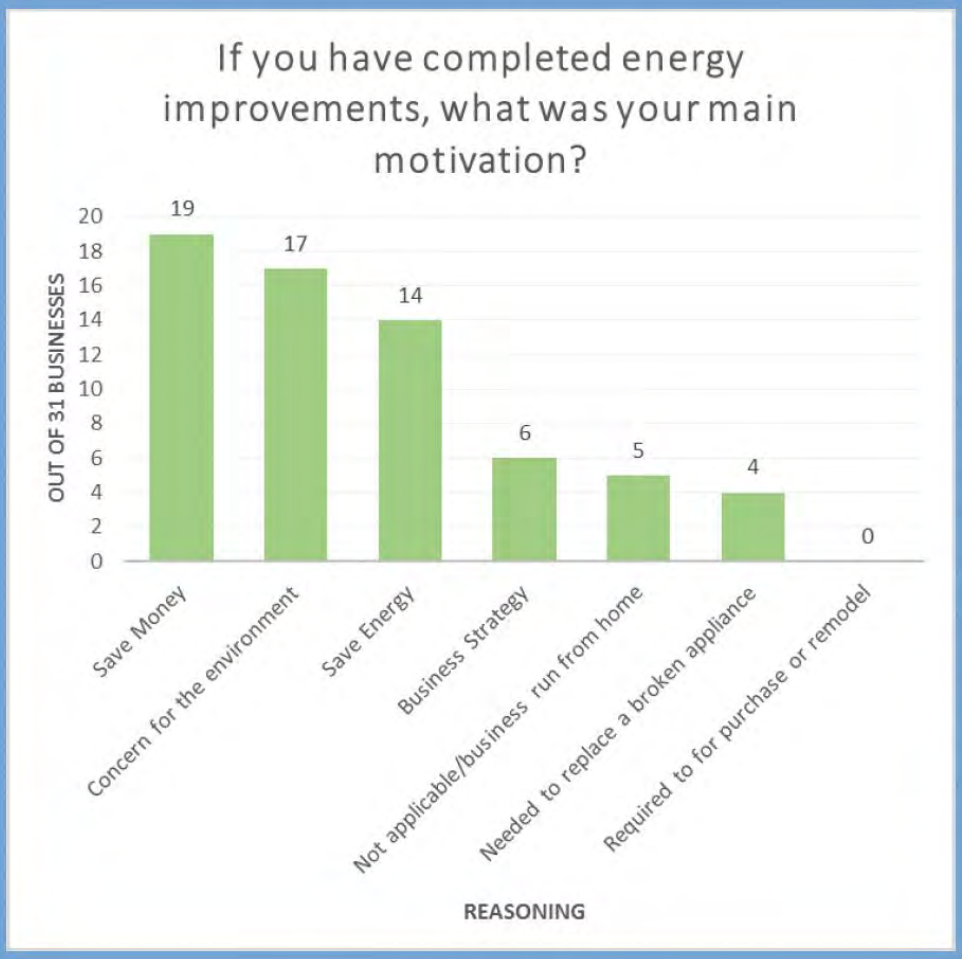
COMMERCIAL SURVEY HIGHLIGHTS

BUSINESS OWNERS AND MANAGERS SHARED THEIR EXPERIENCES TO INFORM STRATEGIES THAT WILL HELP THEM UTILIZE ENERGY EFFICIENCY UPGRADES TO SAVE MONEY AND REDUCE THEIR IMPACT.

42% OF BUSINESS OWNERS STATED THAT THEY HAVE NOT MADE ENERGY UPGRADES BECAUSE THEY RENT THEIR FACILITY AND ARE NOT SURE IF THEY CAN MAKE IMPROVEMENTS.



This highlights the necessity for commercial owner-tenant strategies that support energy efficiency improvements.



We asked business owners and managers the reasons they have completed energy efficiency upgrades. Identifying the main motivation helps the EAP team cater strategies to the needs of business owners and managers.

PHOTOGRAPHER: CHRISTOPHER MUEGNIOT

"THIS IS A FANTASTIC PROACTIVE WAY TO START ADDRESSING WHAT WE CAN DO AS A COMMUNITY, ESPECIALLY AFTER THE THOMAS FIRE. HEARING THESE WILD FIRES GROWING IN INTENSITY DUE TO CLIMATE CHANGE IS A SCARY THING! WAY TO GO VENTURA IN STARTING THIS IMPORTANT CONVERSATION."
-VENTURA RESIDENT

CITY OF VENTURA
ENVIRONMENTAL SUSTAINABILITY

Community Environmental Council

Ventura County REGIONAL ENERGY ALLIANCE

Round 2 Community Engagement Report

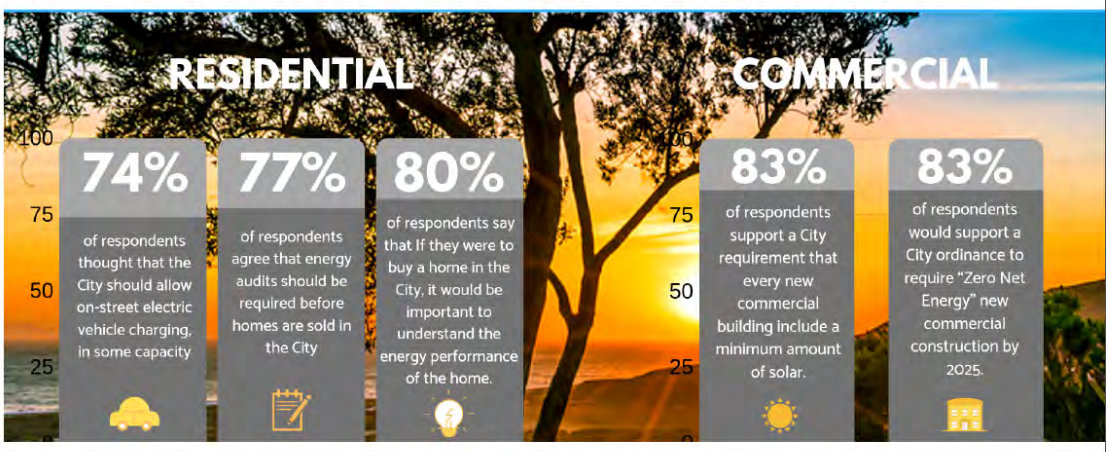
CITY OF VENTURA

ROUND 2 COMMUNITY ENGAGEMENT

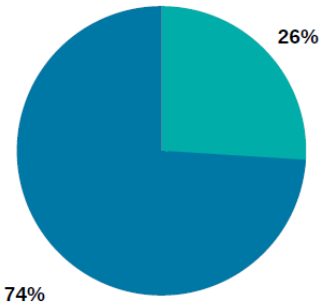
SURVEY RESULTS AND ANALYSIS

In Round 2 of our community engagement, we asked residents about which energy policies and incentives the City should consider for residential and commercial buildings. We also asked them to identify priorities for increasing electric vehicle infrastructure and electric public transportation. In total, 89 people participated in the outreach survey. The valuable feedback we received from the community will help us understand how to best support sustainable energy use and zero-emissions transportation choices in the City of Ventura.

HIGHLIGHTS FROM RESPONDENTS

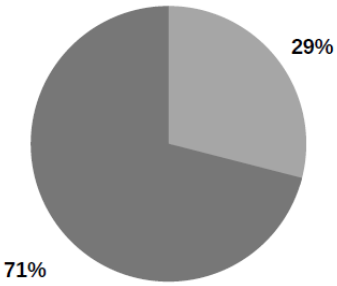


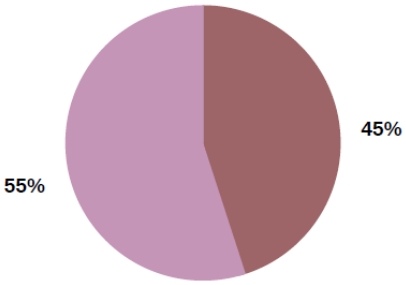
Ventura residents showed strong support for increasing the number of electric vehicle charging stations and access to electric public transportation in the city.



74% (66 people) think the City should allow on-street EV charging, in some capacity.

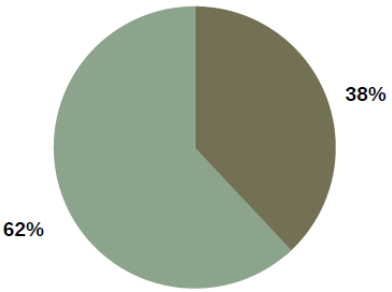
71% (63 people) feel it is important for the bus systems (Gold Coast Transit and VCTC) to transition to all-electric buses.





55% (49 people) feel there are currently not enough public electric vehicle charging stations in the City for them to consider driving an electric vehicle.

62% (55 people) feel the City should require the installation of electric vehicle charging stations at all new commercial developments.



We asked residents which energy efficiency policies the City should consider for residential properties.

77% (68 people) agree that energy audits should be required before homes are sold in the City; however, 56% (38 people) of those respondents *only* support the policy if the energy audits are free.

55% (49 people) think the City should require "cool roof" materials in residential re-roof projects.

72% (64 people) support the City requiring that all rental units upgrade interior lighting to LED when there are vacancies.

80% (71 people) say that, if they were to buy a home in the City, it would be important to understand the energy performance of the home. Residents were unsure; however, about what type of policy would effectively support an energy efficiency standard at the time of a home's sale. Only 42% (37 people) think homes that receive poor energy scores on audits should be required to complete energy upgrades before they are sold. Concerns around who bears the cost of upgrades and whether such policies would affect the affordability of housing in the City were cited as main concerns.

When asked about which energy policies the City should enact for commercial buildings, respondents told us this:

66%
59 people

felt the City should offer a loan program to help commercial properties upgrade their equipment to improve the efficiency of their operations.

83%
74 people

support a City requirement that every new commercial building include a minimum amount of solar.

83%
74 people

would support a City ordinance to require "Zero Net Energy" new commercial construction by 2025.

"We should go all out as much as possible to be an environmentally friendly city, and to model these sustainable practices for other cities."
- Ventura Resident

CITY OF VENTURA
ENVIRONMENTAL SUSTAINABILITY
www.cityofventura.ca.gov/es

Community Environmental Council

Ventura County REGIONAL ENERGY ALLIANCE

Contractor Lunch, December 17, 2019

Concepts for review from draft EAP, City of Ventura

Contractor feedback to draft EAP strategies is captured below as quotes or ratings for various ideas (Ratings for ideas are captured as "X" votes following numbers)

Residential Solar/Storage

The City will review and revise City building codes, design guidelines, and zoning ordinances to remove barriers to renewable energy and battery storage projects.
"Check out Antelope Valley's municipal bus electrification and battery storage project. Also, Lancaster is home to a large electric bus factory. School buses can be used to power schools during outages." "Battery storage – Suggest standardizing permits and implementing online permits. Online permitting of battery storage could result in quantification of for GHG emission reductions. ''Zip Bar foam built into panels – plaster product that becomes structural component – does not pass City plan check (e.g., not allowed) for residential construction because it does not have an ICC number."
The City will develop or expand on existing solar programs, such as Solarize, to provide resources to assist in the installation of residential (multi-family and single-family) solar and storage projects. Resources provided can be in the form of education, planning, contacting installers, and/or financial incentives.
POOR 1 2 3 4-X 5- XXX GREAT "Solarize programs are great. Bringing more customers/case studies to the workshops would help facilitate adoption. Incentives from the City would be great and alleviate the pressure of installers to lower their costs." "The City of Ventura should take the initiative to Solarize public housing buildings and to establish vehicle charging stations so residents can be encouraged to purchase Evs. These charging stations could be covered with solar roofs"

Commercial Solar/Storage

The City will Identify and work to remove barriers to commercial on-site renewable energy generation and energy storage by reviewing and exploring revision opportunities in development codes, design guidelines, zoning ordinances, and general plan policy.
"More education and focus are needed on micro-grids. Resiliency!" "The City should work with Amber Kinetics to establish codes for establishing flywheel storage installations"
The City will actively support local commercial pilot projects encompassing thermal energy storage, battery storage, customer side/dispatchable storage, backup power at critical facilities, and microgrid development.
POOR 1 2 X ("This grade is based on the fact that there doesn't appear to be any movement on micro-grid pilots") 3 4 5- XX GREAT "I can help you include flywheel energy storage in this plan."
The City will research the development of a Solar Cooperative Purchasing Program (e.g., Solarize for businesses) to reduce renewable energy development costs.
POOR 1 2 3 4 5- XXX GREAT "City should look for incentives or dollars to provide the Solarize program." "The City of Ventura should Solarize all public housing and make a large purchase of solar equipment and vehicle charging stations to economize"

Electric Vehicles

The City will review internal permitting policies and permit prices for public and private EV charger installations and modify policies and prices to reflect best practices
"Great" "The City should establish partially solar-powered charging station using battery storage as a demonstration project"
The City will streamline permitting for residential and non-residential EV charging stations as required under California law.
"Yes, Amen." "Great" "EV permit fees – multiple permit fees add up and are expensive. Suggest Bear Valley Electrical Service has a Destination Make-Ready Rebate Pilot that provides installation rebates for up to 50 Level 2 chargers to commercial customers in addition to providing EV-TOU rate. Program combines EV permits fee with other electrical permit fees." https://www.bves.com/media/managed/approvedadviceletters3/355_E_BVES_Transportation_Electrification_Pilot_Programs_Memorandum_Acco_.pdf.
What else should the City do to encourage EV adoption?
"Promote electric bikes! Electric bikes help educate market about charging." "Establish battery or flywheel substations and establish mini/neighborhood utilities." "Some form of monetary incentive"

Other Green Building

The City will amend City Building Code to recommend cool roof materials compliant with CALGreen Code for new construction and significant re-roofing projects.
POOR 1 2 3 4 5- XXXX GREAT "Public housing could use cool roof technology as air conditioners are prohibited in public housing units"
The City will subsidize permit fees and provide front-of-line permitting for building projects pursuing LEED or other green building certifications.
POOR

1 2 3 4-XX 5-XX GREAT
The City will research barriers to electrification of cooking, heating, and cooling in new and existing homes, and update City permitting practices to streamline electrification.
"City-run senior housing residents require a way to cool their units in the summer months as they are prohibited from using standard window mounted AC units" "Heat pumps – there is not an appetite for heat pumps, usually only homes without gas lines request heat pumps. Pumps can be expensive and loud if installed on the side of the house. Suggest installing heat pumps during whole house system upgrades and incentivizing heat pumps. Suggest miniplates as an option." "Lack of incentives – CPA is looking at DER pilot program with incentives as well as Local Strategic Plan incentives for electrification and reach codes."
What else should the City do to increase Green Building OR energy efficiency OR electrification in existing buildings? "Monetary incentive or reduction in permitting timelines" "Oversized AC units – many homes do not need big systems. Suggest contractors help address problems with oversized systems by advising to install appropriately sized systems." "Incentivize Architects and Realtors to educate."

CARP Engagement Summaries

The following are summaries of the community engagement conducted to inform the development of the CARP, including:

- Community Survey on Natural Hazards and Climate Change
- Community Survey on Greenhouse Gas Reduction
- Open House series
- CAUSE focus groups

Community Survey on Natural Hazards and Climate Change: Summary of Results

November 2021

CITY OF VENTURA
OUR VISION, OUR FUTURE

Table of Contents

Survey Overview

The City of Ventura is in the process of creating a Climate Action and Resilience Plan (CARP). This exciting initiative is a roadmap for how the community will reduce greenhouse gas emissions and prepare for the potential impacts of natural hazards and climate change on public health, infrastructure, ecosystems, and our economy.

The City launched a Community Survey on Natural Disasters and Climate Change (survey), which was open from August 2021 through mid-September 2021.The purpose of this survey was to gather information about community members' experiences with recent natural disasters, preparation for possible future natural disasters, and knowledge about climate change.

The survey was made available in both English and Spanish, and a total of 854 unique responses were recorded. This document summarizes the combined responses of both English- and Spanish-language participants.

Survey Methodology and Participation

The survey was developed by City of Ventura staff and the General Plan Update consultant team. In developing the survey, the team considered:

- **Understanding existing hazard preparedness and experiences with recent disasters**: The survey asks specifically about preparedness for large-scale disasters or emergencies, including earthquakes, fires, storms, or blackouts, as well as experiences with recent disasters or emergencies like the Thomas Fire, mudslides, or the 2018 heat wave.
- **Similar Surveys or Polls**: The project team reviewed similar community surveys from other jurisdictions and statistically significant findings from other polls about the topics covered in the survey. Several questions in the survey match questions found in these external tools.
- **Creating a Flexible and Useful Tool to Maximize Engagement**: The survey, in English and Spanish, was developed to measure opinions across all the above areas of interest.

The final survey instruments are attached in the Appendix A and B. Each version of the tool is organized into five sections: demographics, hazard preparedness, experiences with recent disasters, and climate change.

Sampling

This survey was completed by a non-randomized sample (often called a convenience sample) of people who live, work, go to school, or spend time in the City of Ventura.

Using a non-random sample for a survey is commonly used to understand the perspectives and experiences of a group of people ("population"). Data from non-random samples can show the range of views and experiences within a population and be used as a reference point. Data from non-random samples are typically considered more reliable (i.e., more generalizable to the larger population) when they are "triangulated" or validated through additional sources. This survey data will be considered alongside data from focus groups, community meetings, and other public input, with all this data being used to inform decision-making.

Distribution Methods

The survey was available to take online and was produced using the SurveyMonkey platform. The project team developed several outreach graphics and materials, such as social media images and flyers, which were distributed through various methods, including but not limited to:

- **Internet-Based Outreach:** City's GovDelivery listservs (All subscribers; General Plan Update subscribers); GPU Project Website; City's social media accounts (Twitter, Facebook, Instagram, etc.).
- **In-Person Outreach:** Door-to-door canvassing; outreach at pop-up events at Ventura Coast Brewing Company and local taco festival.

The survey and outreach materials were produced in both English and Spanish. To encourage the participation of typically underrepresented groups, the non-profit organization Central Coast Alliance United for A Sustainable Economy (CAUSE) conducted targeted outreach in heavily Hispanic/Latinx, multi-family neighborhoods on Ventura's Westside. CAUSE staff canvassed door-to-door and recorded survey responses with Spanish-speaking residents in person on weekday evenings. When residents did not answer, CAUSE staff left behind flyers with information about how to access the survey.

Demographic and Socioeconomic Characteristics of Survey Participants

Participants were asked several demographic questions during the survey. These questions are intended to help City staff ascertain whether survey respondents generally matched the profile of Ventura and/or whether any groups were over- or underrepresented. Key takeaways are summarized below:

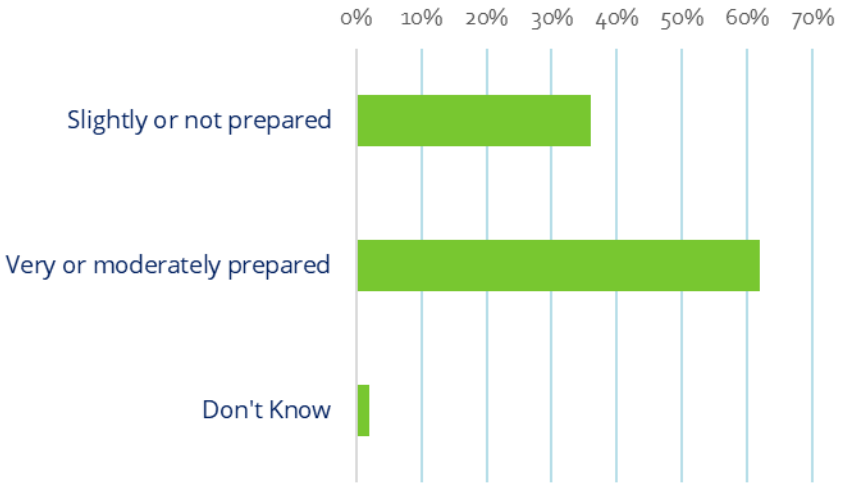
- Almost all respondents (90 percent) are residents of the City of Ventura.
- Of all residents who responded, almost half (49 percent) have lived in Ventura for 21 years or more. Residents of one year or less comprised less than four percent.
- Homeowners made up 63 percent of the respondents, and renters comprised 35 percent of the responses. The survey results overrepresented homeowners (54 percent of the city population) compared to rents (46 percent of the city population).
- Two-thirds of survey respondents identified as Non-Hispanic White or Caucasian (compared to the citywide average of 55 percent) Hispanic and Latino individuals were underrepresented (28 percent compared to the citywide average of 36 percent).
- White respondents are more likely to be homeowners (69 percent), whereas Black, Indigenous and people of color (BIPOC) respondents are more likely to be renters (56 percent).
- People aged 60 and above comprised approximately one-third (31 percent) of respondents.
- The response for most neighborhoods was proportionate to residential population size. The response rate, overrepresented residents from the Westside / The Avenue, comprising 32 percent of all respondents even though it contains 13 percent of the city's residents.

Disaster Preparedness

Survey participants were asked questions about preparedness[1] for large-scale disasters or emergencies that would leave their household isolated in their home or require their household to leave their home for at least 3 days. Natural disasters and emergencies may include earthquakes, fires, storms, or blackouts, among others.

Nearly two-thirds of survey respondents said their household was prepared for a large-scale disaster or emergency (62 percent). Over a third of respondents (36 percent), however, said their households were not too prepared at all or not at all prepared. Significant differences in feelings of preparedness exist between groups in the city. Homeowners (72 percent) and White respondents (70 percent) are more likely to feel prepared, whereas half of renters (52 percent) and BIPOC respondents (48 percent) do not feel prepared for a disaster.

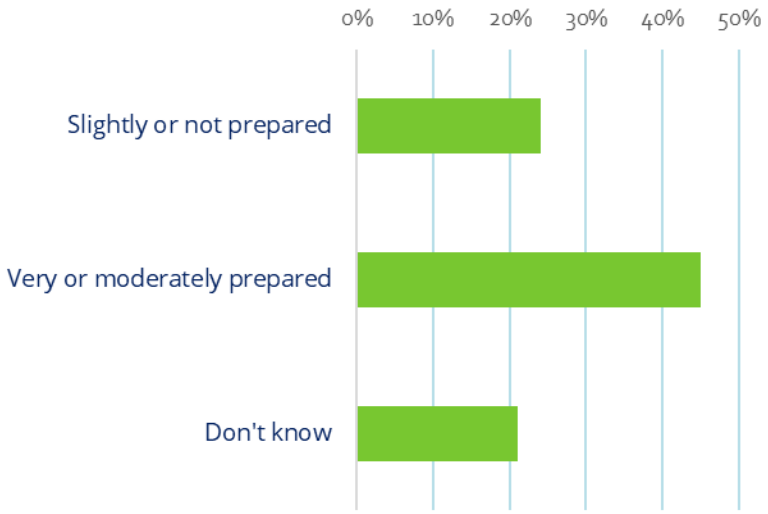
Figure 1: Household Preparedness for a Large-Scale Disaster or Emergency



[1] Preparedness refers to the steps you take to make sure you are safe before, during, and after a disaster or emergency.

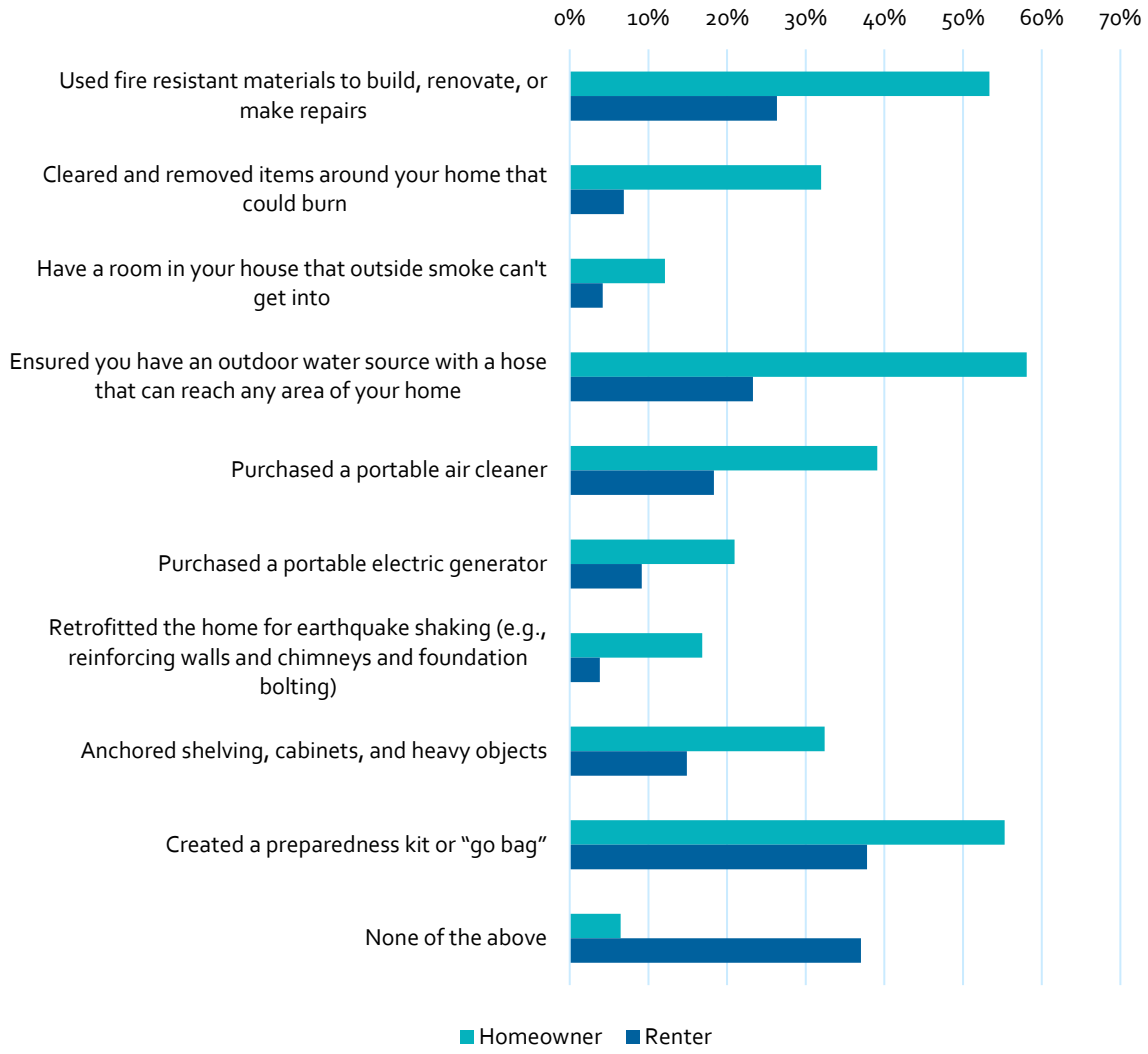
About half of survey respondents (45 percent) said the City of Ventura government is very or somewhat prepared to deal with large-scale emergencies and natural disasters. Approximately one-third said that the City government was not too prepared or not prepared, and 21 percent said they did not know. Responses varied little across different groups in the city.

Figure 2: City of Ventura Government Preparedness for a Large-Scale Disaster



Homeowners were more likely than renters to have taken steps around their homes to prepare for a possible disaster (94 percent to 63 percent). Over half of homeowners used fire resistant materials (53 percent), ensured they have an outdoor water source with a hose (58 percent), created a "go bag" (55 percent), and cleared items around their homes that could burn (32 percent). The most common action taken by renters was creating a "go bag" (38 percent).[2] For those who responded "other," a common theme was that people have a supply of food and water and/or have collected important items (essentially a preparedness kit).

Figure 3: Steps Taken to Prepare for a Disaster

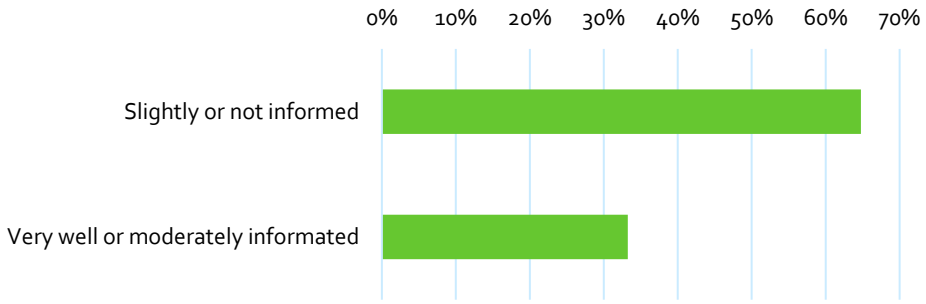


[2] Many of the survey questions listed would not be actions taken by an individual renter, but instead by a landlord or property owner. In some cases, these actions may have been taken but not be known by the renter.

Evacuation Routes and Planning

Respondents were asked a series of questions regarding their knowledge about evacuation routes and planning. Overall, two-thirds of respondents said they were only slightly informed or not at all informed about evacuation routes for their neighborhood. Likewise, over two-thirds of respondents said they were very concerned or somewhat concerned about the adequacy of the evacuation routes and plans for their neighborhood. Responses varied little across different groups in the city.

Figure 4: Knowledge of Evacuation Routes and Plans in Your Neighborhood



Respondents also described their concerns about their neighborhood's evacuation plan, with several key themes emerging as summarized in Table 1.

Table 1: Key Concerns about Evacuation Routes and Planning

Key Concerns	Count
Traffic, road congestion, freeway congestion and access	129
Lack of information: themselves or others not knowing the evacuation routes and/or plans	93
Only one or very few points of ingress and egress from their neighborhood	85
Chaos and confusion hindering evacuation	19
Lack of coordination from police and city leadership	12
Lack of access due to single lane and one-way roads	10
Traffic specifically in relation to housing and population growth	10

Insurance

Respondents were asked a series of questions about insurance. A large majority (78 percent) report having homeowners or renters' insurance for their residence. A majority (69 percent) reported that they do not have a flood insurance policy from the National Flood Insurance Program or from a private insurance company.

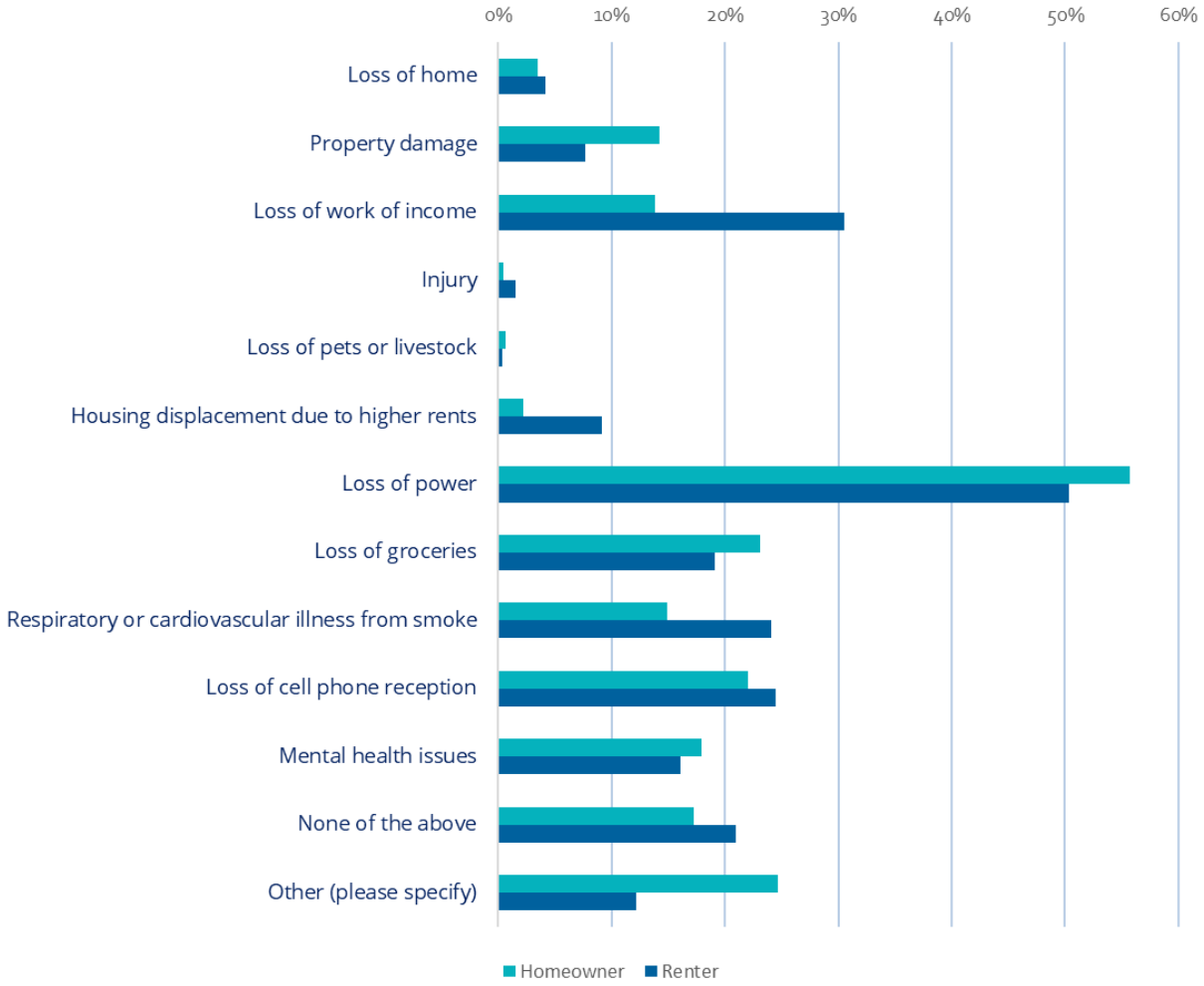
Experience with Recent Disasters

Almost three quarters of respondents have experienced disaster(s) and the other quarter have not. Some years that people reported experiencing disasters in an open-ended question include 1969, 1971, 1987, 1992, 1994, 1995 (Northridge Earthquake), 1997, 1998, and 2016. Of course, 2017 and 2018 were the top responses, as 72 percent of respondents reported experiencing the impacts of the Thomas Fire and/or the subsequent mudslides.

A majority of respondents (57 percent) reported losing power during the Thomas Fire and/or subsequent mudslides. Only a small percentage of respondents experienced losing their home, personal injury, and/or loss of pets or livestock. There are, however, differences when comparing homeowners and renters.

- Renters (who are typically lower income than homeowners) reported experiencing more impacts to their work or income. 31 percent of renters reported losing work or income due to the fire compared to only 14 percent of homeowners.
- A greater percentage of renters reported experiencing respiratory or cardiovascular illness from smoke (24 percent of renters compared to 15 percent of homeowners).
- Because they do not own their residence, renters are typically more susceptible to the impacts of housing cost increases. 9 percent of renters reported experiencing housing displacement compared to 2 percent of homeowners.

Figure 5: Impacts Experienced during the Thomas Fire and/or Subsequent Mudslides



If they selected other, respondents had the chance to elaborate on the impact they experienced. The open answers are coded according to key themes that emerged; many of the answers contained multiple themes.

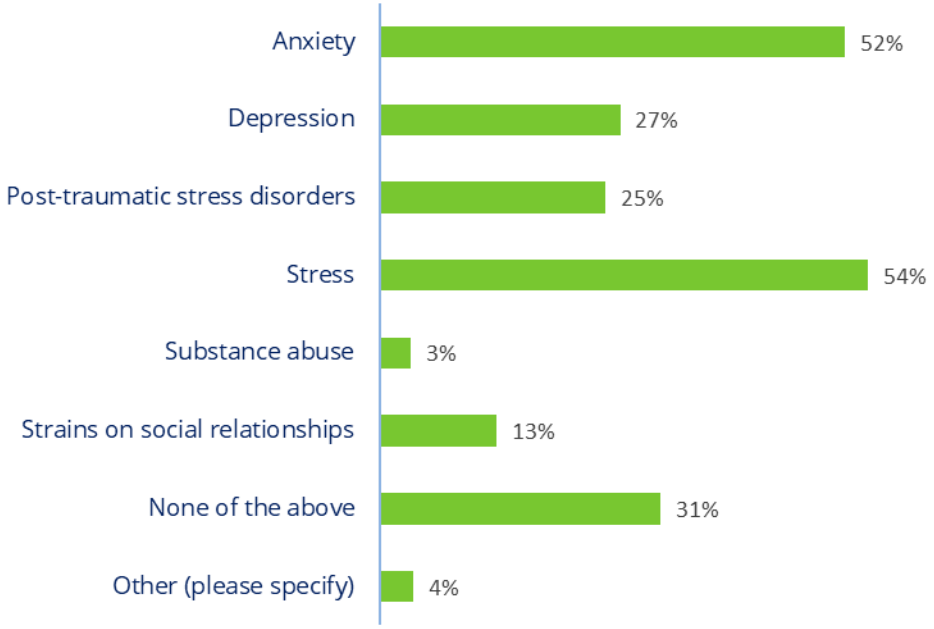
Table 2: Other Impacts Experienced during Thomas Fire and Subsequent Mudslides

Impacts	Count
Had to evacuate and/or was temporarily displaced from their home	59
Impacted by smoke, bad air quality, and ash	45
Experienced stress, trauma, or changes to their outlook on the future	15
Temporarily housed friends, family, or neighbors who had to evacuate or whose homes were damaged or destroyed	13
School closures	4

A majority of respondents reported that they or someone they knew experienced stress and anxiety (54 and 52 percent respectively) during and after the Thomas Fire. A quarter reported experiencing depression and post-traumatic stress disorders, while a third did not experience any mental health issues. Results were largely alike across groups in the city, except for the fact that a greater percentage of homeowners reported experiencing anxiety and stress than renters.

Respondents also had the chance to elaborate on their mental health experience. Though there were few entries, key themes that came up were hopelessness, stress, and existential worries. Of those who reported experiencing mental health issues, about half were able to access resources.

Figure 6: Mental Health Issues Experienced

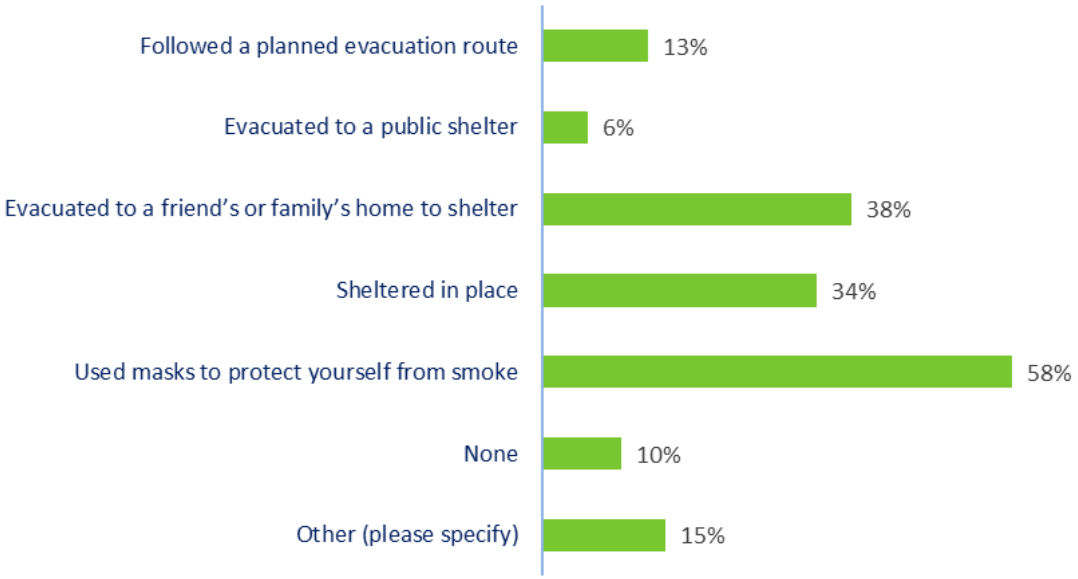


Overall, very few respondents reported receiving support from government agencies or nonprofit charities in the aftermath of the Thomas Fire. A slightly higher percentage of renters reported receiving support (13 percent compared to 5 percent of homeowners). The most-reported assistance was water and other supplies (e.g., masks, toiletries, and blankets), food or food stamps, and monetary donations. Respondents received help from organizations, such as the Red Cross, CAUSE, and their churches.

Safety Measures

To keep themselves safe during the Thomas Fire, a majority of respondents (58 percent) used masks to protect themselves from smoke. 38 percent evacuated to a friend or family's home, and 34 percent sheltered in place. Relatively few respondents followed a planned evacuation route (13 percent) and/or evacuated to a public shelter (6 percent). Responses varied little across different groups in the city.

Figure 7: Safety Measures taken during the Thomas Fire and Subsequent Mudslides



Respondents also had the chance to elaborate on what they did to stay safe. The open answers are coded according to key themes that emerged; many of the answers contained multiple themes.

Table 3: Other Ways Respondents Stayed Safe

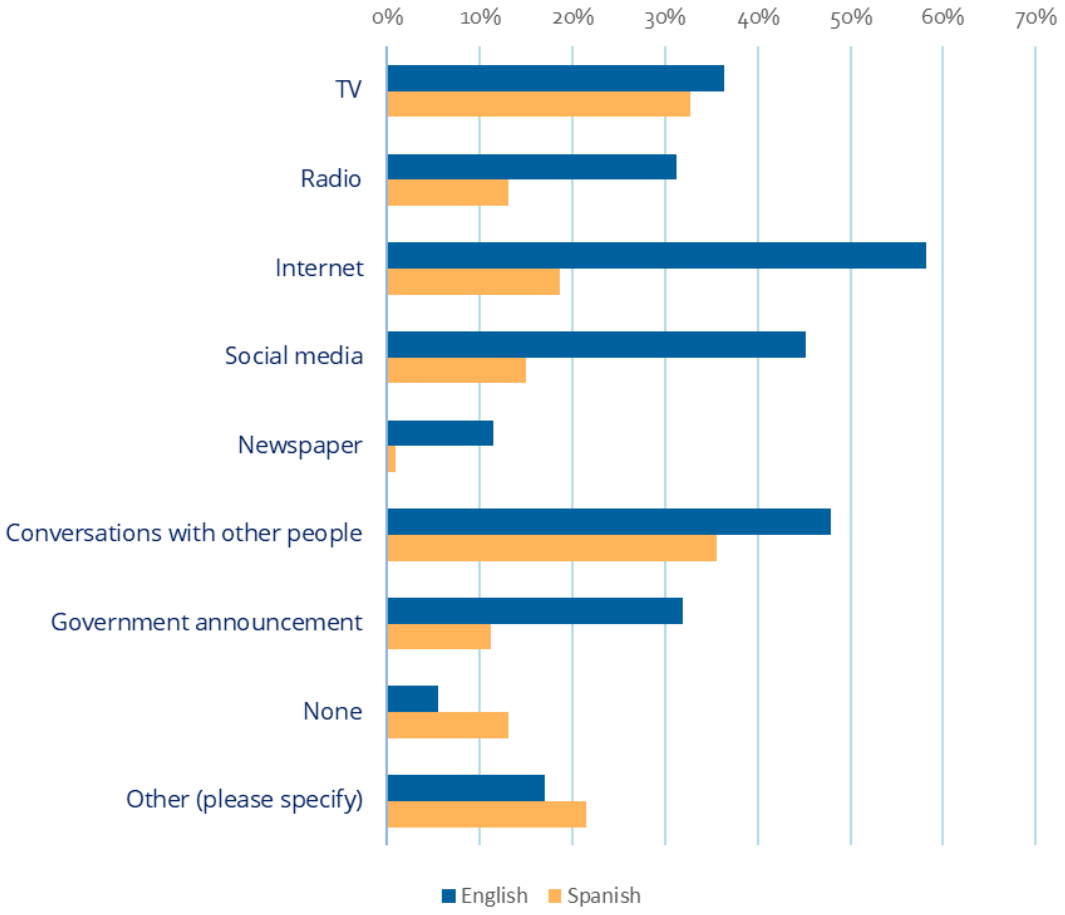
Safety Measures	Count
Evacuated to a hotel or motel, which many respondents described as extremely difficult to find one	19
N/A – were not around at the time of the fire	17
Had car packed with food, water, important items and ready to evacuate	15
Evacuated to businesses, the fairgrounds, or other parking lots and stayed in their cars	10
Purchased an air filter for their home	7

Sources of Information

Overall, the top sources of information during the Thomas Fire were the Internet (53 percent), conversations with other people (46. percent), and social media (41 percent). There were, however, differences in how English-language respondents and Spanish-language respondents answered this question.

- The main ways English-language respondents got information was from the Internet (58 percent), conversations with other people (48 percent), and social media (45 percent).
- The main ways Spanish-language respondents got information was from conversations with other people (36 percent) and TV (33 percent).
- Thirteen percent of Spanish-language respondents reported getting no information during the fires, as opposed to only 6 percent of English-language survey respondents.

Figure 8: Sources of Information Accessed during the Thomas Fire



Respondents also had the chance to elaborate on how they got information. The open answers are coded according to key themes that emerged; a few of the themes overlap with the answer options that were provided.

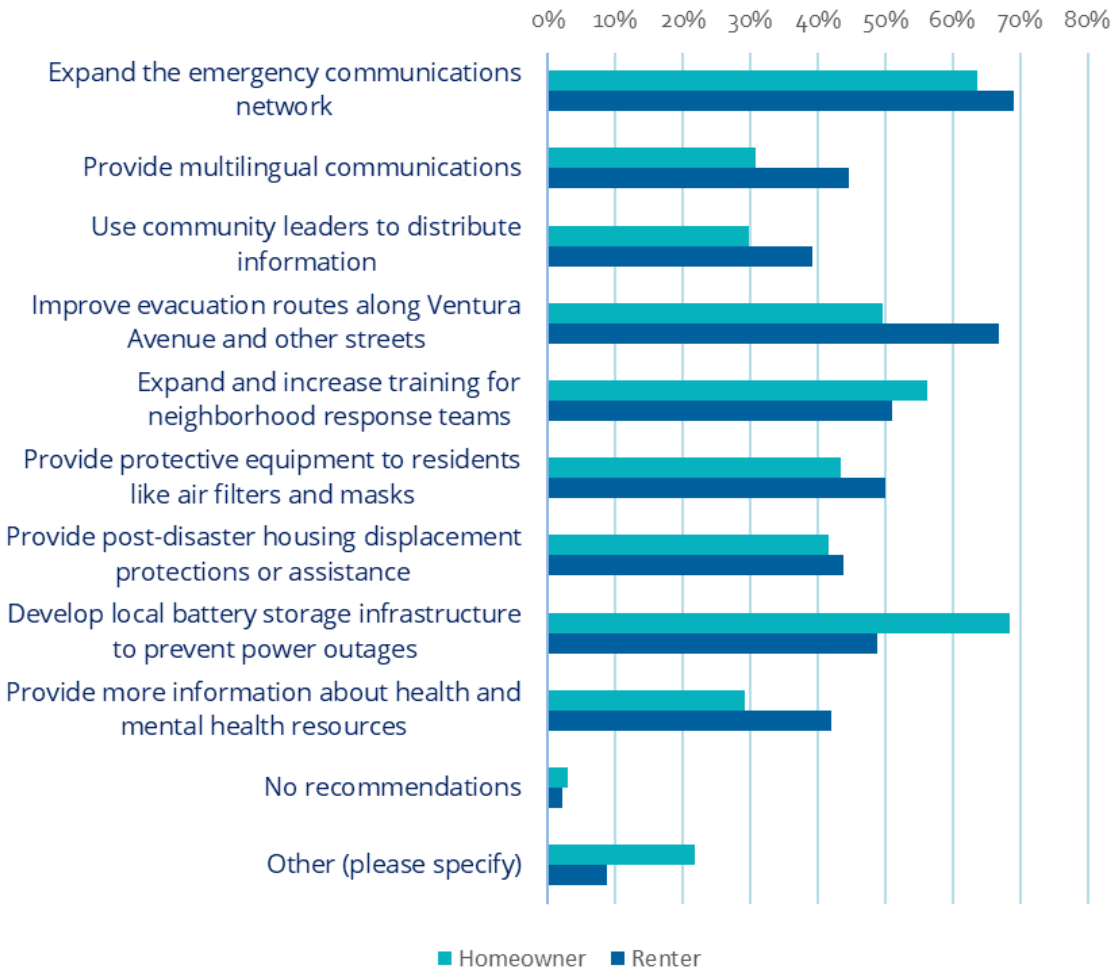
Table 4: Other Sources of Information

Source of Information	Count
Saw the fire firsthand before any other information	30
Word of mouth: conversations with friends, family, and neighbors	20
Phone alert / VC Alert	17
Heard police and/or fire department bullhorns or sirens telling them to evacuate	11

Respondents' top choices for improving the City's disaster response and preparedness were expanding the emergency communications network and developing local battery storage infrastructure to prevent power outages. Answers varied across groups in the city.

- A higher percentage of renters want the City to improve evacuation routes and provide more information about mental health resources.
- Renters also chose providing multilingual communications, in line with the correlation between renters and BIPOC and non-English speaking populations in Ventura.

Figure 9: Ways to Improve the City's Disaster Response



Respondents also had the chance to elaborate on how the City can improve disaster response. The open answers are coded according to key themes that emerged. Many of the answers contained multiple themes and a few of the themes overlap with the answer options that were provided.

Table 5: Other Improvements the City can Make to Improve Disaster Response

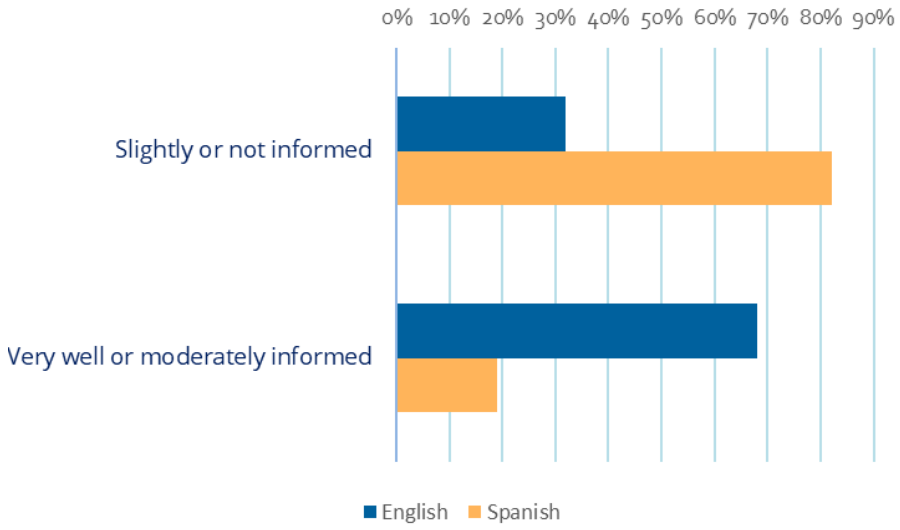
Improvements	Count
Ensure there is adequate water supply, equipment, and power for firefighting	34
Provide better information to the public about evacuation routes and training for disaster	16
Improve warning systems and information channels used during disaster events	15
Secure water resources and systems generally	14
Limit building and growth in Ventura	7
Support the fire department with more resources and/or staff	6

Climate Change

A vast majority of respondents overall (84 percent) think the climate is changing, with little variation across different groups in the city. A vast majority of respondents (89 percent) consider themselves at least slightly informed about the impacts of climate change in Ventura. There were, however, major differences in how groups across the city responded.

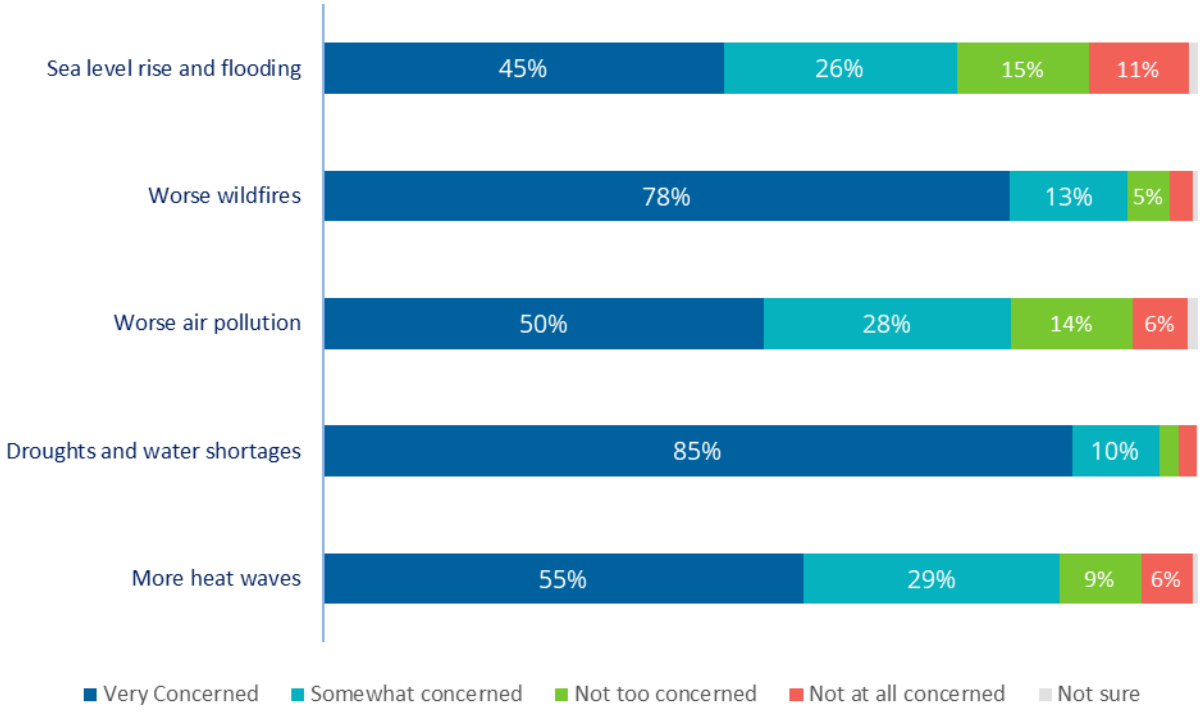
- Spanish-language respondents' answers varied greatly from English-language respondents. Only 19 percent of Spanish-language respondents reported being very well or moderately informed, compared to 68 percent of English-language respondents.
- Likewise, only 41 percent of renters reported being very well or moderately informed, compared to 72 percent of homeowners.

Figure 10: Level of Understanding about Climate Change in Ventura



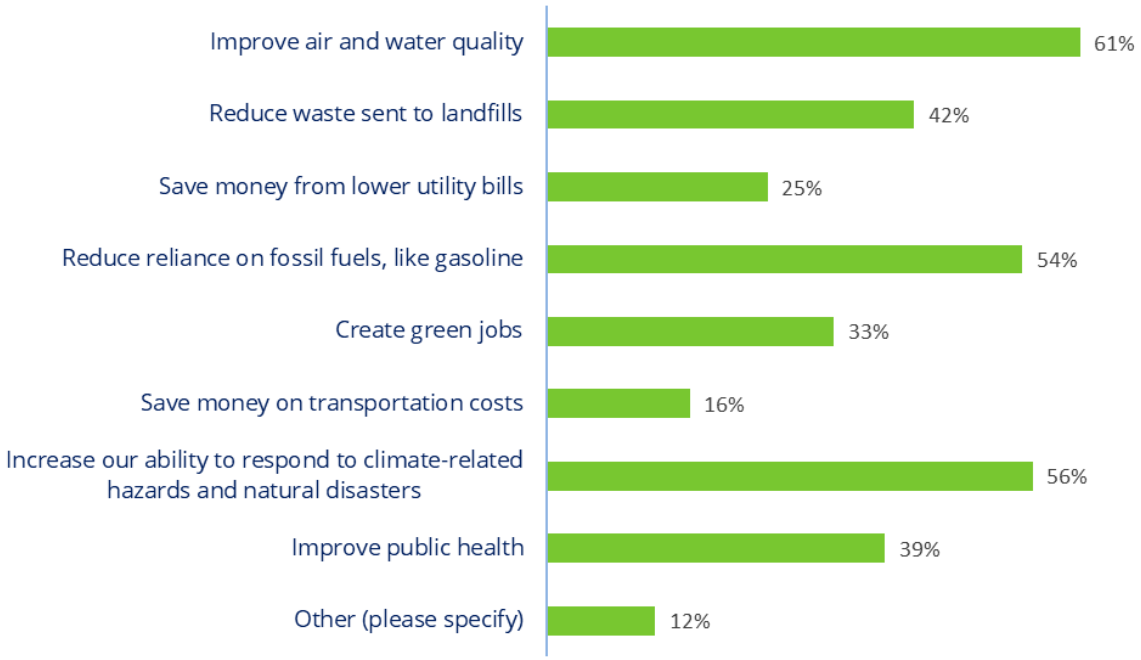
Survey respondents identified droughts and water shortages (95 percent of people reported being very or somewhat concerned) and worsening wildfires (92 percent of people reported being very or somewhat concerned) as the most pressing climate impacts. Sea level rise and flooding and worse air pollution are less of a concern to the respondents. Responses varied little across different groups in the city.

Figure 11: Most Concerning Climate Impacts



Respondents chose improving air and water quality as the most important co-benefit of natural hazard preparedness (chosen by 61 percent). Increasing our ability to respond to climate-related hazards and other natural disasters and reducing reliance on fossil fuels were also high priorities. Saving money from lower utility bills and saving money on transportation costs were lower priorities.

Table 12: Most Important Co-Benefits of Climate Preparedness



Respondents also had the opportunity to elaborate on other co-benefits of climate preparedness. The open answers are coded according to key themes that emerged, many of which had to do with water.

Table 6: Other Co-Benefits of Disaster Preparedness

Co-Benefit	Count
Stop building housing and limit population growth, which people saw as a strain on resources, putting them at risk in disasters, and negatively affecting their community fabric	17
Ensure there is a stable water supply	10
Conserve water and reduce water waste	6
Plant more trees and protect plants, wildlife, and natural habitat	6
Use desalination plants for water supply and expand the use of greywater	5

Appendix A: English Survey

Community Survey on Natural Disasters and Climate Change in the City of Ventura

Version: Web

Introduction

The City of Ventura is in the process of developing a Climate Action and Resilience Plan. This exciting initiative is a roadmap for how the community will reduce greenhouse gas emissions and prepare for the potential impacts of natural hazards and climate change on public health, infrastructure, ecosystems, and our economy.

This survey is designed to gather information about community members' opinions about experiences with recent natural disasters, preparation for possible future natural disasters, and the impacts of climate change. Your answers are anonymous, and you can also skip any questions. There are no right or wrong answers – we want to know about your perspectives and experiences.

Demographic

This section of this survey asks questions about your personal background. This information helps us understand who responded to the survey and who we still need to talk with in our community.

1. Do you live in the City of Ventura? (Check one)
    a. Yes
    b. No

2. How many years have you lived in the City of Ventura? (Check one)
    a. N/A – I do not live in Ventura
    b. Less than 1 year
    c. 1-5 years
    d. 6-10 years
    e. 11-20 years
    f. 21-40 years
    g. 40 years or more

3. What is your age group? (Check one)
    a. 17 years or younger
    b. 18-29 years
    c. 30-39 years
    d. 40-49 years

e. 50-59 years
f. 60-69 years
g. 70 years or older

4. With which race or ethnic group(s) do you most identify? (select all that apply)
    a. Asian or Asian American
    b. Black or African American
    c. Hispanic or Latino
    d. Central and South American Indigenous
    e. Native American or Alaska Native
    f. Native Hawaiian or other Pacific Islander
    g. White or Caucasian
    h. Two or more races
    i. Another race/ethnicity (please specify)

5. What gender do you identify with? (Select all that apply)
    a. Male
    b. Female
    c. Non-Binary
    d. Transgender
    e. Gender Non-Conforming
    f. Other (please specify)

Hazard Preparedness

The following section asks questions about preparedness for large-scale disasters or emergencies that would leave you isolated in your home or require you leave your home for at least 3 days. This might include natural disasters such as earthquakes, fires, storms, or blackouts. Preparedness refers to the steps you take to make sure you are safe before, during, and after a disaster or emergency.

6. How well prepared do you feel your household is to handle a large-scale disaster or emergency? (Check one)
    a. Very prepared
    b. Somewhat prepared
    c. Not too prepared at all
    d. Not at all prepared
    e. Don't know

7. How prepared do you think the Ventura city government is to deal with emergencies such as natural disasters? (Check one)
    a. Very prepared
    b. Somewhat prepared
    c. Not too prepared at all

d. Not at all prepared
e. Don't Know

8. Are there steps you, your household, your landlord, or others have taken around your home to prepare for a possible disaster? (check as many as you want)
    a. Used fire resistant materials to build, renovate, or make repairs
    b. Cleared and removed items around your home that could burn
    c. Have a room in your house that outside smoke can't get into
    d. Ensured you have an outdoor water source with a hose that can reach any area of your home
    e. Purchased a portable air cleaner
    f. Purchased a portable electric generator
    g. Retrofitted the home for earthquake shaking (e.g., reinforcing walls and chimneys and foundation bolting)
    h. Anchored shelving, cabinets, and heavy objects
    i. Created a preparedness kit or "go bag"
    j. None of the above
    k. Other: _____

9. How well informed are you about the evacuation routes and plans for your neighborhood? (Check one)
    a. Not at all informed
    b. Slightly informed
    c. Moderately informed
    d. Very well informed
    e. Other: _____

10. How concerned are you about the adequacy of evacuation plans for your neighborhood? (Check one)
    a. Very concerned
    b. Somewhat concerned
    c. Not too concerned
    d. Not at all concerned
    e. Don't know

11. If you are concerned about the evacuation plans for your neighborhood, what are you concerned about? (Open ended)

12. Do you have homeowners or renters' insurance for your residence? (Check one)
    a. Yes
    b. No
    c. I don't know
    d. Not applicable

13. Do you have a flood insurance policy from the National Flood Insurance Program or from a private insurance company? (Check one)
    a. Yes
    b. No
    c. I don't know
    d. Not applicable

Experiences with Recent Disasters

The following sections asks questions about your experiences with recent disasters or emergencies. This might include events like the Thomas Fire, mudslides, or the 2018 heat wave.

14. Have you or your family ever experienced the impacts of a disaster? (Check one)
    a. Yes
    b. No
    c. I don't know

15. In what year did you experience the disaster?
    a. Year: ____

16. Did you experience impacts from the Thomas Fire and/or subsequent mudslides? (Check one)
    a. Yes
    b. No
    c. I don't know

17. What impacts from the Thomas Fire and/or subsequent mudslides did you experience? (check as many as you want)
    a. Loss of home
    b. Property damage
    c. Loss of work or income
    d. Injury
    e. Loss of pets or livestock
    f. Housing displacement due to higher rents
    g. Loss of power
    h. Loss of groceries
    i. Respiratory or cardiovascular illness from smoke
    j. Loss of cell phone reception
    k. Mental health issues
    l. None of the above
    m. Other: _____

18. During and after the Thomas Fire, did you or anyone you know experience any of the following mental health issues? (check as many as you want)
    a. Anxiety
    b. Depression
    c. Post-traumatic stress disorders
    d. Stress
    e. Substance abuse
    f. Strains on social relationships
    g. None of the above
    h. Other: _____

19. If you experienced any of the above, were you able to access mental health resources? (Check one)
    a. Yes
    b. No
    c. I didn't experience mental health issues

20. During the Thomas Fire, what steps did you take to keep yourself safe? (check as many as you want)
    a. Followed a planned evacuation route
    b. Evacuated to a public shelter
    c. Evacuated to a friend's or family's home to shelter
    d. Sheltered in place
    e. Used masks to protect yourself from smoke
    f. None
    g. Other: ___

21. How did you get the information during the Thomas Fire? (check as many as you want)
    a. TV
    b. Radio
    c. Internet
    d. Social media
    e. Newspaper
    f. Conversations with other people
    g. Government announcement
    h. None
    i. Other: _____
22. Did you receive any support from government agencies or nonprofit charities?
    a. Yes
    b. No
    c. I don't know

23. If you received any support from government agencies or nonprofit charities, what type of support did you receive? (Open ended)

24. How can the City of Ventura and its partners improve disaster response and preparedness? (Check all that apply)
    a. Expand the emergency communications network
    b. Provide multilingual communications
    c. Use community leaders to distribute information
    d. Improve evacuation routes along Ventura Avenue and other streets
    e. Expand and increase training for neighborhood response teams
    f. Provide protective equipment to residents like air filters and masks
    g. Provide post-disaster housing displacement protections or assistance
    h. Develop local battery storage infrastructure to prevent power outages
    i. Provide more information about health and mental health resources
    j. No recommendations
    k. Other: _____

Climate Change

Recently, climate change has been getting some attention in the news. Climate change refers to the change in the usual weather found in a place. For example, this could be a change in how much rain a place usually gets in a year, or it could be a change in a place's usual temperature for a month or season.

25. Do you think the climate in Ventura is changing? (Check one)
    a. Yes
    b. No
    c. I don't know

26. How well informed are you about the effects of a changing climate in Ventura? (Check one)
    a. Not at all informed
    b. Slightly informed
    c. Moderately informed
    d. Very well informed

27. How concerned are you about the each of the following possible impacts of climate change in Ventura? (Check one for each impact)
    a. More heat waves
    b. Droughts and water shortages
    c. Worse air pollution
    d. Worse wildfires
    e. Sea level rise and flooding

        i. Very concerned

ii. Somewhat concerned
iii. Not too concerned
iv. Not at all concerned
v. Not Sure

28. Preparing for natural hazards can have many benefits. Which of the following are most important to you? *Choose up to three*.
    a. Improve air and water quality
    b. Reduce waste sent to landfills
    c. Save money from lower utility bills
    d. Reduce reliance on fossil fuels, like gasoline
    e. Create green jobs
    f. Save money on transportation costs
    g. Increase our ability to respond to climate-related hazards and natural disasters
    h. Improve public health
    i. Other: _____

Additional Demographics

In addition to the information provided at the beginning, this section of this survey asks additional questions about your personal background.

29. In which part of Ventura do you live? (Check one)
    a. Arundell / North Bank
    b. College Area
    c. Downtown
    d. Eastside / Juanamaria (North of Highway 126)
    e. Eastside / Saticoy (South of Highway 126)
    f. Foothills
    g. Marina
    h. Midtown
    i. Pierpont
    j. Southeast / Montalvo
    k. Thille
    l. Westside / The Avenue
    m. Other part of Ventura
    n. I do not live in Ventura

30. What best describes your annual household income level? (Check one)
    a. Less than $20,000
    b. $20,000 - $44,999
    c. $45,000 - $84,999
    d. $85,000 - $99,999
    e. $100,000 - $199,999

f. $200,000 or more

31. Do you own or rent your residence? (Check one)
    a. Own
    b. Rent
    c. Other: ____

32. What best describes your housing unit type? (Check one)
    a. Accessory Dwelling Unit (Including granny flats, converted garages, etc.)
    b. Apartment
    c. Condo/townhouse
    d. Duplex/Triplex
    e. Mobile Home
    f. Single-family house
    g. Unhoused
    h. Vehicle
    i. Other: _____

33. Do you consider yourself a person with a disability? (Check one)
    a. Yes
    b. No
    c. I don't know

34. How do you connect with the City of Ventura for news and events?
    a. City website
    b. City Council or Commission Meetings
    c. Community Council Meetings
    d. MyVentura or other digital City eNewsletters
    e. Parks & Recreation guidebook (seasonal)
    f. Facebook
    g. Instagram
    h. Twitter
    i. Nextdoor
    j. YouTube
    k. Other

35. If you would to be notified about the following ongoing City planning projects, please check the box(es), and provide your email address.
    General Plan Update

    Active Transportation Plan

    E-mail address: _____

Introduction for the PHONE or IN PERSON

Hi, my name is ____ and I am a staff member / project team member working with the City of Ventura. We are doing a special survey about experiences with recent natural disasters, preparation for possible future natural disasters, and the impacts of climate change.

This survey should take about fifteen minutes. We appreciate your honest responses. If we ask a question that you do not want to answer, you don't need to do so. All your answers will be kept confidential. Any questions?

Appendix B: Spanish Survey

Encuesta comunitaria sobre desastres naturales y cambio climático en la ciudad de Ventura

Versión: Web

Introducción

La ciudad de Ventura está desarrollando un Plan de Acción y Resiliencia Climática. Esta interesante iniciativa es una hoja de ruta sobre cómo la comunidad reducirá las emisiones de gases de efecto invernadero y se preparará para los posibles impactos de los riesgos naturales y el cambio climático en la salud pública, las infraestructuras, los ecosistemas y nuestra economía.

Esta encuesta está diseñada para recabar información sobre las opiniones de los miembros de la comunidad acerca de las experiencias con los recientes desastres naturales, la preparación para posibles desastres naturales futuros y los impactos del cambio climático. Sus respuestas son anónimas y también puede omitir cualquier pregunta. No hay respuestas correctas o incorrectas – queremos conocer sus perspectivas y experiencias.

Demografía

En esta sección de la encuesta se hacen preguntas sobre sus datos personales. Esta información nos ayuda a entender quiénes han respondido a la encuesta y con quiénes tenemos que seguir conversando en nuestra comunidad.

1. ¿Vive usted en la ciudad de Ventura?
    a. Sí
    b. No

2. ¿Cuántos años lleva viviendo en la ciudad de Ventura?
    a. N/A – No vivo en Ventura
    b. Menos de 1 año
    c. 1-5 años
    d. 6-10 años
    e. 11-20 años
    f. 21-40 años
    g. 40 años o más

3. ¿Cuál es su grupo de edad?
    a. 17 años o menos
    b. 18-29 años
    c. 30-39 años

d. 40-49 años
e. 50-59 años
f. 60-69 años
g. 70 años o más

4. ¿Con cuál raza o grupos étnicos se identifica más? (Seleccione todos los que correspondan)
    a. Asiático o Asiático Estadounidense
    b. Negro o Afroamericano
    c. Hispano o Latino
    d. Indígenas de América Central y del Sur
    e. Nativo Americano o Nativo de Alaska
    f. Nativo de Hawái u otra Isla del Pacífico
    g. Blanco o Caucásico
    h. Dos o más razas
    i. Otra raza/etnia (por favor, especifique)

5. ¿Con cuál género se identifica? (Seleccione todos los que correspondan)
    a. Masculino
    b. Femenino
    c. No binario
    d. Transgénero
    e. Género no conforme
    f. Otro (por favor, especifique):

Preparación ante los riesgos

En la siguiente sección se plantean preguntas sobre la preparación para desastres o emergencias a gran escala que le dejarían aislado en su casa o le obligarían a abandonarla durante al menos 3 días. Esto puede incluir desastres naturales como terremotos, incendios, tormentas o apagones. La preparación se refiere a las medidas que toma para asegurarse de que está a salvo antes, durante y después de un desastre o emergencia.

6. ¿En qué medida considera que su hogar está preparado para hacer frente a un desastre o emergencia a gran escala? (Marque una)
    a. Muy preparado
    b. Algo preparado
    c. No está muy preparado
    d. No está preparado en absoluto
    e. No sabe

7. ¿En qué medida considera que el gobierno de la ciudad de Ventura está preparado para hacer frente a emergencias como los desastres naturales? (Marque una)
    a. Muy preparado

b. Algo preparado
c. No está muy preparado
d. No está preparado en absoluto
e. No sabe

8. ¿Hay medidas que usted, su familia, su arrendador u otras personas han tomado en su casa para prepararse para un posible desastre? (marque todas las que quiera)
    a. Utilizó materiales resistentes al fuego para construir, renovar o hacer reparaciones
    b. Despejó y retiró los objetos alrededor de su casa que puedan quemarse
    c. Designó una habitación que pueda cerrarse desde el exterior para evitar la entrada de humo
    d. Se aseguró de tener una fuente de agua exterior con una manguera que pueda llegar a cualquier zona de su casa
    e. Compró un limpiador de aire portátil
    f. Compró un generador eléctrico portátil
    g. Modernizó la casa para las sacudidas sísmicas
    h. Colocó anclajes para estanterías, armarios y objetos pesados
    i. Creó un kit de preparación o “bolso de viaje”
    j. Ninguno de las anteriores
    k. Otros: _____

9. ¿En qué medida está usted informado de los planes de evacuación de su vecindario?
    a. Ninguna información
    b. Ligeramente informado
    c. Moderadamente informado
    d. Muy bien informado
    e. Otros: _____

10. ¿En qué medida le preocupa la adecuación de los planes de evacuación de su vecindario? (Marque una)
    a. Muy preocupado
    b. Un poco preocupado
    c. No me preocupa demasiado
    d. No me preocupa en absoluto
    e. No sabe

11. Si le preocupan los planes de evacuación de su vecindario, ¿qué le preocupa? (Respuesta abierta)

12. ¿Tiene un seguro para propietarios o inquilinos para su residencia? (Marque una)
    a. Sí
    b. No
    c. No sabe

13. ¿Tiene una póliza de seguro contra inundaciones del Programa Nacional de Seguros contra Inundaciones o de una compañía de seguros privada? (Marque una)
    a. Sí
    b. No
    c. No sabe

Experiencias con desastres recientes

En las siguientes secciones se hacen preguntas sobre sus experiencias con desastres o emergencias recientes. Esto podría incluir eventos como el incendio Thomas, los deslizamientos de tierra o la ola de calor de 2018.

14. ¿Usted o su familia han sufrido alguna vez los efectos de un desastre? (Marque una)
    a. Sí
    b. No
    c. No sabe

15. ¿En qué año sufrió los efectos del desastre?
    a. Año: ____

16. ¿Sufrió usted el impacto del incendio Thomas y los posteriores desprendimientos de tierra? (Marque una)
    a. Sí
    b. No
    c. No sabe

17. ¿Qué impactos del incendio Thomas y de los posteriores desprendimientos de tierra experimentó? (marque todos los que quiera)
    a. Pérdida de la vivienda
    b. Daños a la propiedad
    c. Pérdida de trabajo o de ingresos
    d. Lesión
    e. Pérdida de animales domésticos o de ganado
    f. Desplazamiento de la vivienda por el aumento de los alquileres
    g. Pérdida de energía
    h. Pérdida de comestibles
    i. Enfermedades respiratorias o cardiovasculares causadas por el humo
    j. Pérdida de recepción del teléfono celular
    k. Problemas de salud mental
    l. Ninguno de las anteriores
    m. Otro: _____

18. Durante y después del incendio Thomas, ¿usted o alguien que conoce experimentó alguno de los siguientes problemas de salud mental? (marque todos los que quiera)
    a. Ansiedad
    b. Depresión
    c. Trastornos de estrés postraumático
    d. Estrés
    e. Abuso de sustancias
    f. Tensiones en las relaciones sociales
    g. Ninguno de las anteriores
    h. Otro: _____

19. Si experimentó una de las situaciones anteriores, ¿pudo acceder a recursos de salud mental? (Marque una)
    a. Sí
    b. No
    c. No he tenido problemas de salud mental

20. Durante el incendio Thomas, ¿qué medidas tomó para mantenerse a salvo? (marque todas las que quiera)
    a. Siguió una ruta de evacuación planificada
    b. Decidió evacuar a un refugio público
    c. Decidió evacuar a casa de un amigo o familiar para refugiarse
    d. Se refugió en el lugar
    e. Utilizó mascarillas para protegerse del humo
    f. Ninguna
    g. Otra: _____

21. ¿Cómo consiguió la información durante el incendio Thomas? (marque todas las que quiera)
    a. TV
    b. Radio
    c. Internet
    d. Medios Sociales
    e. Periódico
    f. Conversaciones con otras personas
    g. Anuncio del Gobierno
    h. Ninguna
    i. Otros: _____

22. ¿Recibió alguna ayuda de organismos gubernamentales o de organizaciones benéficas sin ánimo de lucro?
    a. Sí
    b. No
    c. No sabe

23. Si recibió alguna ayuda de organismos gubernamentales o de organizaciones benéficas sin ánimo de lucro, ¿qué tipo de ayuda recibió? (Respuesta abierta)

24. ¿Cómo pueden la ciudad de Ventura y sus socios mejorar la respuesta y la preparación ante los desastres? (Marque todas las que correspondan)
    a. Ampliar la red de comunicaciones de emergencia
    b. Proporcionar comunicaciones multilingües
    c. Utilizar a los líderes de la comunidad para distribuir información
    d. Mejorar las rutas de evacuación a lo largo de la Avenida Ventura y otras calles
    e. Ampliar y aumentar la formación de los equipos de respuesta vecinal
    f. Proporcionar equipos de protección a los residentes, como filtros de aire y mascarillas
    g. Proporcionar protecciones o ayudas para el desplazamiento de la vivienda tras el desastre
    h. Desarrollar una infraestructura local de almacenamiento de baterías para evitar los cortes de electricidad
    i. Ninguna recomendación
    j. Otro: _____

Cambio climático

Recientemente, el cambio climático ha recibido cierta atención en las noticias. El cambio climático se refiere al cambio en las condiciones climáticas habituales de un lugar. Por ejemplo, puede tratarse de un cambio en la cantidad de lluvia que suele recibir un lugar en un año, o puede ser un cambio en la temperatura habitual de un lugar durante un mes o una estación.

25. ¿Considera que el clima en Ventura está cambiando? (Marque una)
    a. Sí
    b. No
    c. No sabe

26. ¿En qué medida está informado sobre los efectos del cambio climático en Ventura? (Marque una)
    a. Ninguna información
    b. Ligeramente informado
    c. Moderadamente informado
    d. Muy bien informado

27. ¿En qué medida le preocupa cada uno de los siguientes posibles impactos del cambio climático en Ventura? (Marque una opción para cada impacto)
    a. Más olas de calor
    b. Sequías y escasez de agua

c. Peor contaminación atmosférica
d. Peores incendios forestales
e. Aumento del nivel del mar e inundaciones

i. Muy preocupado
ii. Un poco preocupado
iii. No me preocupa demasiado
iv. No me preocupa en absoluto
v. No está seguro

28. Prepararse ante los riesgos naturales puede tener muchos beneficios. ¿Cuáles de las siguientes opciones son más importantes para usted? *Elija hasta tres*.
    a. Mejorar la calidad del aire y del agua
    b. Reducir los residuos enviados a los vertederos
    c. Ahorrar dinero gracias a la reducción de las facturas de los servicios públicos
    d. Reducir la dependencia de los combustibles fósiles, como la gasolina
    e. Crear empleos ecológicos
    f. Ahorrar dinero en gastos de transporte
    g. Aumentar nuestra capacidad de respuesta ante los riesgos relacionados con el clima y los desastres naturales
    h. Mejorar la salud pública
    i. Otros: _____

Datos demográficos adicionales

Además de la información proporcionada al principio, en esta sección de la encuesta se hacen preguntas adicionales sobre sus datos personales.

29. ¿En qué parte de Ventura vive? (Marque una)
    a. Arundell / North Bank
    b. College Area
    c. Downtown
    d. Eastside / Juanamaria (Norte de la Autopista 126)
    e. Eastside / Saticoy (Sur de la Autopista 126)
    f. Foothills
    g. Marina
    h. Midtown
    i. Pierpont
    j. Southeast / Montalvo
    k. Thille
    l. Westside / The Avenue
    m. Otra parte de Ventura
    n. No vive en Ventura

30. ¿Cuál describe mejor el nivel de ingresos anuales de su hogar? (Marque una)
    a. Menos de $20,000
    b. $20,000 - $44,999
    c. $45,000 - $84,999
    d. $85,000 - $99,999
    e. $100,000 - $199,999
    f. $200,000 o más

31. ¿Es usted propietario o alquila su residencia? (Marque una)
    a. Propiedad
    b. Alquiler
    c. Otro: _____

32. ¿Cuál describe mejor su tipo de vivienda? (Marque una)
    a. Unidad de vivienda accesoria (incluidos los apartamentos de acogida, los garajes transformados, etc.)
    b. Apartamento
    c. Condominio/Casa adosada
    d. Dúplex / Tríplex
    e. Casa rodante
    f. Casa unifamiliar
    g. Sin vivienda
    h. Vehículo
    i. Otro: _____

33. ¿Se considera una persona con una discapacidad? (Marque una)
    a. Sí
    b. No
    c. No sabe

34. ¿Cuál es su medio preferido para conectarse con la Ciudad de Ventura e informarse de noticias y eventos?
    a. Página de internet de la ciudad
    b. Reuniones del Concejo Municipal o de la Comisión
    c. Reuniones del Concejo Comunitario
    d. MyVentura u otros boletines digitales de la ciudad
    e. Guías de parques y recreación de temporada
    f. Facebook
    g. Instagram
    h. Twitter
    i. Nextdoor
    j. YouTube
    k. Otro

35. Si le gustaría recibir notificaciones acerca de los próximos planes y proyectos, por favor seleccione una o más opciones y provea su correo electrónico.
    a. Actualización del plan general
    b. Planes de Transporte Activo
    c. Correo electrónico: _____

Presentación por TELÉFONO o EN PERSONA

Hola, me llamo ____ y soy miembro del personal/equipo de proyecto que trabaja con la ciudad de Ventura. Estamos haciendo una encuesta especial sobre las experiencias con los desastres naturales recientes, la preparación para posibles desastres naturales futuros y los impactos del cambio climático.

Esta encuesta debería durar unos quince minutos. Agradecemos que sus respuestas sean sinceras. Si le hacemos una pregunta que no quiere responder, no es necesario que lo haga. Todas sus respuestas serán confidenciales. ¿Tiene alguna pregunta?

Community Survey on Greenhouse Gas Reduction in the City of Ventura

October 2022

CITY OF VENTURA
OUR VISION, OUR FUTURE

Table of Contents

Survey Overview

The City of Ventura is in the process of creating a Climate Action and Resilience Plan (CARP). This exciting initiative is a roadmap for how the community will reduce greenhouse gas (GHG) emissions and prepare for the potential impacts of natural hazards and climate change on public health, infrastructure, ecosystems, and our economy.

The City launched a Community Survey on Greenhouse Gas Reduction in the City of Ventura (survey), which was open from late July 2022 through mid-August 2022.The purpose of this survey was to gather information about community members' opinions about policy options and behaviors to reduce greenhouse gas emissions and help us meet State reduction goals

The survey was made available in both English and Spanish, and a total of 1,071 unique responses were recorded. This document summarizes the combined responses of both English- and Spanish-language participants.

Survey Methodology and Participation

The survey was developed by City of Ventura staff and the General Plan Update consultant team. In developing the survey, the team considered:

- **Draft Greenhouse Gas Reduction Measures for the CARP**: The survey asks specifically about support for measures in the building energy, land use and transportation, water, and solid waste sectors.
- **Similar Surveys or Polls**: The project team reviewed similar community surveys from other jurisdictions and statistically significant findings from other polls about the topics covered in the survey. Several questions in the survey match questions found in these external tools.
- **Creating a Flexible and Useful Tool to Maximize Engagement**: The survey, in English and Spanish, was developed to measure opinions across all the above areas of interest.

The final survey instruments are attached in the Appendix A and B. Each version of the tool is organized into five sections: demographics, policies and behaviors and actions.

Sampling

This survey was completed by a non-randomized sample (often called a convenience sample) of people who live, work, go to school, or spend time in the City of Ventura.

Using a non-random sample for a survey is commonly used to understand the perspectives and experiences of a group of people ("population"). Data from non-random samples can show the range of views and experiences within a population and be used as a reference point. Data from non-random samples are typically considered more reliable (i.e., more generalizable to the larger population) when they are "triangulated" or validated through additional sources. This survey data will be considered alongside data from focus groups, community meetings, and other public input, with all this data being used to inform decision-making.

Distribution Methods

The survey was available to take online and was produced using the SurveyMonkey platform. The project team developed several outreach graphics and materials, such as social media images and flyers, which were distributed through various methods, including but not limited to:

- **Internet-Based Outreach:** City's GovDelivery listservs (All subscribers; General Plan Update subscribers); GPU Project Website; City's social media accounts (Twitter, Facebook, Instagram, etc.).
- **In-Person Outreach:** Door-to-door canvassing; outreach at the CARP Open House; outreach at the CARP focus groups.

The survey and outreach materials were produced in both English and Spanish. To encourage the participation of typically underrepresented groups, the non-profit organization Central Coast Alliance United for A Sustainable Economy (CAUSE) conducted targeted outreach in heavily Hispanic/Latinx, multi-family neighborhoods on Ventura's Westside. CAUSE staff canvassed door-to-door and recorded survey responses with Spanish-speaking residents in person. When residents did not answer, CAUSE staff left behind flyers with information about how to access the survey.

Demographic and Socioeconomic Characteristics of Survey Participants

Participants were asked several demographic questions during the survey. These questions are intended to help City staff ascertain whether survey respondents generally matched the profile of Ventura and/or whether any groups were over- or underrepresented. Key takeaways are summarized below:

- Almost all respondents (90 percent) are residents of the City of Ventura.
- Of all residents who responded, over half (53 percent) have lived in Ventura for 21 years or more. Residents of one year or less comprised lonely one percent.
- Homeowners made up 77 percent of the respondents, and renters comprised 21 percent of the responses. The survey results overrepresented homeowners (54 percent of the city population) compared to rents (46 percent of the city population).
- Almost three-quarters of survey respondents identify as Non-Hispanic White or Caucasian (compared to the citywide average of 55 percent) Hispanic and Latino individuals were underrepresented (18 percent compared to the citywide average of 36 percent).
- People aged 60 and above comprised almost half (48 percent) of respondents.
- The response for most neighborhoods was proportionate to residential population size.

Policies

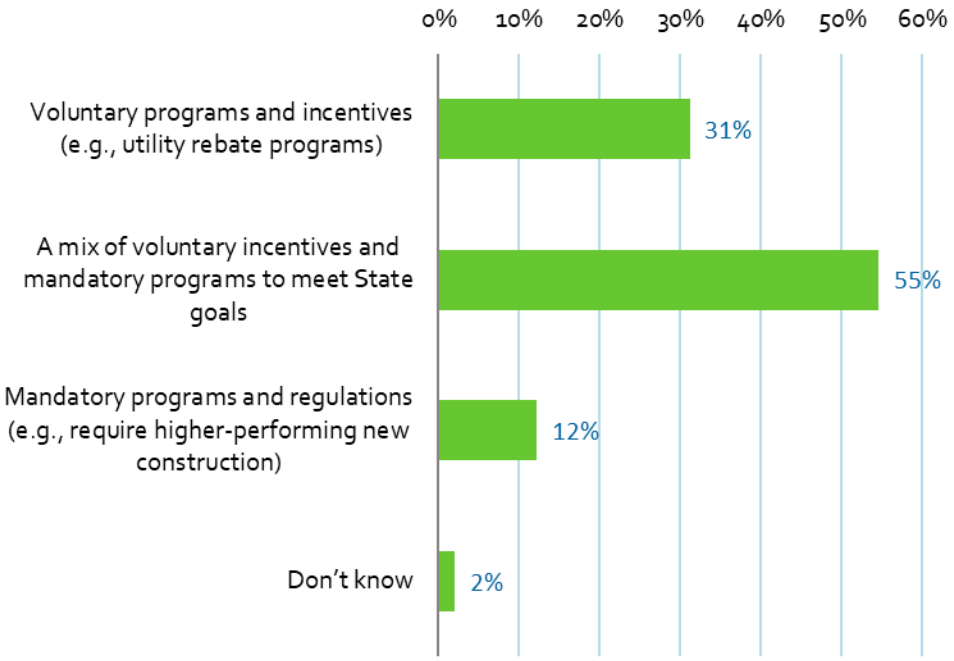
Survey participants were asked questions about their attitudes towards taking climate action. They were also asked a series of policy options to improve energy and water efficiency, reduce air pollution, and reduce greenhouse gas emissions.

Level of Action to Meet GHG Goals

A majority of respondents (81 percent) are aware that California has established GHG emissions. Nearly 60 percent of respondents believe the City should take bold action to meet or exceed those goals. The remaining 40 percent of respondents are split evenly between the City taking moderate or limited action.

However, respondents' stated desire for the City to take bold action is not consistent with their views on how the City should encourage action (Figure 1). Only 12 percent think the City should establish mandatory programs and regulations, while the rest selected the more moderate approach of mixed voluntary and mandatory programs or voluntary programs only.

Figure 1: How the City should Encourage Action to Meet State GHG Goals



Policy Options

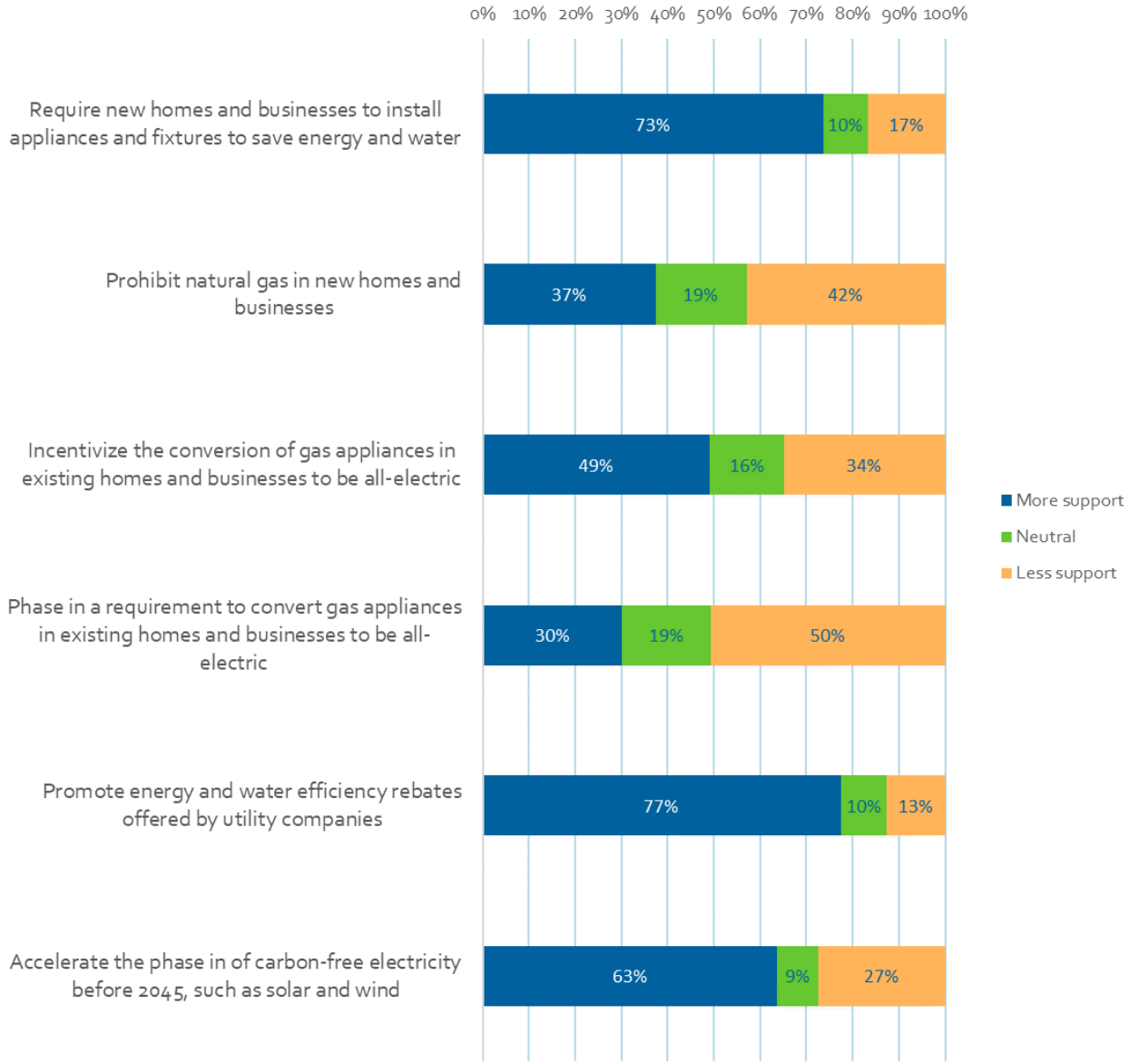
Participants were asked to rank a menu of GHG reduction measures on a scale of 1 to 5, where 1 means "Do not Support" and 5 means "Strongly Support"

Building Energy Policies

About three quarters of respondents support or strongly support promoting water and energy rebates from utilities and requiring new homes and businesses to install efficient appliances and fixtures (77 and 73 percent respectively) (Figure 2). Accelerating the phase-in of carbon-free electricity before 2045 is also supported by a majority (63 percent) of respondents. This measure is more strongly supported by renters than homeowners; 73 percent of renters are in support, compared to 61 percent of homeowners.

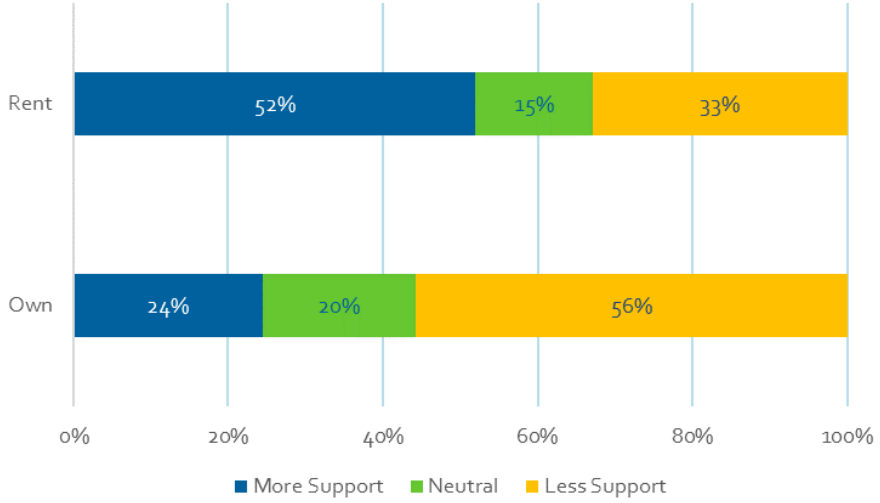
Policy options that respondents are least supportive of are phasing in requirements for converting gas appliances in existing homes and prohibiting natural gas in development (Figure 2). However, these policies also have the highest percentage of "neutral" respondents who could perhaps be swayed to one side through education.

Figure 2: Level of Support for Building Energy Policy Options



Overall respondents are more supportive of incentives than a phased-in requirement when it comes to converting gas appliances to electric in existing development. Broken down by housing tenure, renters are more supportive of both policies than homeowners. 58 percent of renters compared to 47 percent of homeowners support incentives. The difference is stark when it comes to phased-in requirements; only 24 percent of homeowners are in support compared to 52 percent of renters (Figure 3).

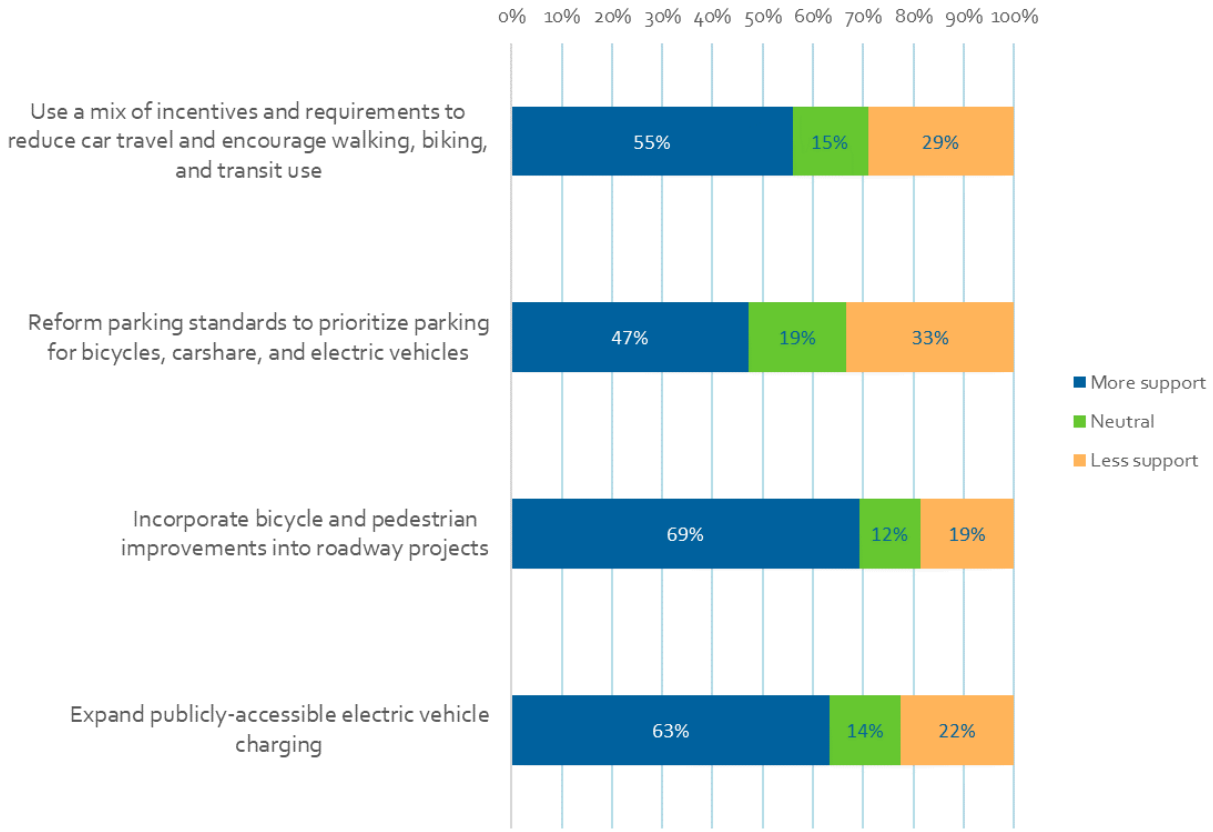
Figure 3: Support of Phased-in Requirements for Gas Appliance Conversion to Electric in Existing Buildings by Housing Tenure



Land Use and Transportation Policies

All of the land use and transportation policies included in the survey are moderately to strongly supported by the overall survey respondents (Figure 4). The most popular options are incorporating bicycle and pedestrian improvements into roadway projects (69 percent support) and expanding publicly accessible EV charging (63 percent support).

Figure 4: Level of Support for Land Use and Transportation Policy Options

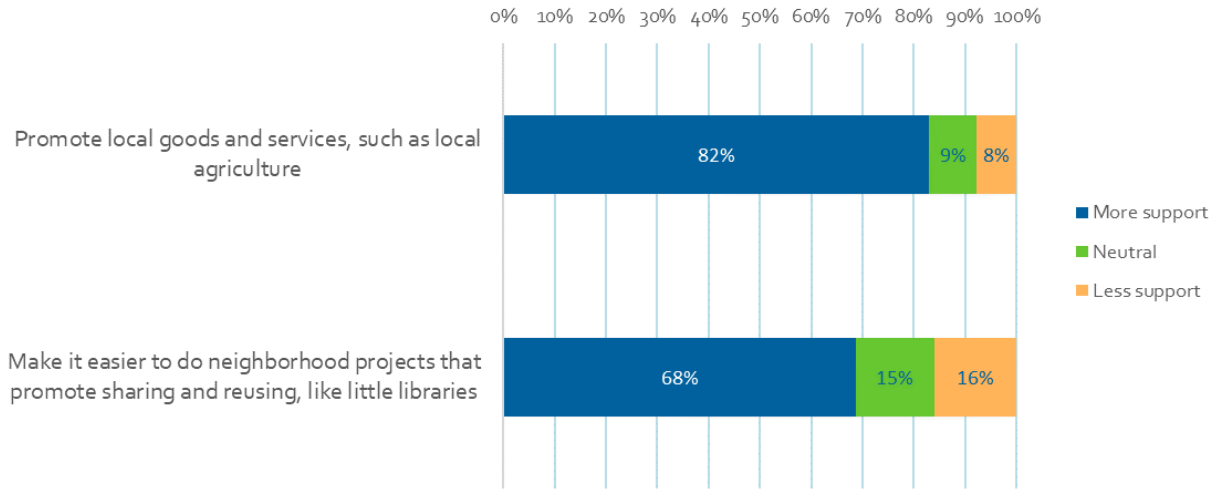


When broken down by housing tenure, respondents who are renters are slightly more supportive of all four policies than homeowners. The policy option with the greatest difference (13 percentage points) between renters and owners is reforming parking standards to prioritize parking for bicycles, carshare, and EVs.

Consumption Reduction Policies

Overall respondents are highly supportive of policies that reduce consumption emissions (Figure 5). Respondents who are renters are more supportive of policies that make it easier to do neighborhood projects that promote sharing and reusing (83 percent of renters support, compared to 65 percent of homeowners).

Figure 5: Level of Support for Consumption Reduction Policy Options



Behaviors

The last section of the survey addressed if respondents currently implement sustainable practices. Respondents could select all options that applied, as well as add their own actions in the "Other" option.

Steps Taken to be more Sustainable

Reducing Energy Use

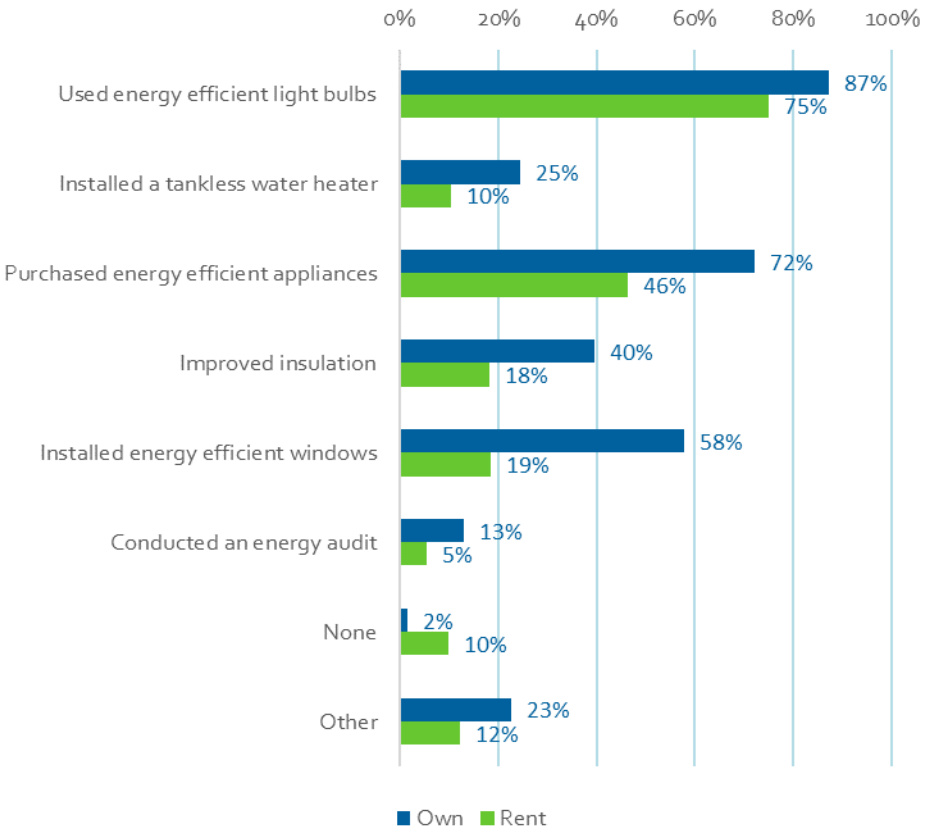
Overall, the most popular actions respondents have taken to reduce home energy use are using energy efficient light bulbs (selected by 91 percent of respondents) and purchasing energy efficient appliances (71 percent). Only a small number of respondents have installed a tankless water heater or conducted an energy audit (23 and 12 percent, respectively).

Common themes in the "Other" responses were:

- Installed or are planning to install solar panels, some with battery backup
- Turn off lights, fans, etc. off when not in use
- Purchased and drive an EV (note: not an energy conservation measure)
- Not using AC, relying more on passive cooling or fans
- Wanting to make the changes listed but being limited as a renter

Because renters have less ability to make changes to their residence, the question asked if they or their landlord have taken the steps to reduce energy use. Even so, renters reported lower implementation of all actions listed (Figure 6). The biggest disparities are in the installation of energy efficient windows, purchase of energy efficient appliances, and improving the building insulation.

Figure 6: Steps Taken Around the Home to Reduce Energy Use by Housing Tenure



Reducing Water Use

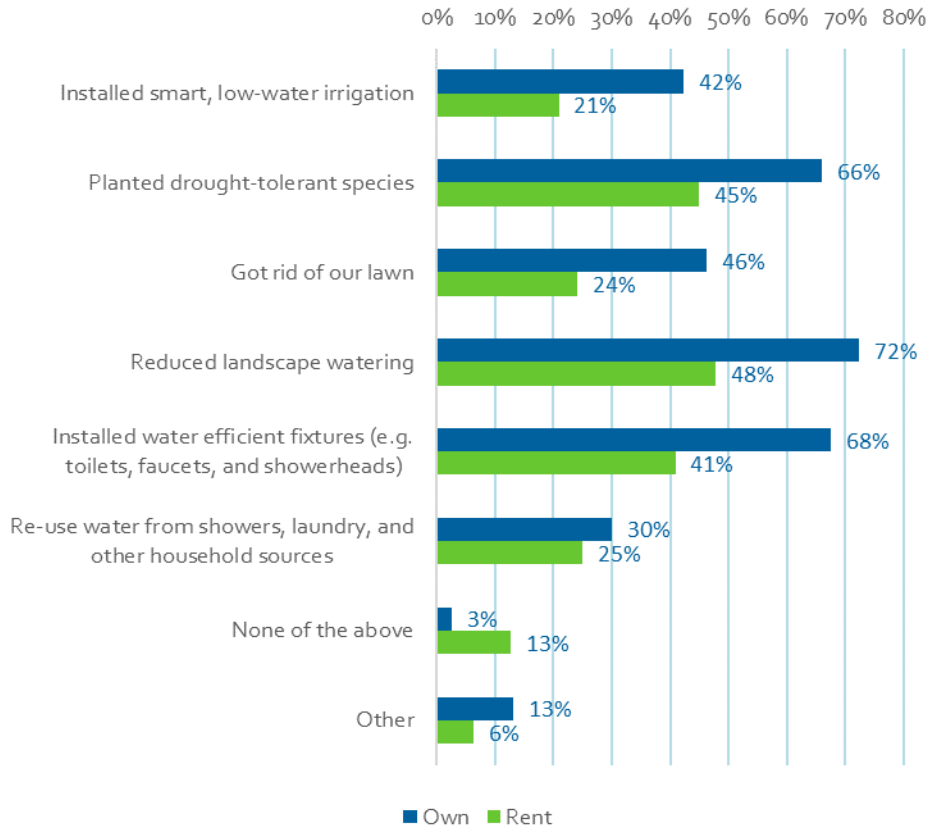
Overall, the most popular actions respondents have taken to reduce home water use are reducing landscape watering (73 percent), installing water efficient fixtures (67 percent), and planting drought-tolerant species (67 percent). Even the less popular actions have decent uptake, with a third to half of respondents implementing low water irrigation, lawn removal, and water re-use. Most of the "Other" responses are more detailed explanations of how people implement the answers in the multiple choice.

Beside the more detailed descriptions of the options in the multiple choice, common themes in the "Other" responses were:

- Shortened the length of showers, sink usage, etc.
- Reduced toilet flushing
- Installed rain barrels
- Installed circulation pumps

Because renters have less ability to make changes to their residence, the question asked if they or their landlord have taken the steps to reduce water use. Even so, renters reported lower implementation of all actions listed (Figure 7).

Figure 7: Steps Taken Around the Home to Reduce Water Use by Housing Tenure



Other Ways to be more Sustainable

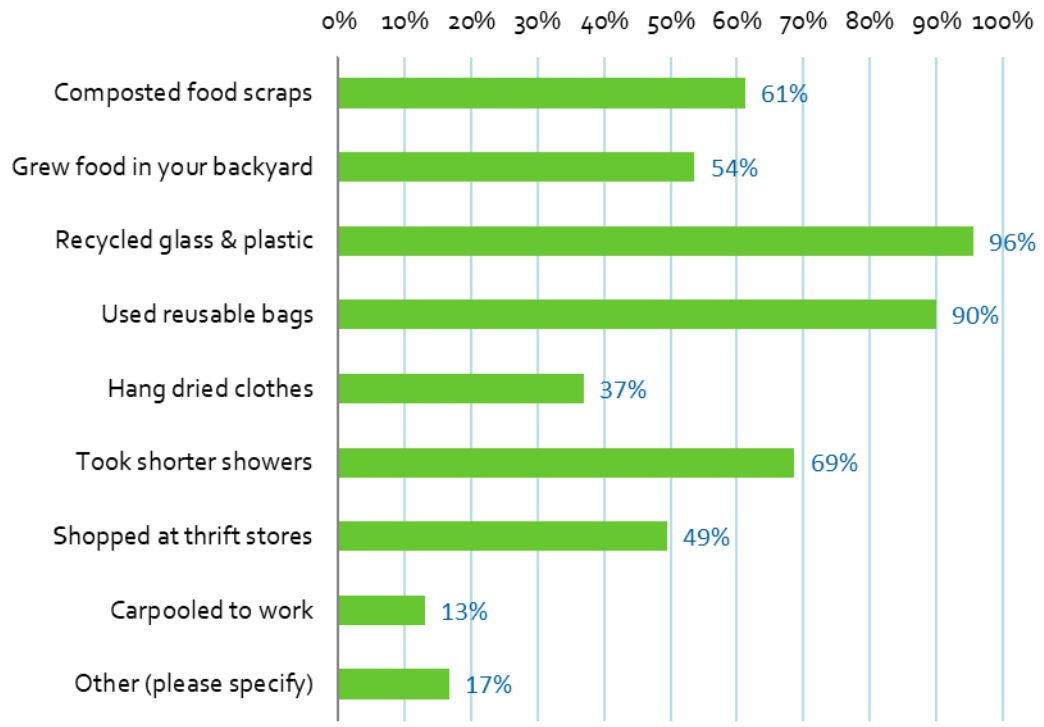
There is a wide variety of other ways households can be more sustainable. Almost all respondents recycle glass and plastic and use reusable bags (96 and 90 percent, respectively), which are ways to reduce landfilled waste. About half of respondents implement measures to reduce consumption emissions, including composting food scraps (61 percent), growing food in their backyard (54 percent), and shopping at thrift stores (49 percent).

The results were mostly consistent between homeowners and renters. However, more renters shopped at thrift stores (57 percent for renters versus 43 percent for homeowners) and carpooled to work (21 percent for renters versus only 9 percent of homeowners).

Common themes in the "Other" responses were:

- Rides a bike, walk, or other active transportation mode to work and run errands
- Uses public transportation
- Uses an EV
- Installed solar panels at home

Figure 8: Other Steps Taken to Help the Environment



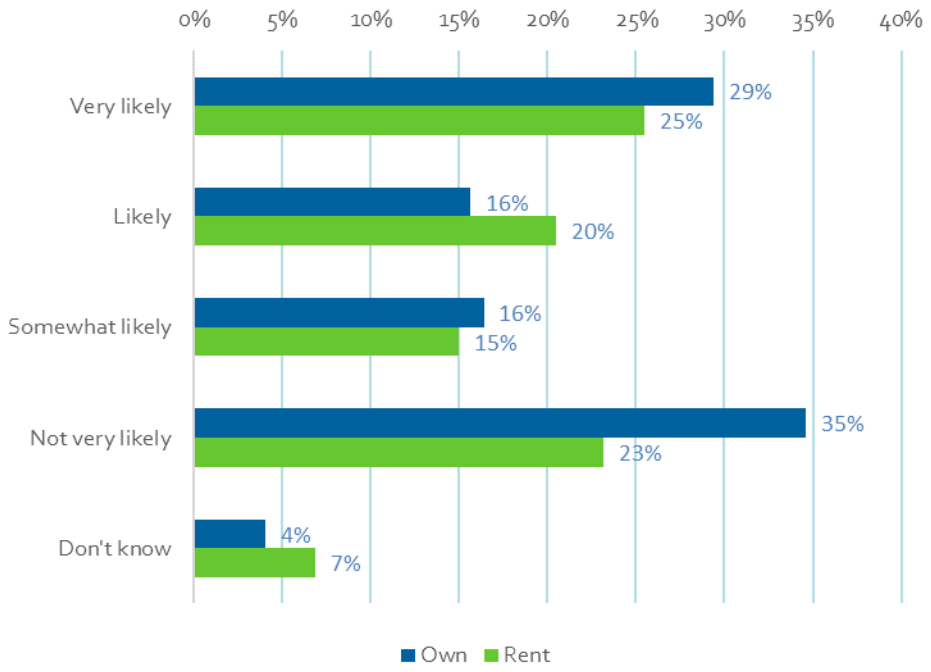
Behavior Change

Opting in to Renewable Energy

Overall, a majority of respondents (62 percent) are aware that they can opt into 100% renewable electricity through their utility. Unfortunately, this knowledge is not accessible to all groups in the City. Only 40 percent of Spanish-speaking respondents and 47 percent of renters are aware of this.

When it comes to likelihood of taking on additional cost to opt into 100% renewable electricity, respondents are pretty evenly split. 46 percent of total respondents are "Very Likely" or "Likely" to opt in, while 48 percent are only "Somewhat Likely" or "Not very Likely" to. The responses of renters versus owners are consistent with the overall result but reveal one slight difference. Fewer renters said they would be "Not very Likely" to opt in to 100% renewable energy (only 23 percent, compared to 35 percent of owners).

Figure 9: Likelihood of Opting In to 100% Renewable Electricity by Housing Tenure

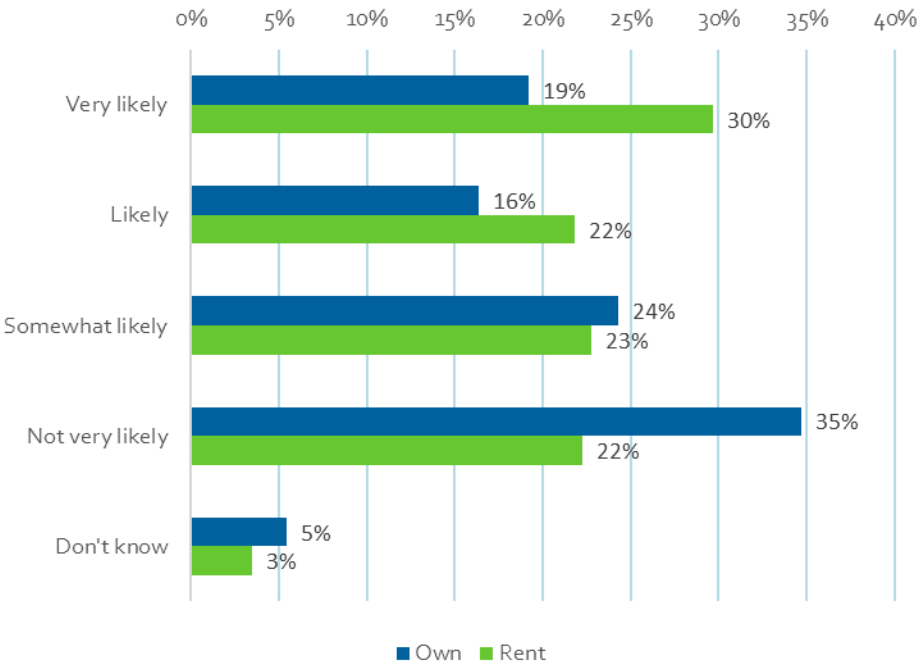


Using Modes of Transportation other than Driving

Respondents who rent their residence use modes other than driving more often than people who own their residence. 46 percent of renters reported that they use active transportation or transit every day or a few times a week, compared to only 32 percent of homeowners. On the other side of the spectrum, 27 percent of renters and 39 percent of homeowners reported that they never use a mode other than driving.

Renters reported more willingness to increase their use of active transportation and transit than homeowners, as 30 percent and 22 percent selecting "Very Likely" or "Likely" respectively (Figure 10).

Figure 10: Likelihood of Increasing Use of Active Transportation and Transit by Housing Tenure



Appendix A: English Survey

Community Survey on Greenhouse Gas Reduction in the City of Ventura

Version: Web

Draft: 7/13/2022

Introduction

The City of Ventura is in the process of developing a Climate Action and Resilience Plan. This exciting initiative is a roadmap for how the community will reduce greenhouse gas emissions and prepare for the potential impacts of natural hazards and climate change on public health, infrastructure, ecosystems, and our economy.

This survey is designed to gather information about community members' opinions about policy options and behaviors to reduce greenhouse gas emissions and help us meet State reduction goals. Your answers are anonymous, and you can also skip any questions. There are no right or wrong answers – we want to know about your perspectives and experiences.

Demographic

This section of this survey asks questions about your personal background. This information helps us understand who responded to the survey and who we still need to talk with in our community.

1. Do you live in the City of Ventura? (Check one)
    a. Yes
    b. No

2. In which part of Ventura do you live? (Check one)
    a. Arundell / North Bank
    b. College Area
    c. Downtown
    d. Eastside / Juanamaria (North of Highway 126)
    e. Eastside / Saticoy (South of Highway 126)
    f. Foothills
    g. Marina
    h. Midtown
    i. Pierpont
    j. Southeast / Montalvo
    k. Thille
    l. Westside / The Avenue
    m. Other part of Ventura

n. I do not live in Ventura

3. Do you own or rent your residence? (Check one)
    a. Own
    b. Rent
    c. Other:____

4. How many years have you lived in the City of Ventura? (Check one)
    a. N/A – I do not live in Ventura
    b. Less than 1 year
    c. 1-5 years
    d. 6-10 years
    e. 11-20 years
    f. 21-40 years
    g. 40 years or more

5. What is your age group? (Check one)
    a. 17 years or younger
    b. 18-29 years
    c. 30-39 years
    d. 40-49 years
    e. 50-59 years
    f. 60-69 years
    g. 70 years or older
    h. Prefer not to answer

6. With which race or ethnic group(s) do you most identify? (select all that apply)
    a. Asian or Asian American
    b. Black or African American
    c. Hispanic or Latino
    d. Central and South American Indigenous
    e. Native American or Alaska Native
    f. Native Hawaiian or other Pacific Islander
    g. White or Caucasian
    h. Two or more races
    i. Another race/ethnicity (please specify)
    j. Prefer not to answer

Policies

This section describes State greenhouse gas reduction goals and a series of policy options to improve energy and water efficiency, reduce air pollution, and reduce greenhouse gas emissions.

7. Do you know the State of California established goals for reducing greenhouse gas emissions? (Check one)
    a. Yes
    b. No

8. How actively should the City work to achieve State greenhouse gas reduction goals? (Check one)
    a. Take bold action to meet or exceed goals
    b. Take moderate action
    c. Take limited action
    d. Don't know

9. To meet State greenhouse gas goals, should the City encourage action through voluntary incentives, establish mandatory requirements, or support a mix of both? (Check one)
    a. Voluntary programs and incentives (e.g., utility rebate programs)
    b. A mix of voluntary incentives and mandatory programs to meet State goals
    c. Mandatory programs and regulations (e.g., require higher-performing new construction)
    d. Don't know

10. The following policy options are efforts the City would have to take to achieve State greenhouse gas emission targets. For each item, rate on a scale of 1 to 5, with 5 being a policy you would strongly support.
    a. Require new homes and businesses to install appliances and fixtures to save energy and water
    b. Prohibit natural gas in new homes and businesses
    c. Incentivize the conversion of gas appliances in existing homes and businesses to be all-electric
    d. Phase in a requirement to convert gas appliances in existing homes and businesses to be all-electric
    e. Promote energy and water efficiency rebates offered by utility companies
    f. Accelerate the phase in of carbon-free electricity before 2045, such as solar and wind
    g. Use a mix of incentives and requirements to reduce car travel and encourage walking, biking, and transit use
    h. Reform parking standards to prioritize parking for bicycles, carshare, and electric vehicles
    i. Incorporate bicycle and pedestrian improvements into roadway projects
    j. Expand publicly-accessible electric vehicle charging
    k. Promote local goods and services, such as local agriculture
    l. Make it easier to do neighborhood projects that promote sharing and reusing, like little libraries

Behaviors and Actions

The following sections asks questions about your behaviors and actions.

11. Are there steps you, your household, your landlord, or others have taken around your home to reduce energy use? (check all that apply)
    a. Used energy efficient light bulbs
    b. Installed a tankless water heater
    c. Purchased energy efficient appliances
    d. Improved insulation
    e. Installed energy efficient windows
    f. Conducted an energy audit
    g. None of the above
    h. Other:_____

12. Are there steps you, your household, your landlord, or others have taken around your home to reduce water use? (check all that apply)
    a. Installed smart, low-water irrigation
    b. Planted drought-tolerant species
    c. Got rid of our lawn
    d. Reduced landscape watering
    e. Installed water efficient fixtures (e.g. toilets, faucets, and showerheads)
    f. Re-use water from showers, laundry, and other household sources
    g. None of the above
    h. Other:_____

12. Are there other steps you and your family have taken to help the environment? (check all that apply)
    a. Composted food scraps
    b. Grew food in your backyard
    c. Recycled glass & plastic
    d. Used reusable bags
    e. Hang dried clothes
    f. Took shorter showers
    g. Shopped at thrift stores
    h. Carpooled to work
    i. Other: _____

13. Do you know that you can opt into 100% renewable electricity through your utility? (Check one)
    a. Yes
    b. No

14. Building energy use accounts for nearly one-third of the City's greenhouse gas emissions. How likely would you be to take on a modest additional cost to opt in to 100% renewable and reliable electricity from your utility to help reduce emissions and meet State greenhouse gas goals? (Check one)
    a. Very likely
    b. Likely
    c. Somewhat likely
    d. Not very likely
    e. Don't know

15. How often do you walk, bike, scoot, or take the train or bus instead of driving? (Check one)
    a. Every day
    b. A few times a week
    c. About once a week
    d. A few times a month
    e. Never

16. Transportation accounts for nearly half of the City's greenhouse gas emissions. How likely would you be to increase the amount of walking, biking, scooting, and train or bus trips to help reduce emissions and meet State greenhouse gas goals? (Check one)
    a. Very likely
    b. Likely
    c. Somewhat likely
    d. Not very likely
    e. Don't know

Thank you for participating in the survey! To learn more about the General Plan and Active Transportation, please visit https://www.planventura.com/ and https://www.activeplanventura.com/ for more details and sign-up for the mailing list.

Introduction for the PHONE or IN PERSON

Hi, my name is ____ and I am a staff member / project team member working with the City of Ventura. We are doing a special survey about policy options and behaviors to reduce greenhouse gas emissions.

This survey should take about fifteen minutes. We appreciate your honest responses. If we ask a question that you do not want to answer, you don't need to do so. All your answers will be kept confidential. Any questions?

Appendix B: Spanish Survey

Encuesta comunitaria sobre la reducción de gases de efecto invernadero en la ciudad de Ventura

Versión: Web

Draft: 7/14/2022

Introducción

La ciudad de Ventura está desarrollando un Plan de Acción y Resiliencia Climática. Esta interesante iniciativa es una hoja de ruta sobre cómo la ciudad reducirá las emisiones de gases de efecto invernadero y se preparará para los posibles impactos de los riesgos naturales y el cambio climático en la salud pública, las infraestructuras, los ecosistemas y nuestra economía.

Esta encuesta está diseñada para recabar información sobre las opiniones de los miembros de la comunidad acerca de las opciones políticas y comportamientos para reducir las emisiones de gases de efecto invernadero y ayudarnos a cumplir los objetivos de reducción del Estado de California. Sus respuestas son anónimas y también puede omitir cualquier pregunta. No hay respuestas correctas o equivocadas – queremos conocer sus perspectivas y experiencias.

Demografía

En esta sección de la encuesta se hacen preguntas sobre sus datos personales. Esta información nos ayuda a entender quienes han respondido a la encuesta y con quienes tenemos que seguir conversando en nuestra comunidad.

1. ¿Vive usted en la ciudad de Ventura? (Marque uno)
    a. Sí
    b. No

2. ¿En qué parte de Ventura vive? (Marque uno)
    a. Arundell / North Bank
    b. College Area
    c. Downtown
    d. Eastside / Juanamaria (Norte de Highway 126)
    e. Eastside / Saticoy (Sur de Highway 126)
    f. Foothills
    g. Marina
    h. Midtown
    i. Pierpont
    j. Southeast / Montalvo
    k. Thille

l. Westside / The Avenue
m. Otra parte de Ventura
n. No vivo en Ventura

3. ¿Es usted dueño de su residencia o alquila? (Marque uno)
    a. Dueño
    b. Alquilo
    c. Otro: ____

4. ¿Cuántos años lleva viviendo en la ciudad de Ventura? (Marque uno)
    a. N/A – No vivo en Ventura
    b. Menos de 1 año
    c. 1-5 años
    d. 6-10 años
    e. 11-20 años
    f. 21-40 años
    g. 40 años o mas

5. ¿Cuál es su grupo de edad? (Marque uno)
    a. 17 años o menos
    b. 18-29 años
    c. 30-39 años
    d. 40-49 años
    e. 50-59 años
    f. 60-69 años
    g. 70 años o mas
    h. Prefiero no responder

6. ¿Con cuál raza o grupo(s) étnico(s) se identifica más? (seleccione todos los que correspondan)
    a. Asiático o Asiático Estadounidense
    b. Negro o Afroamericano
    c. Hispano o Latino
    d. Indígenas de América Central y del Sur
    e. Nativo Americano o Nativo de Alaska
    f. Nativo de Hawái u otra Isla del Pacífico
    g. Blanco o Caucásico
    h. Dos o más razas
    i. Otra raza/etnia (por favor, especifique)
    j. Prefiero no responder

Políticas

Esta sección describe los objetivos estatales para reducir de gases de efecto invernadero y una serie de opciones políticas para mejorar la eficiencia energética y del agua, reducir la contaminación atmosférica y reducir las emisiones de gases de efecto invernadero.

7. ¿Sabe que el Estado de California ha establecido objetivos para reducir las emisiones de gases de efecto invernadero? (Marque uno)
    a. Sí
    b. No

8. ¿En qué medida debe trabajar la Ciudad para alcanzar los objetivos estatales de reducción de gases de efecto invernadero?
    a. Tomar medidas audaces para alcanzar o superar los objetivos
    b. Adoptar acciones moderadas
    c. Tomar medidas limitadas
    d. No sé

9. Para cumplir los objetivos estatales, ¿debe la Ciudad promover acciones mediante incentivos voluntarios, establecer requisitos obligatorios o apoyar una combinación de ambos?
    a. Incentivos y programas voluntarios (por ejemplo, programas de reembolso de servicios públicos)
    b. Una combinación de incentivos voluntarios y programas obligatorios para cumplir los objetivos del Estado
    c. Programas y reglamentos obligatorios (por ejemplo, exigir que construcción nueva sea de mayor rendimiento)
    d. No sé

10. Las siguientes opciones políticas son esfuerzos que la Ciudad tendrá que realizar para alcanzar los objetivos estatales de emisiones de gases de efecto invernadero. Para cada punto, evalúe en una escala de 1 a 5, 5 siendo una política que apoyaría firmemente.
    a. Requerir que los nuevos hogares y empresas instalen aparatos y accesorios que ahorren energía y agua
    b. Prohibir el gas natural en los nuevos hogares y negocios
    c. Incentivar la conversión de los aparatos de gas en los hogares y negocios existentes para que sean totalmente eléctricos
    d. Introducir gradualmente el requisito de convertir los aparatos de gas en los hogares y negocios existentes para que sean totalmente eléctricos
    e. Promover los reembolsos por la eficiencia energética y del agua ofrecidos por las empresas de servicios públicos
    f. Acelerar la introducción progresiva de electricidad libre de carbono antes de 2045, como la energía solar y eólica
    g. Utilizar una combinación de incentivos y requisitos para reducir los viajes en coche y promover los desplazamientos a pie, en bicicleta y en transporte publico

h. Reformar las normas de estacionamiento para dar prioridad al estacionamiento de bicicletas, vehículos compartidos y vehículos eléctricos
i. Incorporar mejoras para bicicletas y peatones en los proyectos de carreteras
j. Ampliar el acceso público a las estaciones de recarga para vehículos eléctricosPromover los bienes y servicios locales, como la agricultura local
k. Facilitar la realización de proyectos vecinales que promueven el intercambio y la reutilización, como las pequeñas bibliotecas

Comportamientos y acciones

En la siguiente sección se hacen preguntas sobre sus comportamientos y acciones.

11. ¿Existen medidas que usted, su hogar, su casero u otras personas han tomado en su casa para reducir el uso de energía? (Marque todas las que correspondan)
    a. Utilizar bombillas de bajo consumo
    b. Ha instalado un calentador de agua sin tanque
    c. Ha comprado electrodomésticos de bajo consumo
    d. Ha mejorado el aislante
    e. Instalación de ventanas energéticamente eficientes
    f. Realización de una auditoria energética
    g. Ninguna de las anteriores
    h. Otro: _____

12. ¿Existen medidas que usted, su hogar, su casero u otras personas han tomado en su casa para reducir el uso de agua? (Marque todas las que correspondan)
    a. Instalación de un sistema de riego inteligente de bajo consumo de agua
    b. Plantado especias tolerantes a la sequia
    c. Nos hemos deshecho del césped
    d. Hemos reducido el riego de los jardines
    e. Instalamos accesorios de bajo consumo de agua (por ejemplo, inodores, grifos y duchas)
    f. Reutilizar el agua de las duchas, la lavandería y otras fuentes domesticas
    g. Ninguna de las anteriores
    h. Otro: _____

12. ¿Hay otras medidas que usted y su familia han tomado para ayudar al medio ambiente? (Marque todas las que correspondan)
    a. Usar los restos de alimentos como abono o compost
    b. Cultivar alimentos en su patio trasero
    c. Reciclar vidrio y plástico
    d. Usar bolsas reutilizables
    e. Colgar la ropa para secar
    f. Tomar duchas más cortas

g. Comprar en tiendas de segunda mano
h. Compartir el coche para ir al trabajo
i. Otro: _____

13. ¿Sabe que puede optar por la electricidad 100% renovable a través de su compañía eléctrica?
    a. Sí
    b. No

14. El uso de energía en los edificios representa casi un tercio de las emisiones de gases de efecto invernadero de la ciudad. ¿Qué probabilidad tendría de asumir un modesto costo adicional para optar por una electricidad 100% renovable y fiable de su empresa de servicios públicos para ayudar a reducir las emisiones y cumplir los objetivos estatales de gases de efecto invernadero? (Marque una)
    a. Muy probable
    b. Probablemente
    c. Algo probablemente
    d. No muy probable
    e. No sé

15. ¿Con que frecuencia camina, anda en bicicleta, en patinete o en autobús en lugar de conducir? (Marque una)
    a. Todos los días
    b. Unas cuentas veces a la semana
    c. Más o menos una vez a la semana
    d. Unas cuantas veces al mes
    e. Nunca

16. La transportación representa casi la mitad de las emisiones de gases de efecto invernadero de la ciudad. ¿Qué probabilidad tendría de aumentar la cantidad de viajes a pie, en bicicleta, en patinete y en tren o autobús para ayudar a reducir las emisiones y cumplir los objetivos estatales de gases de efecto invernadero? (Marque una)
    a. Muy probable
    b. Probable
    c. Algo probable
    d. No muy probable
    e. No sé

Gracias por participar en la encuesta! Para saber más sobre el Plan General y el Plan de Transporte Activo, visite https://www.planventura.com/ y https://www.activeplanventura.com/ para obtener más detalles e inscribirse en la lista de correo.

Introducción por TELEFONO o EN PERSONA

Hola, mi nombre es ___ y soy un miembro del personal de la ciudad del Ventura / del proyecto trabajando con la ciudad de Ventura. Estamos haciendo una encuesta especial sobre opciones políticas y comportamientos para reducir las emisiones de gases de efecto invernadero.

Esta encuesta debería durar unos quince minutos. Agradecemos sus respuestas sinceras. Si le hacemos una pregunta a la que no quiere responder, no es necesario que lo haga. Todas sus respuestas serán confidenciales. ¿Tiene alguna pregunta?

Community Open Houses on Climate Change: Summary of Results

August 2022

CITY OF VENTURA
OUR VISION, OUR FUTURE

Contents

In-Person Open Houses

In-Person Open House Overview

The Climate Action and Resilience Plan (CARP) of Ventura comprises of a new vision for climate action, which includes quantitative goals, tracking metrics, and identification of programs/actions that reduce greenhouse gas emissions and increase resilience. The CARP is a section of the Ventura General Plan, a state-required policy document that establishes a vision for Ventura. California state law requires that a General Plan address eight core topics formally known as "elements" such as housing, economic development, and climate change.

To gain insight into the Ventura community's perspectives on climate action, the City held three open-house style events within the months of July and August. We summarize the ideas shared below and rely on them to inform the City of Ventura Climate Adaptation and Resilience Plan. Materials were provided in English and Spanish, and Spanish-speaking staff were present to engage with residents.

The first two open houses were held in-person at the Ventura City Hall Atrium on July 13th, 2022 and July 14th, 2022. The last open house was held via Zoom on August 11th, 2022. A total of 45 people attended the in-person open houses and 35 attended the virtual event.

Links to the open house materials can be found here.

Participants at the Ventura CARP Open House

Participants interacting with Open House station

Open House Stations

The open house consisted of 7 stations about different topics related to greenhouse gas mitigation and climate adaptation, with detailed descriptions about why each topic matters: Climate Change 101, Visioning for a Climate Ready Ventura, Clean Energy + Buildings, Transportation + Land Use, Solid Waste, Water, and Climate Hazards. Each station had options to record ideas and opinions via sticky notes, voting with stickers for climate-related policies and priorities, and visions. Pictures of the boards used at the In-Person Open Houses can be found in Appendix A.

Station 1: Climate Change and CARP Overview

The first station provided background on what climate change and greenhouse gas emissions are. It also included a summary of what the CARP is, with information such as its components, key terms, and project schedule. Lastly, this station contained a board illustrating the city's communitywide GHG emissions and what they mean for the CARP 's emissions reduction target.

Station 2: My Vision for a Climate Ready Ventura Is…

At station 2, community members were asked to respond to the open-ended prompt: My Vision for a Climate Ready Ventura is… The following summarizes themes from the responses.

Responses related to **mobility** focused on safe, comfortable active transportation (e.g., walking and biking) and transit use including:

- Better transit and less driving
- Keep Main Street closed to traffic and improve infrastructure surrounding the area
- More "open streets" that are car-free and encourage biking and walking
- Separate bike lanes on city streets
- Implement safe routes to school, and lowered speed limits between 7am to 3pm
- Construct electric a light-rail or trolley along Main Street
- Diverse e-mobility options (scooters, bikes, etc.)

Responses related to **energy** focused on transition from natural gas to electricity and renewable energy production including:

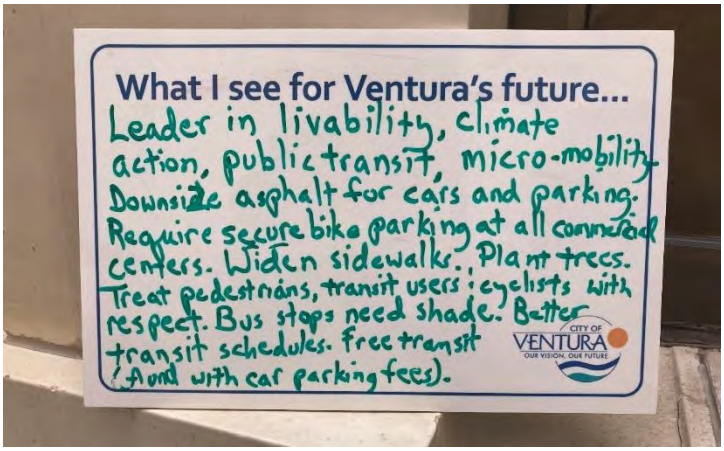
- Electrification of new buildings instead of gas in new constructions
- Distributed solar and microgrids
- Move the Southern California Gas compressor out of Ventura

Responses related to **ecology and open space** focused on trees and urban resilience measures including:

- Implement more projects that mitigate natural hazards and do not cause long-term harm like the Shoreline Retreat-Surfrider Project
- Green incentives for mature trees on residential properties
- Street medians filled with trees

Responses related to **the plan focus and framing** included:

- Environmental justice at the center of the CARP
- We should frame the plan as "Climate Saving" not just "Climate Ready" i.e. not just protecting ourselves from climate hazards
- Support local hillside nonprofits in Ventura



Residents' visions for Climate Ready Ventura

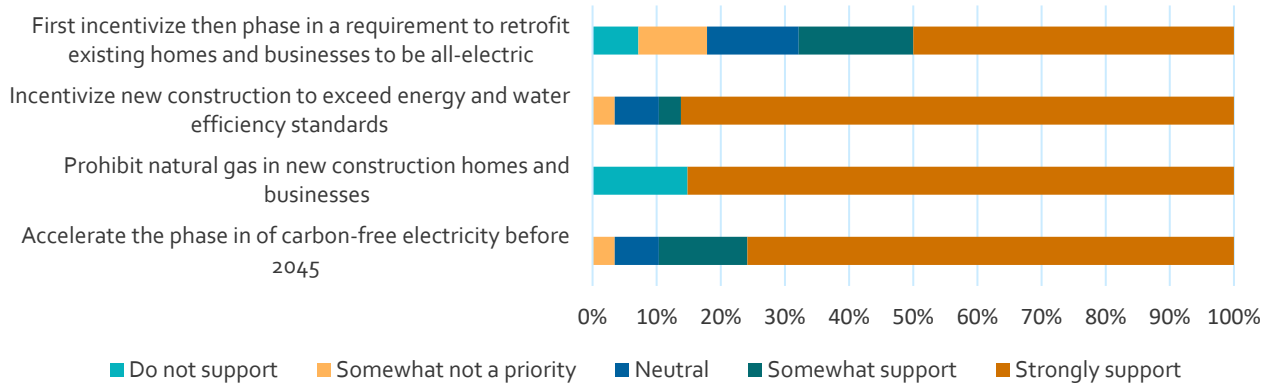
Station 3: Clean Energy + Buildings

At the Clean Energy + Building Station, participants rating a series of policy option the City would have to take to achieve State greenhouse gas emission targets on a scale of 1 (lowest rated) to 5 (highest rated), identified challenges to transitioning to efficient and/or all-electric buildings, and provided other ideas to reduce energy and building emissions.

Policy Rating

Open house participants strongly supported measures to incentivize new construction (86%) to exceed efficiency standards, prohibit natural gas in new construction (85%), and accelerate the transition to carbon free electricity (75%). Approximately 2/3 of respondents strongly supported or somewhat supported phasing in a requirement for existing homes to be all electric.

Figure 1: Ratings for Clean Energy and Building Policy Options (n = 29)



Challenges to All-Electric Buildings

Community members identified the following challenges to transition to more efficient and all-electric buildings:

- Permit timelines and upfront costs
- The need for significant grant money to help with retrofits
- The gas industry's misinformation and lobbying- including the hold they have on the Ventura compression station

Other Ideas to Reduce Energy and Building Emissions

Community members identified the following ideas to reduce energy and building emissions, organized by topic.

Responses related to **renewable energy** focused on:

- Solar panels on city property for community use; for example, parking lots
- Add a carbon tax to properties based on their carbon footprint
- Increase dependency on solar energy

When it came to **building improvements**, participants identified the following:

- Implement a carbon budget for new buildings and permits
- Proper ventilation and discourage air conditioning use
- Restaurants getting rid of gas appliances

Ideas relevant to **urban forestry and trees** called for more shade and tree maintenance:

- Maintain existing and new trees
- Require urban forestry on rooftops of commercial
- More shade trees and reflective roofs
- Adopt a historic tree ordinance

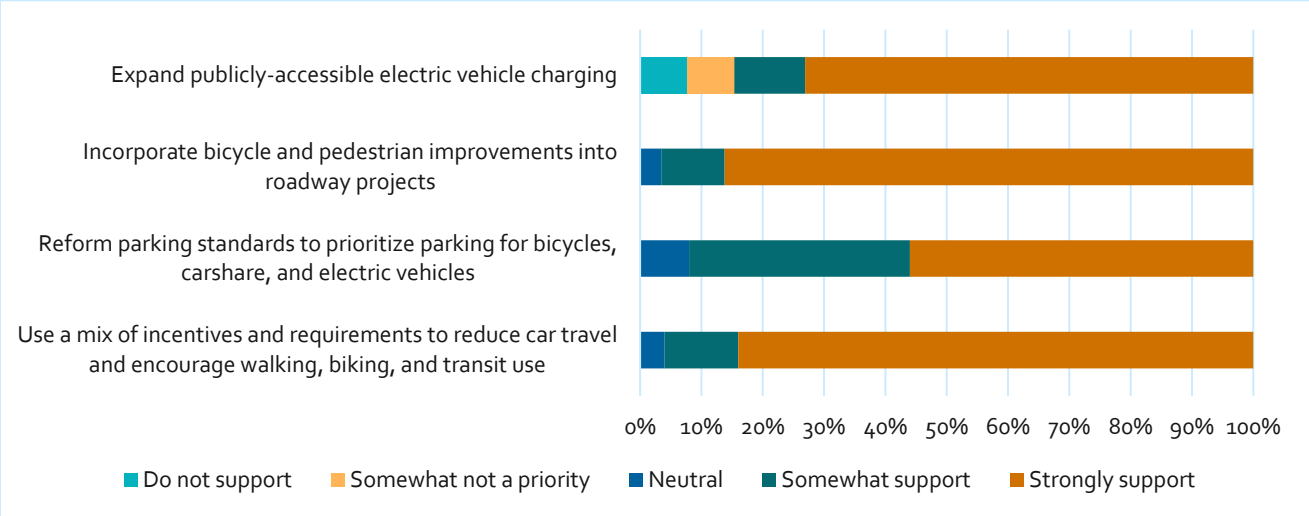
Station 4: Transportation + Land Use

At the Transportation + Land Use Station, participants rated a series of policy options the City would have to take to achieve State greenhouse gas emission targets on a scale of 1 (lowest rated) to 5 (highest rated). In consideration transportation being a major contributor of greenhouse gas emissions, participants identified challenges in shifting away from car use as a primary source of transportation, as well as ideas on reaching the goals.

Policy Rating

Open house participants strongly supported measures to incentivize active transportation across the city. The expansion of electric vehicle charging (72%), bike and pedestrian improvements to existing roads (85%), and parking standard reforms (55%) were all generally strongly supported. About 4/5 participants strongly supported the implementation of a mix of incentives that reduce car travel and encourage active transportation options.

Figure 2: Ratings for Transportation and Land Use Policy Options (n = 29)



Challenges to Active Transportation

Community members identified the following barriers exist to normalizing active transportation in Ventura:

- No e-mobility options available
- Lack of fully protected bike lanes
- The streets are not safe for cyclists or walkers. Ventura prioritizes high car speeds.
- Sidewalk widths are too narrow
- Sidewalk obstructions are in the way

Other Ideas to Reduce Transportation Related Emissions

The following are ideas shared to increase active transportation in the city and reduce transportation related emissions:

- For walkers – shade trees along all sidewalks
- Good-paying jobs within the city
- Requirement for wider sidewalks with no impediments
- Carpool parking by freeways
- Connect all bike lanes
- Grants/rebates for bike purchases (and regular use)
- More resources, education, community promoters for electric vehicle + bike use in the city
- Transit that goes up to the hills

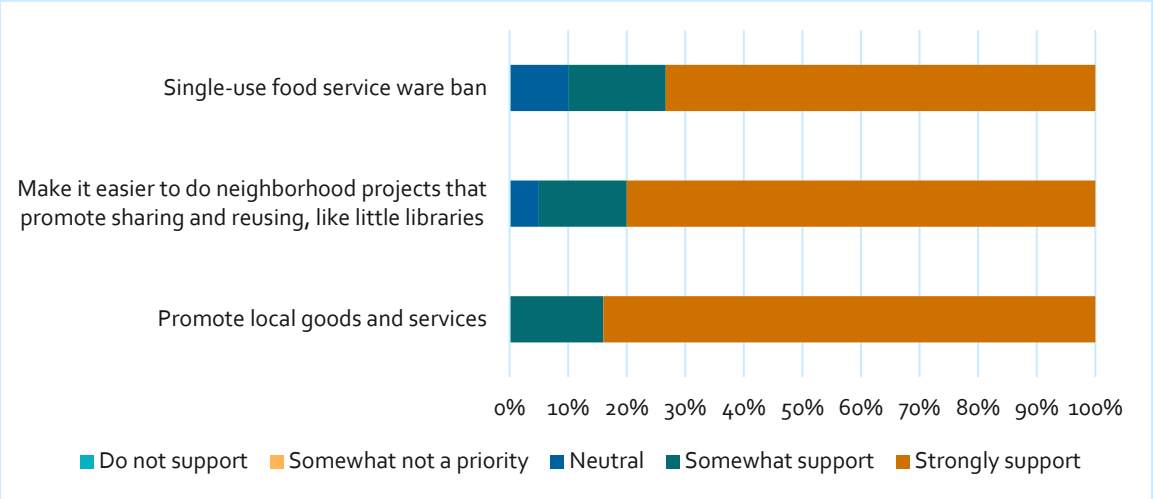
Station 5: Solid Waste

The fifth climate-related station at the open house had information about solid waste in the city. Community members rated solid waste mitigation policy options on a scale of 1 (lowest rated) to 5 (highest rated). Furthermore, participants shared barriers that exist to ensuring that solid waste originating in Ventura is reduced, as well as ideas related to solid waste reduction.

Policy Rating

Open house participants strongly supported all three measures to incentivize the practice of reusing goods and materials. The establishment of a food service ware ban (72%), projects that promote sharing and reusing (80%), and promoting local goods and services that support the reuse of goods (83%) were all of interest to open house visitors.

Figure 3: Ratings for Solid Waste Policy Options (n = 29)



Challenges to Reducing Solid Waste

Participants identified the following challenges or barriers that exist to reducing waste and using less plastic:

- Abundance of single-use products, especially bottles
- Getting folks to participate in waste-reduction practices
- Lack of place where you can reuse plastic; the Refill Shoppe in Ventura is great, but not cheap
- Recycling can come at a high cost to low-income consumers, financial and timewise

Other Ideas Related to Reducing Solid Waste

Ideas shared to reduce solid waste emissions include:

- Modeling recycling programs like those at Harrison's, where recyclables are picked up weekly and their kitchen waste program
- A ban on single-use items should be analyzed though an equity lens- considering people who may need rely on single use plastics
- Banning single-use plastic straws or cups

Station 6: Water

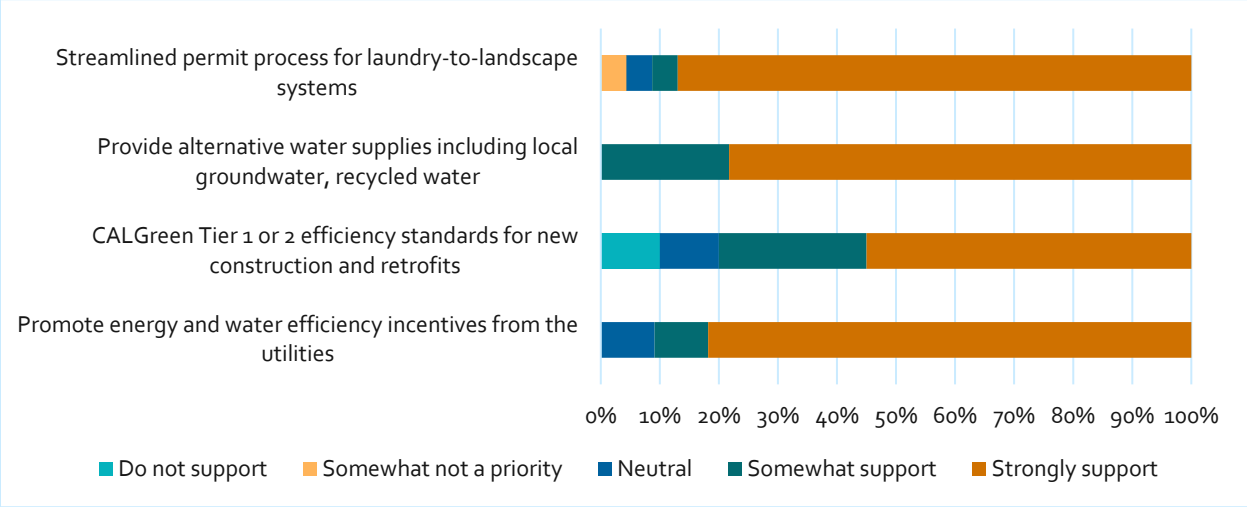
Water conservation is a major issue in the city of Ventura, as the region has a vast agricultural industry and is subject to drought conditions impacting the rest of the state of California. Participants were given the opportunity to rate policy options about water use, as well as provide insight on what challenges exist to conserving water in Ventura.

Policy Rating

Community members rated policy options that are efforts the City would have to take to achieve water conservation targets. Each policy was rated on a scale of 1 (lowest rated) to 5 (highest rated). Open house participants strongly supported all four options to conserve local water in Ventura. The establishment of

a streamlined laundry-to-landscape permit process (88%), alternative water supplies (79%), and CAL Green Trier 1 and 2 efficiency standards (55%) were all of interest to open house visitors. Furthermore, 4/5 visitors agreed that the promotion of energy and water utility incentives would be effective.

Figure 4: Ratings for Water Conservancy Policy Options (n = 29)



Challenges to Water Conservation

These are the challenges related to conserving water identified by community members:

- Disproportionate impacts on agriculture
- No enforcement of wasting water

Other Ideas Related to Conserving Water

- Return snow melt to rainwater
- Expand recycled water to irrigation for trees
- Stop outsourcing park maintenance, we need more staff to monitor landscape and water usage
- We must get water to the medians with innovative landscape design
- Encourage low water use crops
- Remove grass lawns from city property not used for recreation
- Resources dedicated to creating a "protecting water" culture (education, incentives, etc.)
- Incentivize lawn removal

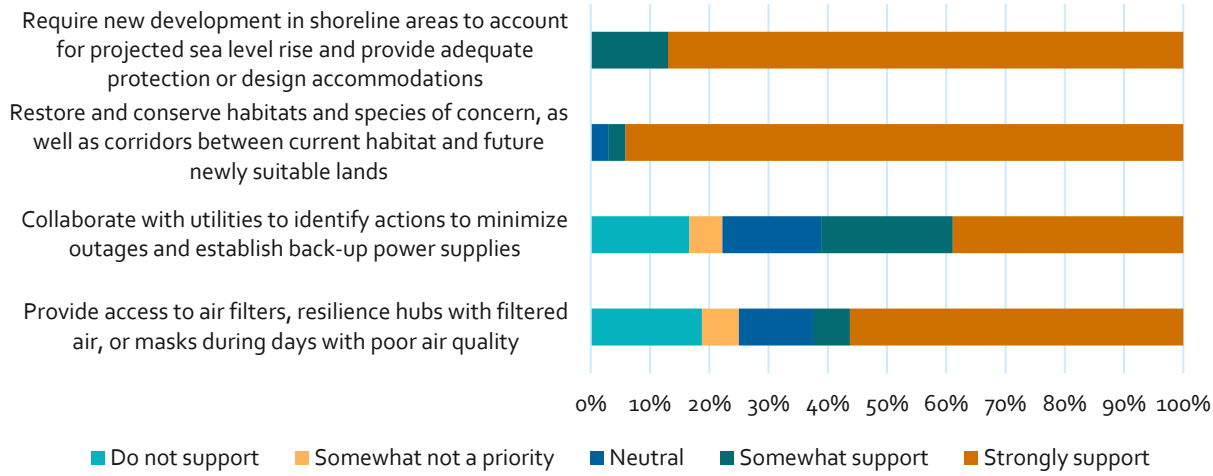
Station 7: Climate Hazards

The final open house station on Climate Hazards prompted community members to weigh in on policies that ensure that the region achieves State greenhouse gas emission targets. Furthermore, they discussed barriers in achieving these goals as well as ideas that the City should explore.

Policy Rating

Community members rated policy options that are efforts the City would have to take to mitigate the potential for climate hazards. Each policy was rated on a scale of 1 (lowest rated) to 5 (highest rated). Open house participants strongly supported policies related to strict protection measures for new shoreline developments (85%) and the restoration and conservation of natural habitats (93%).

Figure 5: Ratings for Water Conservancy Policy Options (n = 29)



Challenges to Climate Hazard Adaptation

These are the challenges related climate hazard adaptation identified by community members:

- Reliance on natural gas
- Region is susceptible to earthquakes landslides, wildfires that can cause line leaks and explosions
- There is no environmentalist on the city council

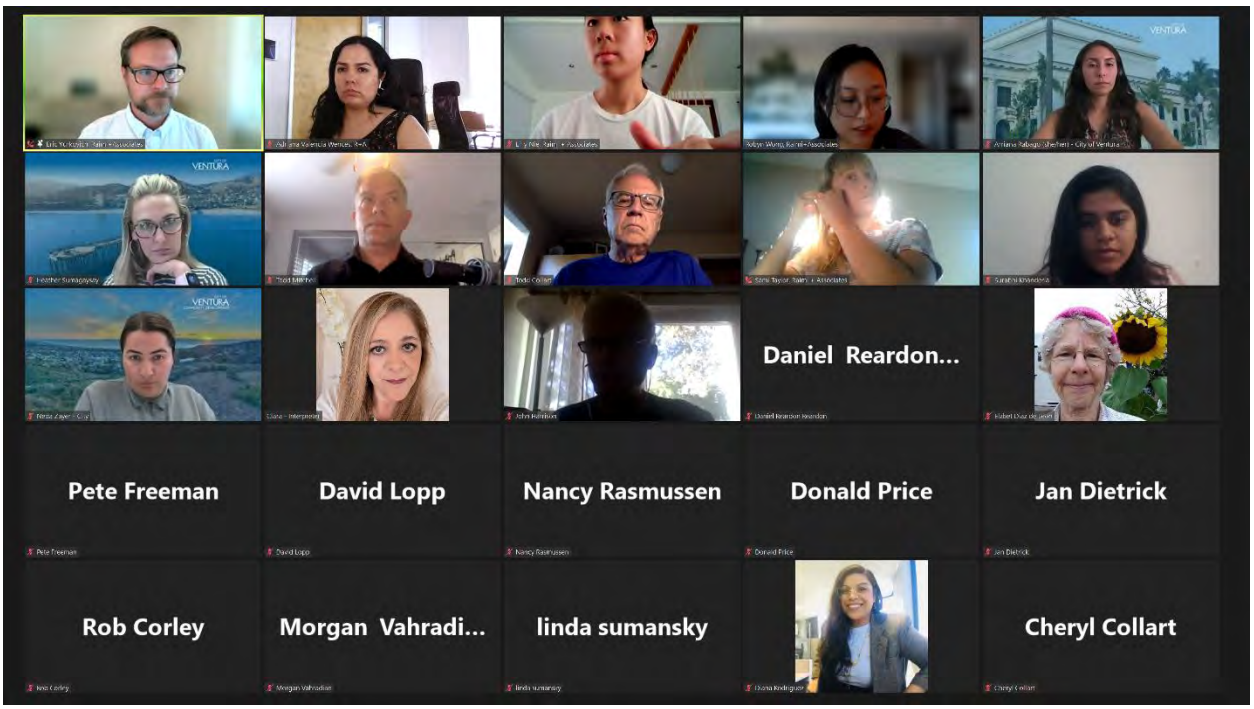
Other Ideas Related to Climate Hazard Adaptation

- Plan for moving the fairgrounds elsewhere in the county
- Redevelop land with sea level in mind
- We could create a nifty shoreline that keeps tourism vital

Virtual Open House

Virtual Open House Overview

The last open house was held via Zoom on August 11th, 2022, with 35 people in attendance. The Virtual Open House started with a brief presentation from the City and consultant team that summarized what climate change is, what the CARP is, the communitywide GHG inventory, and GHG reduction measures. The Virtual Open House interactive portion consisted of various stations like those presented at the in-person open houses a few weeks prior. Participants were asked to share ideas and barriers to a wide range of topics relevant to Climate Action and Resiliency, including transportation, water, and energy. On-demand Spanish interpretation was available for the duration of the event, and the interactive boards contained both English and Spanish text. Pictures of the interactive white boards used in the Virtual Open House can be found in Appendix B.



Participants at the Virtual CARP Open House

Station 1: Clean Energy + Buildings

Challenges to All-Electric Buildings

- Unclear permitting process for laundry-to-landscape and greywater - clients interested but lack of info
- Lack of understanding at City council level
- Need a program to help maintain enrollment in CPA 100% tier
- City needs to identify interests and lobby at the state level to get incentives and laws to allow beneficial tech

Other Ideas on All-Electric Buildings

- City should review Measure O monies to provide funding for mitigation programs
- Incentives need to be designed to support the cost differences between SFR and MF
- Greywater opportunities could provide work for former NG plumbers
- Require solar PV and solar thermal if not electric
- Mandate EV to grid bidirectional chargers - Ford F150 could serve as a battery to power your home - advocate to the CPUC

Station 2: Water

Multi-Benefit Water Strategies

- Landscaping choices that sequester carbon and are drought-friendly
- Lower Ventura River Groundwater Basin restoration and clean up

Station 3: Transportation + Land Use

Challenges to Active Transportation

- Street design really favors cars
- Walking / biking is difficult in most parts of Ventura
- Street parking takes up too much space that can be used for biking
- Need heat island mitigation measures
- Need DC chargers to support fast charging. Need to go beyond Level 2 chargers - need FAST chargers

Other Ideas Related to Transportation Emissions Mitigation

- More mass transit: it is currently not accessible enough
- Public education on sharing the road together
- Electrified postal fleet
- More funding for the Ventura Bike Hub
- Intentional communities formed around transit needs
- Minibus programs for seniors and youth
- Bike share

Station 4: Solid Waste

Ideas Related to Solid Waste

- Bagging food waste
- Food waste recycling at large events and facilities
- Use recycled plastic pallets instead of wooden pallets
- Reusable packaging/containers
- Higher cost of solid waste collection to disincentivize waste generation

Station 5: Climate Hazards

Ideas Related to Climate Hazards

- Establish cooling areas for people to take refuge
- Repave with cool pavements and plant trees
- Do not allow development of houses in the shoreline at all
- Need leadership at Council, school boards, special districts who will actively engage with the topic (and educate themselves
- Motivating/engaging with youth will produce the big political change
- Get back to basics: Natural habitat corridors, remediation, gardens, homesteads will help create a healthy environment and connected ecosystem+ community
- Make sure there's enough funding to ensure parks, rivers, and beachfront are maintained for public benefit
- More education at community colleges to help people get into the green job market (solar install, tankless water heaters, etc.).
- Partner and City should do a public literacy campaign for all ages, and especially students
- See City of Berkeley
- Pair CARP with budget/incentives
- Public maps of where the hazard areas are

Appendix A: In-Person Open House Boards

Figure A - 1. Station 2

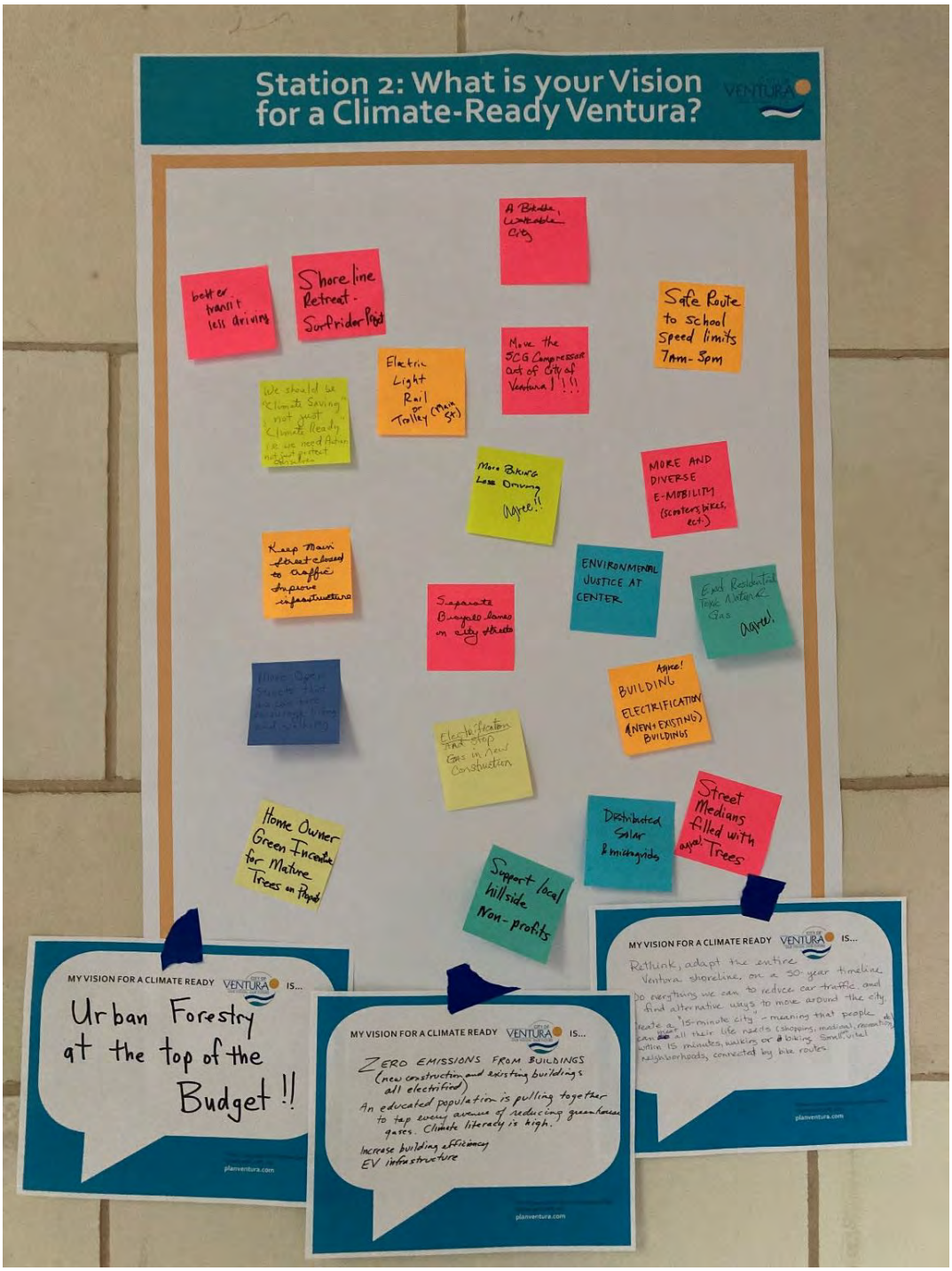


Figure A - 2. Station 3

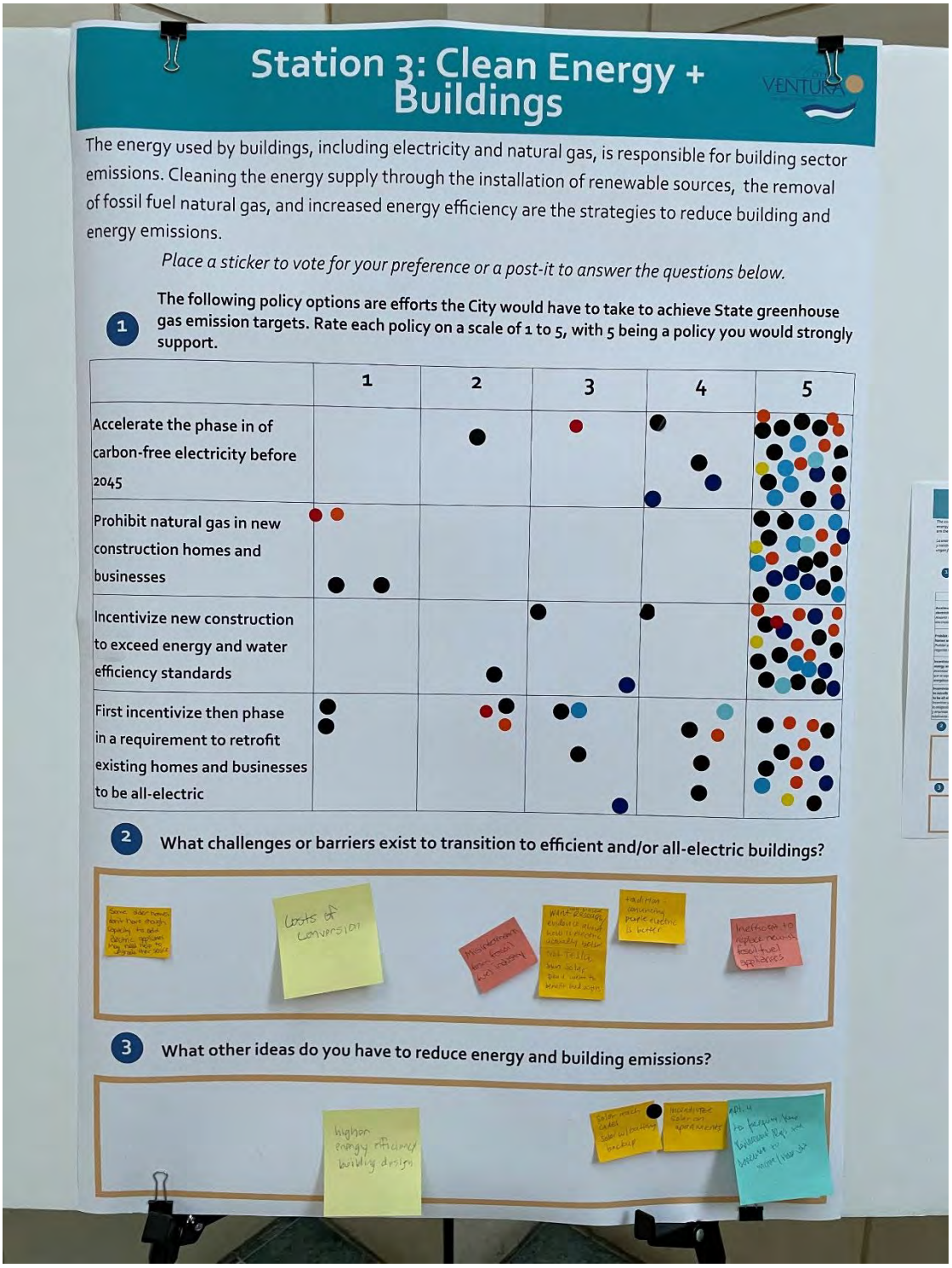


Figure A - 3. Station 4

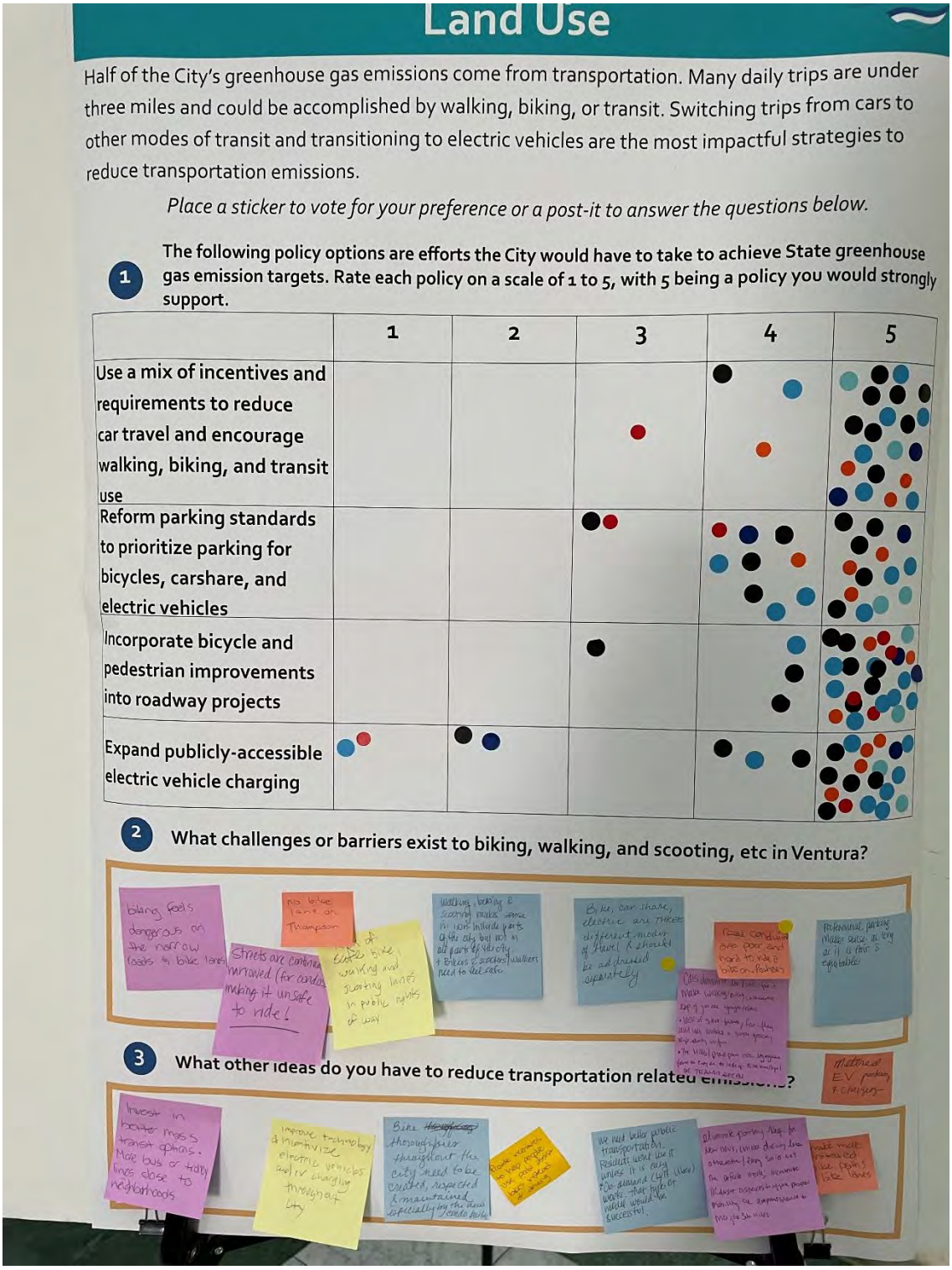
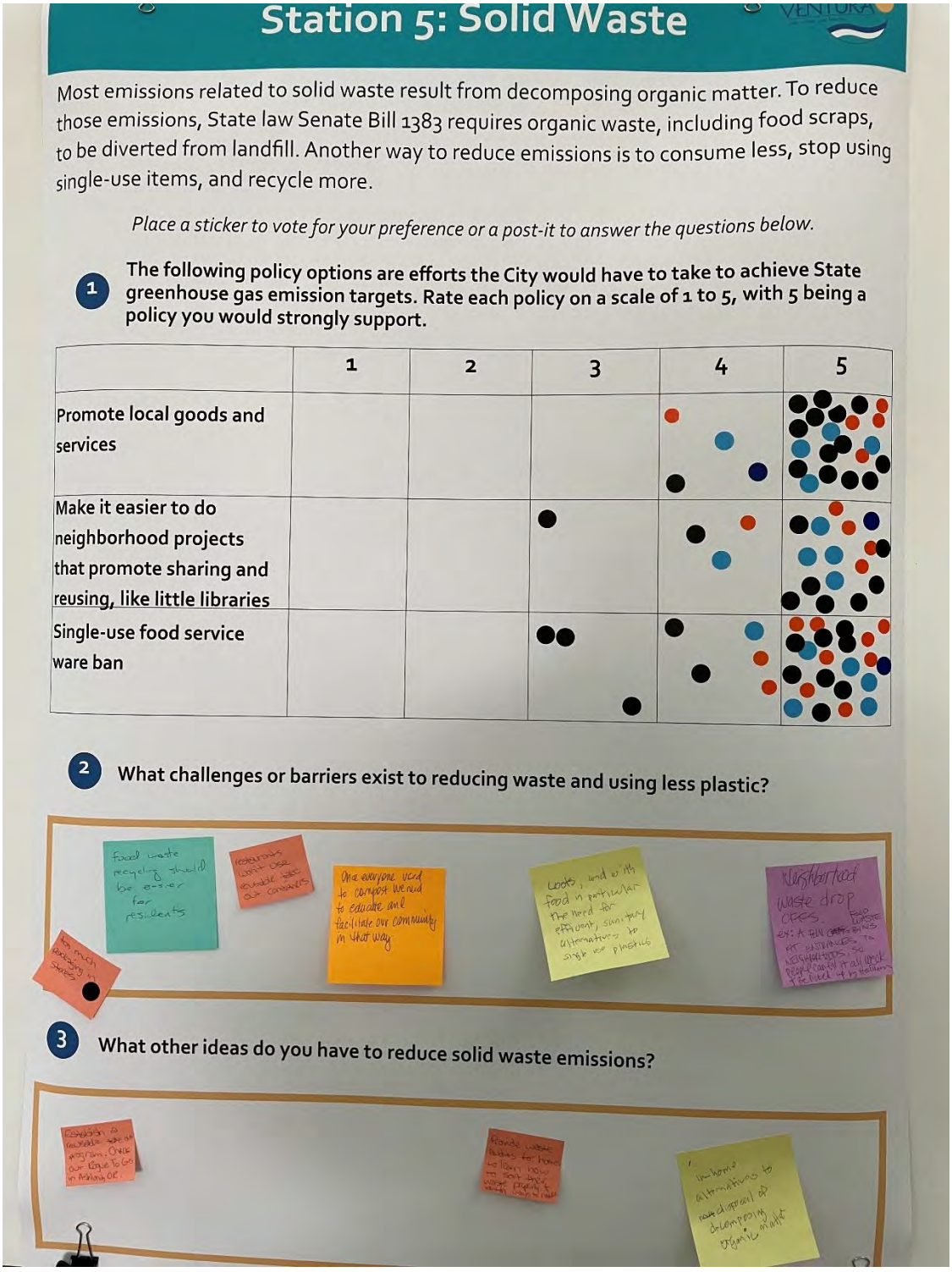


Figure A - 4. Station 5



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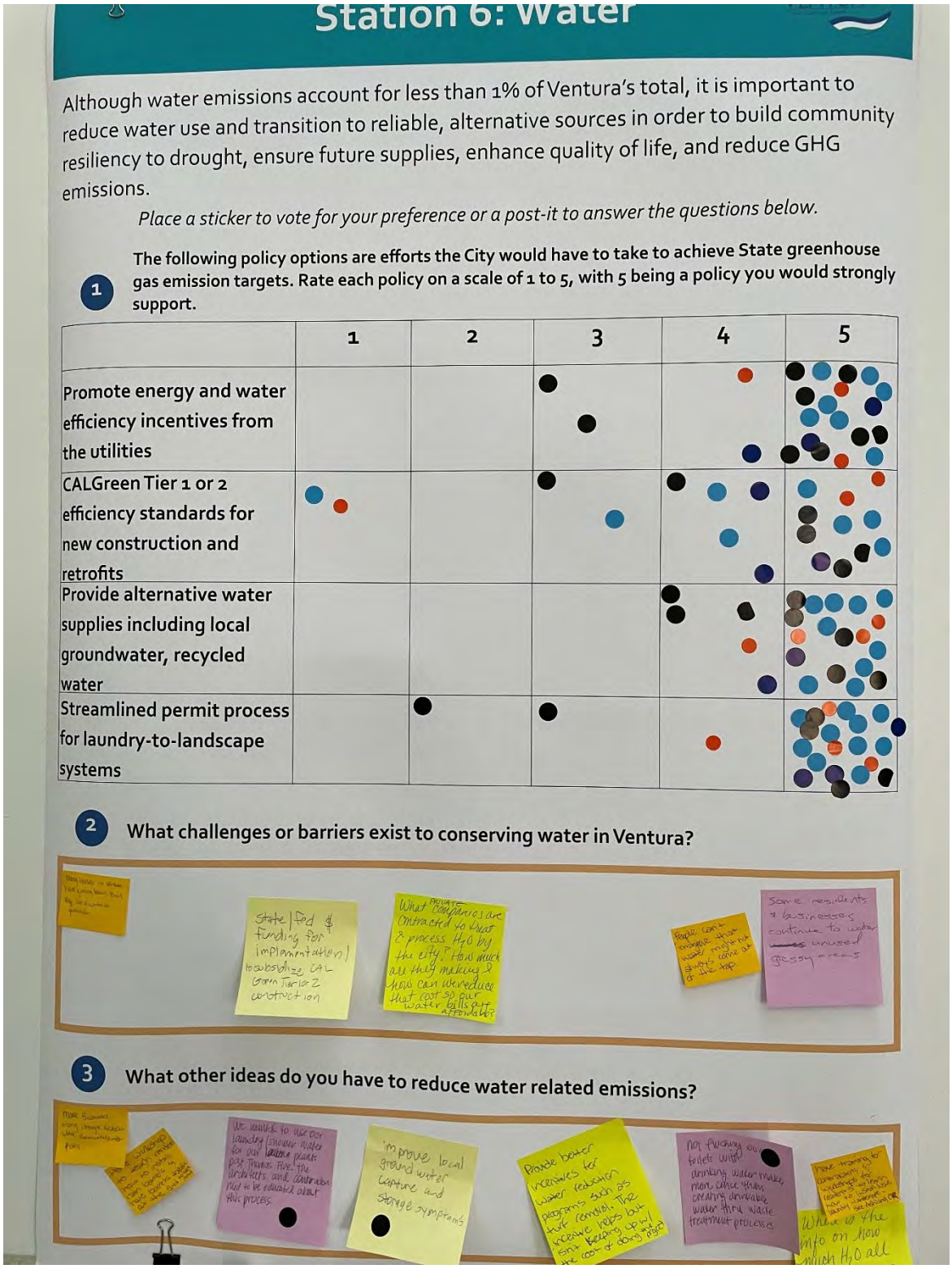
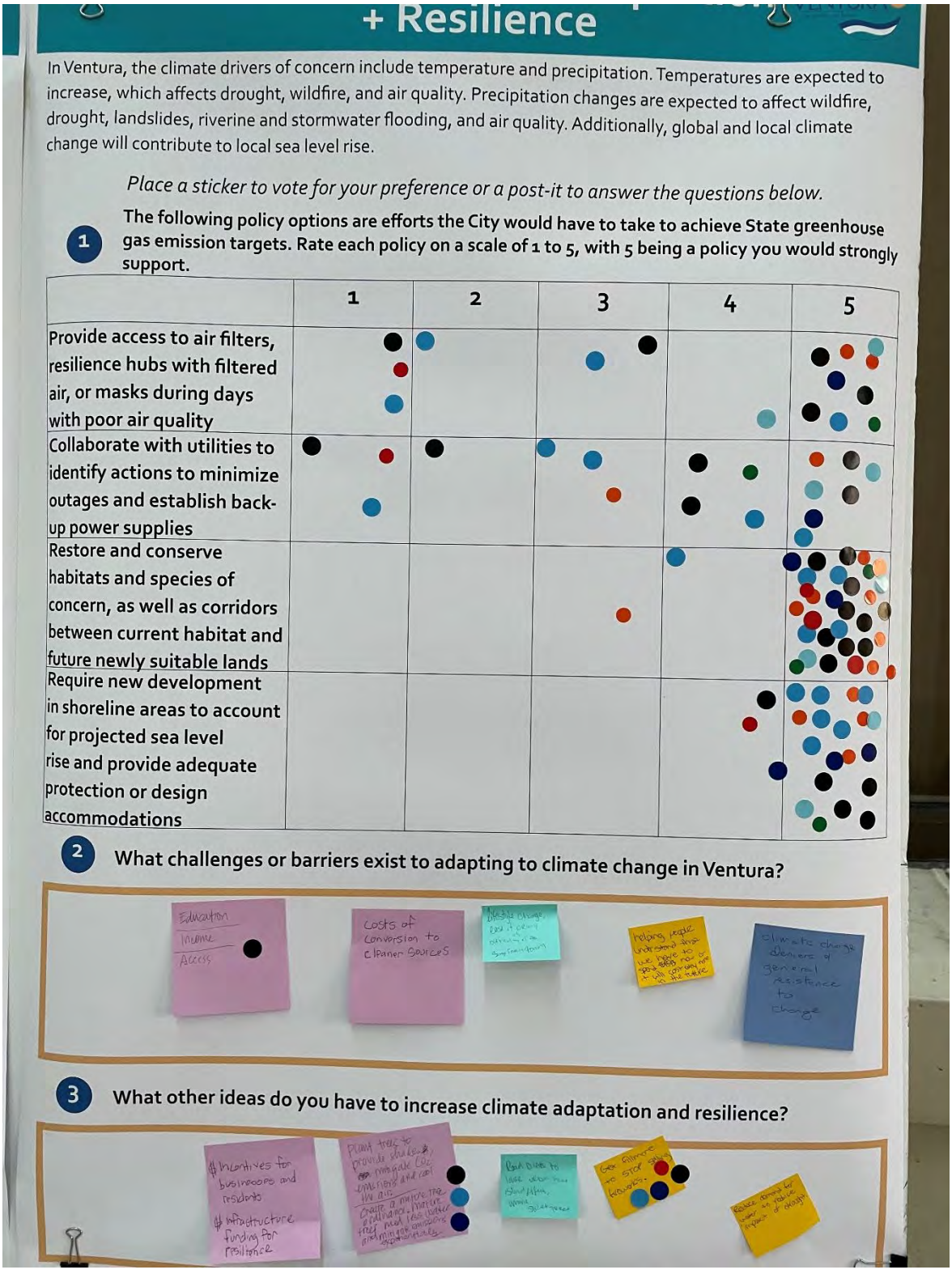


Figure A - 6. Station 7



Appendix B: Virtual Open House Boards

Figure B - 1. Clean Energy + Buildings

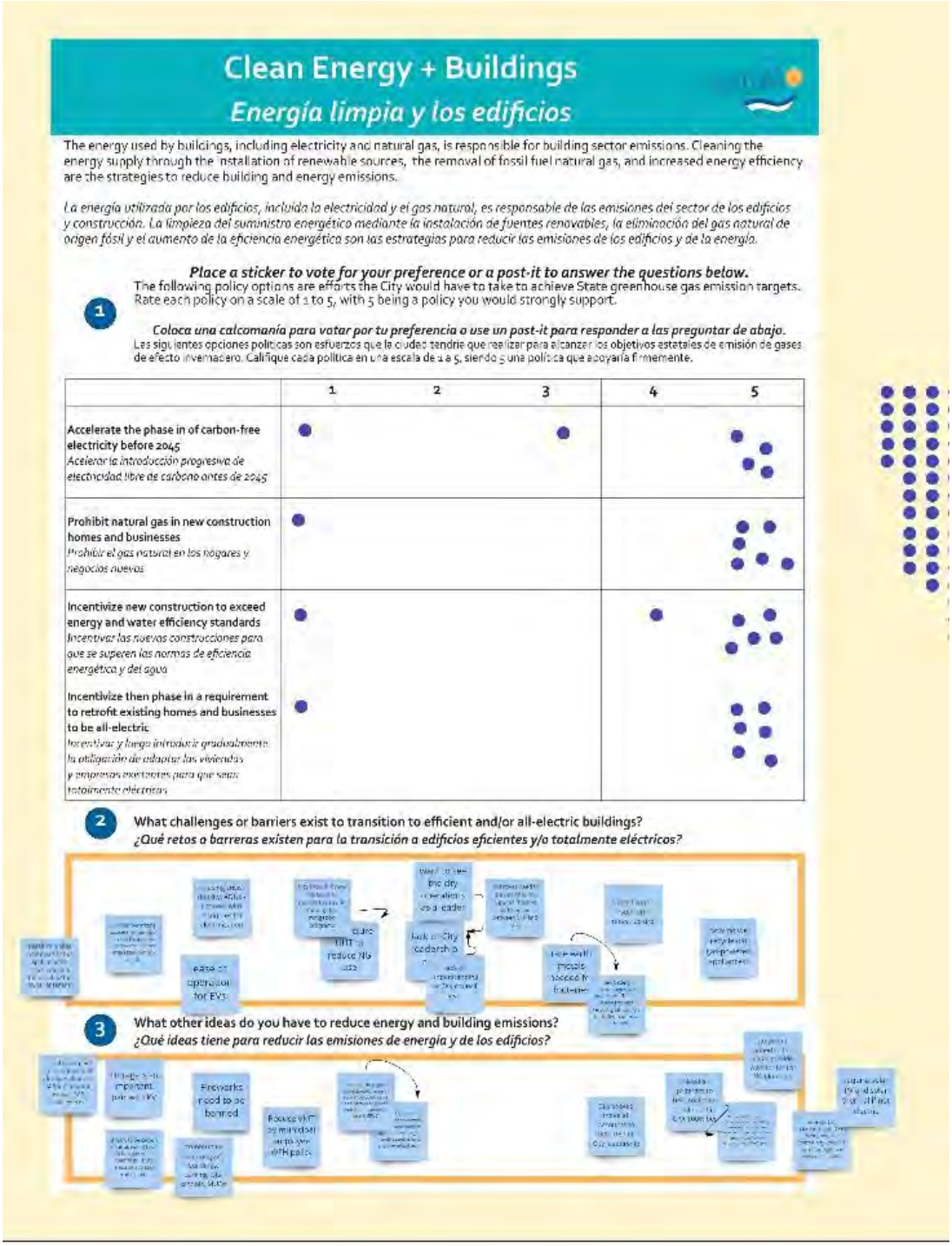
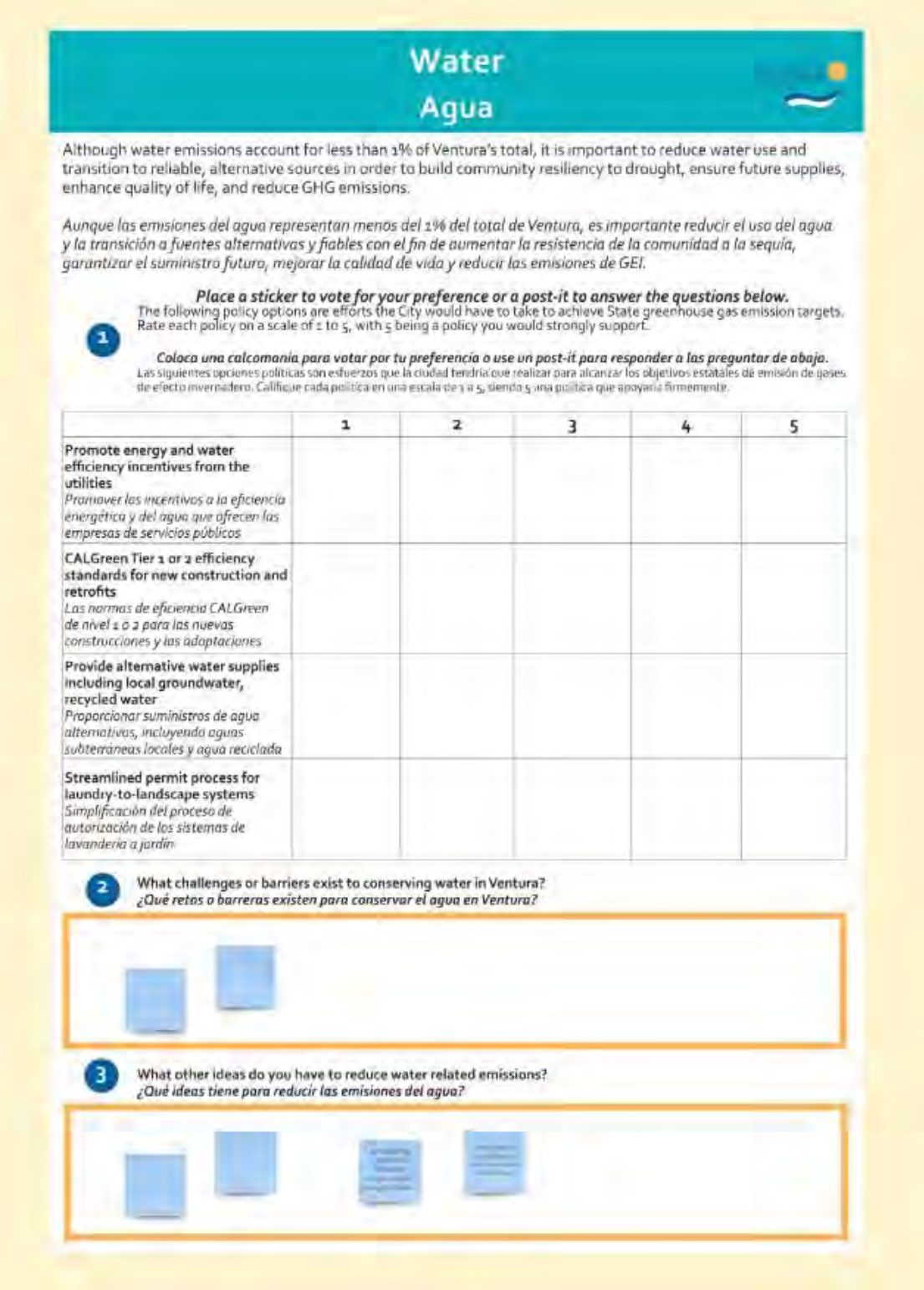


Figure B - 2. Water



Water
Agua

Although water emissions account for less than 1% of Ventura's total, it is important to reduce water use and transition to reliable, alternative sources in order to build community resiliency to drought, ensure future supplies, enhance quality of life, and reduce GHG emissions.

Aunque las emisiones del agua representan menos del 1% del total de Ventura, es importante reducir el uso del agua y la transición a fuentes alternativas y fiables con el fin de aumentar la resistencia de la comunidad a la sequía, garantizar el suministro futuro, mejorar la calidad de vida y reducir las emisiones de GEI.

Place a sticker to vote for your preference or a post-it to answer the questions below.

1 The following policy options are efforts the City would have to take to achieve State greenhouse gas emission targets. Rate each policy on a scale of 1 to 5, with 5 being a policy you would strongly support.

Coloca una calcomanía para votar por tu preferencia o use un post-it para responder a las preguntar de abajo.
Las siguientes opciones políticas son esfuerzos que la ciudad tendría que realizar para alcanzar los objetivos estatales de emisión de gases de efecto invernadero. Califique cada política en una escala de 1 a 5, siendo 5 una política que apoyaría firmemente.

	1	2	3	4	5
Promote energy and water efficiency incentives from the utilities *Promover los incentivos a la eficiencia energética y del agua que ofrecen las empresas de servicios públicos*					
CALGreen Tier 1 or 2 efficiency standards for new construction and retrofits *Las normas de eficiencia CALGreen de nivel 1 o 2 para las nuevas construcciones y las adaptaciones*					
Provide alternative water supplies including local groundwater, recycled water *Proporcionar suministros de agua alternativos, incluyendo aguas subterráneas locales y agua reciclada*					
Streamlined permit process for laundry-to-landscape systems *Simplificación del proceso de autorización de los sistemas de lavandería a jardín*					

2 What challenges or barriers exist to conserving water in Ventura?
¿Qué retos o barreras existen para conservar el agua en Ventura?

3 What other ideas do you have to reduce water related emissions?
¿Qué ideas tiene para reducir las emisiones del agua?

Figure B - 3. Transportation and Land Use

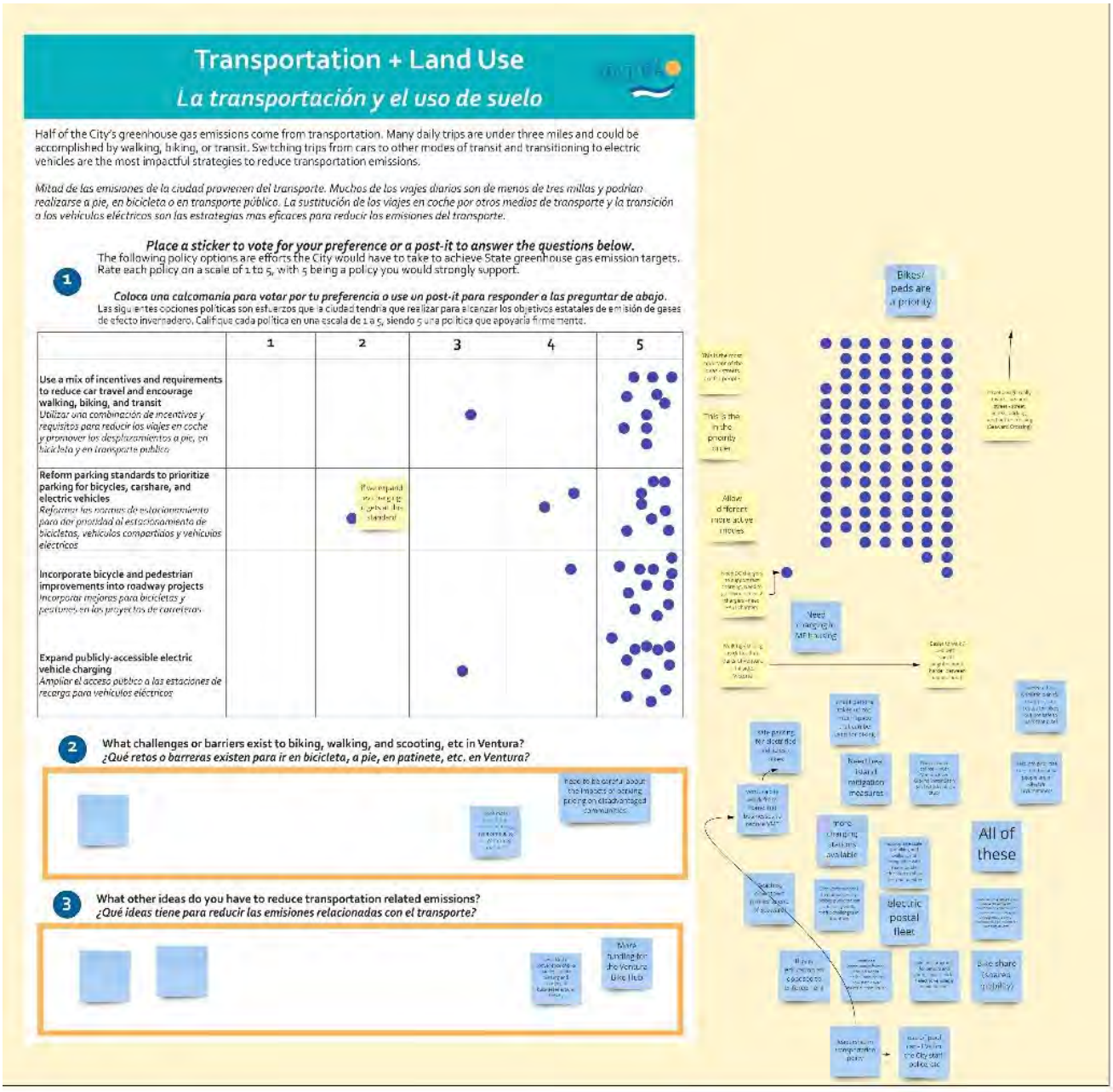


Figure B - 4. Solid Waste

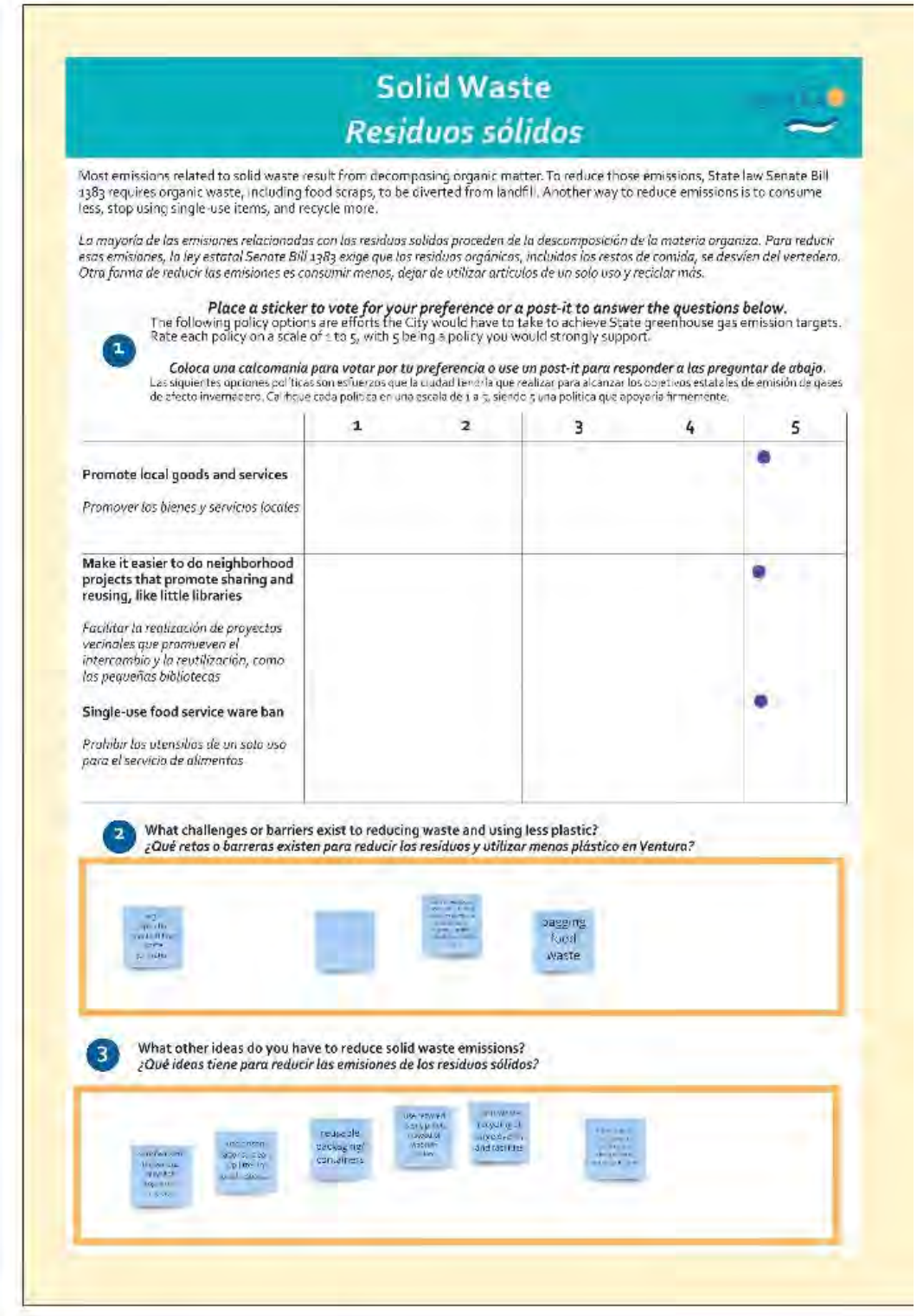
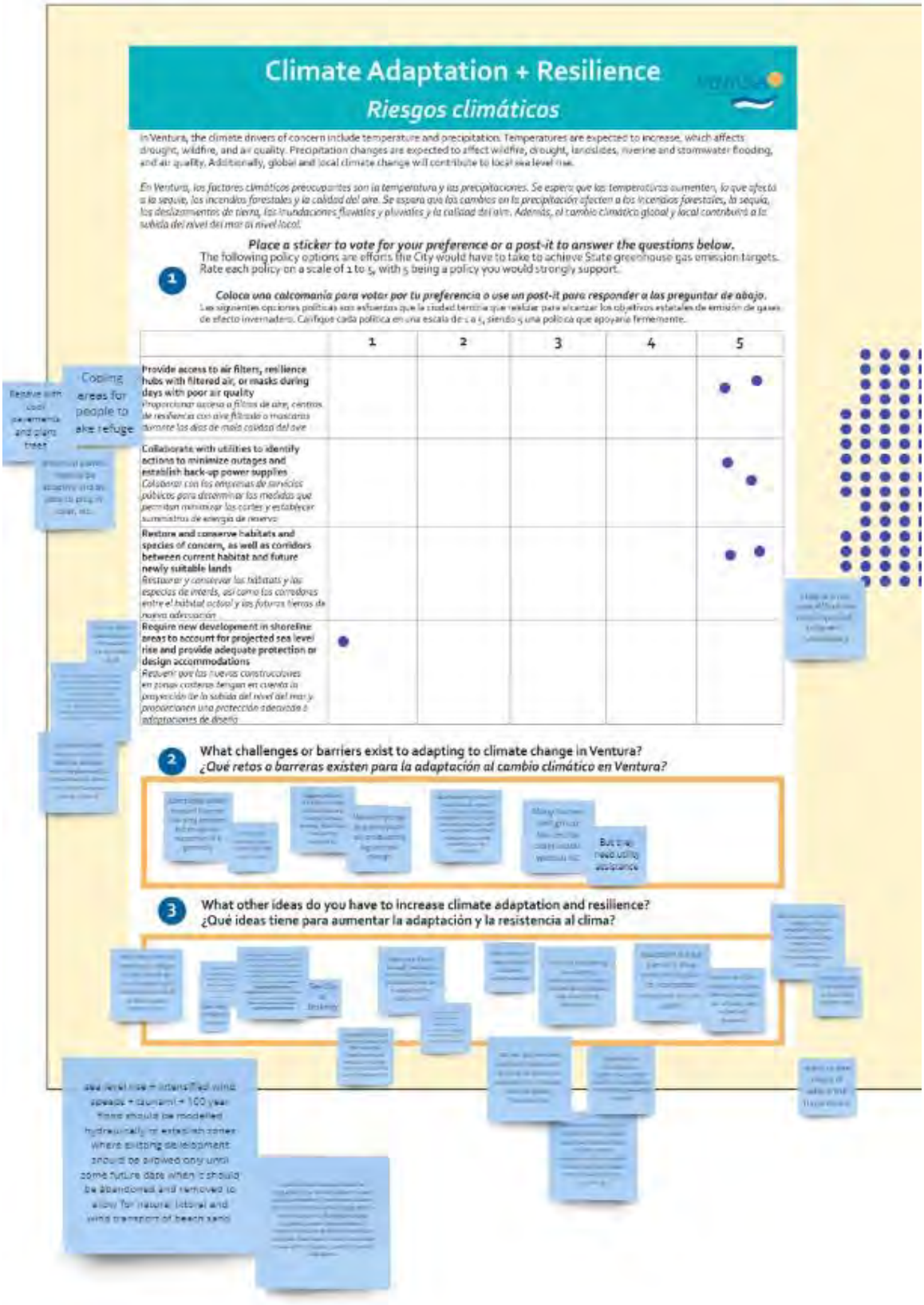


Figure B - 5. Climate Adaptation + Resilience



	1	2	3	4	5
Provide access to air filters, resilience hubs with filtered air, or masks during days with poor air quality *Proporcionar acceso a filtros de aire, centros de resiliencia con aire filtrado o mascarillas durante los días de mala calidad del aire*					
Collaborate with utilities to identify actions to minimize outages and establish back-up power supplies *Colaborar con las empresas de servicios públicos para determinar las medidas que permitan minimizar los cortes y establecer suministros de energía de reserva*					
Restore and conserve habitats and species of concern, as well as corridors between current habitat and future newly suitable lands *Restaurar y conservar los hábitats y las especies de interés, así como los corredores entre el hábitat actual y las futuras tierras de nueva adecuación*					
Require new development in shoreline areas to account for projected sea level rise and provide adequate protection or design accommodations *Requerir que las nuevas construcciones en zonas costeras tengan en cuenta la proyección de la subida del nivel del mar y proporcionen una protección adecuada o adaptaciones de diseño*					

August 16th, 2022

Dear Raimi & Associates,

This report meets CAUSEs subconsultant agreement to hold focus groups as part of the Climate Action and Resilience Plan Engagement. CAUSE conducted Adult and Youth community focus groups on the Westside of Ventura on the dates of July 28th & 29th. The findings from those two groups focused on the City of Ventura's efforts to form a Climate Action & Resilience Plan for Ventura residents and the feedback received from both youth and adults on the obstacles of mitigating climate change locally.

The summary below of the focus groups provides insight on what community members are most concerned about and interested in when discussing climate change issues and are detailed in the full report:

1. Although the Adult and Youth focus groups were on separate days, similar themes were brought up and talked about by both groups. The main focus for these groups were **Clean Energy and Buildings** along with **Land Use/Transportation**. Key themes and responses from both groups noted that although moving towards renewable energy in homes and businesses is a great solution, it is a costly alternative that isn't always accessible or available to all in the community. An emphasis was made on renters who don't have control over when changes such as switching to electric stoves and ovens, solar panels, and electric water heaters could happen simply due to the decisions made by their landlord. Community members with lower incomes don't have the luxury to think about these options when looking for a place to live. Although they support these alternatives, their top priority is finding what works for them financially.
2. Participants also shared their struggles with different forms of transportation outside of personally owned vehicles. Alternative transportation methods such as walking, biking, using public transportation, and switching to electric vehicles were all areas of concern for the attendees. Many mentioned that time plays a big role on how they choose their transportation mode as many youth and adults stated they preferred personal vehicle use.

Participants expressed concerns over transportation safety, sharing stories of stress from taking public transportation during the COVID-19 pandemic. Participants also shared safety concerns over streets and bike lanes in need of repair and the lack of adequate bike infrastructure for those choosing to cycle on the Westside of Ventura.

3. Lastly, participants recommended various solutions to benefit the needs of their community if the city of Ventura is serious about mitigating their contribution to climate change. They suggested that the community be informed about the effects of climate change, what contributes to climate change in their own communities, and financial support for home appliances or renovations that promote clean energy but are costly.

CAUSE Climate Action & Resilience Plan Focus Groups Results

On July 28th & 29th, CAUSE held community focus groups engaging Ventura residents at the Bell Arts Factory on Ventura's Westside. The purpose of these focus groups was to gauge the level of awareness, concern, and feedback from community members on the topic climate change in Ventura and possible solutions moving forward. The focus groups included 15 English-speaking youth and young adults who participated on July 28th and 14 Spanish-speaking adults on the second day July 29th. CAUSE first presented a brief powerpoint on the meaning of climate change, what contributes to climate change, and the different issues that contribute to climate change locally in their communities. After being briefed on the goal for these focus groups, participants were divided into two groups and given different issue areas to discuss. CAUSE staff facilitated each group with one focusing on **Clean Energy and Buildings** and the other on **Land Use/Transportation.** The facilitators switched between the two groups to make sure all participants were able to give feedback on both topics. Below are the common themes and differences discussed, followed by the description of each focus group.

The Cost of Electric Appliances

The common theme between both Youth and Adults discussions showed agreement that a major barrier in shifting from gas powered home appliances to more energy and water efficient appliances as well as 100% renewable electricity at home is the barrier of cost and lack of affordability for many low-income families. CAUSE facilitators asked a number of questions, “What are barriers/difficulties for you and your family to choose 100% clean energy through CA Power Alliance?”, “What are barriers/difficulties for you and your family to switch to energy & water efficient appliances?”, and “How do you think the city should take into account frontline communities when creating goals around energy and gas?”.

Renters Face Additional Burdens: While both adults and youth thought the idea of going all electric in homes was a good way to reduce Ventura’s greenhouse gasses, renters faced additional barriers of costs and affordability. Participants who are renters shared that making the transition seemed particularly difficult for low-income families who are already struggling financially due to the housing crisis and high inflation. Participants also worried that costs for landlords required to upgrade their appliances would be passed down to renters via higher rent costs in a time when rent costs are alarmingly high. Many participants felt that if it was optional, they would be more inclined to keep using gas powered appliances rather than electric if it meant they would pay less monthly. The adult groups in particular went into more detail explaining that currently electricity is more expensive than gas and if their stoves, water heaters, and furnaces were upgraded to be all electric, they fear potentially paying more for the actual appliances (if homeowners) while also paying more in their monthly electricity bill.

Solutions discussed included protections like rent control to ensure any new greenhouse gas reduction policies adopted would prevent landlords from passing the cost to renters who already pay steep rents and avoid further displacement. Other suggestions for a just transition to clean energy and ways to center frontline communities are to: 1) prioritize rebates, grants and other

appliance replacement programs for low-income homeowners and landlords, 2) limiting the penalization of low-income renters and homeowners, and 3) placing a tax on the wealthiest residents and high polluting corporations and businesses which cause a higher proportion of emissions.

Other barriers that adults expressed on switching from electric to gas included the difficulty for people changing an appliance they have been using for decades and the belief and/or perception that “electric stoves don’t work” or cook in the same way as gas stoves and that “the food doesn’t taste the same.”

Lack of Information About Renewable Energy

The second barrier that was most talked about was the lack of accessible information in general about the topic of climate change, specifically what climate change is, how it affects the residents of Ventura and also the lack of availability of information in Spanish for the Latinx community. The adults expressed that if the community was better informed about the Clean Power Alliance-what it is, how it works and the benefits to our health and our environment-that more people would be willing to make the switch even if it’s a little more expensive. Adults also shared that the term “clean energy” is something they had not heard of before. They didn’t know it was related to how energy was being generated so more background needed to be discussed on where our current electricity comes from and how renewable energy is considered “clean” due to the fact that it doesn’t contribute to greenhouse gas emissions compared to coal, oil and gas. Prior to the facilitator explaining the concept, certain adults thought it was a way to have our electricity undergo a cleaning process and that’s what makes it “clean”.

Focus Group participants brought up costs again as a barrier for families who are struggling financially and suggested the need for programs that focused on low income households that would allow reimbursements for these families to make the switch to 100% renewable energy. However, all youth and adults in the focus groups were surprised and glad to hear that the Clean Power Alliance offers two other options where 50% and 40% of the energy comes from renewable sources and that those were the same cost as Edison’s rates or a little less expensive. Youth talked about the importance of knowing how much more it would be to switch to 100% renewable energy to see if a family could afford it because they were unsure of the impact of the 7-9% increase in cost for families. Lastly, adults brought up renters having additional barriers such as those renting a room or who are not on the lease not having a say on which provider and what tier to choose if part of Clean Power Alliance.

Additional Comments Re: Clean Energy & Climate Change

Youth Comments and Questions:

- Is the city doing anything to hold corporations accountable for their greenhouse gas emissions instead of just placing the responsibility on residents?
- Youth expressed and agreed that the City of Ventura needs to improve youth engagement related to climate change due to the following reasons:
    - Often youth are the voice for their parents' needs.
    - Youth and young adults are good messengers to share info with their parents and grandparents.
    - Climate change will have more of an impact on youth and young adults in their lifetimes and their kids' lives than their parents.
    - The information on climate change that is taught in school is very general and not local so it's not as engaging or personal-feels like it's not happening here.
    - Solutions talked about like wind and solar energy are too massive and there are no ways to engage locally in climate actions.
    - Frustrated that climate change decisions being made don't take youth into account just because they are not of voting age (ex: Local Measures A and B on June 2022 Primary ballot for Ventura County)

Adult Comments and Questions:

- What's going to happen to the old appliances and the additional waste it's going to create in our landfills?
- Need more information and engagement from folks that live on the Westside/Avenue, especially in Spanish to bring more awareness about this topic and any programs that come out of it.
- Find it helpful when different programs from either the government or utility companies are explained in person such as when people go knocking on doors to inform people and offer free upgrades to their homes.

Current Issues with City Land Use and Transportation

During the **Transportation** and **Land Use** discussion, groups were asked the following:

1. What are barriers/difficulties to use our personal cars less and rely on walking?
2. What are barriers/difficulties to use our personal cars less and rely on biking?
3. What are barriers/difficulties to use our personal cars less and rely on public transportation?
4. How do you think the city should take into account frontline communities when creating goals around transportation, example: have requirements related to driving less, etc?

CAUSE's goal was to understand why participants rely on personal vehicle use and what changes they would suggest to increase the use of alternatives to driving. Common barriers participants shared were time management, safety concerns, and street accessibility.

Adult Focus Group Responses:

During the Adult focus group discussion, the majority of the participants stated time was the defining factor on why personal car use was their preferred mode of transportation. When talking about walking and biking locally, most responded by stating that in the Westside of Ventura the lack of bike lanes and street space was the biggest issue. Some adults enjoy biking recreationally but feel unsafe doing so in other circumstances due to the lack of designated bike lanes on many streets around their homes. It was also noted that many streets on and around the Westside lacked upkeep and were either too small/narrow to walk comfortably on. In general, walking and or biking was more of a recreational activity rather than a reliable form of transportation for work, social gatherings, or shopping trips because other alternatives take too long or are not practical to meet the needs for their family.

Only a few of the participants used public transportation consistently but out of the two who did, their biggest concern was safety and time. The COVID-19 pandemic and restrictions that followed caused many changes in public transportation such as limiting the number of people allowed on buses at one time, the routes available to regular commuters, and lack of bus drivers that consequently lengthened the wait times. Many participants stated that they avoided taking public transportation due to COVID concerns and these concerns still worry them to this day. Infrequent and overcrowded buses also caused participants to have long wait times including having to wait for the next available bus, causing time conflicts with their work or other priorities.

Possible Solutions:

Participants from the Adult focus group suggested different improvements that the city could do to incentivize the use of walking, biking, or public transportation. These suggestions included:

1. Improve and maintain sidewalks and streets (Ex. cracked roads, old streets, new layouts).

2. Add accessible bike lanes or create wider streets for walking.
3. Improve and expand the city's bus routes and safety protocols.
4. Put more crosswalks on busy streets/neighborhoods.
5. Increase wages for public transportation employees to address the shortage of drivers in Ventura.
6. Lower the fares for public transportation.

Youth Focus Group Responses:

Participants in the Youth focus group had similar sentiments on walking, biking, and using public transportation in Ventura. The majority of participants stated they most often rely on rides provided by their parents or guardian in their personal car to go to school or for other activities. Many participants mentioned that walking was mainly recreational but not a daily option due to time constraints when traveling to school. Biking was often not seen as a viable option due to safety concerns such as the lack of bike friendly infrastructure and lack of bike lanes in certain neighborhoods. In addition, parents and guardians often do not allow youth to bike in certain places because of these same safety concerns. Many stated that if there were designated bike lanes in more areas of Ventura, and not just midtown or the Eastside of Ventura, their choice to use bicycles in their daily routines would increase.

Lastly, use and recommendations of public transportation varied among the youth participants. Many of the youth don't have an accessible bus route to get to school and they thought most trips were too far or would take too much time out of their day to rely on the bus. Those who do rely on public transportation had similar experiences as the adults; buses are often maxed out on capacity due to students needing it after school ends and they often have to wait for a later bus to arrive or wait for their parents to pick them up by car. Youth participants also noted that afternoon activities such as finishing practice from sports or clubs would mean they would leave school at later times. Walking, biking, or taking public transportation during later times in the evening or even at night was also a safety concern and so parents or guardians often give youth rides

Possible Solutions:

Participants from the Youth focus group suggested different improvements that the city could do to incentivize the use of walking, biking, or public transportation. Listed below are the solutions that were suggested:

1. Create more bus school routes in different parts of the city.
2. Add more public bus routes around high schools to lessen the wait times.
3. Create safe bike lanes and routes for students to get to school.
4. Have the city or school provide loaner bikes.
5. Put in more crosswalks to make walking/biking safer and more accessible.

Accessibility to Electric Vehicles

Continuing the conversation with both youth and adults on various forms of transportation, we followed up with their previous responses and asked their opinion on electric powered transportation. Within this discussion, we wanted to learn more about what the community understood and felt about electric vehicles in the city of Ventura and in their personal lives.

We first spoke about what they thought of electric vehicles such as hybrid cars or fully electric cars and if these types of vehicles are an option in their lives. When speaking to both groups, none stated they owned an electric or hybrid vehicle, many did say they either knew a friend, coworker, or even family member who owned one. The majority of adults and youth stated that owning an electric vehicle was simply out of their budget, although they recognize the environmental benefits of owning an electric vehicle, they stated that overall owning a gas powered car was more economical. Here are the reasons that were stated as barriers to owning an electric car:

1. Too expensive to buy a new electric vehicle.
2. There are not enough charging stations around the city.
3. Paying more for electric services such as charging stations and electricity bills.
4. Many stated their electricity bills are being raised and want to avoid heavy usage at home.

Possible Solutions:

Next, we asked their thoughts on the city of Ventura's use of gas and electric powered vehicles. We wanted to know what they thought should be done or changed in heavy industries that pollute different communities. Listed below are thoughts that were stated by both groups:

1. Introduce electric buses or hybrids for public transportation.
2. Impose taxes on big industries and corporations.
3. Electric trailers (Some stated this is already being done in Europe).
4. Stipends or rebates for those who opt to buy an electric vehicle.
5. Support from the city for significant changes to electrifying the communities personal transportations methods.

Overall, the majority of participants stated that going all electric was too much of an obstacle at the moment. The price of a new electric vehicle, electricity bills, local charging accessibility, and lack of support from the city or corporations are the defining factors. Although both youth and adults recognize the importance of going electric to reduce emissions, at the moment the cost to make that change is too high.

Event Conclusion:

Our overall assessment of the focus groups CAUSE held on the dates of July 28th & 29th was that community members who attended found value in discussing and providing personal experiences about the issues of climate change in the city of Ventura. The support and roles from each staff member, Youth Fellow, and Intern contributed to productive and organized community discussions. Hosting the event in one of the most impacted neighborhoods in the city where many of the participants who attended reside was important for us to reach our participant goal and to make sure community members who are most impacted had the opportunity to give their personal feedback.

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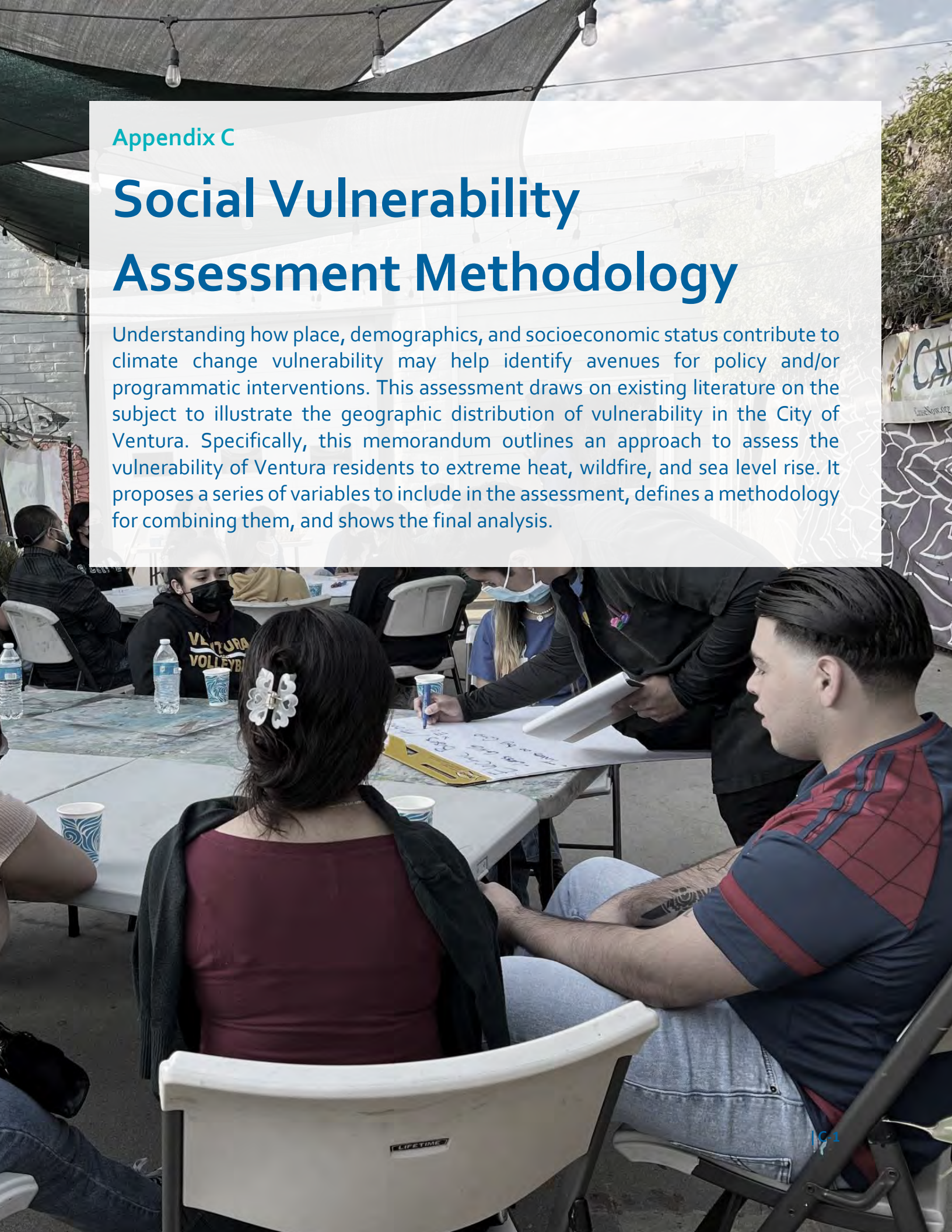
Appendix C

Social Vulnerability Assessment Methodology

Understanding how place, demographics, and socioeconomic status contribute to climate change vulnerability may help identify avenues for policy and/or programmatic interventions. This assessment draws on existing literature on the subject to illustrate the geographic distribution of vulnerability in the City of Ventura. Specifically, this memorandum outlines an approach to assess the vulnerability of Ventura residents to extreme heat, wildfire, and sea level rise. It proposes a series of variables to include in the assessment, defines a methodology for combining them, and shows the final analysis.



Literature Review

Raimi + Associates conducted a brief literature review of climate change vulnerability to inform the City of Ventura's Social Vulnerability Index. Overall, there are many social, economic, and environmental factors that influence community and individual vulnerability to climate impacts and their ability to adapt to climate change.

For example, outdoor workers are at greater risk of heat stroke and related illnesses from extreme heat events, lower income residents have fewer resources to repair flood or fire damage and may live in poor housing conditions, and people with limited English language proficiency are less likely to access programs that could help during or after an extreme weather event. Moreover, individual biological factors, such as age or health status, can amplify a population's sensitivity to climate change.

Furthermore, communities of color are often burdened with multiple, overlapping factors that cumulatively impact their ability to adapt or respond to climate change. Structural and institutional racism in economic, government, and social systems has resulted and continues to result in the disproportionate distribution of climate burdens and exposures, such as a low concentration of tree canopy coverage and a high concentration of impervious surfaces. In addition, a growing body of social epidemiological research has found that repeated experiences of racism become biologically embedded in the body and results in "weathering" or premature physiological deterioration, which in turn increases a population's sensitivity to climate hazards.

Model Indices

As part of the literature review, four indices that measure social vulnerability and disadvantage were assessed to inform the City of Ventura's Social Vulnerability Index. All four indices are publicly available and utilize data from several verified sources of information.

Social Vulnerability Index

The Social Vulnerability Index was developed by the Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR) to help public health officials and local planners better prepare for and respond to emergency events, like hurricanes, disease outbreaks, or exposure to dangerous chemicals. This index includes fifteen indicators from the U.S. American Community Survey, which are organized into four domains: socioeconomic status, household composition, race/ethnicity/language, and housing/transportation. Overall index scores are calculated on a percentile rank basis by ranking census tracts in comparison to all other census tracts in the state and in the nation. The index is commonly used to identify communities that will need support before, during, or after natural disasters and public health emergencies.

CalEnviroScreen

In California, disadvantaged communities are often identified through the California Environmental Health Screening Tool (CalEnviroScreen), which is a statewide index developed by the Office of Environmental Health Hazards Assessment (OEHHA) and California's Environmental Protection Agency (CalEPA). In 2021, OEHHA and CalEPA released version 4.0 of the tool, which includes data on 21 indicators at the census tract level that are organized into four categories: pollution exposures, environmental effects, sensitive populations, and socioeconomic factors. CalEnviroScreen's overall index scores are calculated relative to all census tracts in California and are not on an absolute numeric basis.

Based on guidance from the Governor's Office of Planning and Research, disadvantaged communities are identified as the top 25% scoring census tracts in comparison to all other census tracts in the state. Overall, CalEnviroScreen helps jurisdictions to identify communities disproportionately burdened by multiple sources of pollution.

Climate Change and Health Vulnerability Indicators (CCHVIs)

The CCHVIs is a data visualization platform developed by the Climate Change and Health Equity Section at the California Department of Public Health (CDPH). The platform provides data on nineteen climate change and health indicators, which are organized into three domains: environmental exposures, population sensitivity, and adaptive capacity. Although CCHVIs is not itself an index, it provides information to better understand the people and places in California that are more susceptible to adverse health impacts associated with climate change, specifically extreme heat, wildfire, sea level rise, drought, and poor air quality.

Healthy Places Index

The California Health Places Index (HPI) is a weighted index of twenty-five healthy community indicators developed by the Public Health Alliance of Southern California. Indicators are organized at the census tract level into eight domains: economic, education, transportation, social, neighborhood, clean environment, housing, and healthcare access. Indicators are standardized into z-scores and averaged for each domain, and the overall scores are calculated as the weighted sum of all domain scores. Unlike other indices that measure vulnerability, higher scores indicate greater health conditions relative to the rest of California. Overall, the HPI is a comprehensive tool for measuring health equity and is used by many public health departments across California.

Variables and Methodology

Social Vulnerability Index

Based on the results of the literature review, Raimi + Associates compiled a list of social, economic, and environmental indicators commonly associated with climate change vulnerability. This preliminary list was further refined by prioritizing cross-cutting variables that applied to at least two distinct hazards. Fifteen vulnerability indicators were chosen for this analysis. Indicators were then sorted into five distinct risk categories: demographic characteristics, socioeconomic status, race and ethnicity, housing conditions, and neighborhood conditions. Table C-1 lists the proposed risk categories, vulnerability indicators, geographic scales, and data sources of the datasets to be included in the analysis.

Two units of geography are proposed for the social vulnerability analysis:

- **Census Tract:** A statistical subdivision of a county designated by the U.S. Census Bureau. A census tract has a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. Census tracts are often used in demographic analysis because their optimum size allows for community-level data with low margins of error.
- **Census Block Group:** A small statistical subdivision of county designated by the U.S. Census Bureau. A block group has a population size between 600 and 3,000 people. Every census tract has at least one block group, and block groups are uniquely numbered within a census tract.

Table C-1: Social Vulnerability Indicators

Risk Category	Indicator	Geographic Scale	Data Source
Demographic Characteristics	Percent Age 65 or older	Block Group	ACS 15-19, Table B01001
	Percent Age 17 or younger	Block Group	ACS 15-19, Table B01001
	Percent with Any Disability	Census Tract	ACS 15-19, Table B18101
Socioeconomic Status	Percent Age 25 or older with less than a bachelor's degree	Block Group	ACS 15-19, Table B15003
	Percent of Households Below 80% of Area Median Income	Block Group	ACS 15-19, Table B19011
	Percent Agricultural Workers[21]	Census Tract	ACS 15-19, Table C24050
	Percent Construction Outdoor Workers	Census Tract	ACS 15-19, Table C24050
Race and Ethnicity	Percent Population of Color	Block Group	ACS 15-19, Table B03002
	Percent Linguistic Isolation (speak English less than well)	Census Tract	ACS 15-19, Table C16001
Housing Conditions	Percent Renter-Occupied Housing Units	Block Group	ACS 15-19, Table B25003
	Percent Pre-1980 Housing	Block Group	ACS 15-19, Table B25034
	Percent Mobile Homes	Block Group	ACS 15-19, Table B25024
	Percent No Vehicle Households	Block Group	ACS 15-19, Table B25044
	Percent of Households with Housing Cost Burden	Census Tract	ACS 15-19, Table B25106
Neighborhood Conditions	Percent of Households Without Broadband Internet	Block Group	ACS 15-19, Table B28002
	Percent Impervious Surface	Census Tract	MLRC National Land Cover Database (2011)
	Percent No Tree Canopy[22]	Census Tract	MLRC National Land Cover Database (2011)

[21] Note: The ACS does not have specific estimates for the number of farmworkers. The closest employment category available is "Agriculture, Forestry, Fishing And Hunting, And Mining". Thus, this category was used as a proxy for farmworkers.
[22] Percent of area in the census tract not covered by tree canopy, weighted by population

Figure C-1: Social Vulnerability Assessment

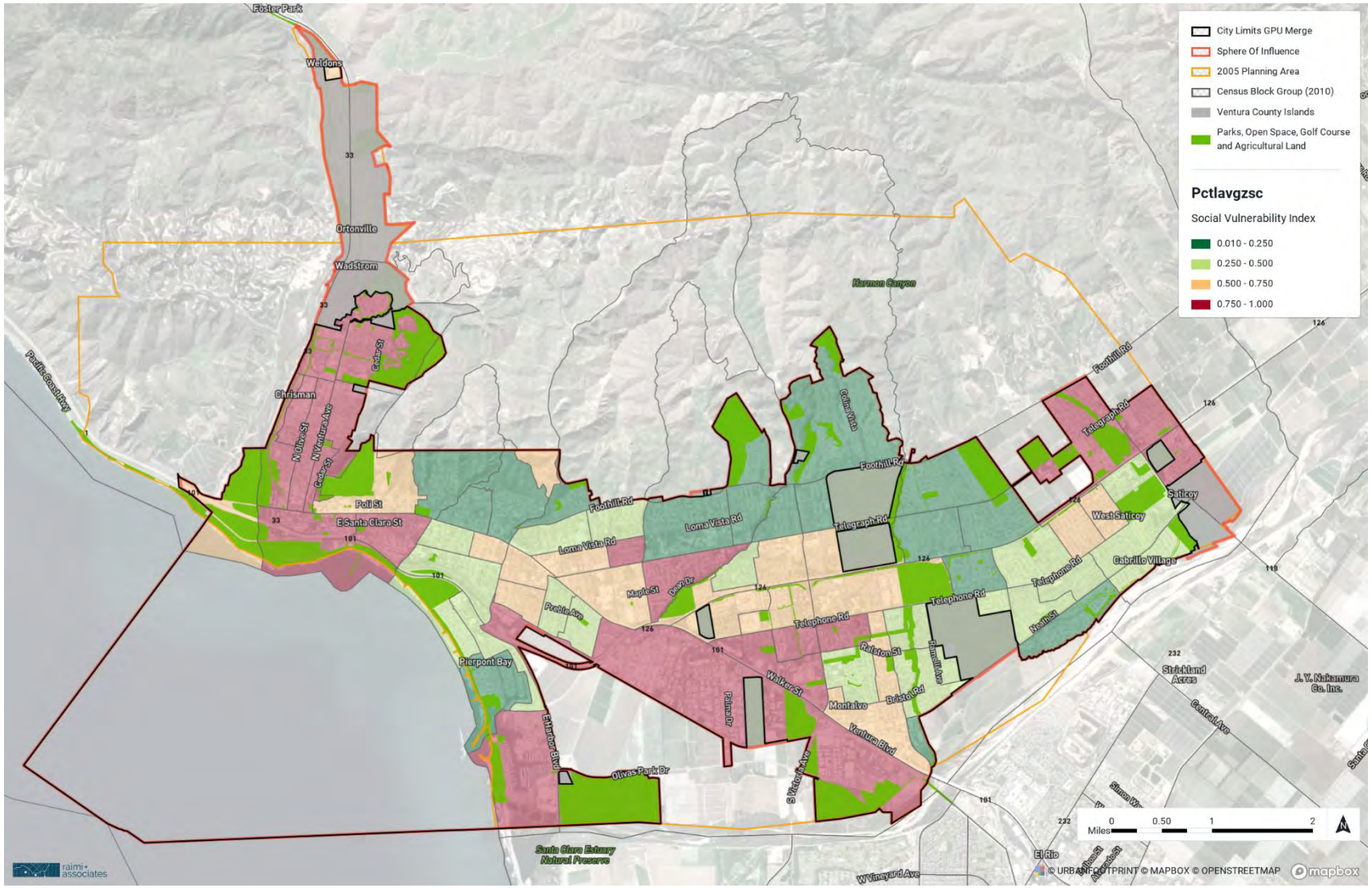


Figure C-2: Social Vulnerability Assessment with SB 1000 Disadvantaged Communities

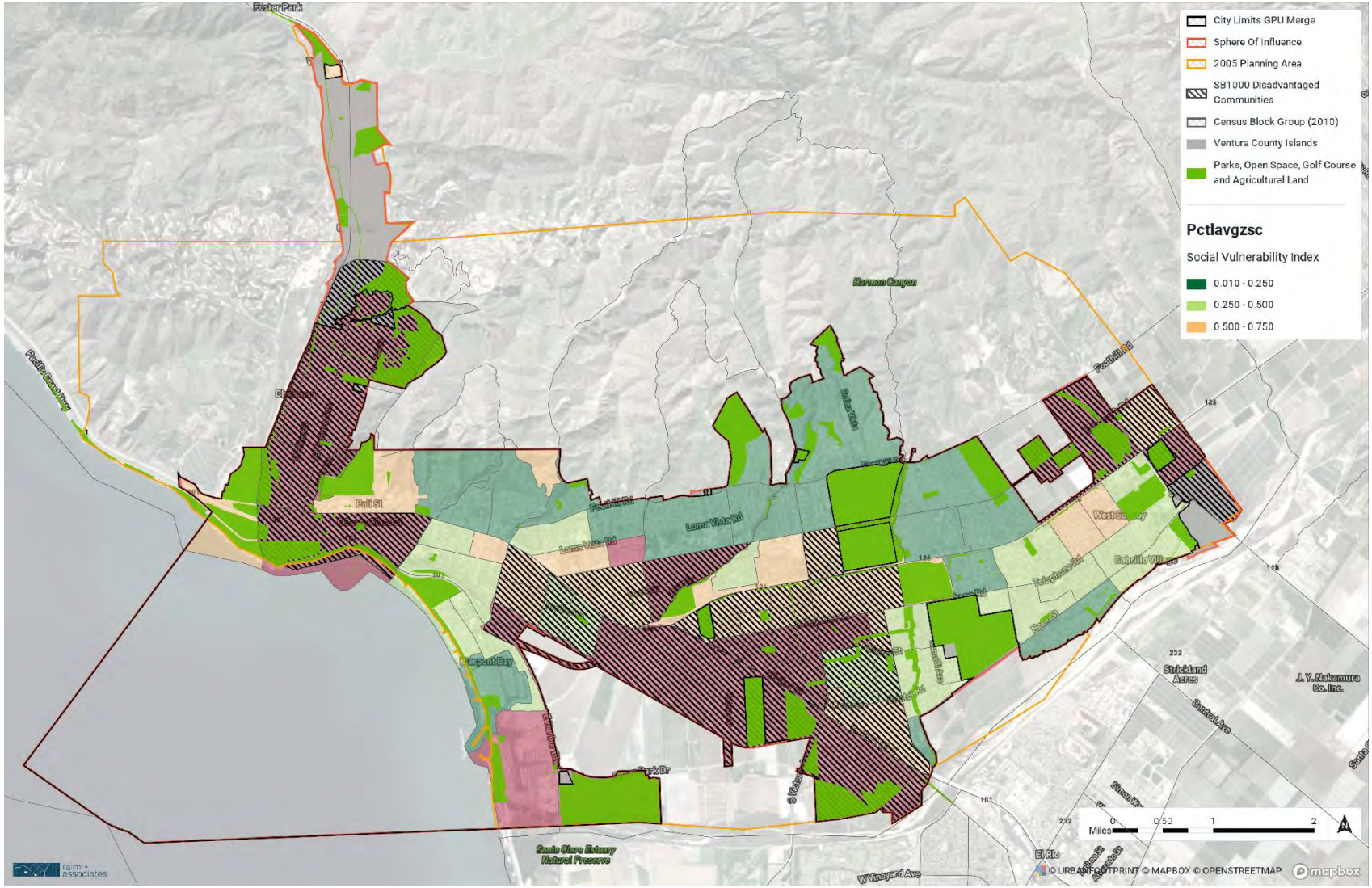


Figure C-3: Social Vulnerability Assessment with Fire Hazard Severity Zones

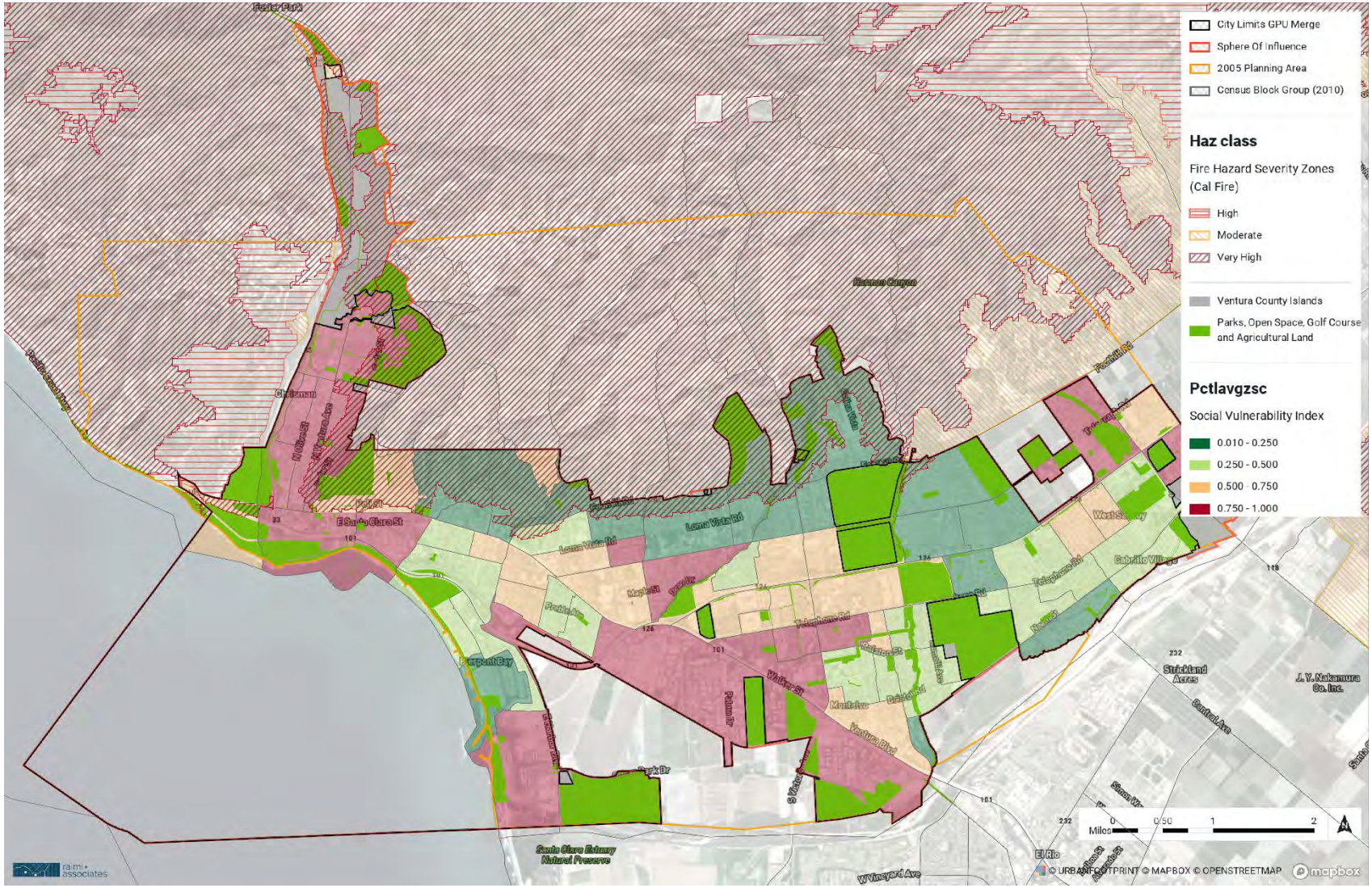


Figure C-4: Social Vulnerability Assessment with FEMA Flood Zones

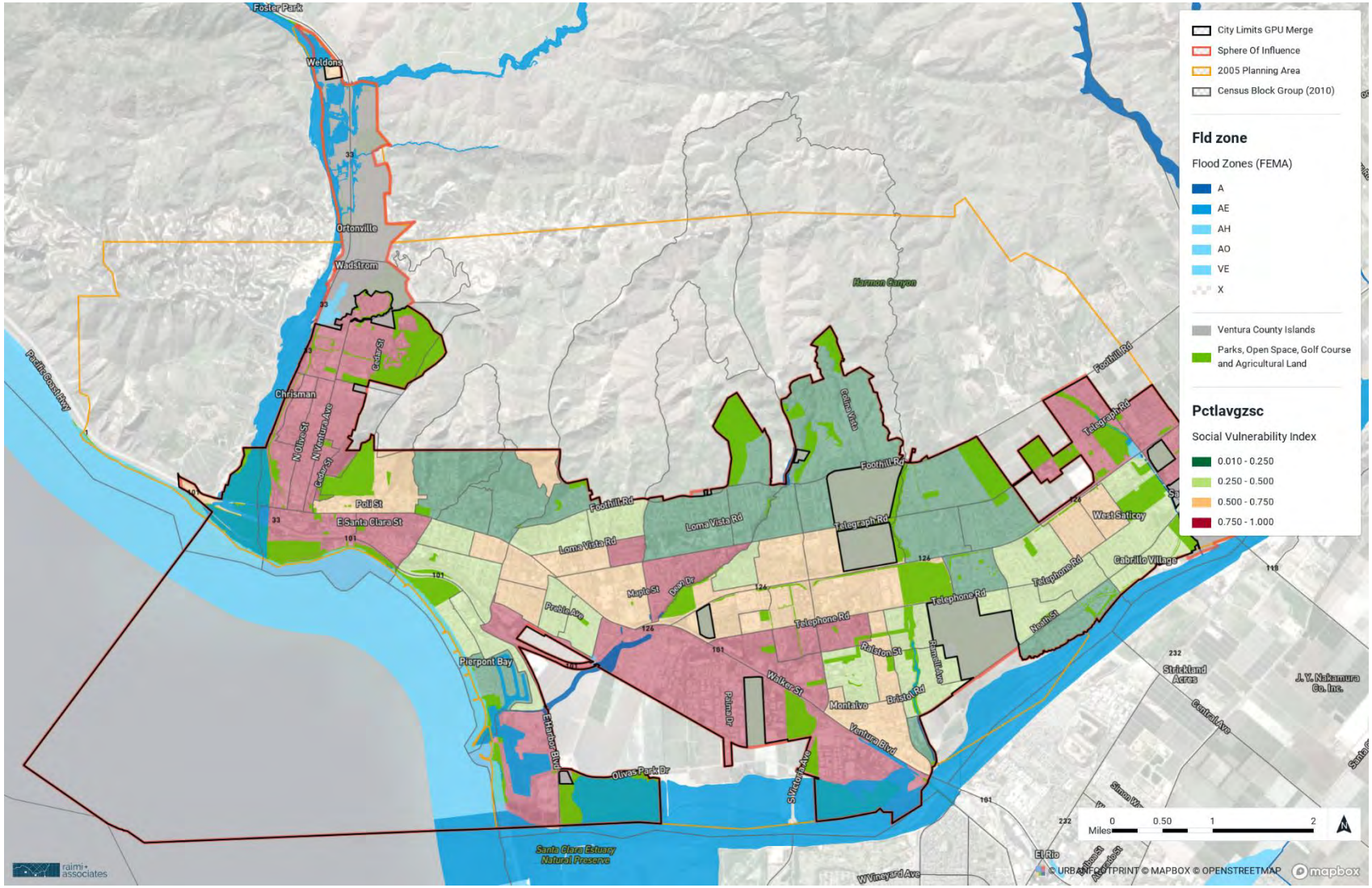
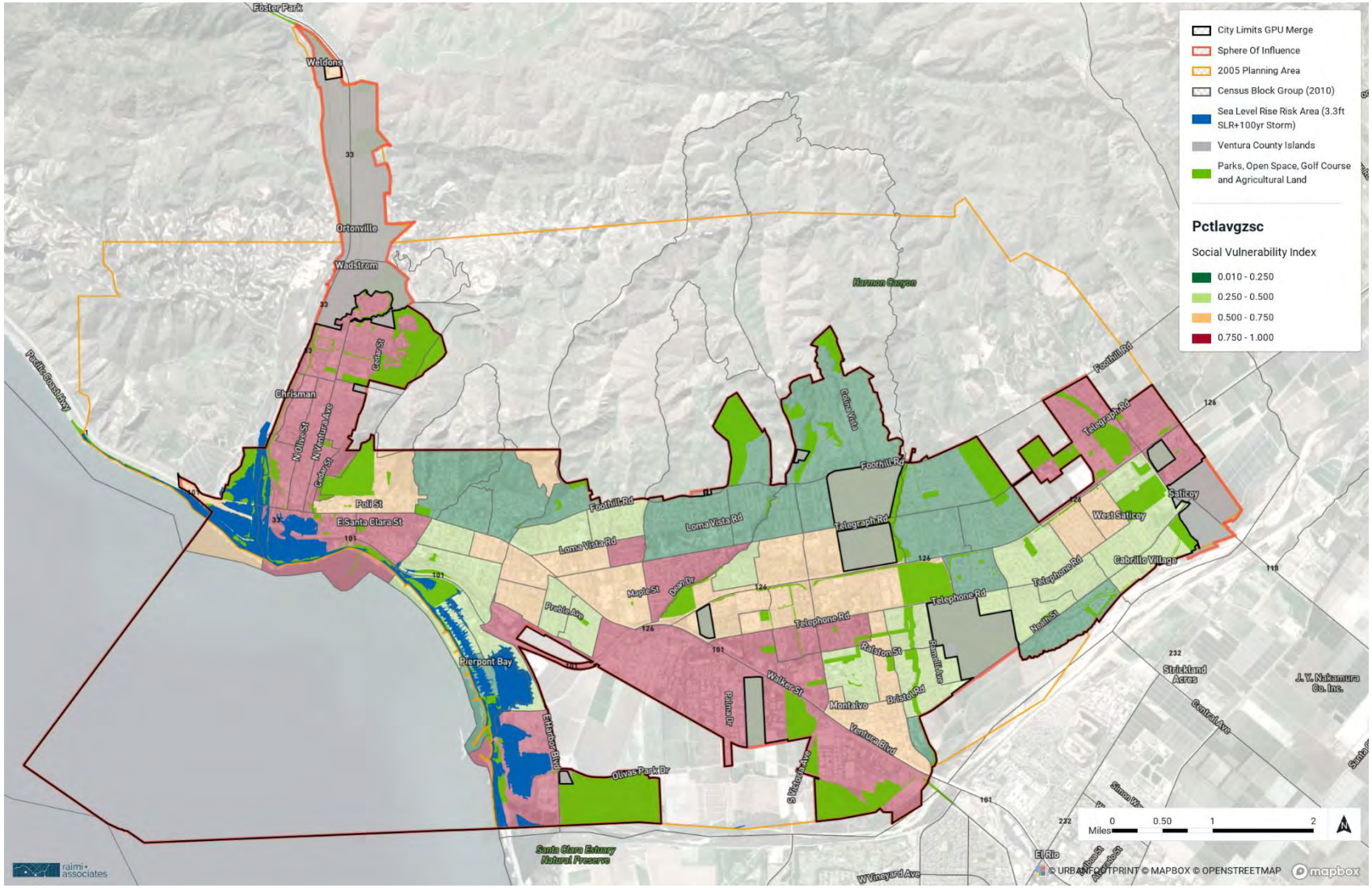


Figure C-5: Social Vulnerability Assessment with Sea Level Rise Inundation Zones



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Appendix D

Climate Change Vulnerability Assessment

This assessment evaluates how climate change may impact vulnerable community members, natural resources, buildings and facilities, and services and infrastructure in the City of Ventura. This report is consistent with Government Code § 65302 (as amended by Senate Bill (SB) 379) which requires cities, counties, and unincorporated areas across California to prepare a Climate Change Vulnerability Assessment to inform updates to the Public Safety Element of the General Plan. Understanding Ventura's vulnerabilities to climate change provides a foundation to develop required climate adaptation goals, policies, and implementation programs for the CARP and the City's Public Safety Element.

City of Ventura

Climate Change Vulnerability Assessment

July 2022

Prepared by

Rincon Consultants, Inc.

Table of Contents

Tables

Figures

1 Introduction

1.1 Background on Climate Change

This report evaluates how climate change may impact vulnerable community members, natural resources, buildings and facilities, and services and infrastructure in the City of Ventura. This report is consistent with Government Code § 65302 (as amended by Senate Bill (SB) 379) which requires cities, counties, and unincorporated areas across California to prepare a Climate Change Vulnerability Assessment to inform updates to the Public Safety Element of the General Plan. Understanding Ventura's vulnerabilities to climate change provides a foundation to develop required climate adaptation goals, policies, and implementation programs for the City's Public Safety Element. This report consists of the following:

Causes of Climate Change

Climate change is caused by the addition of excess greenhouse gases (GHGs) to the atmosphere, which traps heat near the earth's surface raising global average temperatures in what is referred to as the greenhouse effect. This increase in average temperatures across the globe affects sea level rise, precipitation patterns, the severity of wildfires, the prevalence of extreme heat events, water supply, and ocean temperatures and chemistry (NASA 2022). According to the Intergovernmental Panel on Climate Change (IPCC), GHGs are now higher than they have been in the past 400,000 years, raising carbon dioxide levels from 280 parts per million to 410 parts per million in the last 150 years (IPCC, 2021). The dramatic increase in GHGs is attributed to human activities beginning with the industrial revolution in the 1800s, which represented a shift from an agrarian and handicraft-based economy to one dominated by industry and machine manufacturing (NASA 2022).

1.2 City of Ventura Snapshot

The City of San Buenaventura is in Ventura County, California. Ventura is a coastal City set against the Pacific Ocean, undeveloped hills, and flanked by the Ventura River along its western edge and the Santa Clara River along its southern edge. The City is surrounded by the Transverse Range which are part of a large ecosystem comprised of hillsides, rivers, and seven miles of shoreline that provide rich habitat for many species. The Ventura region has been inhabited for thousands of years, initially by the Chumash, and was incorporated into a city in 1866 (County 2022).

The City borders the Pacific Ocean to the west, Oxnard to the south, Santa Paula to the east and Casitas Springs to the north. The County boundaries extend from Santa Barbara to Los Angeles along state route 101 and the City of Ventura encompasses an area of 32.09 square miles. In 2020, the City's population was 106,276 (County 2022).

For most of the 20th Century, Ventura was economically sustained by its role in the region's oil and agriculture industries. Today, the City of Ventura supports more diversified land uses with protected open spaces, managed parks, and extensive recreation opportunities. Beaches, museums, the harbor, the neighboring Channel Islands, and downtown areas attract over a million visitors annually. Oil and agriculture continue to provide economic stability, with diminishing importance, and County government currently remains the City's largest employer (City 2005).

1.3 Report Overview

1. **Introduction** provides a lexicon of terms used throughout the report and describes the methodology and key data sources used to prepare the Climate Change Vulnerability Assessment.
2. **Exposure to Climate Hazards** outlines climate drivers, relevant climate hazards, historical hazards events, how hazards are expected to change, and includes figures mapping climate hazards spatially across the City of Ventura.
3. **Sensitivity** identifies populations and assets most at risk to climate change.
4. **Adaptive Capacity** summarizes plans, policies, and programs that help the City of Ventura cope with climate hazard events.
5. **Vulnerability Analysis** describes potential impacts for each hazard based on sensitive community, natural, and built assets, with consideration given to their adaptive capacity. The chapter includes vulnerability scores of low, medium, or high for each population group and asset. See Vulnerability Scoring Methodology section below for more detail.
6. **Conclusion** presents the key findings of this report.

1.4 Lexicon

Several words and phrases are used throughout the plan to illustrate climate vulnerabilities within Ventura.

- **Adaptation.** The process of adjustment to actual or expected climate and its effects, either to minimize harm or exploit beneficial opportunities. In natural systems, human intervention may facilitate adjustment to expected climate (IPCC, 2012).
- **Adaptive Capacity.** Ventura's ability to cope with and adjust to the impacts of climate change (Cal OES 2020).
- **Asset.** Referential to a resource, structure, facility, or service that is relied on by a community.
- **Cascading Impact.** Climate hazard caused impacts that compromise infrastructure or disrupt critical services (i.e., power supply or water conveyance) broadening the scope of impact past a singular subject to reliant subsystems and populations (Collins et al. 2019).
- average events occur simultaneously and increase the scope of impact or severity of the event; an additional risk brought about by increased frequency of events from climate change (Seneviratne et al. 2012).
- **Impact.** Effects on natural and human systems including effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure by interactions of climate hazards and the vulnerabilities of the effected (IPCC 2012).
- **Mitigation.** An act or sustained actions to reduce, eliminate, or avoid negative impacts or effects (Cal OES 2020).
- **Resilience.** The capacity of an entity (an individual a community, an organization, or a natural system) to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience (Cal OES 2020).

- **Climate Driver.** A change in the climate which acts as the main source of change for subsequent climate hazards. Climate drivers relevant to the City and discussed in this report are temperature and precipitation.
- **Climate Hazard**. A dangerous or potentially dangerous condition created by the effects of the local climate (Cal OES 2020). Climate hazards of concern for the City of Ventura are extreme heat, warm nights, chill hours, drought, wildfire, landslides, tule fog, riverine and stormwater flooding, and air quality.
- **Compounding Risk.** When two or more extreme events or
- **Sensitivities**. The degree to which a species, natural system, community, asset, or other associated system would be affected by changing climate conditions (Cal OES 2020).
- **Vulnerable Populations.** Vulnerable populations experience heightened risk and increase sensitivity to climate change and have less capacity and fewer resources to cope with, adapt to, or recover from climate impacts (Cal OES 2020).
- **Vulnerability.** The propensity or predisposition to be adversely affected (IPCC 2012).

1.5 Vulnerability Assessment Methodology

The following section details state guidance, methods, and sources used in the production of this report.

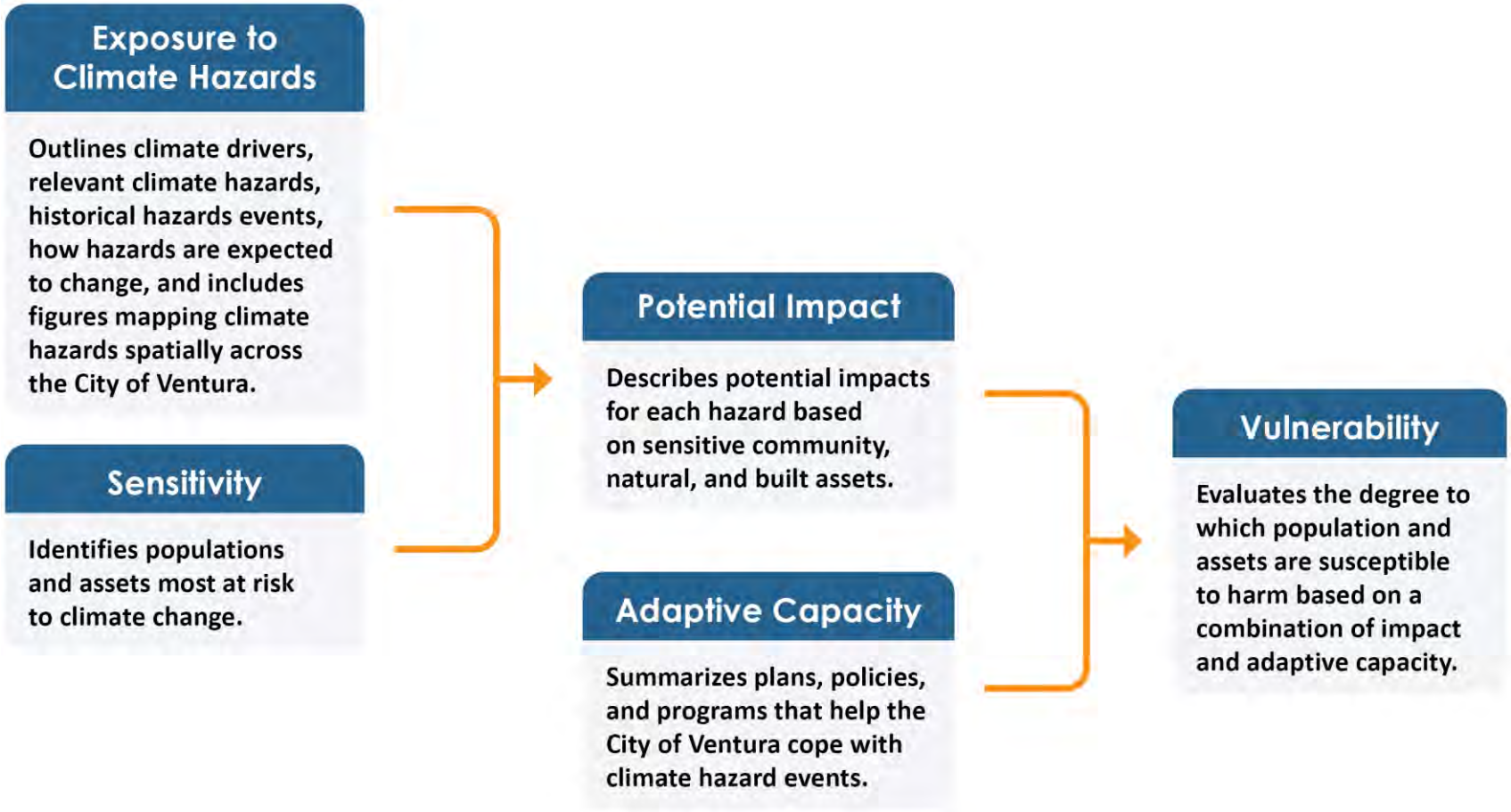
California Adaptation Planning Guide Phases

The City of Ventura Climate Change Vulnerability Assessment follows the vulnerability assessment process recommended by the California Governor's Office of Emergency Services (Cal OES), as documented in the 2020 California Adaptation Planning Guide (Cal APG). The adaptation planning process outlined by the Cal APG consists of four phases, illustrated in the graphic below, with Phase 2 detailing the vulnerability assessment process (Cal OES, 2020). The City of Ventura Climate Change Vulnerability Assessment is prepared consistent with Phase 2 of the Cal APG (see Figure 1) and is composed of the following parts found in Figure 2.

Figure 1 California Adaptation Planning Phases to Assessing Vulnerability

Source: 2020 California Adaptation Planning Guide

Figure 2 Vulnerability Assessment Flow Diagram



Key Data Sources

The following data sources and tools, many of which are recommended within the Cal APG, were used in preparation of this report.

- **U.S. Census, 2015-2019 American Community Survey (ACS)** presents demographic data by census tract and was used to supplement the HPI percentile score. U.S. Census data was used to identify the percentage of the City of Ventura population that corresponds to each vulnerable group
- **Cal-Adapt** is an online tool that presents historic and modeled projections based on 10 different global climate models. The tool was developed and is maintained by the University of California with oversight from the California Energy Commission (CEC). This tool is used to present projection data related to minimum and maximum temperature, precipitation, extreme heat, warm nights, drought, and wildfire.
- **California's Fourth Climate Change Assessment** was developed by the CEC and other State of California coordinating agencies to present up-to-date climate science, projections and potential impacts associated with climate change. The CEC and coordinating agencies developed nine regional reports to provide regional-scale climate information to support local planning and action. The Los Angeles Region Summary Report (2018) presents an overview of climate science, regional projections, specific strategies to adapt to climate impacts, and key research gaps needed to safeguard the greater Los Angeles area (including Ventura) from climate change. The Los Angeles Region Summary Report was used to understand regional changes that may affect the City of Ventura both directly and indirectly.
- **The California Healthy Places Index (HPI)** is an online mapping tool that reports on community conditions that are known to predict health outcomes and life expectancy. The tool was prepared by the Public Health Alliance of Southern California, a collaborative of local health departments in Southern California. HPI displays 25 community characteristics at various legislative boundaries, including census tracts and city and county boundaries. The community characteristics relate to the following identified Policy Action Areas: economic, education, housing, health care access, neighborhood, clean environment, transportation, and social factors. HPI applies a relative percentile score across all census tracts in California using statistical modeling techniques based on the relationship of the Policy Action Areas to life expectancy at birth. Low percentile scores reflect unhealthy conditions. HPI was used to prepare the social sensitivity index score as described in more detail below. HPI is a useful in providing both big picture and localized insights into community health. HPI was updated in the Spring of 2022 to include data averages from the U.S. Census 2015-2019 ACS.
- **The Nature Conservancy (TNC) Coastal Resilience Web Tool** is an online mapping tool showing potential impacts from sea level rise and coastal hazards designed to help communities develop and implement solutions that incorporate ecosystem-based adaptation approaches. This tool is available statewide but has detailed modelling for the Ventura area.
- **Ventura County Multi-Jurisdictional Hazard Mitigation Plan** presents information on existing processes and plans in place that address Ventura County and the City's ability to prepare for climate change impacts and informed the adaptive capacity discussion of this report. The Multi-Jurisdictional Hazard Mitigation Plan (2022) was also used to identify recent historical events.

- **Ventura County Resilient Coastal Adaptation Project** The County of Ventura's Resilient Coastal Adaptation Project (VC Resilient) uses best available science to develop a balanced and forward-thinking response to sea level rise. It considers various coastal hazards and has several web tools and story maps to help disseminate SLR information to the affected communities. The website contains many resources including related county ordinances, plans, projects, and tools. The associated **Ventura County Sea Level Rise Assessment** is specific to unincorporated Ventura County, however, information in the assessment pertaining to the broader Ventura region is included in this report.

Data Limitations

- The limitations of this report and analysis stem from gaps in data availability and completeness of data methods. Census data can miss portions of the population (e.g., homeless populations) and general demographic information may not accurately capture populations vulnerable to climate change (Cantwell 2021). Federal Emergency Management Agency (FEMA) 100-year and 500-year flood plains do not account for climate change projections, zones are instead based on historical information. The California Department of Forestry and Fire Protection (CalFire) very high fire hazard severity zones are based on vegetation, fire history, and terrain but also has similar limitations, projections of future fire are not included (OSFM 2022). Extrapolating landslides and air quality hazard exposure data in the context of climate change is difficult and therefore expected exposures are likely to be underestimated.
- The data presented in **Cal-Adapt** tools are projections, or estimates, of the future. The limitation in these projections is that the long-term behavior of the atmosphere is expressed in averages – for example, average annual temperature, average monthly rainfall, or average water equivalent of mountain snowpack at a given time of year. The averages discussed often downplay the extremes by which daily weather events occur and when presented as an average, only show moderate changes within the climate. For example, what is using averages can result in an omission of the frequency of extremes. For example, in the case of like extreme weather events, atmospheric rivers may increase, while low-moderate intensity weather events decrease through the end of the century. In instances of modeled precipitation projections, an average maintains a quantification similar to historic levels which does not account for anticipated fluctuations in extremes (CEC 2021).

Vulnerability Scoring Methodology

Vulnerability scoring is a valuable step in the climate vulnerability assessment process because it identifies which assets and populations face the highest threat to climate hazards. This can aid in the prioritization of adaptation actions. The vulnerability score is a combination of the impact and adaptive capacity score and is discussed in the Vulnerability Analysis section of this report. The impact and adaptive capacity scores are developed using a qualitative methodology outlined in the Cal APG, as seen in Table 1. Impact and adaptive capacity scores are identified for each asset and population for each climate hazard.

Table 1 Impact and Adaptive Capacity Scoring Rubric

Score	Impact	Adaptive Capacity
Low	Impact is unlikely based on projected exposure; would result in minor consequences to public health, safety, and/or other metrics of concern.	The population or asset lacks capacity to manage changes; major changes would be required.
Medium	Impact is somewhat likely based on projected exposure; would result in some consequences to public health, safety, and/or other metrics of concern.	The population or asset has some capacity to manage climate impact; some changes would be required.
High	Impact is highly likely based on projected exposure; consequences to public health, safety, and/or other metrics of concern.	The population or asset has high capacity to manage climate impact; minimal to no changes are required.

Source: Cal OES 2020

The vulnerability score is prepared by combining the two scores as demonstrated in Table 2. The range of potential impacts spans 1 through 5 with 4-5 being at highest threat.

Table 2 Vulnerability Score Matrix

Potential Impacts	**High**	3	4	5
	Medium	2	3	4
	Low	1	2	3
		High	**Medium**	**Low**
		Adaptive Capacity		

Source: Cal OES 2020

2 Exposure to Climate Hazards

Climate change is a global phenomenon that can impact local health, natural resources, infrastructure, emergency response, and many other aspects of society. Projected changes to the climate are dependent on location. The Cal-Adapt tool provides climate data from global scale models that have been localized (downscaled) to 3.7 mile by 3.7-mile grids (CEC 2021). The data in Cal-Adapt is combined with information from the California Fourth Climate Change Assessment to model future changes in specific types of hazards within this report. Projections throughout this section are outlined by two separate Representative Concentration Pathways (RCPs) (CEC 2021).

- RCP 4.5 is a medium emissions scenario where global emissions peak by the year 2040
- RCP 8.5 is a high emissions scenario in which global emissions continue to rise through the end of the 21st century.

Additionally, projections are forecasted to mid-century (2035-2064) and end-century (2070-2099) as 30-year averages to be compared to a modeled historical baseline (1961-1990) (CEC 2021).

This section presents information on temperature and precipitation, which are characterized as climate drivers. The section then provides information on projected changes to natural hazards, including extreme heat and warm nights, drought, wildfire, landslides, riverine and stormwater flooding, air quality, and sea level rise, which result from changes to climate drivers.

2.1 Climate Drivers

In Ventura, the climate drivers of concern include temperature and precipitation. All projections are pulled from the Cal-Adapt Local Climate Change Snapshot tool and supplemented with the Los Angeles regional information found in the California Fourth Climate Change Assessment (CEC 2021, Hall et al. 2018).

Temperature

The average maximum and minimum temperatures are expected to increase in Ventura with mid-century projections showing a 3.5°F (RCP 4.5) to 4.3°F (RCP 8.5) increase in temperature maximum and minimums (CEC 2021). End-Century projections show a 4.5°F (RCP 4.5) to 7.1°F (RCP 8.5) increase in Ventura. Temperature increases affect extreme heat and warm nights, drought, wildfire, and air quality. Global temperature increases cause ocean temperatures to rise which expands ocean waters. Glaciers, ice caps, and ice sheets melt from rising temperatures which further contribute to sea level rise (Hall et al. 2018).

Precipitation

Ventura precipitation projections under RCP 8.5 demonstrate a 0.132-inch increase by mid-century and 0.289-inch increase by end-century in annual precipitation totals (CEC 2021). However, as already observed in recent decades precipitation changes are largely observed as more extreme variability with intensely wet years followed by extreme droughts (Hall et al. 2018). It is projected that the wettest day every year will increase by 25-30% by the end

of the century in some parts of the Los Angeles Region (Hall et al. 2018). There will be more dry periods punctuated by increased precipitation intensities of the largest storms or wet periods, producing little net change in precipitation totals but more extreme conditions (Hall et al. 2018). Precipitation changes are expected to affect wildfire, drought, landslides, riverine and stormwater flooding, and air quality.

2.2 Hazards

This section outlines projected changes for the following climate hazards:


Extreme Heat and Warm Nights


Drought


Wildfire

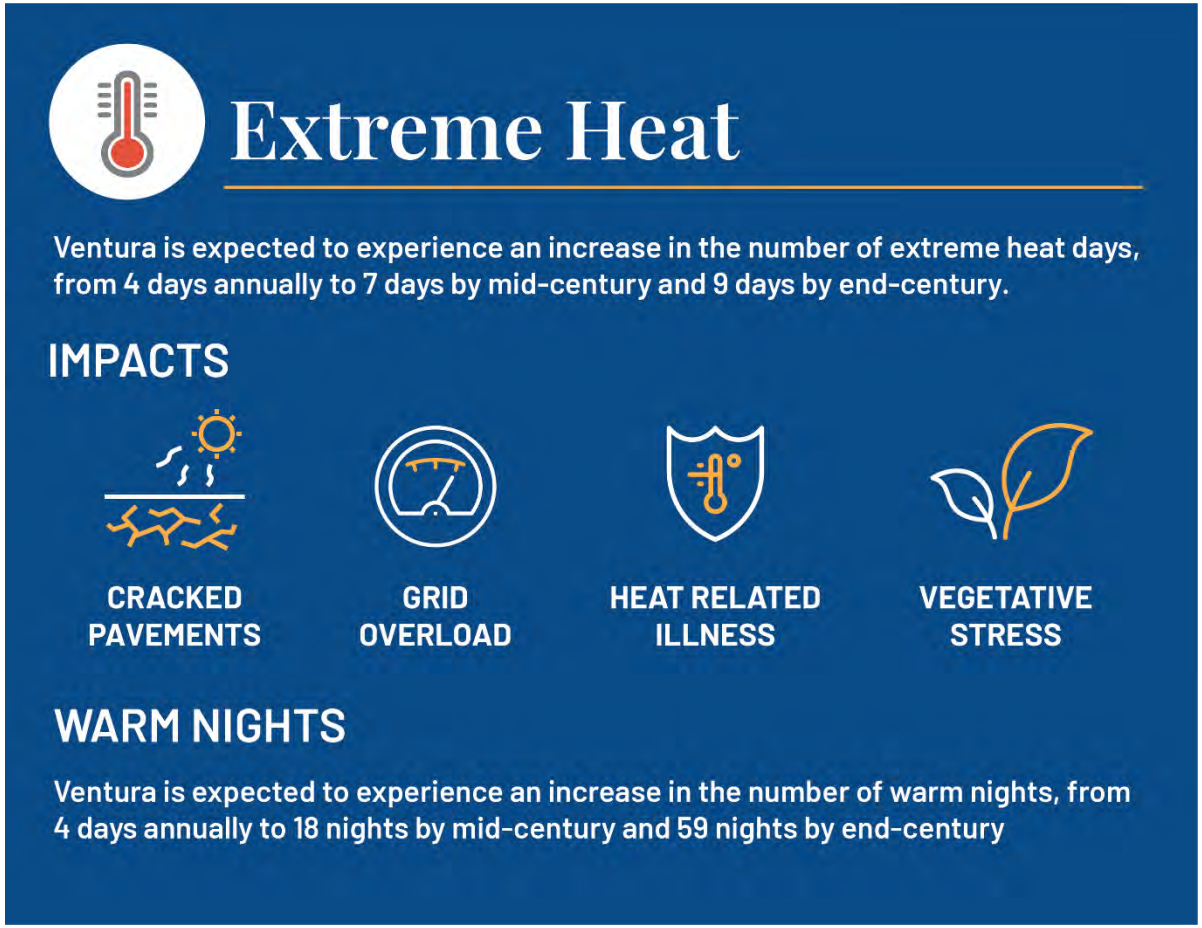

Landslides


Riverine and Stormwater Flooding


Air Quality


Sea Level Rise

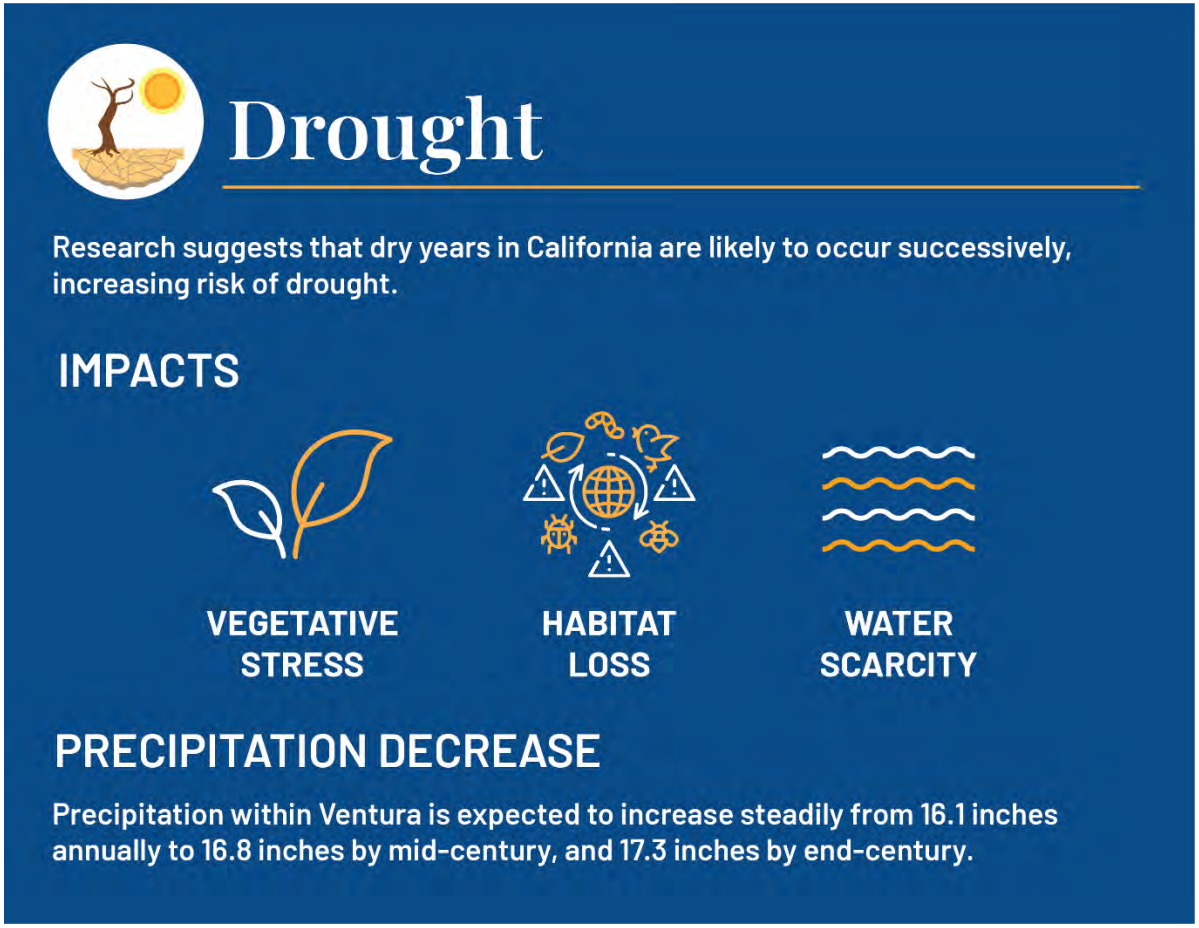
Extreme Heat and Warm Nights



Extreme heat events are defined as days in which the daily maximum temperature exceeds the 98thpercentile value of the historical average (CEC 2021). For Ventura, the threshold temperature is 91.9°F (CEC 2021). Increased frequency of extreme heat days can result in increased public health risks, which tend to be disproportionate for vulnerable populations such as those experiencing homelessness, outdoor workers, older adults, children, and individuals with underlying chronic diseases. These include increased likelihood of heat-related illnesses such as heat stroke, and vector-borne illnesses. Warm nights can further exacerbate the risk of heat illness because they affect the body's ability to cool after a day of heightened temperatures, which may be mitigated with at home cooling systems including fans, air conditioning, and proper insulation. Due to the cost of acquiring and utilizing these systems, disproportionate effects are experienced by those with economic disadvantages. High concentrations of impervious surfaces such as pavements and roofs coupled with minimal tree canopy and green space can increase urban heat effect. This effect can cause temperature increases in urban areas by multiple degrees and is further exacerbated during heatwaves (Hall et al. 2018). Ventura has historically experienced 4 warm nights a year and is projected to experience a mid-century total of 25 nights (RCP 8.5) and an end-century total of 26 (RCP 4.5) to 59 nights (RCP 8.5) (CEC 2021). Extreme heat can also damage roadways, overload electrical grid systems, and result in vegetation die-off or stress.

Drought

Climate change will increase the likelihood that low-precipitation years will coincide with above-average temperature years. Warming temperatures increase seasonal dryness and the likelihood of drought due to decreased supply of moisture and increased atmospheric demand for moisture as evaporation from bare soils and evapotranspiration from plants increases. The increased moisture loss from soils and vegetation amplifies dryness during periods without precipitation. In California's highly variable climate setting, climate models project less frequent but more extreme daily precipitation, with year-to-year precipitation becoming more volatile and the number of dry years increasing (Hall et al. 2018).



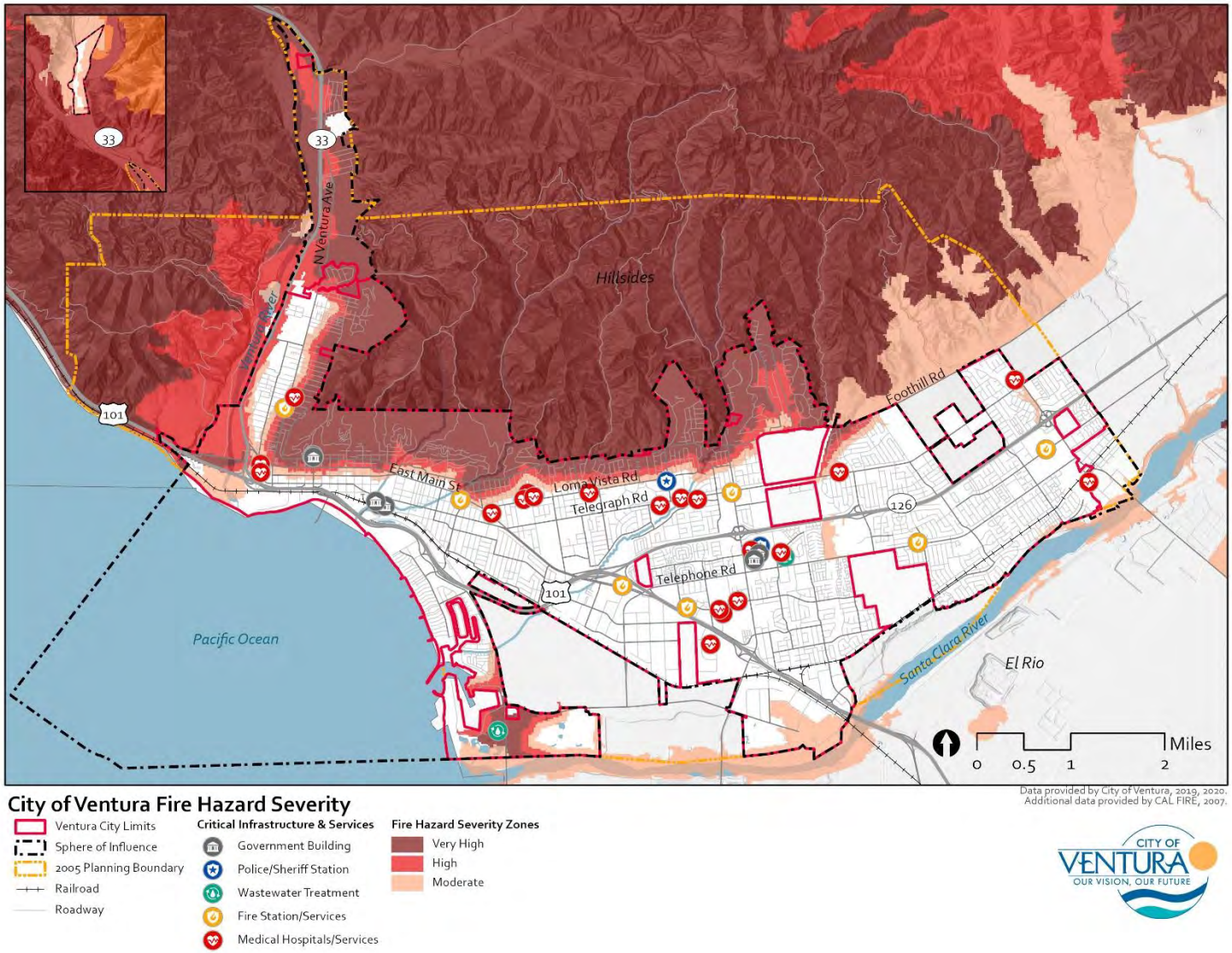
The duration of dry spells is projected to vary based on emissions scenario. Like patterns in precipitation some of the annual variability is obscured within 30-year averages. Despite this, the clear trend is for maximum lengths of dry spells to increase through the end of century (CEC 2021).

Drought can affect vulnerable populations as can suppress economic productivity throughout the Ventura region. Vulnerabilities for natural resources can include stressed vegetation and habitat depletion and populations may be more vulnerable to heat stress and dehydration (Hall et al. 2018). Additionally, sustained drought conditions can lead to dry, dusty conditions which can impact health, as discussed in the section on air quality below.

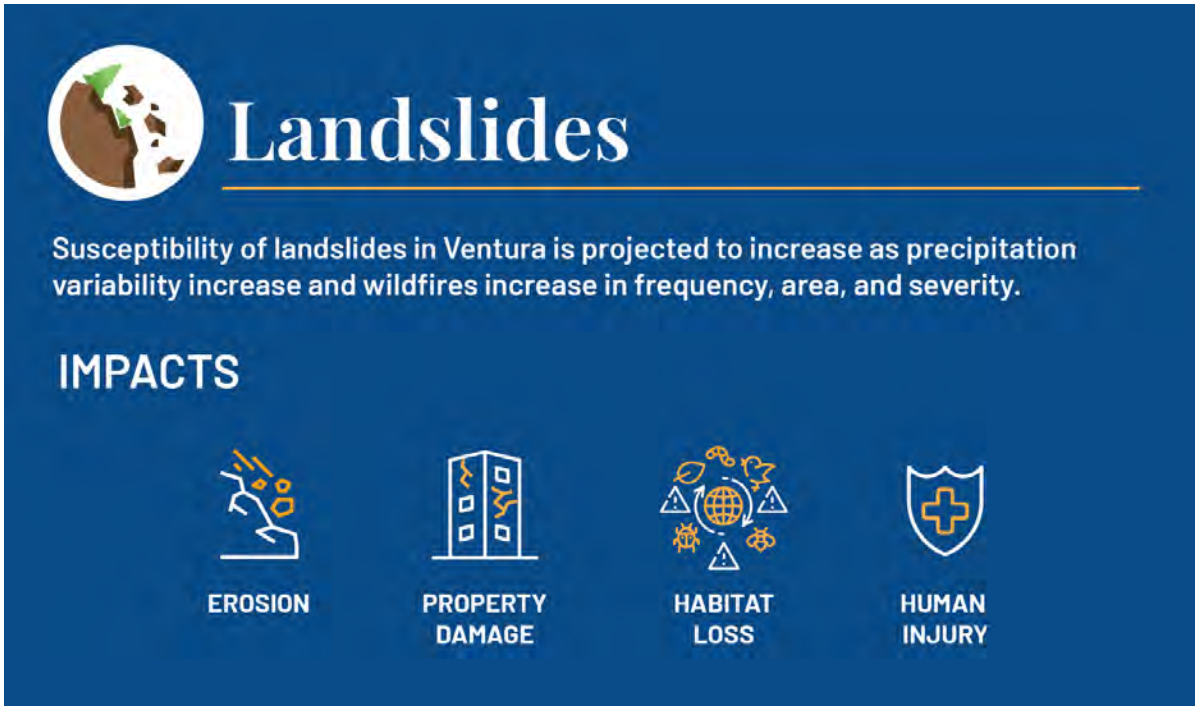
Wildfire

The occurrences of wildfires have increased significantly within California in frequency and intensity over the past two decades (Hall et al. 2018). For Ventura this trend is projected to follow through mid and end-century projections (CEC 2021). Wildfire events are a product of temperature increases compounded with precipitation declines creating wildfire prone conditions. Ventura County's wildfires are influenced by Santa Ana Winds, downed power lines, and fuel availability (Hall et al. 2018). Areas in Ventura that are of significant risk to wildfire are located along the northern portion of the City. These areas are categorized as CAL FIRE very high fire hazard severity zones (VHFHSZ), shown in Figure 3. There are several critical facilities within proximity to the VHFHSZ including medical facilities, government buildings, fire stations, and the police station. Several roads and residential areas are also located within the City's fire zone. Wildfires can create risk of injury, death, or financial hardship if personal property is damaged as well as physical damage to all other assets creating cascading risks for vulnerable populations when infrastructure is damaged or off-line. For example, individuals with chronic health conditions who rely on medical equipment for critical health care could be severely impacted by a wildfire-caused power outage. Since 2005 there have been 14 federal disaster declarations for Wildfire events in Ventura County, including the 2017 Thomas Fire which burned numerous structures and residences in the City of Ventura (County 2022).

Figure 3 Wildfire Hazard Severity Zones in the City of Ventura



Landslides

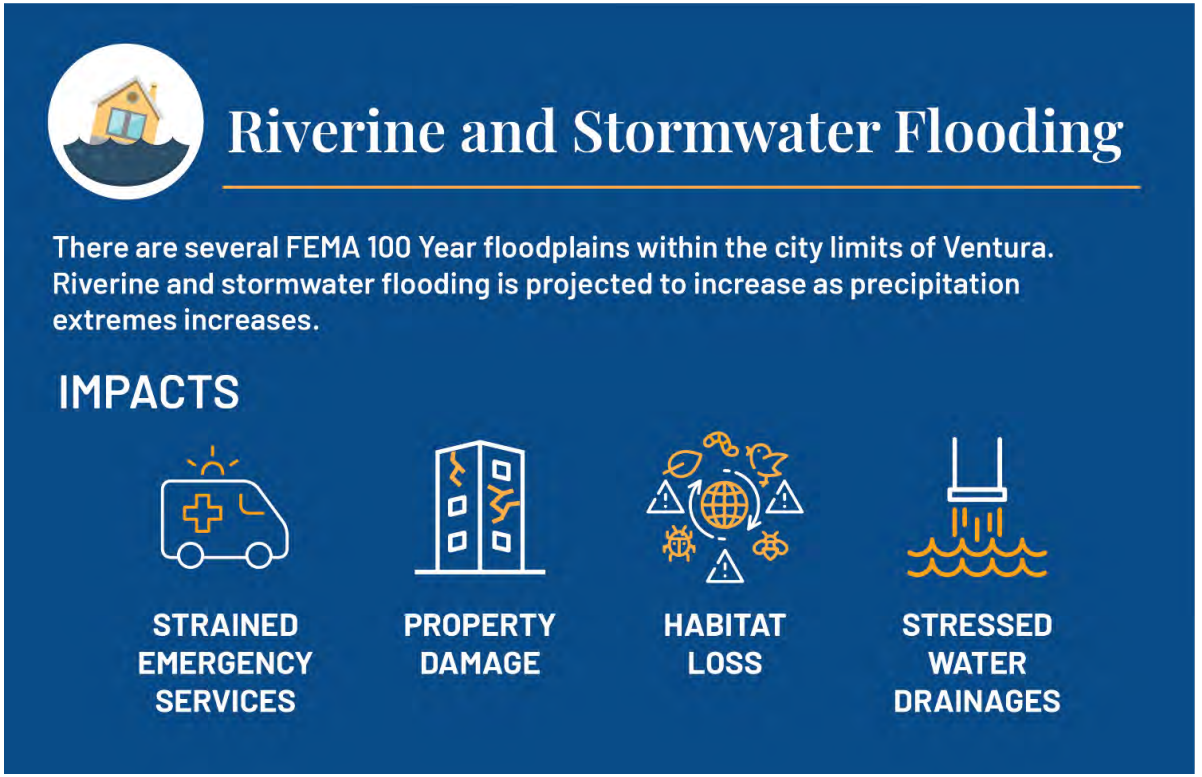


Triggered by extreme bouts of precipitation or wildfires, the susceptibility of the larger Ventura region to landslides is projected to increase as precipitation variability increases and wildfires increase in frequency, area, and severity (Hall et al. 2018). The Ventura Region is projected to experience increases to wildfire and precipitation and subsequently landslide-prone conditions (CEC 2021). Historically, landslides have occurred in the hillsides south of the Santa Clara River, and the east side of the Ventura River. Additional landslide prone regions in the City of Ventura overlap with wildfire zones (CDOC 2021). The Ventura County Multi-Jurisdictional Hazard Mitigation Plan ranks the risk for landslides as the highest of all other climate hazards for the City of Ventura. In 2017, The Thomas Fire burned over 500 homes in the City and left burn scars in the hillsides susceptible to landslides (County 2022). The susceptibility to deep-seated landslides is classified as high along most of the northern border of the City as well as along both sides of Highway 33. Specifically, the hillsides north of Poli Street/Foothill Road, and east of Ventura Avenue and Cedar Street contain several landslide prone areas and are likely to sustain future landslide activity (City 2021). The projected increase in precipitation extremes, alone and in combination with the projected increase in wildfires, creates increased overall potential for floods, mudslides, and debris flows in the City.

Historical Debris Flows

Following heavy rains and winter storms, substantial debris flows have occurred in the Santa Clara River, Ventura River, as well as other local streams and culverts. Debris flows following wildland fires are particularly bad and can require removal of material from streams, streets, culverts, and beaches.

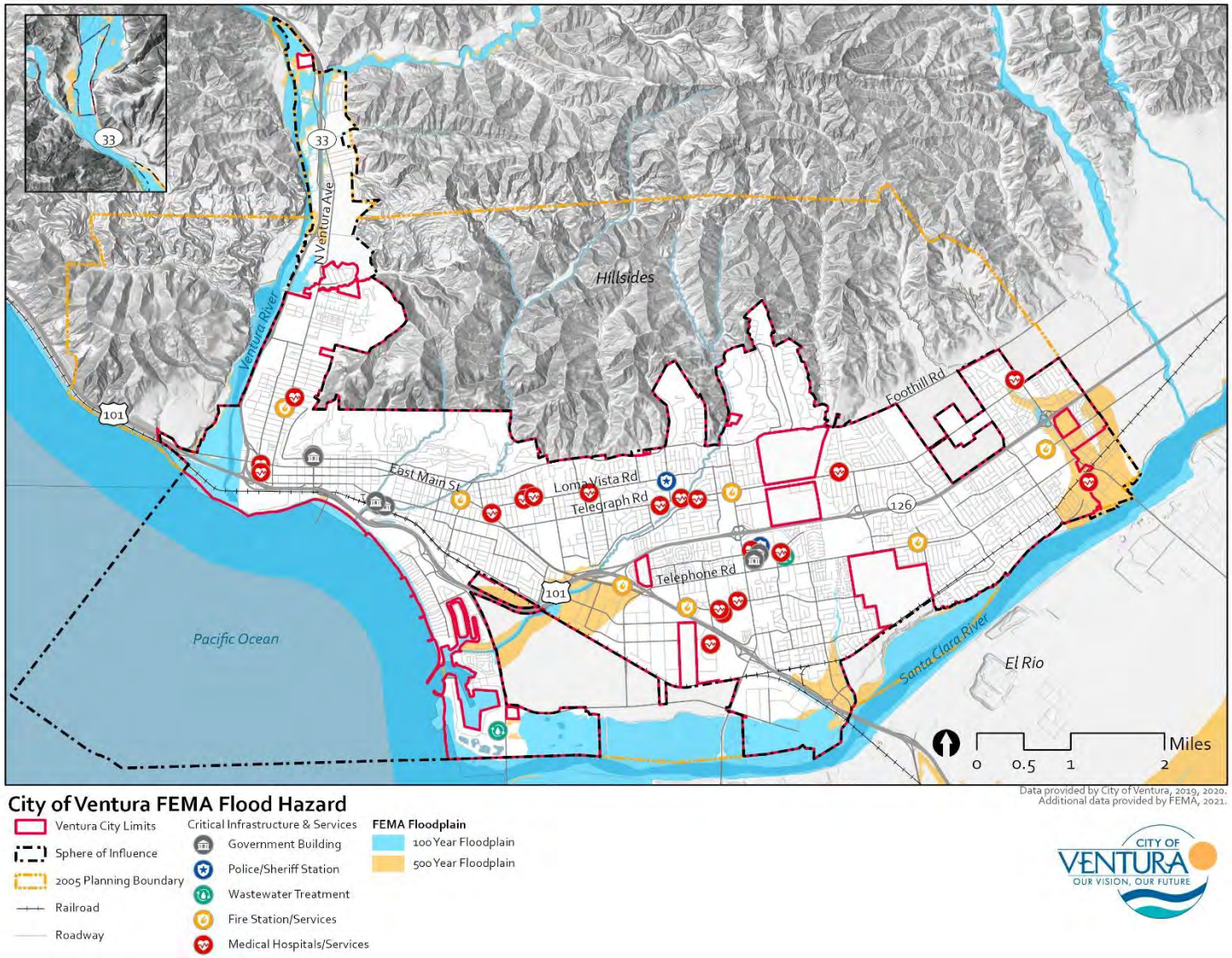
Riverine and Stormwater Flooding



Climate change may cause low-lying areas throughout Ventura to experience more frequent flooding and could increase the extent of 100-year floods, as seen in Figure 4. Stormwater systems may be overwhelmed more frequently as more extreme rain events occur, causing localized flooding which could impact properties and close streets. The Santa Clara and Ventura Rivers run through the City, as well as a series of seasonal watercourses called barrancas. FEMA regulates development along all City watercourses in the case of a 100-year flood event. While 100-year flood hazard zones for Ventura's watercourses are relatively limited, the largest recorded flood event along the Santa Clara and Ventura rivers in 1969 exceeded the 100-year flood zone (Ventura GPU 2005). The Multi-Jurisdictional Hazard Mitigation Plan for Ventura County identifies flooding as a medium risk, and notes that numerous areas of the City are subject to flooding during periods of high rain. The impact of the flooding includes street closures, and damage to property, vehicles, and buildings (County 2022).

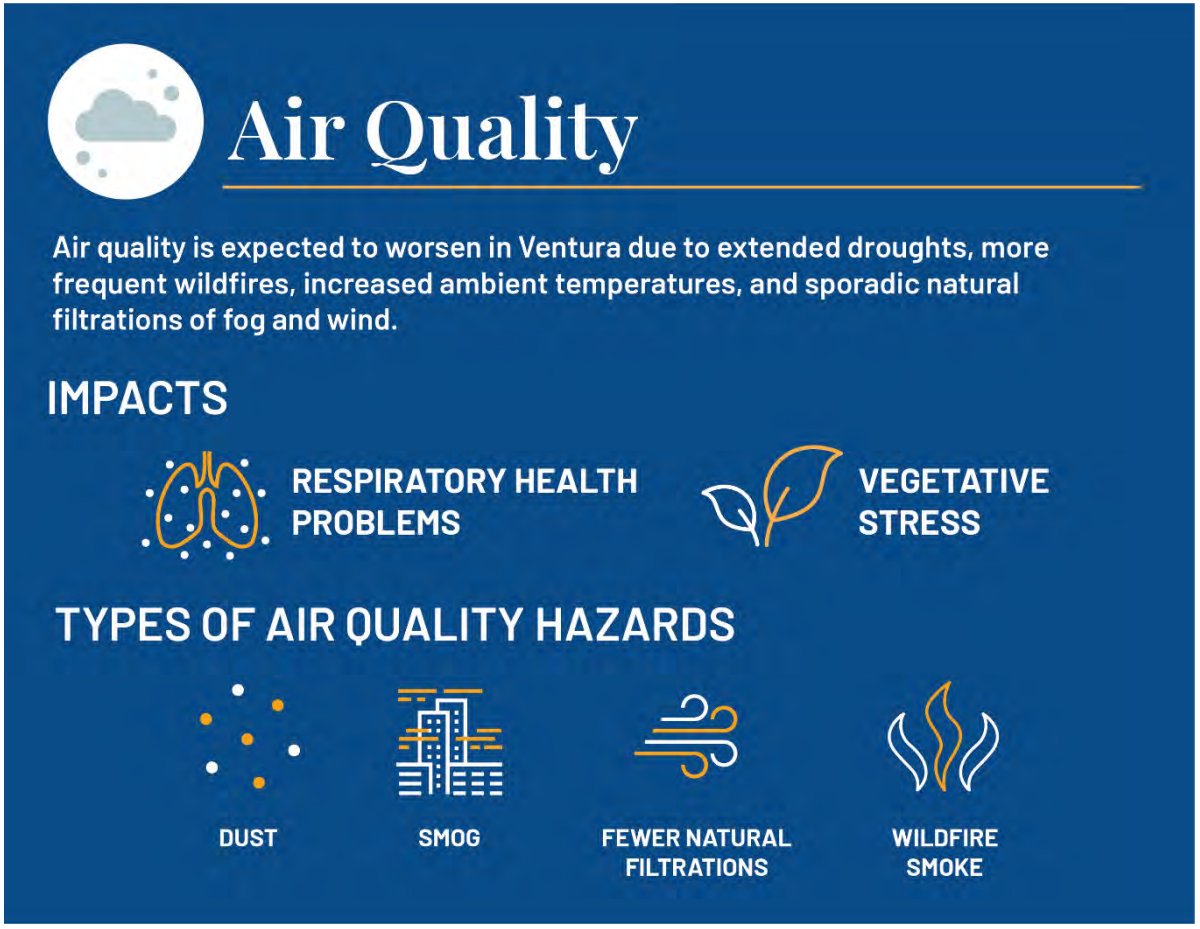
On record, there have been 23 flood events since 1954 that warranted Federal Disaster Declarations in Ventura County. These tend to occur in the winter and early spring following severe storms and/or wildfires and have become more frequent in recent history (County 2022). Flooding impacts cause physical damages from inundation, and can also have cascading effects on power, wastewater, and storm drainage infrastructure, exacerbating public health concerns (Hall et al. 2018).

Figure 4 100 and 500 Year Floodplain in the City of Ventura



Air Quality

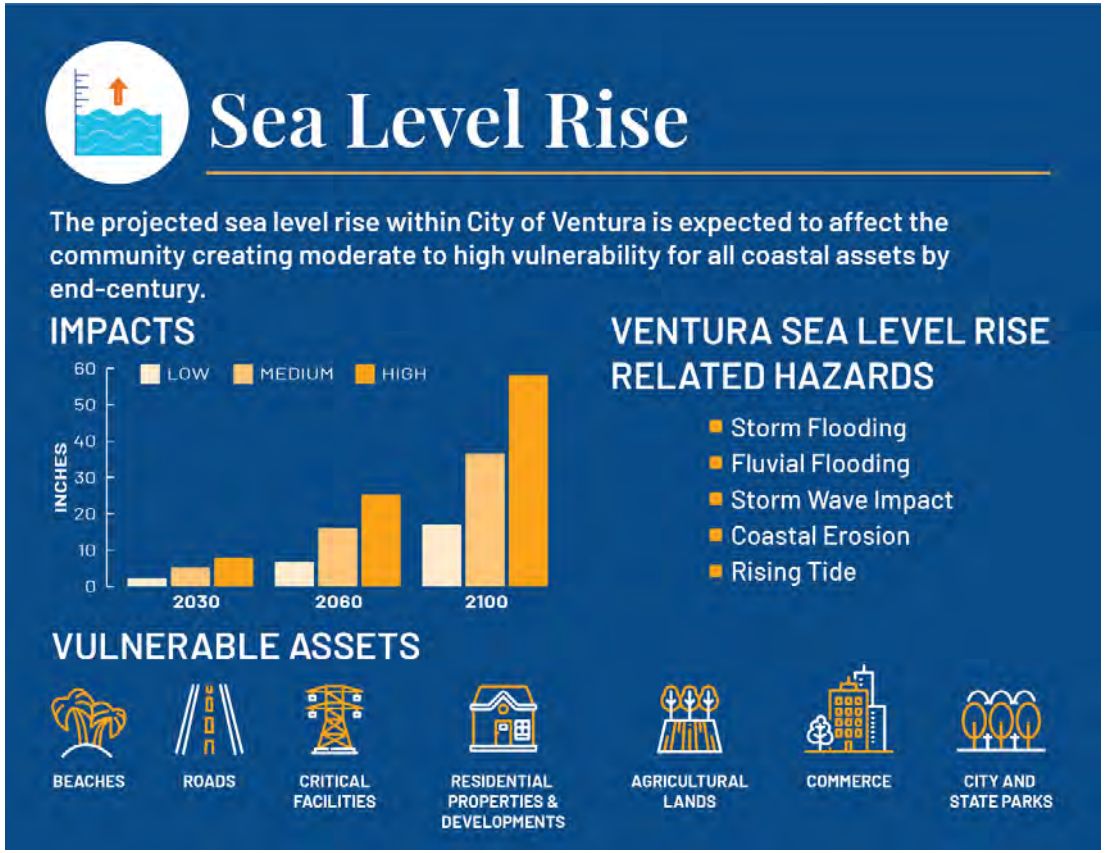
Worsening air quality due to climate change can create respiratory issues for vulnerable populations and impact indoor areas without adequate air filtration systems. There are several types of air quality decline sources found below:



- **Dust.** Increased temperature leads to dry, dusty conditions also associated with drought (Hall et al. 2018).
- **Smog.** Increases in ambient temperature can lead to higher rates of smog also referred to as ozone. Ground-level ozone specifically will be experienced at higher rates leading to raised cardiovascular and respiratory morbidity and mortality rates (CDPH, 2014). Ground-level ozone has also been shown to have particularly disproportionate adverse impacts on populations experiencing homelessness and lower median income (PNAS 2021). The City of Ventura will experience increases in ozone concentrations in parallel to temperature increases.
- **Fewer Natural Filtrations.** Precipitation variability and long periods of dry spells lead to less reliable air quality for the entire region. Moisture in the air can filter pollutants and provide for overall improved conditions.
- **Wildfire Smoke.** Temperature, severe wildfire conditions, and the area burned by wildfires throughout the state has increased and will continue to increase. Higher temperatures accompanied by an increase in the incidence and extent of large wildfires will lead to increased wildfire smoke and associated toxins and air pollution (Hall et al. 2018).

Sea Level Rise

- Sea levels in California are expected to rise in the coming decades as a result of global greenhouse gas emissions. It is anticipated that until mid-century, the most damaging events for the California coast will be dominated by large El-Niño-driven storm events in combination with high tides and large waves. By the end of the century, as sea levels continue to rise, scientists project that even small storms will cause substantial damage and large events will have unprecedented consequences (CCC 2018). The effects of sea level rise in Ventura include regular rising tides, coastal erosion, wave impact, storm flooding, and fluvial flooding. Climate change is expected to increase the rate of sea level rise dependent on the extent of warming temperatures. The Nature Conservancy Coastal Resilience Model provides precise hazard predictions and has been used for all the coastal planning in the Ventura region. This tool is available statewide and has detailed modeling for Ventura County. The following are Coastal Resiliency projections for SLR and related hazards for the Ventura region. They are provided for the years 2030, 2060, and 2100 at low, medium, and high SLR rates (TNC n.d.)
- By 2030, sea level is expected to rise 2.3" (in a low modeling scenario), 5.2" (in a medium outcome scenario), and 8.0" (in a high outcome scenario).
- By 2060, sea level is expected to rise 7.4" (low), 16.1" (medium), and 25.3" (high).



- By 2100, sea level is expected to rise 17.1" (low), 36.5" (medium), and 58.1" (high).

The following sub-sections discuss sea level rise related hazards and their current and projected impacts on the City of Ventura.

Coastal Erosion

Large portions of the California coast are susceptible to coastal erosion. As sea levels rise, the amount of time that beaches are exposed to waves and abnormally high tides increases, furthering beach erosion and substantially altering the width of beaches (CCC n.d.) Figure 6 shows projected coastal erosion in the City of Ventura for 2030, 2060, and 2100 (TNC n.d.) Sandy beaches and dunes are at risk of erosion related to sea level rise, with low-lying beaches, such as those in the City, being at particular risk (TNC 2021). 2030 projections show erosion potential surpassing the beach line and entering the residential community along Ventura Beach. The By 2060 and 2100, estimation of erosion impacts are expected to increase with the greatest change taking place north of Sanjon Road, where erosion will impact Shoreline Drive and the neighboring commerce.

Fluvial Flooding

The City of Ventura is set between two rivers, the Santa Clara and Ventura Rivers, both of which deposit into the Pacific Ocean. Fluvial flooding during storm events is expected to worsen as ocean water levels rise (TNC n.d.) As seen in Figure 4, models project fluvial floodplains along these rivers in the event of 100-year flood. The 100-year floodplain for the Santa Clara River extends from Olivas Park Drive to West Gonzales Road, with a breakout area reaching south of West Gonzales Road between South Victoria Avenue and West 5th Street.

Storm Flooding

Climate change may cause low-lying coastal areas to experience more frequent flooding and an increase in the inland extent of 100-year coastal floods. Drainage systems that discharge close to sea level may also have similar issues and inland areas may become flooded if outfall pipes back up with saltwater (CCC n.d.) Figure 7 shows projected storm flooding in the City of Ventura for 2030, 2060, and 2100 (TNC n.d.) During winter storms, increased temporary short-term flooding in tandem with sea level rise. If coupled with high tides and large waves, significant erosion and property damage is likely to occur. In a moderate SLR scenario of 14 inches or less – likely to occur before 2050—the risk of serious flooding to life and property would increase by orders of magnitude (Hall et al. 2018). The 2030 projections show impacts to nearly all the residences and commercial areas south of East Harbor Blvd. By 2060 and 2100, projections show flooding surpassing the Ventura Freeway at the intersection of Highway 33. This level of flooding could affect roads, residential developments, the wastewater treatment facility, and medical facilities, as well as commercial and industrial areas in the City.

Storm Wave Impact

Rising sea levels will cause waves to force water further inland, especially during coastal storm events (CCC n.d.) If waves become larger and more frequent, they are expected to increase erosion of beaches, possibly damaging properties, and development. Figure 8 shows projected storm wave impact in 2030, 2060, and 2100 in the City of Ventura (TNC n.d.) In 2015, waves of up to 15 feet resulted in the evacuation and closure of the Ventura Pier, and caused 15 pylons to break, causing an extended closure while repairs were made (County 2022). In 2030, storm wave impacts are expected encroach on the communities south of Ventura Beach, and the

Marina Park and Harbor areas. By 2060 and 2100, the impacts are magnified, and are projected to extend beyond the Ventura Highway at the intersection of Highway 33. These impacts could affect residential areas, parks and open space, medical and governmental facilities, as well as commercial and industrial areas in the City.

Rising Tide

Sea level rise will cause areas not currently exposed to the tide to become inundated (CCC n.d.) Unlike flooding, inundation results in permanent wetting, often resulting in the need to either protect or move infrastructure and development. Figure 9 shows projected rising tide impacts in 2030, 2060, and 2100 in the City of Ventura (TNC n.d.) In the City of Ventura, people experiencing homelessness live on or near the beach and are therefore at a greater risk during high tide events (County 2022). Near term impacts (i.e., 2030 and 2060) from projected rising tide in the City is minimal. By 2100, the rising tides are expected to impact Seaside Wilderness Park and residential and commercial structures near Marina Park in the area known as the Ventura Keys.

Figure 5 Sea Level Rise in the City of Ventura

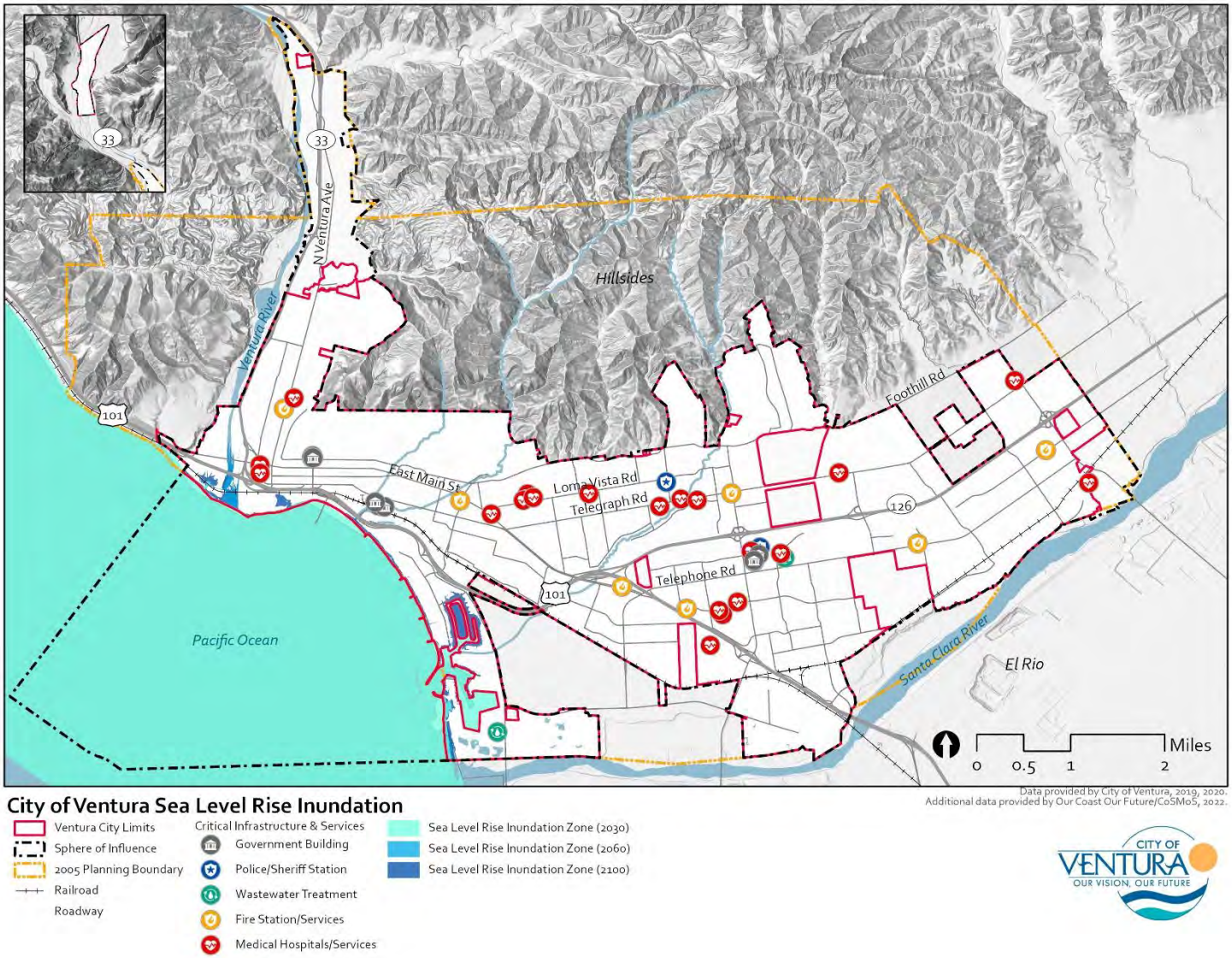


Figure 6 Coastal Erosion in the City of Ventura

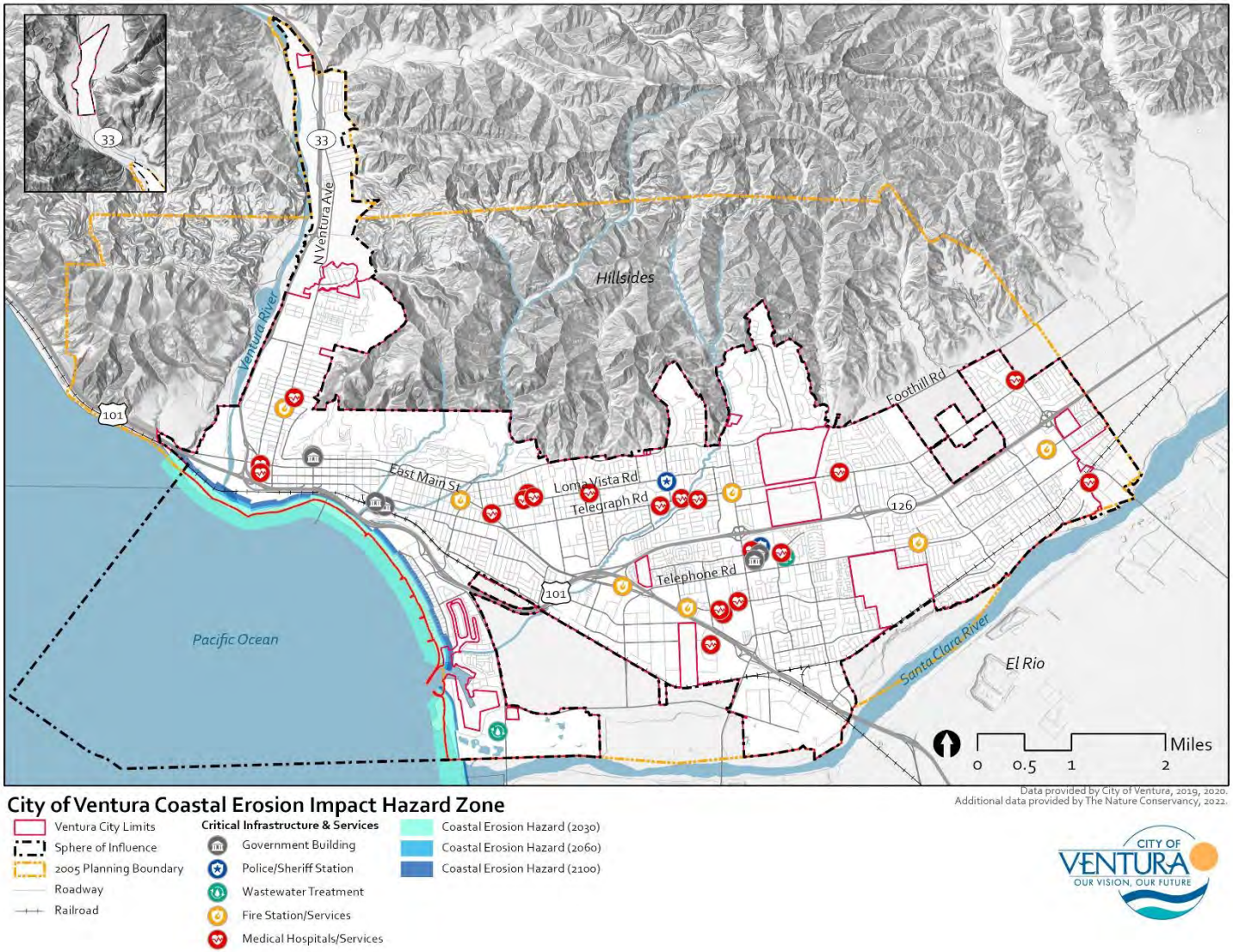


Figure 7 Coastal Storm Flooding in the City of Ventura

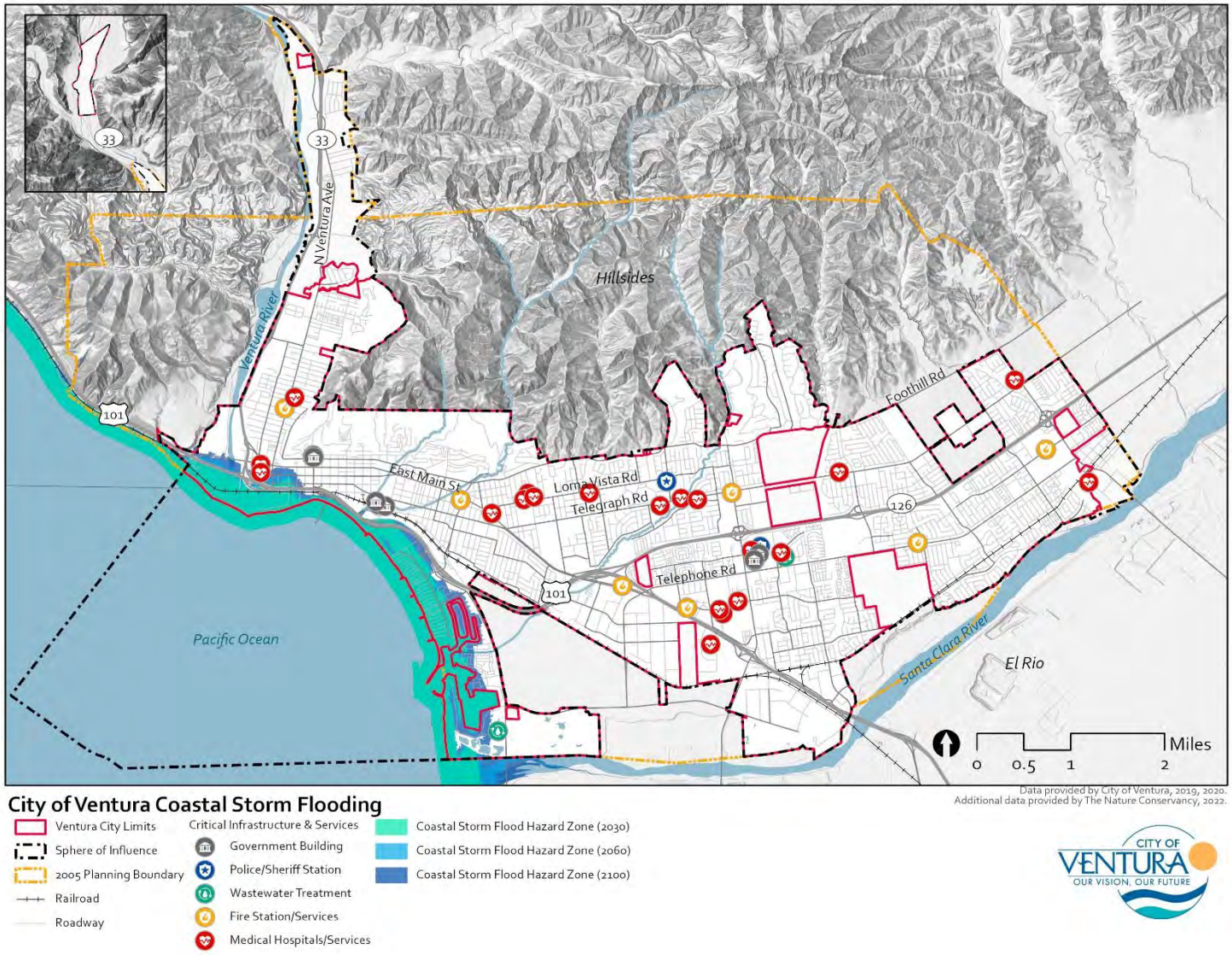


Figure 8 Storm Wave Impact in the City of Ventura

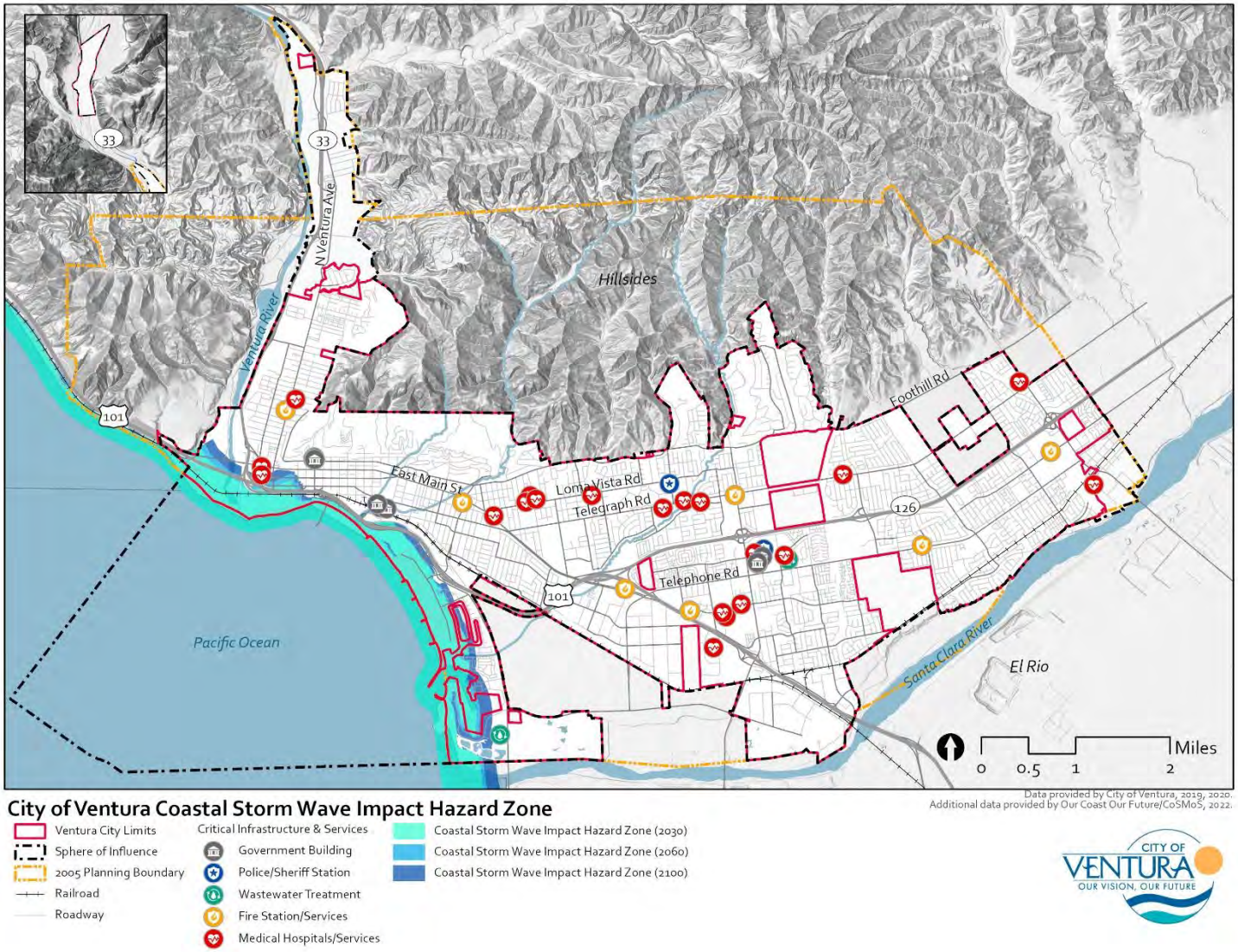
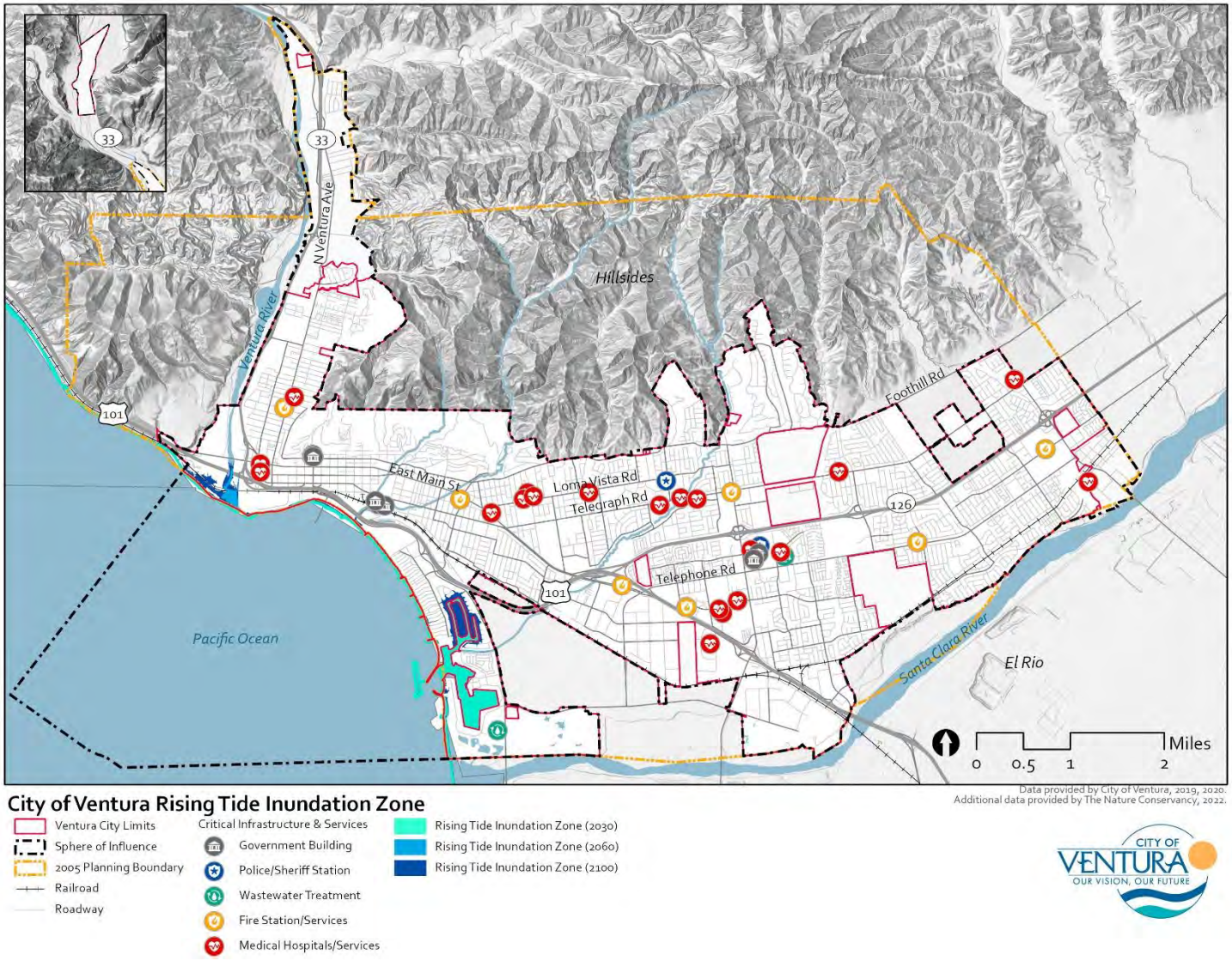


Figure 9 Rising Tide Inundation in the City of Ventura



3 Sensitivity

Populations and assets are affected by climate change depending on their sensitivity to climate hazards. This section identifies sensitive populations and assets within the City of Ventura. Potential impacts from the climate hazards of concern on sensitive populations and assets are presented in the Vulnerability Analysis section. Assets are grouped in the following manner:


Vulnerable Populations


Natural and Managed Resources


Buildings and Facilities


Infrastructure and Critical Services

3.1 Vulnerable Populations


While all people in a community will experience climate change, some may be more affected than others. For example, older adults and young children may be more at-risk to heat illness during an extreme heat event. Several factors influence sensitivity to climate hazards including an individual's health, age, and ability, societal disadvantages, inequities in access to health care, economic opportunity, education and other resources, and inequities found in basic needs and exposure to environmental stressors (Cal OES 2020). Vulnerable populations experience heightened risk to climate change and have fewer resources to adapt and recover from climate change impacts. Following guidance from the Southern California Adaptation Planning Guide, vulnerable population groups were identified for the City (SCAG 2020). Indicators of vulnerable populations were also identified as part of the Social Vulnerability Assessment for the City of Ventura Climate Action and Resilience Plan using data gathered from U.S Census Bureau's 2-15-2019 American Community Survey (ACS). The City of Ventura has several vulnerable populations that will disproportionately experience the impacts of climate change, listed in Table 3 below.

Vulnerable populations were grouped based on potential exposure to climate hazards, access to resources to prepare, cope with, or recover from climate hazards, whether individuals face societal disadvantages, or if individuals have heath conditions or health sensitivities that leave them vulnerable to climate hazards.

Table 3 Vulnerable Populations in the City of Ventura

Population	Population Description	Total Number, Percentage of Population, or Households
Renters*	Percent renter-occupied housing units	45.5%
Population of color*	All individuals that do not identify as white	45%
Seniors*	Percentage 65 years or older	16.6%
Foreign-Born-Non-Citizens	Percent of people born outside of the US that are not US citizens	47.3%
Individuals with no health insurance	Individuals aged 18 to 64 years old currently uninsured	9.7%
Individuals with disabilities*	Individuals with any of the six disability types (hearing, vision, cognitive, ambulatory, self-care, and independent living difficulty)	12.3%
Youth and Children*	Percent age 17 or younger	21.4%
Miliary Veterans	Individuals who have served but are not currently serving in the US Armed Forces	6,656
Linguistically isolated individuals*	Individuals 5 years and older who speak English less than very well	8.8%
Agricultural workers*	Individuals who are employed, 16 and older, and work in agriculture	2.9%
Outdoor construction workers*	Individuals who are employed, 16 and older, and work outdoors in construction	6.4%
Isolated Individuals*	Percent no vehicle households	6.5%
People experiencing homelessness	Individuals who currently lack fixed, regular, and adequate housing	531
Tribal and Indigenous communities	American Indian or Alaska Native	0.427%
Housing cost burdened*	Percent of households with housing cost burden (renter and homeowner)	39.9%
Individuals with education attainment less than 4 years of college*	Percent age 25 or older with less than a Bachelor's degree	64.9%
Mobile Homes*	Percent of mobile homes	5.2%
Pre-1980 Housing*	Percent of pre-1980 housing	70%
Low Income*	Percent of households below 80% of area median income	47.7%
Households without broadband internet*	Households without access to broadband internet	17.7%

Source: The percentages used in this table were acquired from the California Healthy Places Index 3.0 and the U.S. Census American Community Survey (ACS) 2015-2019 5-year estimates acquired from Social Explorer.

Notes:

*These indicators were identified as part of the Social Vulnerability Assessment for the City of Ventura Climate Action and Resilience Plan.

Often individuals have characteristics that make them vulnerable in a variety of ways; however, for the purpose of this report, they were grouped based on the sensitivity that increases their risk the most. Vulnerable populations are grouped below:

- **Individuals with High Outdoor Exposure.** Agricultural workers, outdoor construction workers, and people experiencing homelessness.
- **Under-Resourced Individuals.** Individuals with no health insurance, low income, renters, isolated individuals, housing cost burdened, pre-1980 housing occupants, mobile home occupants, individuals with education attainment less than 4 years of college, and individuals without broadband internet**.**
- **Individuals Facing Systemic Discrimination.** Populations of color, linguistically isolated, Tribal and Indigenous communities, and foreign-born-non-citizens.
- **Individuals with Chronic Health Conditions or Health Related Sensitivities.** Seniors, Youth, Individuals with disabilities, and Military Veterans.

3.2 Natural and Managed Resources

Natural and managed resources within the City of Ventura are detailed in the City's General Plan. Natural resources include coastal resources and beaches, hillsides, rivers (Ventura River, Santa Clara River) and barrancas, riparian and freshwater marshes, and the related biodiversity. Recreational resources include neighborhood, community, citywide, linear parks, and agricultural lands. The City oversees nearly 600 acres of developed park facilities (City 2005). Agriculture has been a dominant industry in Ventura for decades and can be found in various parts of the City including Midtown, the North Bank, and at Taylor's Ranch (City 2005). These various resources provide habitat, sources of community resilience, recreation, and economic productivity to the City. These resources are spread throughout the City and face various levels of exposure to climate hazards.

3.3 Buildings and Facilities

Climate change is expected to amplify extreme weather and climate hazards in the City of Ventura. A jurisdiction's vulnerability increases when buildings and facilities are not designed, operated, and/or maintained to function effectively under extreme weather conditions or can be damaged by extreme weather conditions. The following buildings and facilities would be particularly sensitive to climate change including residential buildings and developments, and educational facilities.

3.4 Critical Infrastructure and Services

Within the City of Ventura there is a wide array of critical infrastructure and services that are vulnerable to the impacts of climate change. Assets within this category include water supply, wastewater treatment, solid and hazardous material waste and recycling, government buildings, fire services, police services, medical services, utilities and major utility corridors, communication facilities, energy services, public transportation, roadways, and active transportation routes. This asset group is sensitive to climate change as the impacts of hazards can affect the service line ability to provide resources and the infrastructure in place may not be adequately prepared to sustain increasing and compounding hazards.

4 Adaptive Capacity

Adaptive capacity is the ability to adjust to the consequences of climate change. This section summarizes the ways in which the City currently manages for the negative impacts of climate change. Types of adaptive capacity include adjustments in behavior, resources, and technologies. The City of Ventura has actively taken steps to increase the City's adaptive capacity. Existing policies, plans, programs, and institutions that increase the City's resilience to climate change impacts are organized by climate hazard and listed in Table 4.

4.1 Programs, Plans, and Policies to Manage Impacts of Climate Hazards

Table 4 lists programs, plans, and policies that help communities become more resilient to an increase in climate hazards.

Table 4 Program, Plans, and Policies to Manage Impacts of Climate Hazards

Existing and Planned Programs, Plans, and Policies	Objectives	Climate Hazard Mitigated
Ventura County Contingency Plan for Heat/Cold Weather Events (County 2020)	This document outlines responses to an extended heat wave or cold weather that could endanger the lives of citizens of Ventura County, especially those who are medically fragile, those living alone, and disabled individuals. Some considerations discussed include community centers as refuges from weather, creation of Voluntary Relief Centers, and proposed establishment of Cooling Centers.	Severe weather
Heatwave Safety (City of Ventura n.d.)	The City of Ventura webpage under emergency preparedness provides information about extreme heat and how to prepare for a heat emergency. The page Includes resources for shelter from extreme heat and signs of heat-related illnesses.	Severe weather
Surfers Point Managed Retreat Project (Surfrider Foundation 2022)	This project focuses on moving infrastructure away from the beach to preserve the beach and surf break. Instead of building coastal armor such as a seawall, this project will move the parking lot, pedestrian path, and bike path away from the tideline. The project also includes planting and maintaining native vegetation within sand dunes and bioswales.	Sea level rise, stormwater runoff

Existing and Planned Programs, Plans, and Policies	Objectives	Climate Hazard Mitigated
2020 Draft Urban Water Management Plan for the City of San Buenaventura (City of Ventura 2020)	The 2020 Urban Water Management Plan for the City of San Buenaventura includes descriptions of the community's water supply sources, projected water demands, and supply reliability during normal water years, single dry years, and five-dry years. The plan includes a discussion of the potential impacts of climate change on the system as well as reliability planning and a water shortage event contingency plan. The Urban Water Management Plan does not include strategies for mitigation and adaptation.	Drought, flooding
Coastal Resilience Ventura Project (TNC n.d.)	This program uses a web-based mapping tool to help identify Ventura County's vulnerability from coastal hazards. Vulnerable populations are identified under various climatic scenarios. Critical infrastructure in coastal zones is identified under various sea level rise and storm surge scenarios as well.	Sea level rise, severe storm
Ventura Land Trust Community Wildfire Protection Plan (Ventura Land Trust 2022)	The Ventura Land Trust's Community Wildfire Protection Plan (CWPP) identifies wildfire risks and clarifies priorities for funding and programs to reduce impacts of wildfire on communities at risk. Some actions include vegetation management, wildfire safety education programs, and establishment and maintenance of evacuation routes.	Wildfire, air quality
Ventura Regional Fire Safe Council Home Hardening Resiliency Program (VRFSC 2020)	The Ventura Regional Fire Safe Council has implemented Wildfire Safety Liaisons to lead in facilitating educational workshops as well as free home hardening assessments in locations designated as high-risk for wildfire.	Wildfire
The 2005 City of Ventura General Plan (City 2005)	The 2005 City of Ventura General Plan includes actions that assess wildfires, flood hazards, air quality, water supply, and emergency response practices. General Plan policies include actions to optimize firefighting and minimize exposure to air pollution associated with point sources, project design review, land use compatibility, and compliance with the Ventura County Air Pollution Control District requirements. The General Plan also describes the water supply and system including the Casitas Municipal Water District, Ventura River surface water intake, subsurface water and wells (Foster Park), Mound groundwater basin, Oxnard Plain groundwater basin (Fox Canyon Aquifer), and Santa Paula groundwater basin. The General Plan includes policies for resource conservation, policies to minimize flood hazards and mitigation for new development within flood hazard zones.	Wildfire, flooding, air quality, drought
Ventura County Multi-Jurisdiction Hazard Mitigation Plan (Ventura County 2022)	The Ventura County Multi-Jurisdiction Hazard Mitigation Plan describes hazard mitigation policies for landslides, flooding, wildfires, sea level rise, and drought. The policies within the plan are regarding FEMA 100-year tide	Landslides, flooding, wildfires, sea level rise, drought, severe weather, severe storm

Existing and Planned Programs, Plans, and Policies	Objectives	Climate Hazard Mitigated
	and sea level rise, compliance with NFIP, flood plain management, and long-term resilience to sea level rise and extreme storms for communities and critical assets adjacent to San Buenaventura Beach, Santa Clara River, Ventura River, and nearby areas of the shoreline. The plan also describes the County's StormReady program, Ventura Water Pure Program, Hall Canyon Channel Drainage Basin Improvement Project, and wildfire awareness program.	
City of Ventura Emergency Response Team (CERT) Program (City of Ventura 2020)	The CERT program trains volunteers in basic first aid, light search and rescue, and small fire suppression, and is closely associated with Ventura's Fire Department. CERT volunteers may assist neighbors and other emergency personnel in times of emergency, and support evacuations along with other responsibilities.	Severe weather, severe storm, landslide, flooding, wildfire
City of Ventura Emergency Operations Plan (City of Ventura 2021)	Ventura's Emergency Operations Plan details protocols to improve emergency preparedness, response, and recovery from natural disasters. The plan provides a system for the effective management of emergency situations and identifies lines of authority and responsibility. The plan reviews the hazards most likely to impact the City, especially those exacerbated by climate change including drought, extreme heat, wildfire, flooding, and severe winter storms.	Drought, extreme weather, wildfire, flooding, severe storm
City of Ventura Tree Master Plan (City 2018)	The City Tree Master Plan is a guide to effective administration and management of a comprehensive Urban Forest program in the City. Tree canopy is low in the City and this Plan discusses the climate adaptation benefits of tree canopy.	Drought, extreme heat, air quality

5 Vulnerability Analysis

This section describes the impacts each climate hazard has on community assets and services described in the Sensitivity section. Existing plans, policies, and programs that contribute to the adaptive capacity is summarized throughout. An impact score and an adaptive capacity score is identified for each asset by climate hazard, along with an overall vulnerability score consistent with the scoring methodology described in Vulnerability Assessment Methodology.


Vulnerable Populations


Natural and Managed Resources


Buildings and Facilities


Critical Infrastructure and Services

5.1 Vulnerable Populations


Individuals with High Outdoor Exposure including agricultural workers, outdoor construction workers, mobile home occupants, and people experiencing homelessness face disproportionate direct exposure to climate hazards, causing them to be extremely vulnerable to the effects of climate change.

Under-resourced individuals often do not have access or the ability to afford resources needed to prepare for, cope with, and recover from climate change impacts. Individuals who are unemployed or are low-income often face financial barriers when preparing for and recovering from climate change hazards. Individuals in these groups often live in homes that are less protected against climate hazards. Low-income individuals may not be able to take time off work to address health concerns either caused by or exacerbated by climate hazards. Individuals with educational attainment of less than 4 years of college usually have lower earning potential than those with a 4-year college degree. As defined by the U.S. Census Bureau, this population group does not include individuals who have attended trade schools, apprentice programs, or who have attained associates degrees. Individuals with 4-year degrees are half as likely to be unemployed than those who only have a high school degree (Association of Public and Land-Grant Universities n.d.). Under-resourced individuals in this group are less likely to have access to transportation, healthcare, and other basic needs. These individuals often lack the financial resources to evacuate from a climate hazard and/or find an affordable place to evacuate to.

Individuals Facing Systemic Discrimination are subject to disproportionate impacts of climate change. People of color are more likely to live in high hazard risk areas and less likely to be homeowners, which leaves them vulnerable to climate hazards. If evacuation and/or advisory notices, hazard preparedness material, or governmental guidance is not provided in languages other than English, linguistically isolated individuals, and foreign-born non-citizens may not be able to prepare for, cope with, or recover from a climate hazard (Gamble et al. 2016). The close relationship some

tribal communities have with their surrounding ecosystems and natural resources leaves these populations particularly at risk to climate change impacts because the natural systems their livelihoods are dependent on are rapidly changing (Baird 2008).

Individuals with chronic health conditions or health related sensitivities are socially and physiologically vulnerable to climate change impacts and hazards. Seniors and individuals with disabilities may have limited or reduced mobility, mental function, or communication abilities, making it difficult to evacuate during or prepare for a climate hazard event (CDPH 2020). They may also have medical needs for electricity which may be impacted during a public safety power shutoff or climate hazard event. Individuals in these groups are more likely to have pre-existing medical conditions and/or chronic illnesses that may exacerbate the risk of illnesses and medical problems from climate hazards. Children are socially and physiologically vulnerable to climate hazards with limited understandings of climate hazards and insufficient resources to independently prepare for and safely respond during a climate hazard event. Children, especially young ones, are reliant on their parental figures to ensure their health, safety, and wellbeing (CDPH 2020). Children also have vulnerable physical characteristics because they have not fully physiologically developed and are therefore more vulnerable to health effects of climate change impacts (Kenny et al. 2014). Military veterans are more likely to be low-income and experience homelessness after their service, which also makes them vulnerable to preparing for and responding to climate hazards (Olenick et al. 2015).

Potential Impacts

Extreme Heat and Warm Nights

Outdoor workers and people experiencing homelessness are at risk to health impacts from extreme heat. Outdoor workers, including construction workers and agricultural workers, are often subject to strenuous work conditions and are vulnerable during extreme heat events. People experiencing homelessness are exposed to health-related impacts associated extreme heat because they have limited access to shelter and air conditioning. The primary health impacts to these populations are heat-related illnesses, such as heat stress, heat stroke, and dehydration, which can be life-threatening (CDPH 2020).

Under-resourced individuals may not be able to pay for adequate air conditioning or fans, increasing their exposure to extreme heat. Isolated individuals don't have access to a vehicle to travel to cooling centers or move to temporary shelters during extreme heat event (Cooley et al. 2012). Under-resourced individuals are less likely to receive medical care for illnesses triggered or exacerbated by extreme heat. Households without a computer or broadband internet may not receive heat advisory warnings or governmental guidance, causing them to experience health impacts from extreme heat exposure (CDPH 2017). Additionally, individuals with no health insurance may not be able to receive care in the case of extreme heat related illness.

People experiencing systemic discrimination, including populations of color, linguistically isolated, foreign-born-non-citizens, and Tribal and Indigenous communities are at risk to impacts of extreme heat. Communities of color and Indigenous communities often live in housing with insufficient protection from extreme heat events and limited or no affordable air conditioning (Gamble et al. 2016). Linguistically isolated individuals may not to be able to read heat

advisory warnings or governmental guidance, potentially causing them to experience greater exposure to extreme heat (Gamble et al. 2016). The primary health impacts to these populations are heat-related illnesses, such as heat stress, heat stroke, and dehydration, which can be life-threatening (CDPH 2020). These populations may not have access to medical services to treat heat-related illnesses.

Individuals with chronic health conditions or health related sensitivities are particularly at risk to heat related illnesses during extreme heat events. Individuals with disabilities, older adults, youth, and children may have difficulty turning on air conditioning or traveling to cooling centers during extreme heat events. Extreme heat conditions can exacerbate asthma, cardiovascular disease, certain disabilities, and other respiratory and cardiovascular conditions, potentially causing heat-related illnesses such as heat stress, heat stroke and dehydrations, which can be-life threatening (CDPH 2020). Children are still physiologically developing which means that they are less able to regulate their bodies during extreme heat events (Kenny et al. 2014).

Drought

Individuals with high outdoor exposure are at risk to drought conditions and associated cascading impacts. During prolonged drought conditions, people experiencing homelessness may have difficulty accessing clean and affordable drinking water (Gamble et al. 2016).

During periods of prolonged drought, under-resourced individuals are more likely to experience the cost burden associated with increased water rates (Feinstein et al. 2017). These individuals may struggle to access clean and affordable drinking water which may cause dehydration and/or exacerbate underlying health conditions and illnesses (Gamble et al. 2016).

Individuals facing systemic barriers may face discrimination and restrictive policies when seeking to access affordable and clean water supplies, which may cause dehydration and/or exacerbate underlying health conditions and illnesses (Gamble et al. 2016). Tribal communities may experience food insecurity if a drought negatively impacts local food sources (Lynn et al. 2011).

Individuals with chronic health conditions or health related sensitivities are at risk to drought conditions and associated cascading impacts. Prolonged drought conditions can lead to water scarcity and individuals may need to rely on poor quality water supplies. Individuals with chronic health conditions or health related sensitives may experience negative health impacts if they become dehydrated. Children, youth, and older adults are especially at risk to dehydration as their bodies are not able to regulate as well (Kenny et al. 2014). Dehydration may exacerbate underlying health conditions and illnesses. (CDPH 2017).

Wildfire

Outdoor workers may be exposed to hazardous work conditions during wildfire events and may become injured from smoke inhalation or burns. People experiencing homelessness are particularly at-risk during wildfire events as they often suffer from respiratory conditions, mental illness, and chronic health conditions that may be exacerbated from physical contact with wildfire or smoke inhalation. People experiencing homeless have limited access to shelter and do not have access to transportation to evacuate from burning areas. They may also have their personal belongings destroyed or damaged during a wildfire event (CDPH 2017).

Under-resourced individuals may experience injuries or death from smoke inhalation or burns and are less likely to receive medical treatment (CDPH 2017). These individuals are more likely to live in

wildfire hazard zones and in housing with insufficient protection and thus may have their belongings, homes, and health damaged by wildfire and/or smoke. If this occurs, under-resourced individuals are likely to suffer from the cost burden associated with losses or damage. Households without a computer or internet may not receive communications and evacuations to safely evacuate from hazard areas. Isolated individuals are vulnerable during wildfires because they no do have access to a vehicle to evacuate. Renters have limited control over home hardening and improvements that may protect against fire and smoke. Subsequently, they may experience economic and health impacts and a greater loss of belongings than homeowners (Gamble et al. 2016).

Populations experiencing system discrimination may experience disproportionate impacts during wildfires. Communities of color and Indigenous people are more likely to be in wildfire hazard zones and in housing with insufficient protection against wildfire. Linguistically isolated individuals and foreign-born-non-citizens may not be able to read wildfire or smoke advisory warnings or governmental guidance, potentially causing them to experience greater exposure to smoke and/or wildfire. Individuals in these groups may face systematic and/or cultural barriers to access resources to safely evacuate hazard areas (Gamble et al. 2016). As a result, individuals in these groups may experience injuries or death from smoke inhalation or burns (CDPH 2017).

Individuals with chronic health conditions or health related sensitivities may experience injuries or death from smoke inhalation or burns (CDPH 2017). Seniors, military veterans, and pollution burdened individuals are vulnerable to health impacts from wildfire smoke pollutants because they are more likely to have underlying respiratory and/or cardiovascular conditions and illnesses. Youth and children may experience respiratory health impacts from wildfire smoke because their respiratory systems are not fully developed and are therefore more sensitive to stressors. Individuals with disabilities, youth and children, and seniors may have difficulty evacuating from wildfires, increasing the risk of health impacts and or death from wildfire, smoke inhalation, or fire burns (EPA 2022).

As seen in Figure 10, the communities along the East side of the Ventura River have a social vulnerability index (SVI) between 0.81-1.0 and are at high and very high risk of wildfires. Along Loma Vista Road, communities at varying social vulnerability levels are in VHFHSZ's, including those along the Northern edge of East Main Street, who have an SVI of 0.91-1.0.

Landslides

Vulnerable populations living in areas with high landslide risk may be subjected to disproportionate negative impacts during landslide and debris flow events. Communities of color and Indigenous people are more likely to be situated in wildfire scar zones or landslide prone areas. Linguistically isolated individuals and foreign-born-non-citizens may not be able to read landslide advisory warnings or governmental guidance, potentially causing missed critical evacuation information or limited ability to safely evacuate hazard areas (Gamble et al. 2016).

Riverine and Stormwater Flooding

Outdoor workers may be exposed to hazardous work conditions during riverine and/or stormwater flooding events and therefore are vulnerable to health impacts (CDPH 2020). People experiencing homelessness are disproportionately at risk to health impacts during flood events because they often live in flood hazard areas and do not have access to transportation to evacuate inundated areas. They may also have their personal belongings destroyed or damaged during a flood event (Ramin & Svoboda 2009).

Under-resourced individuals may experience injuries or death because of high velocity flooding and are less likely to receive medical treatment (CDPH 2017). Individuals in these groups may experience cost burdens if their belongings and homes are damaged from floodwater inundation. Isolated individuals have limited or no access to a vehicle to evacuate flood hazard areas. Households without a computer or internet may not receive communications and emergency alerts to safely evacuate from hazard areas (CDPH 2020). Renters have limited control over home improvements that may protect against flood damage. Subsequently, they may experience economic and health impacts and a greater loss of belongings than homeowners (Gamble et al. 2016).

Populations that experience system discrimination are at greater risk to impacts of extreme heat. Communities of color and Indigenous groups are more likely to live in flood hazard areas and in housing with insufficient protection against riverine and stormwater flooding. Linguistically isolated individuals and foreign-born-non-citizens may not be able have access to flood warning or governmental guidance in their language, potentially causing them to experience greater exposure to flooding. Individuals in these groups may face systematic and/or cultural barriers when seeking to access resources needed to safely evacuate hazard areas (Gamble et al. 2016).

Seniors, youth, and children are particularly at risk to injury and/or death from high velocity flooding (CDPH 2017). Riverine and stormwater flooding may also limit access to transportation systems, healthcare centers, and emergency response to those that are injured or in need or consistent medical care, such as those with chronic health conditions or illnesses. Youth, children, seniors, individuals with disabilities, and individuals with chronic health conditions or illnesses may not be able to safely evacuate floodwater hazard areas.

Many communities along the Western portion of the Santa Clara River are located in the FEMA 100- and 500-year flood plains, including communities with an SVI of 0.81-0.9, visible in Figure 11.

Air Quality

Individuals with high outdoor exposure, such as outdoor workers and people experiencing homelessness, are disproportionally vulnerable to poor air quality because they are outdoors and are therefore directly exposed to air pollutants (CDPH 2017).

Under-resourced individuals may be disproportionally impacted by poor air quality if their housing lacks sufficient air filtration, and they may not be able to afford supplemental air filtration equipment (Gamble et al. 2016). Individuals in these groups may experience the development or exacerbation of respiratory illnesses and are less likely to receive medical treatment (California Department of Public Health 2017).

Individuals experiencing system discrimination are at higher risk of negative health outcomes associated with air quality. Tribal communities and populations of color are vulnerable to health impacts associated with poor air quality because their housing may lack sufficient air filtration and they may not be able to afford supplemental air filtration equipment (Gamble et al. 2016). Linguistically isolated individuals and foreign-born-non-citizens may not have access to air quality advisory warnings or governmental guidance that are in their primary language, potentially causing them to experience greater exposure to extreme heat (CDPH 2017).

Individuals with chronic health conditions or health related sensitivities are at risk of developing or experiencing exacerbated health impacts from poor air quality. Youth and children are extremely vulnerable to health impacts from poor air quality because their respiratory system has not fully developed yet (CDPH

2017). Seniors, military veterans, and individuals with disabilities are vulnerable to health impacts from poor air quality because they are more likely to have underlying health conditions (EPA 2022).

Sea Level Rise

People who live in inundation zones may need to retrofit homes to adapt to sea level rise and associated impacts, such as mold. This activity is particularly difficult for those with limited access to resources including individuals who are unemployed, and low-income individuals. Linguistically isolated individuals may not have access to non-English versions of sea-level-rise preparedness guidance and therefore may not be able to prepare for and cope with sea-level-rise. (Cooley 2012).

The Ventura County Resilient Coastal Adaptation Project (VC Resilient Report) identifies seniors, youth and children, and low-income populations as most affected by flood hazards (County 2018). Seniors may have decreased mobility, and may not have access to emergency warning systems, and in the case of a loss of property or belongings, may lack financial resources to recover. Renters are vulnerable in the mitigation and recovery stages of hazards because they lack the authority over their residence to aptly prepare for flooding. Additionally, they are less likely to have insurance to cover their belongings in the case of a flood event (County 2018).

The figures below show the projections of SLR and related hazards in relation to the City of Ventura's citizens social vulnerability indices. Areas with an SVI of 0.81-1.0 are located along the coast in potential sea level rise and rising tide inundation areas such as along the intersection of highway 1 and highway 33, as well in the areas surrounding the Ventura Harbor, as seen in Figure 12 and Figure 16. Storm flooding has the potential to impact coastal communities, extending beyond Shoreline Drive, and reaching up to West Main Street on the Northern end of the City and up to Outrigger Avenue on the Southern end. The impacted communities have a breadth of SVIs ranging from 0.21-1.0, as seen in Figure 13.

In Figure 14, coastal erosion projections show impacts to all coastal communities in the City, with impacted groups having SVIs ranging from 0.21-1.0. Storm wave impacts will expand beyond highway 101 in many places along the City's coastline, causing impacts to communities beyond those directly on the coast. These communities have SVIs ranging between 0.21-1.0, as shown in Figure 15.

Adaptive Capacity

The City of Ventura has plans, policies and programs in place that protect vulnerable populations from all climate hazards. The level of enforceability, implementation, and efficacy varies based on the hazard type.

Ventura only has 4 percent of land with tree canopy, which is lower than 75 percent of other California cities and towns. Tree canopy is beneficial in many ways but particularly can be essential in mitigating the effects of extreme heat events (HPI 2022). The Ventura County Contingency Plan for Heat/Cold Weather Events plan outlines responses to extended heat waves that could endanger the lives of vulnerable populations in Ventura, including seniors and individuals with disabilities. The Heatwave Safety webpage provides emergency preparedness information for the community to prepare for heat emergencies.

Plans concerning stormwater flooding and drought mainly address infrastructure resilience and water reliability. The Ventura County Sea Level Rise Assessment includes an appendix which discusses stormwater flooding impacts on vulnerable populations. Plans like the Urban Water Management Plan, the General Plan, and the City

of Ventura Emergency Response Plan serve as a baseline of water assurance planning for the general populations in response to drought events, but do not explicitly address vulnerable populations. The City of Ventura has just over 50 percent impervious surface cover and is in the 82.5th percentile in California, implying that there is more impervious cover than most other cities and towns in the states. These materials cover the ground and prevent water from soaking into soil which can exacerbate flooding and reduce groundwater reserves (HPI 2022).

Though air quality is mentioned in the City's General Plan as well as the Wildfire Plan as a health hazard, no specific programs or actions are discussed to mitigate related harm to vulnerable populations.

The Ventura County Muti-Jurisdiction Hazard Mitigation Plan assigns a modest capacity to the City residents' ability to adapt to climate impacts. The plan acknowledges that vulnerable populations within the City may not be able to relocate or protect their home in the case of a flood but provides no guidance on how to address vulnerable populations in the case of SLR or flooding events (County 2022). The Ven-6 action outlined in the plan aims to improve long-term resilience to all population groups in SLR and extreme storms in the areas adjacent to the beach and the rivers (County 2022).

Vulnerability Score for Vulnerable Populations

Climate Hazard	Impact Score	Adaptive Capacity Score	Vulnerability Score
Extreme Heat	High	Medium	**4-High**
Drought	Medium	Medium	**3-Medium**
Wildfire	High	Medium	**4-High**
Landslides	Medium	Low	**4-High**
Riverine and Stormwater Flooding	Medium	Medium	**3-Medium**
Air Quality	High	Low	**5-High**
Sea Level Rise	High	Low	**5-High**

Vulnerable populations in the City of Ventura are most vulnerable to extreme heat/warm nights, drought, wildfire, landslides, air quality, and sea level rise.

Figure 10 Wildfire Hazard Severity Zones and Social Vulnerability in the City of Ventura

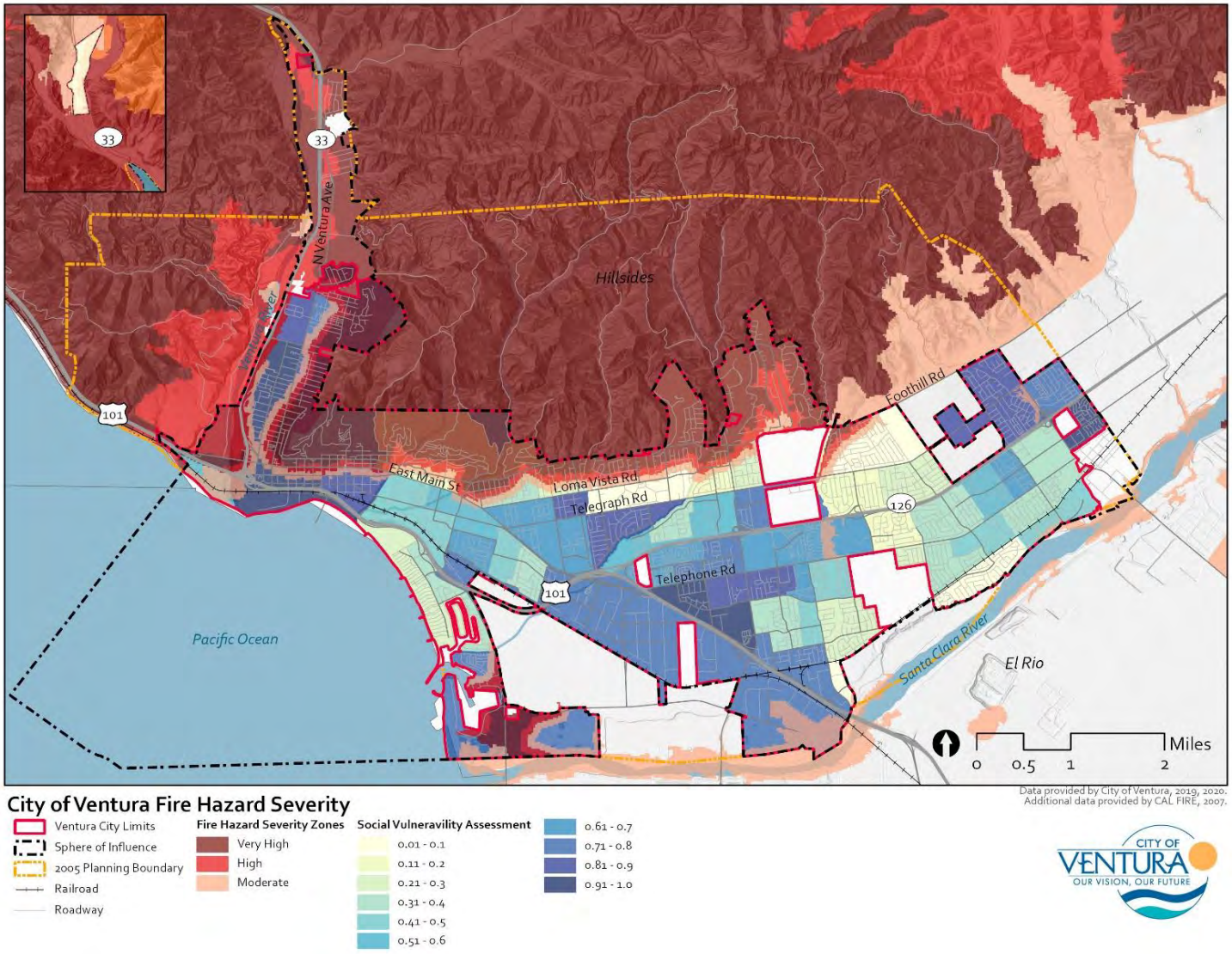


Figure 11 FEMA Flood Hazard Zones and Social Vulnerability in the City of Ventura

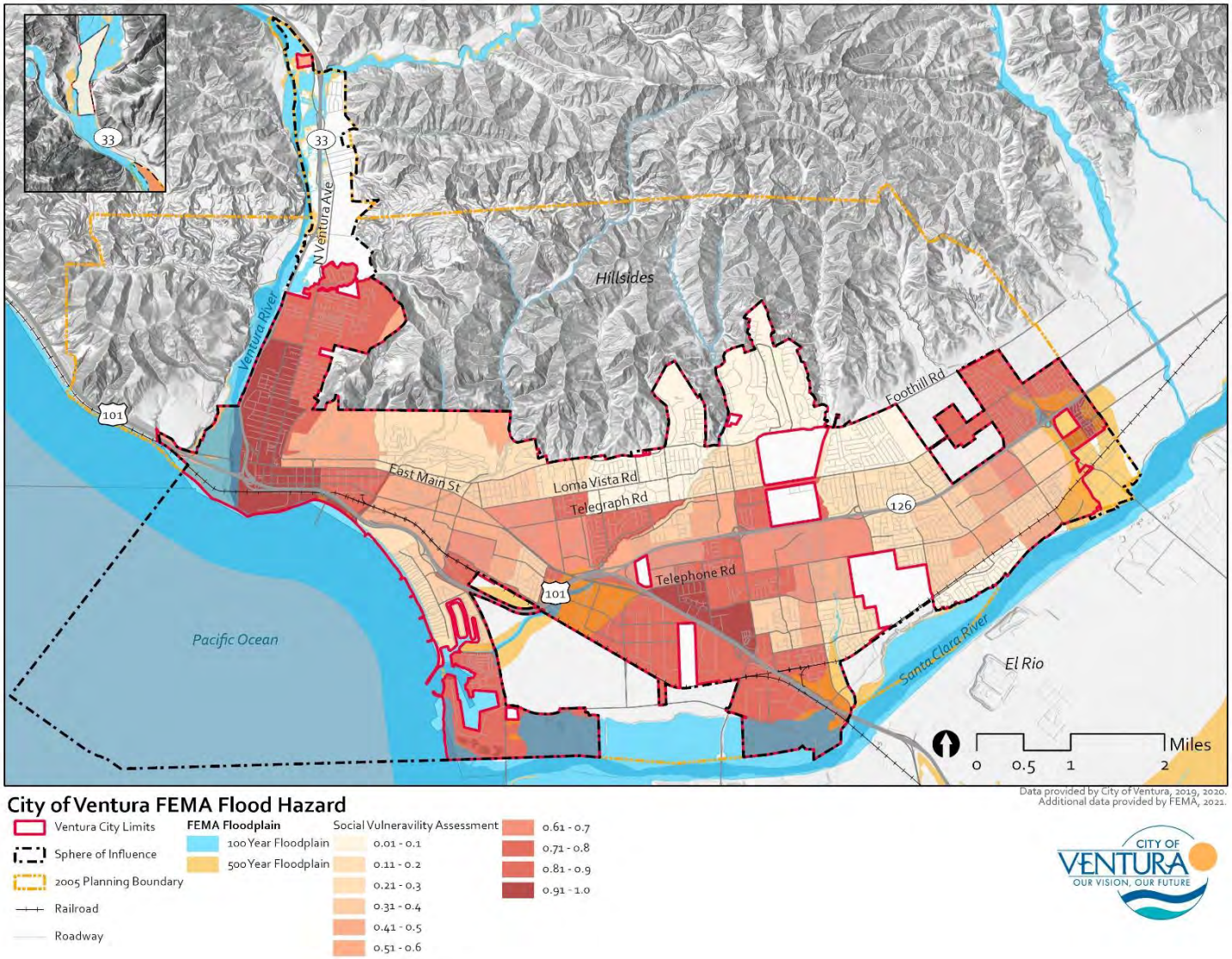


Figure 12 Sea Level Rise and Social Vulnerability in the City of Ventura

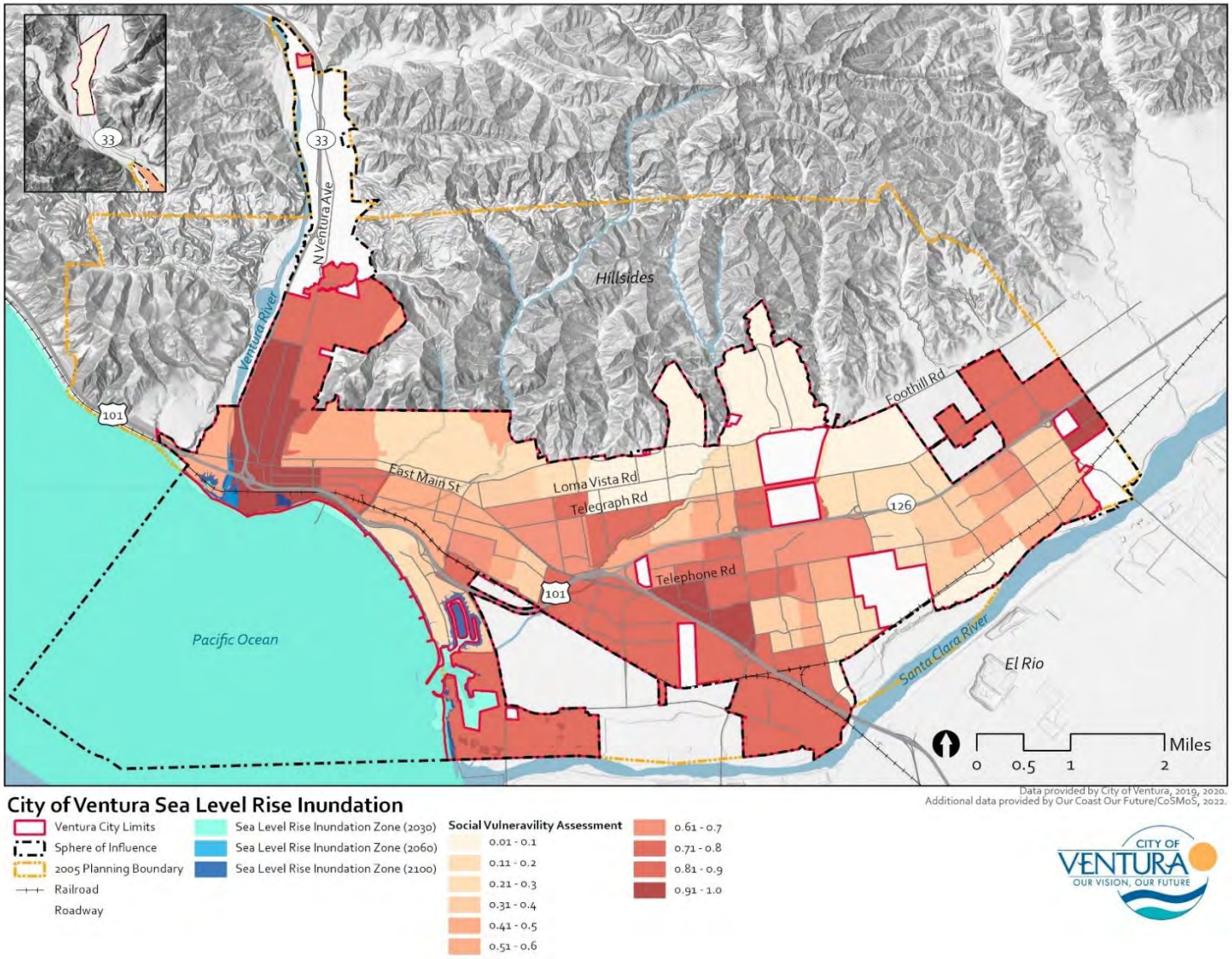


Figure 13 Coastal Storm Flooding and Social Vulnerability in the City of Ventura

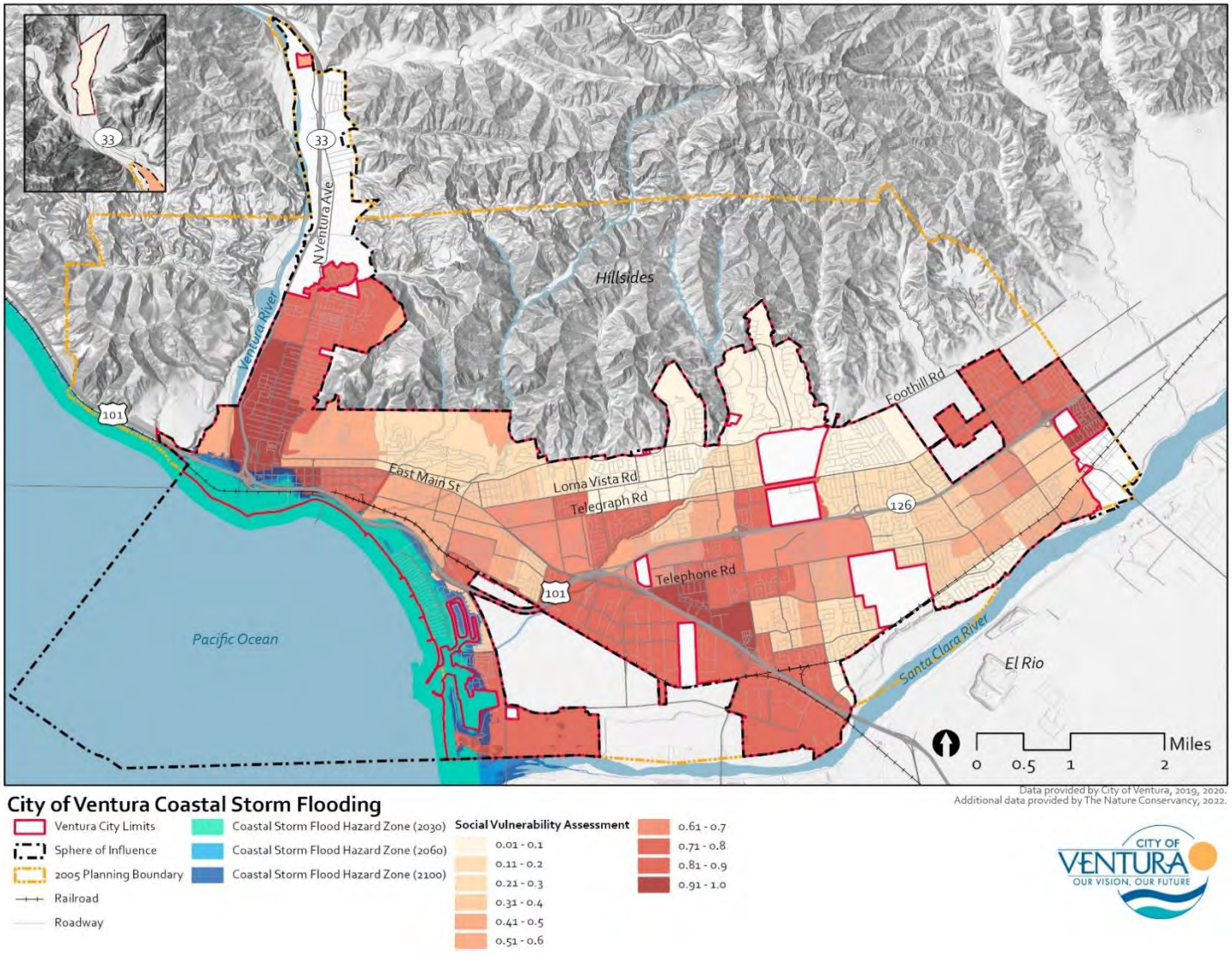


Figure 14 Coastal Erosion and Social Vulnerability in the City of Ventura

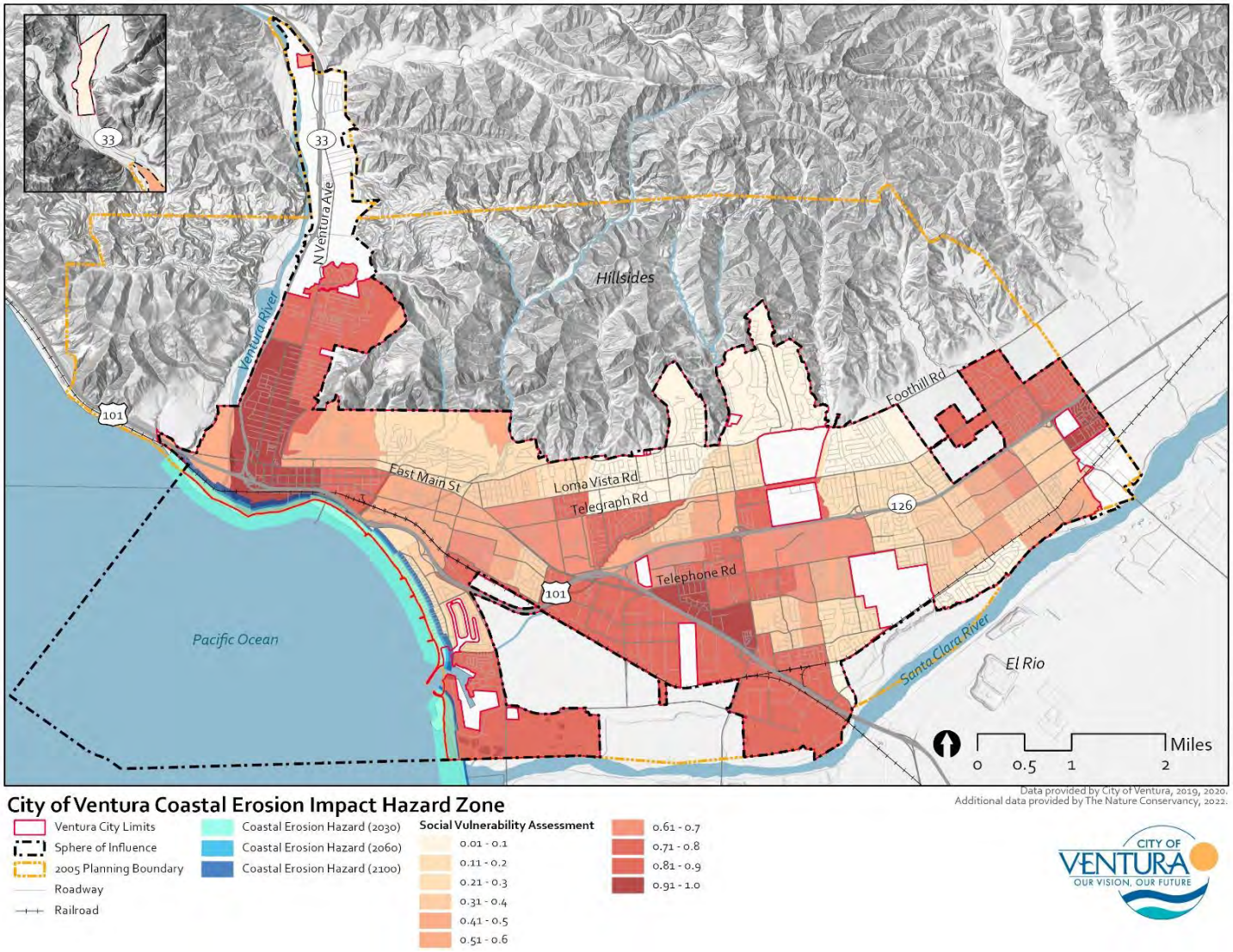


Figure 15 Coastal Storm Wave Impact and Social Vulnerability in the City of Ventura

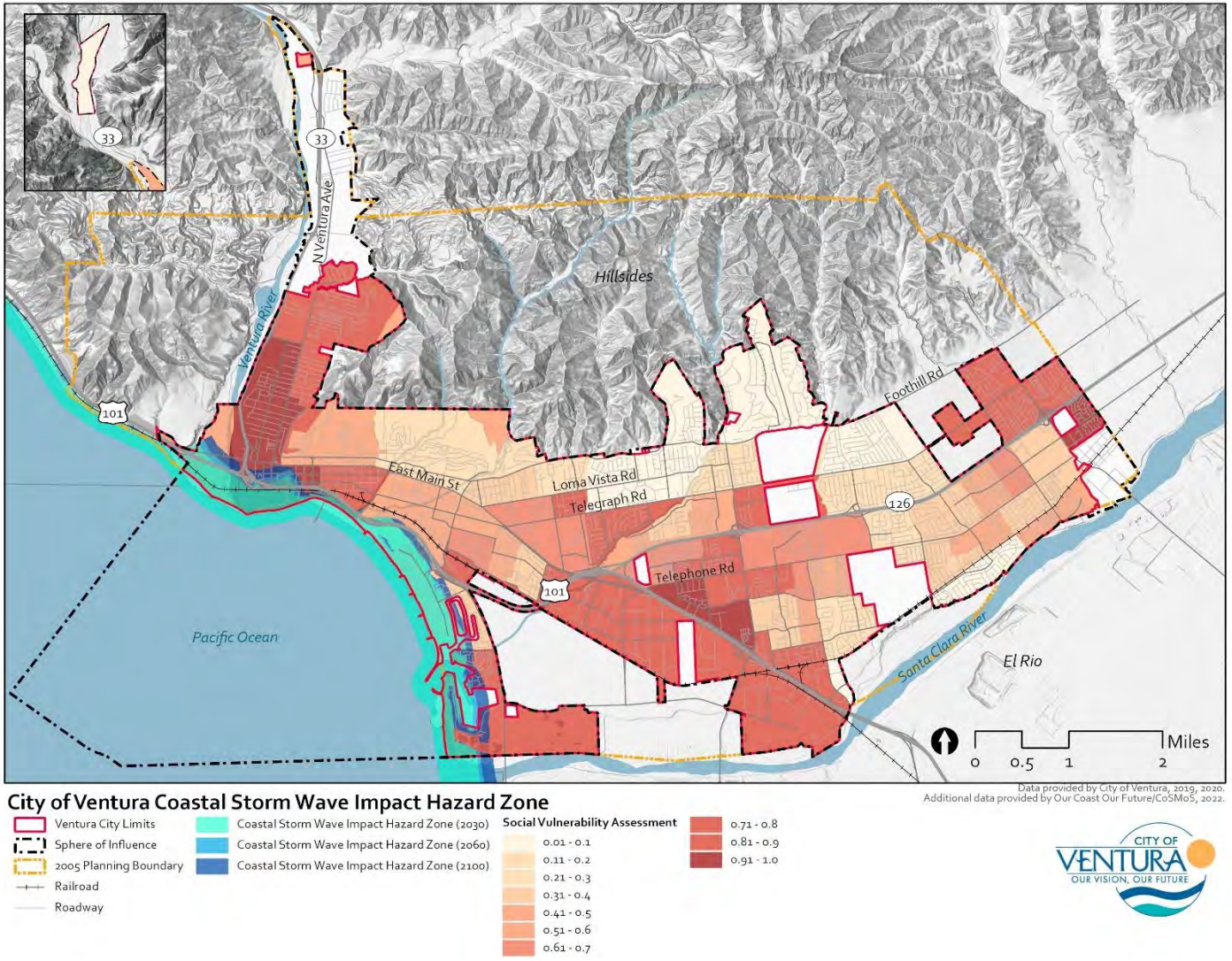
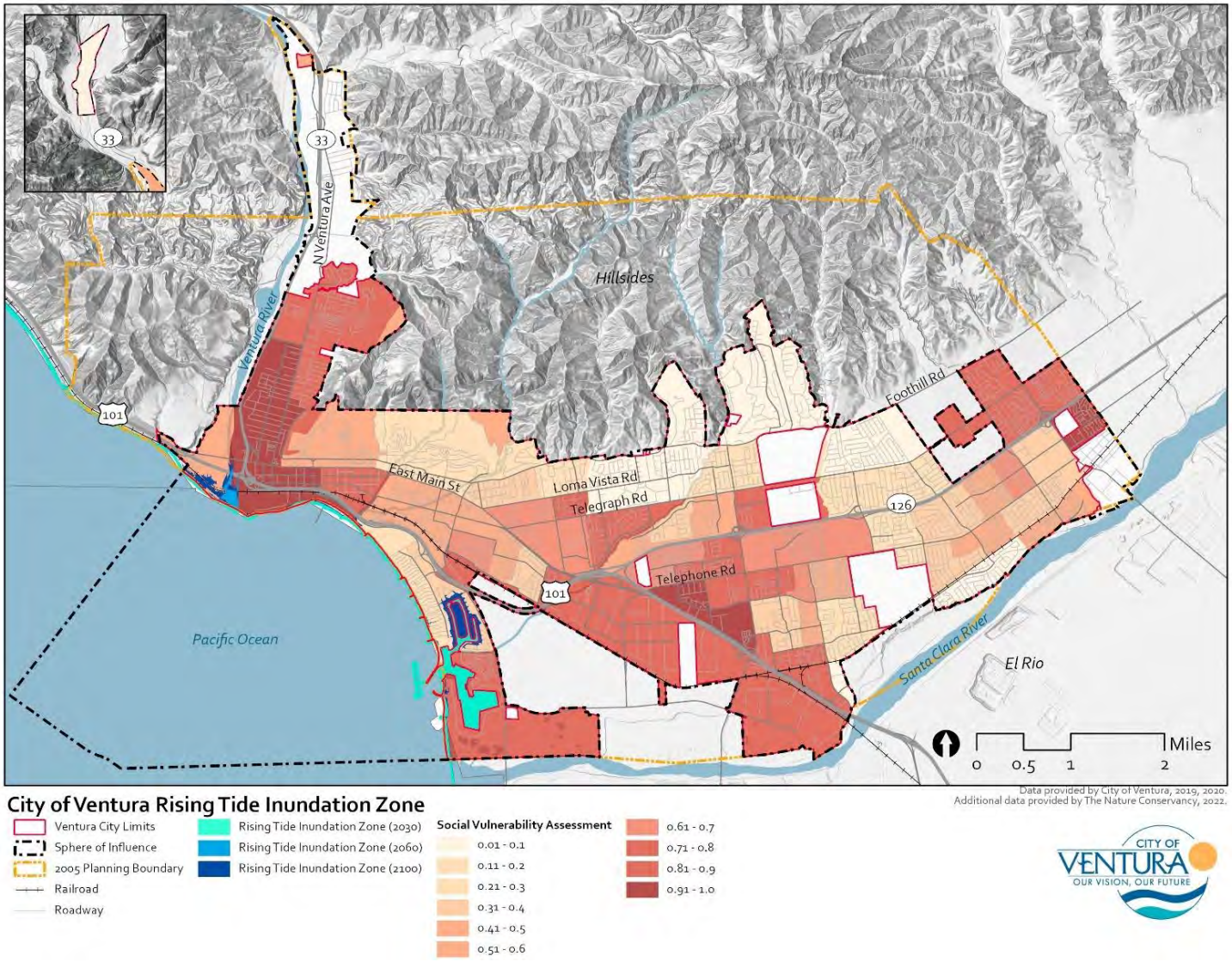


Figure 16 Rising Tide Inundation and Social Vulnerability in the City of Ventura



5.2 Natural and Managed Resources

Primary vulnerabilities for natural resources are associated with climate hazard-caused stress and physical damage to resource types within this asset group. Compounding climate hazards stress natural ecosystems past their ability to absorb individual climate hazards. Wildlife will seek out more conducive habitats during climate hazards such as extreme heat or drought which tend to be where people recreate (USDA 2018). Impacts related to habitat shifts are exacerbated in comparison with rural communities, as densely populated and isolated open space areas have limited opportunities for natural re-seeding or re-habitation from adjacent areas. Both natural resources (beaches, hillsides, rivers and barrancas, riparian and freshwater marshes, biodiversity) and managed resources (parks and agricultural lands) in the City of Ventura, are highly affected by and vulnerable to the effects of climate change.

Potential Impacts

Extreme Heat

The impacts to natural and managed resources in the City of Ventura during extreme heat and warm nights are similar to the impacts experienced by vulnerable populations. Wildlife under these conditions face heat stress and heat related illness as well as disrupted reproductive cycles, and compounding risks associated with early and extended seasonal temperature increases (Backlund 2008). Because it is seasonally warmer earlier in the year species can emerge early with no food source and potentially face an untimely cold front, which increases mortality rates. Timing of seasonal warmth may not overlap with food sources and extreme heat may stress dependent vegetation communities and wildlife (Dale 1997, Hamerlynck 1995, Maclean 2011). Plants are more likely to experience heat stress and drying, habitat ranges may shift, and native species may be outcompeted by invasive species capable of surviving the harsh conditions. Some pests can proliferate more easily with warmer temperatures (Hamerlynck 1995), and some plants and animals ill-suited to the new warmer conditions may suffer increased mortality rates (CA, 2022). Natural resources are highly exposed to extreme heat and warm nights. Both mid- and end- of century projections depict dramatic increases in extreme heat days (CEC 2021).

Higher temperatures will decrease the snowpack in California and raise the snowline, decreasing one of the most important surface water reserves for agriculture in the state (CA 2022). Extreme heat and warm nights can result in declines in crop yields because of heat stress and anomalous warmth during periods that are typically cooler (Parker et al. 2020). Lower crop yields can increase costs and ultimately decrease agriculture profitability. Livestock operations are potentially less viable during extreme heat events as livestock may suffer from heat related illness.

Drought

Impacts from drought involve risks associated with water scarcity and availability for reliant natural resources. Drought will disrupt habitats and will decrease the resiliency of wildlife. Extended or variable drought conditions effect the amount and duration of water available in ephemeral and permanent sources, which impacts plants and wildlife dependent on those aquatic resources (Burkett 2000).

Like extreme heat and warm nights, drought is linked to declines in crop yields, increasing costs, and decreasing crop profitability.

Drought can result in regional losses of crops and can stress the statewide water supply. Crops grown in Ventura, such as fruit, nuts, vegetables, cut flowers, and livestock and poultry are dependent on high depths of water and subsequently higher water intensity needs. In Ventura County in 2020, there were 96,523 acres of irrigated cropland (VCAC 2020).

Wildfire

The largest direct impacts to natural resources are caused by wildfires. The severity and frequency of wildfires can lead to long term habitat conversions, or vegetative communities that no longer support reliant species, and the landscape provides minimal alternative habitats (Bell et al. 1999, Stephenson et al. 1999, Coop et al. 2020). As discussed with the Exposure to Climate Hazards section, extreme wildfire risk days in the City of Ventura are projected to increase through the end of the century (CEC 2021). Figure 3 depicts the delineation of VHFHSZ's which both border and fully encompassing areas with natural resources including many recreational areas and city parks.

Given the projected expansion of wildfire prone areas, larger areas of croplands may be within fire hazard severity zones in the future due to climate change. Wildfires can destroy crops and disrupt rangeland operations while wildfire smoke may stress the health of crops and livestock.

Landslides

Landslide susceptibility is limited and the likelihood of landslides occurring is determined by precipitation and wildfire occurring sequentially (CA, 2022). In the event of a landslide there is potential for loss of lands, habitat, and disruption of waterbodies in areas of debris flow. Wildlife and plants face a compounding risk when presented with landslide events. The hillsides north of Poli Street/Foothill Road, and east of Ventura Avenue and Cedar Street contain several landslide prone areas and are likely to sustain future landslide activity (City 2021).

The majority of the City's cropland is in the foothills, where landslide potential is greatest, and are therefore at high risk of related disruption or destruction (VCAC 2020).

Riverine and Stormwater Flooding

The major impacts of flooding on natural and managed resources are the damage and destruction that occurs because of related erosion, as well as the degradation of water quality, which impacts survival rates of aquatic species and fish (Talbot 2018). One way that stormwater flooding reduces water quality is by causing algae blooms which lead to plant and wildlife health issues within wetlands and waterbodies (EPA 2022). Other impacts include damage from inundation in storm flooded areas including natural habitats and public and private land surrounding waterbodies in the City. Riverine and stormwater flooding will mostly affect sensitive species of plants and wildlife that are based in low-lying areas of the City, specifically those adjacent to the rivers and barrancas in the area. The 100-year flood hazard area for the Ventura River is confined to the area west of the levee, near the River mouth. A 100-year flood along the Santa Clara river would cause a limited area of the City just north of the river, including Olivas Park and Buenaventura Golf Courses to be impacted (City 2021).

Agricultural operations neighboring the Santa Clara river are susceptible to the impacts riverine and stormwater flooding. These operations have the potential to be disrupted during flood events, and inundation is likely to result in crop yield reductions. Agricultural worker's residences could also be damaged by floodwater inundation (VCAC 2020).

Air Quality

The direct effects of air quality declines on natural resources relates to plant and wildlife health as increased air pollutants is correlated to increased stress and mortality rates. Impacts from air quality can further impact natural resources since air quality declines correspond with other hazards (such as wildfire and extreme heat events), which compounds risks.

The direct impacts of air quality on crop yield and livestock health within the City of Ventura are of concern as livestock are dependent on clean air for overall health, and smoke damage may render crops unsaleable.

Sea Level Rise

The extent to which coastal inundation affects habitats, wildlife, and plants is significant in the City of Ventura. The Ventura Sea Level Rise Vulnerability Assessment outlines several coastal resources that will be vulnerable to SLR through the end of the century throughout Ventura County. Coastal sand dunes, beaches estuarine ecosystems, and various coastal recreation areas are the most vulnerable to sea level rise and potentially at risk of flooding and coastal erosion. Ventura's beaches draw many visitors annually and brings a significant economic benefit to the City. Under existing projections, the beaches are subject to coastal erosion and flooding, which will render many unusable at high tide (County 2018)

Though most agricultural land in the City in the foothills, some plots near the Santa Clara river are susceptible to the impacts of SLR related hazards (VCAC 2020).

Adaptive Capacity

There are no explicit plans, programs, or policies directly increasing the adaptive capacity of the City of Ventura's natural resources to the climate hazard of extreme heat, drought, or landslides.

The Coastal Resilience Ventura Project provides data with projections of SLR- related hazards which highlights natural and managed resources that will be impacts in the coming decades.

Related to wildfire, there are existing programs and plans outlined in the Ventura Land Trust Community Wildfire Protection Plan. The plan identifies natural and managed resources that are susceptible to wildfire and plans for vegetation management as a mitigation effort. Indirect planning, such as emergency notification and alert systems, exists within the 2020 Urban Water Management Plan, the 2005 City of Ventura General Plan, the 2022 Ventura County Multi-Jurisdictional Hazard Mitigation Plan, and the 2021 City of Ventura Emergency Response Plan to provide awareness of natural and managed resources impacts around climate hazards.

Phase 1 of the Surfers Point Managed Retreat Project has been completed which is an effort to relocate bike trails, parking lots, and other beach access amenities away from the shoreline in SLR and coastal erosion areas.

Vulnerability Score for Natural and Managed Resources

Climate Hazard	Impact Score	Adaptive Capacity Score	Vulnerability Score
Extreme Heat/Warm Nights	High	Low	**4-High**
Drought	High	Low	**4-High**
Wildfire	High	Medium	**4-High**
Landslides	High	Low	**4-High**
Riverine and Stormwater Flooding	High	Medium	**3-Medium**
Air Quality	Medium	Medium	**3-Medium**
Sea Level Rise	High	Medium	**4-High**

Natural and managed resources in the City of Ventura are most vulnerable to extreme heat/warm nights, drought, landslides, wildfire, and sea level rise.

5.3 Buildings and Facilities

Vulnerabilities within this asset category primarily concern physical exposure and damages to residential areas, commercial and industrial buildings, and educational facilities in relation to climate hazards. Impacts associated with operations of critical services are discussed under the Critical Infrastructure and Services section.

Potential Impacts

Extreme Heat and Warm Nights

Extreme heat could impact occupants of buildings and facilities that are not adequately weatherized for increased temperatures.

Drought

Drought will have minimal impact on the physical structures of buildings and facilities across the City of Ventura.

Wildfire

The structures and buildings that occupy wildfire hazard zones are at risk of structural damage from wildfires. There are several residential areas in the City's wildfire hazard zones shown in Figure 3.

Landslides

Landslide susceptibility for the City of Ventura overlaps with sloped wildfire hazard zones (CDOC 2021). Impacts to buildings and facilities as outlined in the multi-jurisdiction hazard mitigation plan encompass many residential neighborhoods as well as some commercial developments.

Riverine and Stormwater Flooding

There is some risk of riverine and stormwater flooding to the physical structures outlined under this asset category. The location of floodplains in Figure 4 show only a slight risk of impact based on current flood conditions, primarily to residences neighboring the Santa Clara and Ventura Rivers.

Air Quality

The impact of reduced air quality will have a similar effect as extreme heat on buildings and facilities. The ability to filter air will greatly affect the subsystems, services, and populations that are reliant on the buildings and facilities, but the direct impact on structures is low.

Sea Level Rise

Physical damages to buildings and facilities brought about by coastal flooding are mainly related to structural damages--residential properties, coastal commercial industry, and some industrial facilities (County 2018).

The Ventura Sea Level Rise Vulnerability Assessment found that losses to residential land made up 95% of all land use vulnerabilities --primarily concentrated in oceanfront neighborhoods comprised primarily of single-family residences (County 2018).

Adaptive Capacity

The City of Ventura has minimal existing adaptive capacity to increase the weatherization of buildings and facilities throughout the City. This means that risks related to climate hazards including wildfire, landslides, riverine and stormwater flooding, and air quality are significant.

The Multi-Jurisdiction Hazard Mitigation Plan provides some actions to retrofit, purchase, or relocate structures located in hazard areas, with priority on those that have experienced repetitive loss or are in high-risk areas (County 2022).

The 2005 Ventura City General Plan acknowledges several concerns in the City's ability to provide swift and successful response in the case of a wildfire that may impact buildings and facilities: lack of fire protection systems in older structures, lengthy response times to far reaching areas in the City, insufficient staffing levels, and a need for a reliable and sustainable source of revenue for fire response (City 2005).

Vulnerability Score for Buildings and Facilities

Climate Hazard	Impact Score	Adaptive Capacity Score	Vulnerability Score
Extreme Heat/Warm Nights	Low	Low	**3-Medium**
Drought	Low	Low	**3-Medium**
Wildfire	High	Medium	**4-High**
Landslides	Medium	Medium	**3-Medium**
Riverine and Stormwater Flooding	Medium	Medium	**3-Medium**
Air Quality	Low	Low	**3-Medium**
Sea Level Rise	High	Medium	**4-High**

Buildings and facilities in the City of Ventura are most vulnerable to wildfires and sea level rise.

5.4 Critical Infrastructure and Services

Overall vulnerabilities associated with this asset category involve structural preparedness and service reliability in the face of climate change. This section is mainly concerned with the cascading impacts physical damages to buildings and facilities can have on services and infrastructure.

Potential Impacts

Extreme Heat and Warm Nights

As temperatures increase, roadways, active transportation routes, and railroads are vulnerable to damages through sustained heat such as buckled railroad ties and cracked surfaces (Hall et al. 2018). Additional impacts from extreme heat are associated with increased emergency service calls which could strain medical services. Electrical infrastructure may become overwhelmed by demand and result in blackouts, or energy providers may conduct power safety shutoffs to avoid impacts to electrical facilities. Power outages have significant impacts on communication networks, water conveyance, and vulnerable populations, and are a cascading impact of extreme heat events, which place additional strain on infrastructure and critical services.

Drought

Drought can impact water reliability and water infrastructure. All emergency services depend on water, particularly firefighters, who rely on adequate water supply for fire suppression. Water providers within the City will encounter increased difficulty as drought decreases general service reliability. Drought impacts can create service strain for emergency and medical services. Cracked pavements from drought compounded with extreme heat affects roadways and transportation routes.

Wildfire

There are some critical facilities, such as the police station, several medical facilities, fire stations, and government buildings, located in the high and moderate fire hazard severity zones as shown in Figure 3 that are at risk of damage and destruction caused by wildfires. Additionally, utility lines have the potential to be damaged in high-risk locations, resulting in oil and gas leaks and power outages. Utility lines under certain high wind conditions can also trigger wildfires through downed power lines (Hall et al. 2018). Power safety shut offs in response to wildfire risk can affect service reliability of power. Increased frequency of wildfires can place strain on fire and emergency services. Evacuation routes could be disrupted during a wildfire event limiting emergency responders and ability for people to evacuate as well. Post-wildfire there are additional issues of displacement and needs for temporary shelters for uprooted communities.

Landslides

The Thomas Fire burned over 500 homes in the City and left burn scars in the hillsides susceptible to landslides (County 2022). Landslides risk is high along most of the northern border of the City as well as along both sides of Highway 33, which leaves critical facilities and services, including the police station, several medical facilities, fire stations, and government buildings vulnerable.

Riverine and Stormwater Flooding

Impervious surfaces can impede the absorption of water and increase stormwater flooding in areas of the City. There is risk of

damage from increased extreme precipitation events including erosion, washouts, and sinkholes. Storm drainage and flood protection services for the City may be impacted by these events. In flood events, water quality decreases, which may lead to cascading impacts such as limited availability for fire suppression.

Air Quality

Higher incidence of unsafe air quality caused by increased smog, dust and wildfire smoke can create general strain on existing critical services and infrastructure through increased rates of hospitalization and emergency and medical services (CDPH 2020).

Sea Level Rise

The SLR-related hazards that the City of Ventura is expected to experience are significant. Critical services and infrastructure including critical transportation, coastal highways, and infrastructure corridors are vulnerable to sea level rise and related hazards. The Pacific Coast Highway is the most vulnerable road on the coast (County 2018). SLR will likely impact the City's wastewater treatment facility, located on the northern bank of the Santa Clara River. Additionally, coastal medical facilities and government buildings may be impacted by rising sea level and related hazards.

Adaptive Capacity

The relevant existing plans, policies, and programs for the City of Ventura are mainly multi-hazard based. All multi-hazard plans, programs and systems are designed to address service and infrastructure failings and contingencies. Existing planning cover wildfires, drought, landslides, flooding, severe weather and storms, and sea level rise. Relevant plans and systems in place are found below:

- Ventura County Multi-Jurisdictional Hazard Mitigation Plan
- City of Ventura Emergency Response Plan
- City of Ventura Emergency Response Team (CERT) Program
- City of Ventura 2005 General Plan Public Safety Element

The Multi-Jurisdiction Hazard Mitigation Plan includes action Ven-21 which highlights City fire facilities and develops plans to retrofit fire facilities in accordance with local regulations and industry standards (County 2022).

Cascading risks of services and power dependencies are addressed in relation to the aforementioned hazards throughout these plans and programs.

Vulnerability Score for Critical Services and Infrastructure

Climate Hazard	Impact Score	Adaptive Capacity Score	Vulnerability Score
Extreme Heat/Warm Nights	High	Low	**5-High**
Drought	High	Medium	**4-High**
Wildfire	High	High	**3-Medium**
Landslides	Medium	Low	**4- High**
Riverine and Stormwater Flooding	High	Low	**5-High**
Air Quality	Medium	Low	**4-High**
Sea Level Rise	High	Medium	**4-High**

Critical services and infrastructure in the City of Ventura are most vulnerable to extreme heat/warm nights, drought, landslides, riverine and stormwater flooding, air quality, and sea level rise.

6 Conclusion

This report evaluates how climate change may impact vulnerable community members, natural resources, critical facilities, buildings, services, and infrastructure in the City of Ventura. The report provides a list of vulnerable population groups and assets for which adaptation policies and programs should be developed and implemented to increase community resilience. Vulnerability is based on the combination of potential impacts and adaptive capacity, as identified in the Vulnerability Analysis section of the report.

A list of asset categories and related vulnerability scores is provided on the next page. Highly vulnerable assets are discussed below:

- All sensitive population groups identified are highly vulnerable to many climate hazards including extreme heat, air quality, wildfires, flooding, landslides, and sea level rise.
- Natural and managed resources are highly vulnerable to extreme heat, drought, wildfire, flooding, landslides, and sea level rise.
- Buildings and facilities in the City are highly vulnerable to wildfire and sea level rise. Buildings and facilities located in inundation zones are at risk of structural damage from sea level rise.
- Critical infrastructure and services are highly vulnerable to extreme heat, flooding, landslides, air quality, and sea level rise. Several facilities are in the wildfire hazard severity zones of the City. These buildings and facilities are at risk of structural damage from wildfire. Infrastructure and dependent populations experience additional cascading impacts around power outages from downed utility lines, power safety shut offs and grid overload. All forms of power outages can affect how critical services are able to perform their needed functions during a hazard.

This report establishes a foundation for identifying adaptation policies and programs that can increase resilience in the City of Ventura. The City of Ventura Safety Element will include policies and programs to increase the resilience of the population groups and asset categories with the highest vulnerability to climate change.

Climate Hazard	Impact Score	Adaptive Capacity Score	Vulnerability Score
Vulnerable Populations			
Extreme Heat	High	Medium	**4-High**
Drought	Medium	Medium	**3-Medium**
Wildfire	High	Medium	**4-High**
Landslides	Medium	Low	**4-High**
Riverine and Stormwater Flooding	Medium	Medium	**3-Medium**
Air Quality	High	Low	**5-High**
Sea Level Rise	High	Low	**5-High**
Natural and Managed Resources			
Extreme Heat/Warm Nights	High	Low	**4-High**
Drought	High	Medium	**4-High**
Wildfire	High	Medium	**4-High**
Landslides	Low	Low	**4-High**
Riverine and Stormwater Flooding	High	Medium	**3-Medium**
Air Quality	Medium	Medium	**3- Medium**
Sea Level Rise	High	Medium	**4-High**
Buildings and Facilities			
Extreme Heat/Warm Nights	Low	Low	**3-Medium**
Drought	Low	Low	**3-Medium**
Wildfire	High	Medium	**4-High**
Landslides	Medium	Medium	**3-Medium**
Riverine and Stormwater Flooding	Medium	Medium	**3-Medium**
Air Quality	Low	Low	**3-Medium**
Sea Level Rise	High	Medium	**4-High**
Critical Services and Infrastructure			
Extreme Heat/Warm Nights	High	Low	**5-High**
Drought	High	Medium	**4-High**
Wildfire	High	High	**3-Medium**
Landslides	Medium	Low	**4- High**
Riverine and Stormwater Flooding	High	Low	**5-High**
Air Quality	Medium	Low	**4-High**
Sea Level Rise	High	Medium	**4-High**

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Dale, Virginia H. First published: 01 August 1997.Photosynthetic and stomatal responses to high temperature and light in two oaks at the western limit of their range ERIK HAMERLYNCK1,2 and ALAN K. KNAPP1 1 Division of Biology, Kansas State University, Ackert Hall, Manhattan, KS 66506-4901, USA 2 Present address: Department of Biological Sciences, University of Nevada Las Vegas, 4505 Maryland Parkway, Box 454004, Las Vegas, NV 89154-4004, USA Received May 25, 1995 https://doi.org/10.1890/10510761(1997)007[0753:TRBLUC]2.0.CO;2

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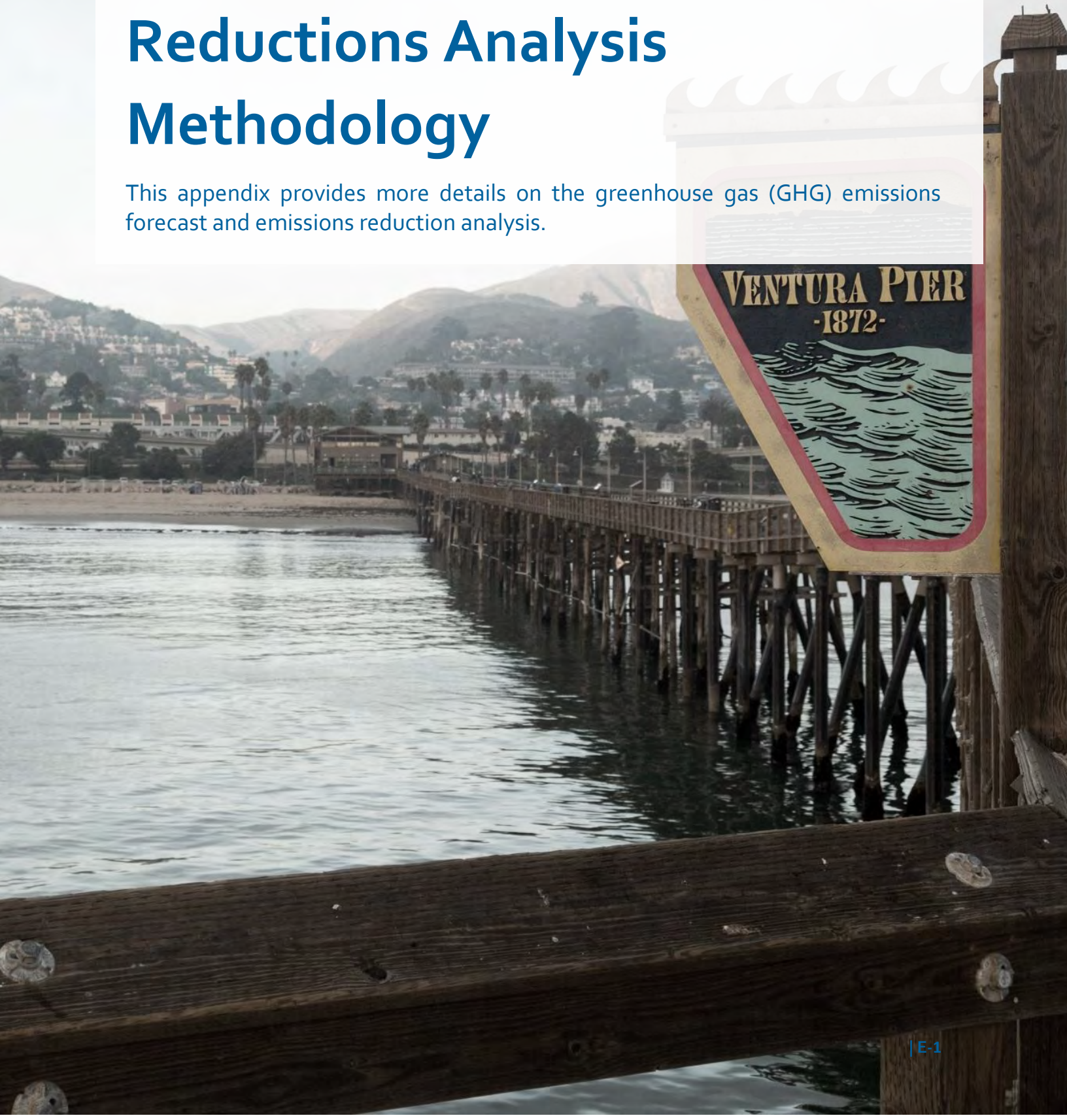
Appendix E

Greenhouse Gas Forecast and Reductions Analysis Methodology

This appendix provides more details on the greenhouse gas (GHG) emissions forecast and emissions reduction analysis.



Greenhouse Gas Emissions Forecast

A GHG emissions forecast estimates future GHG emission changes by accounting for projected community growth as defined by Palmdale's General Plan Update. The forecast is built off the 2017 communitywide GHG emissions forecast and thus includes the same sectors and facilities.

Calculating the difference between the GHG emissions forecast and GHG emissions reduction targets set by a jurisdiction determines the gap in GHG emissions that needs to be closed through the implementation of local GHG reduction policies as outlined in the CARP. Two forecast scenarios were developed for Ventura out to horizon year 2045:

- Business-as-usual scenario (BAU): Provides a forecast of how future GHG emissions would change if consumption trends continued as they did in 2019 and growth were to occur as projected in the City's General Plan, absent any regulations that would reduce local emissions.
- Legislative adjusted scenario (ABAU): Provides a forecast of how currently adopted legislation would reduce GHG emissions from the business-as-usual scenario. The legislative adjusted scenario represents the state's contribution to reducing local GHG emissions to meet state goals.

The adjusted forecast incorporates the impact of state regulations that provide GHG emission reduction potential to offer a more accurate picture of future GHG emissions growth and the responsibility of the City for GHG emissions reduction. The state legislation included in the adjusted forecast result in GHG emissions reduction related to transportation, building efficiency and renewable electricity.

The following State policies were included in the ABAU forecast:

- **Transportation**: Major regulations incorporated into the CARB's 2021 transportation modeling used for forecast development include the Advanced Clean Truck Rule, SAFE Vehicle Rules and Actions, and Innovative Clean Transit Rule.[23]
- **Title 24**: The California Code of Regulations Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings is updated triennially to allow consideration and possible incorporation of new energy-efficient technologies and methods. The SB 32 Scoping Plan calls for the continuation of ongoing triennial updates to Title 24 that will yield regular increases in the mandatory energy and water savings for new construction.
- **Renewable Portfolio Standard (SB 100)**: The RPS requires utilities to increase procurement from eligible renewable energy resources to 50% of total procurement by 2026, 60% of total procurement by 2030, and GHG-free sources to 100% of total procurement by 2045. The GHG emission reduction from SB 100 are accounted for by reducing the GHG emissions associated with each unit of energy in line with the increasing stringent RPS requirements. In 2045, all retail electricity is assumed to be completely carbon neutral.

The City of Ventura CARP includes the following GHG emissions targets:

- Reduce GHG emissions to 40% below 1990 levels by 2030 (SB 32 target year)

[23] California Air Resources Board. (2021). EMFAC2021 Volume III Technical Document Version 1.0.1. Accessed from: https://ww2.arb.ca.gov/sites/default/files/2021-08/emfac2021_technical_documentation_april2021.pdf.

- Achieve carbon neutrality by 2045 (EO B-55-18 target year)

The equivalent 1990 GHG emission levels are derived by comparing the State's GHG emissions from relevant sources from given year to the statewide GHG emission in 1990, using relevant GHG emission sectors. This assumes that GHG emissions in the City of Ventura have generally scaled with the State's GHG emissions, as vehicle fuel economy standards, waste reduction policies, and increased renewable energy procurement would have similar effects in the City as they did statewide. For the state minimum targets presented here, the State's GHG emissions in 2005 were compared to 1990, with the agricultural GHG emission sector excluded. This showed that 2005 State GHG emissions levels were approximately 15% less than 1990 levels, and as such the City's 2005 GHG emission levels are also assumed to be 15% less than 1990 levels.

The above GHG reduction analysis presented in the CARP shows that Ventura can reduce its fair share of emissions and achieve the SB 32 target of a 40% reduction by 2030. As a result, Ventura's CARP can be considered a Qualified Plan under CEQA. The concept of having a "qualified" CAP means that a climate action plan meets the criteria specified in CEQA Guidelines Section 15183.5(b) for a plan for the reduction of greenhouse gas emissions, such that a "qualified" CAP may then be used for the specific purpose of streamlining the analysis of GHG emissions in subsequent projects. Local governments have discretion on what levels or targets are established in a "qualified" CAP, provided they address adopted policies and are based on substantial evidence.

GHG Reduction Estimates

The table below shows the detailed greenhouse gas reductions that the City can achieve by implementing the mitigation strategies and actions in the CAP. It also shows the participation assumptions and level of effort needed to achieve the associated reductions for each strategy based on the GHG reduction model. For example, to achieve the GHG reductions associated with the electrification strategy, 35% of existing residential and nonresidential buildings within the city have transitioned to all-electric in 2035 and 56% by 2045 and the annual number of dwelling units or buildings transitioning is 1,225 units and 65 nonresidential buildings.

Table E-1. Projected GHG Reduction Results

Strategy	Assumptions	Cumulative Participation Rate 2035	Cumulative Participation Rate 2045	Annual Participation	GHG Reductions 2030	GHG Reductions 2045
Buildings + Energy						
Existing Building Electrification	**Phased-in:** voluntary until 2035, mandatory after (assume 2.5% annual participation then 5% participation)	35%	62%	1,347 dwelling units 78 nonresidential buildings	33,158	70,256
Residential New Construction Reach Code	**Mandatory:** assume 100% participation	100%	100%	N/A	876	983
Energy Efficiency Retrofits	**Voluntary:** assume 2.5% annual participation	13%	21%	480 dwelling units 28 nonresidential buildings	9,256	21,378
Nonresidential and Multi-family Building Retrocommissioning	**Voluntary:** assume 2.5% annual participation rate	13%	21%	480 dwelling units 28 nonresidential buildings	2,612	6,175
Clean Power Alliance	Assume 50%-100% RE	RPS	100% carbon free	94% of customers	46,876	0
Local Solar Installations	**Voluntary:** assume 2.5% annual participation	5%	9%	200 dwelling units 52 nonresidential buildings	0	0

Transportation + Land Use						
EV Adoption	Assume adoption rate in line with Ventura County	5% of households	11% of households	510 vehicles	7,356	14,878
Mode Split	**Mandatory:** TDM program for employers	Carpool: 15% Transit: 6% Walk/Bike: 7%	Carpool: 18% Transit: 10% Walk/Bike: 10%	N/A	21,748	58,602
Materials + Consumption						
Organics Diversion	**Mandatory:** SB 1383 compliance	75% reduction	75% reduction	N/A	3,885	3,723
Natural Systems + Water Resources						
Tree Planting	**Voluntary**	N/A	N/A	400 trees	156	368
Water Efficiency	**Voluntary:** assume 2.5% annual participation	28%	48%	1,200 dwelling units 63 nonresidential buildings	237	0
Total Reductions ($MTCO_2e$)					126,161	176,364
Forecasted ABAU emissions					487,135	446,803
Remaining ABAU emissions					360,974	270,439
1990 % Reduction					**-40%**	**-55%**

GHG Reduction Calculator Data Sources

Emissions forecast: Raimi + Associates. (Updated 2022). Based on City of Ventura provided 2019 GHG Communitywide Inventory.

Demographic data: California Department of Finance, SCAG, and US Census Bureau adjusted by Raimi + Associates to align with the Ventura General Plan Update Demographic estimates

- Housing units: 3x RHNA for City of Ventura
- Jobs growth: 1:1 with housing

Clean Energy

Avg. DC system size (kW): NREL PVWatts Calculator default value: https://pvwatts.nrel.gov/pvwatts.php

Annual kWh generated by PV: NREL PVWatts Calculator default value: https://pvwatts.nrel.gov/pvwatts.php

% homes using natural gas: California Residential Building Electrification Market Assessment https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf

Avg. Building size: California Residential Building Electrification Market Assessment https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf

Avg. appliance efficiencies: https://rael.berkeley.edu/wp-content/uploads/2017/07/Raghavan-Wei-Kammen-WaterHeating-_-ENergyPolicy-2017.pdf

Energy savings of retrocommissioning and solar installation: CEC Options for Energy Efficiency in Existing Buildings

Energy Savings of nonresidential retrofits: Advanced Energy Retrofit Guides https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-20814.pdf, https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-20761.pdf

Energy Savings of residential retrofits: CEC Large Scale Residential Retrofit Program https://ww2.energy.ca.gov/2017publications/CEC-500-2017-009/CEC-500-2017-009.pdf.

EPIC emissions factor: 75% carbon neutral electricity estimated as 25% of current emissions factor for electricity

Buildings

Commercial building assumptions: A Look at the U.S. Commercial Building Stock: Results from EIA's 2012 Commercial Buildings Energy Consumption Survey (CBECS) https://www.eia.gov/consumption/commercial/reports/

SCE emissions factor: Raimi + Associates. 2017 Communitywide GHG Emissions Inventory. (Updated 2022).

SoCalGas emissions factor: Raimi + Associates. 2017 Communitywide GHG Emissions Inventory. (Updated 2022).

Transportation

EV Fuel assumptions: Hybrid and Plug-In Electric Vehicle Emissions Data Sources and Assumptions https://afdc.energy.gov/vehicles/electric_emissions.html

Number and Types of EVs in Los Angeles County: California Plug-In Electric Vehicle Infrastructure Projections: 2017-2025 https://www.nrel.gov/docs/fy18osti/70893.pdf

VMT per trip: Ventura County 2016 EMFAC model

Current mode split: US Census Bureau.

VMT: Forecasted to increase by service population demographic data.

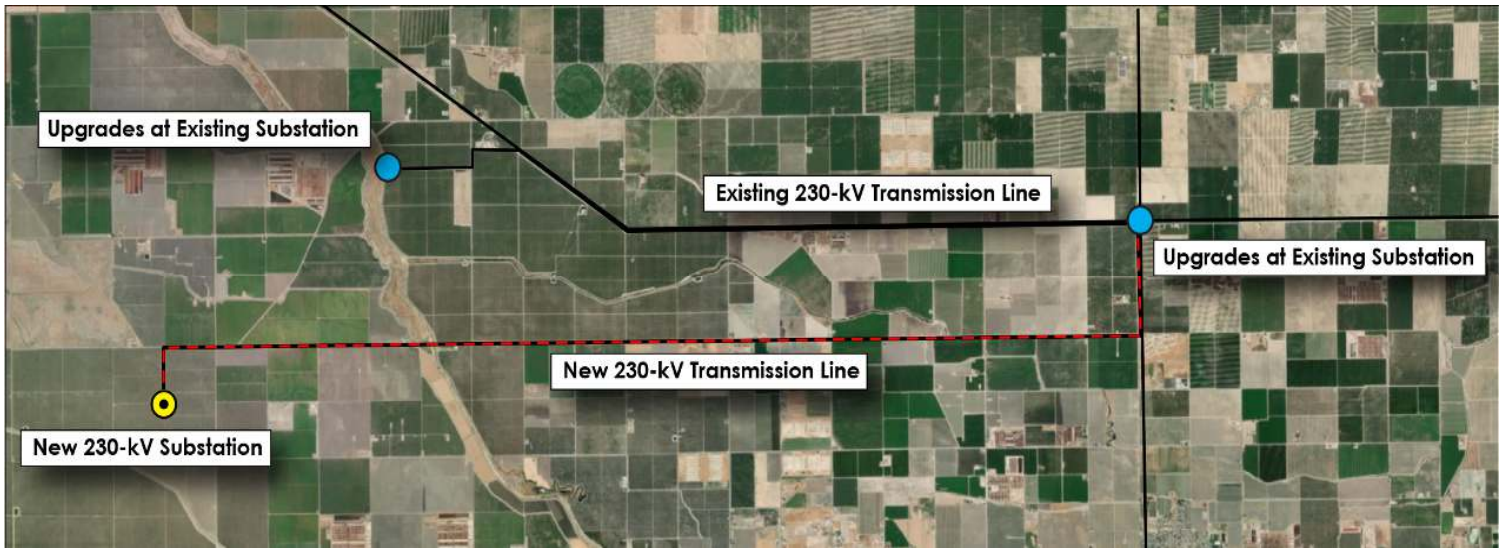
Mode split estimates: CAPCOA Quantifying Greenhouse Gas Mitigation Measures

Waste

Tonnage data: CalRecycle

Sequestration

Annual CO_2 accumulation per Tree: CAPCOA Quantifying Greenhouse Gas Mitigation Measures



Guidelines for Energy Project Applications Requiring CEQA Compliance:

Pre-filing and Proponent's Environmental Assessments

November 2019

Version 1.0

Energy Division

Infrastructure Permitting and CEQA Unit

California Public Utilities Commission

Guidelines for Energy Project Applications Requiring CEQA Compliance:

Pre-filing and Proponent's Environmental Assessments

Contents

Foreword

November 12, 2019

To: Applicants Filing Proponent's Environmental Assessments for Energy Infrastructure Projects at the California Public Utilities Commission (CPUC or Commission)

From: Merideth Sterkel (Program Manager, Infrastructure Planning and Permitting) and Mary Jo Borak and Lonn Maier, Supervisors, Infrastructure Permitting and California Environmental Quality Act, Energy Division, CPUC

Subject: Introducing revisions to the Pre-filing Guidelines for Energy Infrastructure Projects and a Unified and Updated Electric and Gas PEA Checklist

We are pleased to release a 2019 revision to the California Environmental Quality Act (CEQA) Proponent's Environmental Assessments (PEA) Checklist. This substantially revised document is now entitled "Guidelines for Energy Project Applications Requiring CEQA Compliance: Pre-filing and Proponent's Environmental Assessments" (Guidelines). Future updates to this document will be made as determined necessary. The CPUC's Rules of Practice and Procedure Sections 2.4 provide that all applications to the CPUC for authority to undertake projects that are not statutorily or categorically exempt from CEQA requirements shall include an Applicant-prepared PEA.

Updates Overview

Prior versions of the Working Draft PEA Checklist were published in 2008 and 2012. For this 2019 update, extensive revisions were made to all sections based on our experience with the prior checklist versions. All electric and natural gas projects are now addressed in a single PEA Checklist, and the following updates were made:

- **CEQA Statute and Guidelines 2019 Updates:** The PEA Checklist is updated pursuant to the 2019 CEQA Statues and Guidelines, including new energy and wildfire resource areas.
- **Pre-filing Consultation Guidelines:** Pre-filing guidelines are now provided since the pre-filing and PEA development processes are intertwined.
- **Unified PEA Checklist for Energy Projects:** All electric and natural gas projects are now addressed in a single PEA Checklist.
- **Additional CEQA Impact Questions:** Questions are included for the following PEA Checklist sections: 5.4, Biological Resources; 5.6, Energy; 5.9, Hazards, Hazardous Materials, and Public Safety; 5.16, Recreation; 5.17, Transportation; and 5.19, Utilities and Service Systems.
- **CPUC Draft Environmental Measures:** Draft measures are provided in PEA Checklist Attachment 4 for Aesthetics, Air Quality, Cultural Resources, Greenhouse Gas Emissions, Utilities and Service Systems and Wildfire.

Purpose of the Guidelines Document

The purpose and objective of the PEA Checklist included within this Guidelines document has not changed, which is to provide project Proponents (Applicants) with detailed guidance about information our CEQA Unit Staff expect in sufficient PEAs. The document details the information Applicants must provide the CPUC to complete environmental reviews that satisfy CEQA requirements. Specifically, the Pre-filing Consultation Guidelines and PEA Checklist, together, are intended to achieve the following objectives:

1. Provide useful guidance to Applicants, CPUC staff, and outside consultants regarding the type and detail of information needed to quickly and efficiently deem an application complete;

2. Ensure PEAs provide reviewers with a detailed project description and associated information sufficient to deem an application complete, avoid lengthy review periods and numerous data requests for the purpose of augmenting a PEA, and avoid unnecessary PEA production costs;
3. Increase the level of consistency between PEAs submitted and provide for more consistent review by CPUC CEQA Unit Staff and outside consultants; and
4. Promote transparency and reduce the potential for conflicts between utility and CPUC Staff about the types, scope, and thoroughness of data expected for data adequacy purposes.

The Guidelines document provides detailed instructions to Applicants for use during the Pre-filing process and PEA development. The document is intended to fully inform Applicants and focus the role of outside consultants, thus, enabling Applicants to submit more complete, useful, and immediately data-adequate PEAs.

Benefits of High Quality and Complete PEAs

CPUC CEQA Unit Staff seek to complete the environmental review process required under CEQA as quickly and efficiently as possible. Table 1 shows the average duration in months of CPUC applications that require CEQA documents. While there are tensions between speed and quality in all project management, the achievement of expeditious environmental reviews can result in lower project costs to ratepayers. Our staff have reviewed the timelines for 108 past CPUC applications that required review pursuant to CEQA and determined that the average length of time from application filing to PEA deemed complete is four months, regardless of the type of CEQA document. The goal for our agency is to deem PEAs complete within 30 days. The faster PEAs are deemed complete, the sooner staff can prepare the CEQA document. With each delay to PEA completeness, the fundamental project purpose and need and baseline circumstances may shift, requiring refreshing of the data. The Guidelines document will improve the initial accuracy of PEAs and reduce the time required to deem PEAs complete. Once an application is formally filed, the Applicant will receive a notification letter from CPUC CEQA Unit Staff when the PEA is deemed complete.

Table 1. Average Duration in Months of CPUC Applications that Require CEQA Documents (1996–2019)

	I: Application Filed to PEA Deemed Complete	II: PEA Deemed Complete to Draft Environmental Document Circulated	III: Draft Environmental Document to Final Released	IV: Final Released to Proposed Decision	V: Proposed Decision to Final Decision (with Certification of CEQA Document)	I-V: Overall Duration (1)
Environmental Impact Report (EIR; n=49)	5	13	7	5	2	**29**
Initial Study/ Mitigated Negative Declaration (IS/MND; n=56)	4	8	3	4	1	**19**
All Document Types (n=108)	4	8	4	5	2	**23**
Range: All Document Types	*1-9*	*5-18*	*2-10*	*1-7*	*1-2*	***12-38***

Note:
(1) The overall duration is not a sum of the average durations for each step. The overall duration was calculated using "n," the number of applications with data available for the date of application filing and final decision date. Not all projects had data available for each step. The data include several instances where the CEQA document was developed in conjunction with a NEPA document, e.g., an EIR/Environmental Impact Statement or IS/MND/Environmental Assessment/Finding of No Significant Impact was prepared instead of an EIR or MND, respectively. The above data is not inclusive of projects that had averages and ranges that are statistically abnormal.

Lessons Learned about the PEA Process

In the past, Applicants have filed PEAs using the checklist to ensure the correct information was provided but have not followed the format and organization of the PEA checklist and sometimes chose not to engage in Pre-filing activities with our staff. To achieve the objectives and benefits listed above, Applicants will file all future PEAs in the same organizational format as the updated checklist and adhere to the Pre-filing Consultation Guidelines in coordination with CPUC CEQA Unit Staff.

The Guidelines document describes the level effort required for the assessments necessary to not only finalize a CEQA document but ensure its legal defensibility. While final design and survey information is preferred, the PEA may incorporate preliminary design and survey data as appropriate and in consultation with CEQA Unit Staff during Pre-filing. We recognize that projects are fact specific, and deviations from the Pre-filing Consultation Guidelines and PEA Checklist are inevitable but providing concise and accurate information as soon as possible is paramount. Any deviations from these Guidelines must include clear justification and should be discussed and submitted during the Pre-filing Consultation process to avoid subsequent delays.

The PEA Checklist is written with the assumption that an Environmental Impact Report will be prepared, however, a Mitigated Negative Declaration or other form of CEQA document (e.g., exemption) may be appropriate. This determination, however, must be made in consultation with CPUC CEQA Unit Staff during Pre-filing and prior to submittal of the Draft PEA.

Future Modifications and Improvements

Like the predecessor PEA checklists, this is a working document that will be modified over time based on experience and changes to the CEQA Statute and Guidelines. To meet the above stated objectives and maintain consistency with CEQA. We expect Applicants, their consultants, CPUC consultants, and the CPUC to engage in a regular and ongoing dialogue about specific improvements to the CEQA process overall, and these Guidelines in particular.

We look forward to working with Applicants during the Pre-filing Consultation process to ensure that the level of effort that goes into preparing PEAs can be effectively and efficiently transferred into the CEQA document prepared by CPUC Staff and consultants. Applicants are invited to debrief with our staff about the efficacy of these Guidelines.

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California Public Utilities Commission

Pre-Filing Consultation Guidelines

The following Pre-filing Consultation Guidelines apply to all PEAs filed with applications to the CPUC and outline a process for Applicants to engage with CPUC CEQA Unit Staff about upcoming projects that will require environmental review pursuant to CEQA. The CPUC is typically the Lead Agency for large projects by investor-owned gas and electric utilities. The CPUC's CEQA Unit Staff are experienced with developing robust CEQA documents for long, linear energy projects. The PEA Checklist, starting in the next section, is based upon that experience.

Pre-filing Consultation Process

During Pre-filing Consultation, Applicants and CPUC Staff meet to discuss the upcoming application. Successful projects will commence Pre-filing Consultation no less than six months prior to application filing at the CPUC. When the application is formally filed at the CPUC, the Application and the PEA are submitted to the CPUC Docket Office.

1. Meetings with CPUC Staff

To initiate Pre-filing Consultation, Applicants will request and attend a meeting with CPUC CEQA Unit Staff at least six months prior to application filing.

   a. Applicants can request a Pre-Filing Consultation meeting via email or letter. Initial contact via telephone may occur, but staff request written documentation of Pre-filing Consultation commencement.

   b. For the initial meeting, Applicants will provide staff with a summary of the proposed project including maps and basic GIS data at least one week prior to the meeting.

   c. Applicants will receive initial feedback on the scope of the proposed project and PEA. Staff will work with Applicants to establish a schedule for subsequent Pre-filing meetings and milestones.

2. Consultant Resources

CPUC CEQA Unit Staff will initiate the consultant contract immediately following the initial Pre-filing Consultation meeting. CPUC's consultant contract resources will be executed prior to Applicant filing of the Draft PEA. The consultant contract is critical to the Pre-filing Consultation process. Applicants are encouraged to request updates about the status of the contract. The CPUC may use its on-call consulting resources contract for these purposes. If CEQA Unit Staff determine that their on-call consulting resources are not appropriate due to the anticipated project scope, staff may initiate a request for proposals process to engage consulting resources, and the resulting contracting process will be completed and consultant contract in place prior to Draft PEA filing.

3. Draft PEA Provided Prior to PEA Filing

A complete Draft PEA will be filed at least three months prior to application filing. CPUC CEQA Unit Staff and the CPUC consultant team will review and provide comments on the Draft PEA to the Applicant early in the three-month period to allow time for Applicant revisions to the PEA.

4. Project Site Visits

One or more site visits will be scheduled with CPUC CEQA Unit Staff and their consultant at the time of Draft PEA filing (or prior). Appropriate federal, state, and local agencies will also be engaged at this time.

5. Consultation with Public Agencies

The Applicant and CPUC CEQA Unit Staff will jointly reach out and conduct consultation meetings with public agencies and other interested parties in the project area. CPUC CEQA Unit Staff may also choose to conduct separate consultation meetings if needed.

If a federal agency will be a co-lead pursuant to the National Environmental Policy Act and coordinating with the CPUC during the environmental review process, the Applicant and CPUC CEQA Unit Staff will ensure that the agency has the opportunity to comment on the Draft PEA and participate jointly with the CPUC throughout the application review process. Applicant and Commission CEQA Unit Staff coordination with the federal agency (if applicable) will likely need to occur more than six months in advance of application filing.

6. Alternatives Development

PEAs will be drafted with the assumption that an Environmental Impact Report (EIR) will be prepared. Applicants will include a reasonable range of alternatives in the PEA (even though a Mitigated Negative Declaration [MND] may ultimately be prepared), including sufficient information about each alternative. In some situations, CPUC CEQA Unit Staff and project Applicants may agree during Pre-filing Consultation that an MND is likely and a reasonable range of alternatives is not required for the PEA. This determination, however, must be made in consultation with CEQA Unit Staff during Pre-filing and is not final. The type of document to be prepared may change based on public scoping results and other findings during the environmental review process.

CEQA Unit Staff will provide feedback on the range of alternatives prior to Draft PEA filing (if possible) based on their review of the Draft PEA. It is critical that Applicants receive feedback from CEQA Unit Staff about the range of alternatives prior to filing the PEA. Applicants will ensure that each alternative is described and evaluated in the PEA with an equal level of detail as the proposed project unless otherwise instructed in writing by CEQA Unit Staff.

7. Format of PEA Submittal

Each PEA submittal will include the completed PEA Checklist tables. Each PEA submittal will be formatted and organized as shown in the Example PEA Table of Contents provided in the PEA Checklist unless otherwise directed by CPUC CEQA Unit Staff in writing prior to application filing. The example PEA Table of Contents is modeled after typical CPUC EIRs.

8. Transmission and Distribution System Information

A key component of CEQA projects analyzed during CPUC environmental reviews is the context of the project within the larger transmission and distribution system. Detailed descriptions of the regional transmission system, including GIS data, to which the proposed project would interconnect are required. The required level of detail about interconnecting systems is project specific and will be specified by CEQA Unit Staff in writing during Pre-filing Consultation. Detailed distribution system information may also be required.

9. Data and Technical Adequacy

Applicants will focus PEA development efforts on providing thorough, up-to-date data and technical reports required for CPUC CEQA Unit Staff to complete the environmental document and alternatives analysis.

The Applicant-drafted PEA Executive Summary, Introduction, Project Description, Description of Alternatives, and other chapters typically found in past CPUC EIRs and Initial Study/MNDs will be *thorough*—emulate the level of detail provided in typical CPUC EIRs. The setting sections provided for

PEA Chapter 5, Environmental Analysis, will also be thorough. Applicants will ensure that the PEA text, graphics, and file formats can be efficiently converted into CPUC's CEQA document with minimal revision, reformatting, and redevelopment by CPUC Staff and consultants.

The impact analyses and determinations provided for Chapter 5, Environmental Analysis, and Chapter 6, Comparison of Alternatives, need not be as thorough as those to be prepared by the CPUC for its CEQA document. These two sections are expected to be revised and redeveloped by CPUC Staff and consultants. Other sections of the CEQA document will only be revised and redeveloped by CPUC Staff and consultants if determined to be necessary after PEA filing.

10. Applicant Proposed Measures

The Pre-filing Consultation process can support the development Applicant Proposed Measures (APMs); measures that Applicants incorporate into the PEA project description to avoid or reduce what otherwise may be considered significant impacts. APMs that use phrases, such as, "as practicable," "as needed," or other conditional language will be superseded by Mitigation Measures if required to avoid or reduce a potentially significant impact. CPUC CEQA Unit Staff and their consultant team may review and provide comments on the Draft PEA APMs during Pre-filing Consultation.

Applicants will carefully consider each CPUC Draft Environmental Measure identified in Chapter 5 of this PEA Checklist. The measures may be applied to the proposed project if appropriate and may be subject to modification by the CPUC during its environmental review.[1]

11. PEA Checklist Deviations

CPUC CEQA Unit Staff understand that the PEA Checklist requires Applicants to develop a significant quantity of information. There are times when it is appropriate to deviate from the PEA Checklist. Deviations to the Pre-Filing Consultation Guidelines or the PEA Checklist contents may be approved by the CPUC's CEQA Unit Staff. Staff approval will be in writing and will occur prior to Applicant filing of the Draft PEA. Note that any deviations approved in writing by staff during the Pre-filing period may be reversed or modified after application and PEA filing and at any time throughout the environmental review period at the discretion of CPUC CEQA Unit Staff.

12. Submittal of Confidential Information

CPUC Staff are available during Pre-filing Consultation to discuss concerns that Applicants may have about confidentiality. However, the CEQA process requires public disclosure about projects, and such disclosure can often appear to conflict with Applicant requests for confidentiality. CPUC CEQA Unit Staff will rely on CPUC adopted confidentiality procedures to resolve confidentiality concerns. Applicants that expect aspects of a PEA filing to be confidential must follow CPUC confidentiality procedures. Applicants may mark information as confidential if allowed pursuant to General Order 66 or latest applicable Commission rule (e.g., see Public Records Act Proceeding Rulemaking (R.14-11-001).

13. Additional CEQA Impact Questions

Additional CEQA Impact Questions that are specific to the types of projects evaluated by the Commission's CEQA Unit are identified in the PEA Checklist to be considered in addition to the checklist items in CEQA Guidelines Appendix G.

The next section of this Guidelines document provides the PEA Checklist for all energy project applications that require CEQA compliance.

[1] At this time, the CPUC environmental measures are in draft format, see PEA Checklist Attachment 4. They may be formally incorporated into Chapter 5 of future versions of the PEA Checklist.

Proponent's Environmental Assessment (PEA) Checklist

The PEA Checklist provides project Applicants (e.g., projects involving electric transmission lines, electric substations or switching stations, natural gas transmission pipelines, and underground natural gas storage facilities) with detailed guidance regarding the level of detail CPUC CEQA Unit Staff expect to deem PEAs complete. Applicants will prepare their PEAs using the same section headers and numbering as provided in the PEA Checklist. Applicants will also provide supporting data that is specific to each item within the PEA Checklist. As noted in the Pre-Filing Consultation Guidelines, the PEA Checklist is written with the assumption that an EIR will be prepared. PEA contents may not need to support the development of an EIR, but this determination can only be made in consultation with CPUC CEQA Unit Staff as described in the Pre-Filing Consultation Guidelines.

Formatting and Basic PEA Data Needs, Including GIS Data

1. Provide **editable and fully functional source files** in electronic format for all PDF files, hardcopies, maps, images, and diagrams. Files will be provided in their original file format as well as the output file format. All Excel and other spreadsheet files or modeling files will include all underlying formulas/modeling details. All modeling files must be fully functional.
2. Details about the types of **GIS data and maps** to be submitted are provided in Attachment 1. GIS data not specified in this checklist may also be requested depending on the Proposed Project and alternatives.
3. The Applicant is responsible for ensuring that all project features, including project components and temporary and permanent work areas, are included within all **survey boundaries** (e.g., biological and cultural resources).
4. Excel spreadsheets with **emissions calculations** will be provided that are complete with all project assumptions, values, and formulas used to prepare emissions calculations in the PEA. Accompanying PDF files with the same information will be provided as Appendix B to the PEA (see List of Appendices below).
5. Applicants will provide in an Excel spreadsheet a comprehensive **mailing list** that includes the names and addresses of all affected landowners and residents, including unit numbers for multi-unit properties for both the proposed project and alternatives.
    a. An affected resident or landowner is defined as one whose place of residence or property is:
        i. Crossed by or abuts any component of the proposed project or an alternative including any permanent or temporary disturbance area (either above or below ground) and any extra work area (e.g., staging or parking area); or
        ii. Located within approximately 1,000 feet[2] of the edge of any construction work area.
    b. Include in the following information for each resident in a spreadsheet, at minimum: parcel APN number, owner name and mailing address, and parcel physical address. If individual occupant names, facility names, or business names are available, also provide these names and addresses in the spreadsheet. A sample mailing list format is provided in Table 2.

[2] Notice to all property owners within 300 feet of a Proposed Project is required at the time of application filing under GO 131-D. Commission notices of CEQA document preparation may be mailed to residents and property owners greater than 300 feet from a Proposed Project to ensure adequate notification (e.g., 1,000 feet) and the extent of notification will be determined on a project specific basis. Appropriate notice expectations will be discussed during Pre-filing (e.g., with respect to visual impact areas and other types of impacts specific to the Proposed Project and its study area).

Table 2. Sample Project Mailing List

Category	Company/ Agency	Name	Mailing Address	Phone Number	Email	APN	Source
State Agency	California Resources Agency	John Doe	1234 California Street City, CA 98765	(333) 456-7899	johndoe@email.com	123-456-789	County Assessor
Individual	n/a	Jane Doe	222 Main Street City, CA 97531	(909) 876-5432	janedoe@email.com	101-202-303	Public meeting on Month, Day 2019

6. **PEA Organization:** This PEA Checklist is organized to include each of the chapters and sections found in typical CPUC EIRs. The following sections will serve as the outline for all Draft PEAs submitted during Pre-filing and all PEAs filed with the CPUC Docket Office. PEAs will include each chapter and section identified (in matching numerical order) unless otherwise directed by CPUC CEQA Unit Staff in writing prior to filing.

Cover

A single sheet with the following information:	Applicant Notes, Comments
Title "Proponent's Environmental Assessment" and filing date	
Proponent Name (the Applicant)	
Name of the proposed project[3]	
Technical subheading summarizing the type of project and its major components, in one sentence or about 40 words, for example: A new 1,120 MVA, 500/115kV substation, 10 miles of new singled-circuit 500kV transmission lines, 25 miles of new and replaced double-circuit 115kV power lines, and upgrades at three existing substations are proposed.	
Location of the proposed project (all counties and municipalities or map figure for the cover that shows the areas crossed)	
Proceeding for which the PEA was prepared and CPUC Docket number (if known) or simply leave a blank where the Docket number would go	
Primary Contact's name, address, telephone number, and email address for both the project Applicant(s) and entities that prepared the PEA	
See example PEA cover in Figure 1.	

[3] If approved by the California Independent System Operator (CAISO), the project name listed will match the name specified in the CAISO approval. If multiple names apply, list all versions.

Figure 1. Example PEA Cover

Proponent's Environmental Assessment for California Utility Company's Evergreen Electric Substation and Transmission Line Project

May 1, 2019 (PEA filing date)

A new 230 kV substation, 10 miles of new single-circuit 230kV transmission lines, and upgrades at two existing substations are proposed.

The Proposed Project would be located primarily in __ County but would also cross __ and __ counties and areas within the City of __.

Application A.19-05-01 to the California Public Utilities Commission

Prepared by California Environmental Consulting
1234 Avenue
City, CA Zip Code
Primary Contact's Name
Position
Phone Number
Email

Prepared for California Utility Company
1234 Avenue
City, CA Zip Code
Primary Contact's Name
Position
Phone Number
Email

Table of Contents

Sections

Order	The format of the PEA will be organized as follows:	Applicant Notes, Comments
--	Cover	
--	Table of Contents, List of Tables, List of Figures, List of Appendices	
1	Executive Summary	
2	Introduction	
3	Proposed Project Description	
4	Description of Alternatives	
5	Environmental Analysis	
5.1	Aesthetics	
5.2	Agriculture and Forestry	
5.3	Air Quality	
5.4	Biological Resources	
5.5	Cultural Resources	
5.6	Energy	
5.7	Geology, Soils, and Paleontological Resources	
5.8	Greenhouse Gas Emissions	
5.9	Hazards, Hazardous Materials, and Public Safety	
5.10	Hydrology and Water Quality	
5.11	Land Use and Planning	
5.12	Mineral Resources	
5.13	Noise	
5.14	Population and Housing	
5.15	Public Services	
5.16	Recreation	
5.17	Transportation	
5.18	Tribal Cultural Resources	
5.19	Utilities and Service Systems	
5.20	Wildfire	
5.21	Mandatory Findings of Significance	
6	Comparison of Alternatives	

7	Cumulative Impacts and Other CEQA Considerations	
8	List of Preparers	
9	References[4]	
--	Appendices	

Required PEA Appendices and Supporting Materials

Order	Title	Applicant Notes, Comments
Appendix A	Detailed Maps and Design Drawings	
Appendix B	Emissions Calculations	
Appendix C	Biological Resources Technical Reports (see Attachment 2)	
Appendix D	Cultural Resources Studies (see Attachment 3)	
Appendix E	Detailed Tribal Consultation Report[5]	
Appendix F	Environmental Data Resources Report, Phase I Environmental Site Assessment, or similar hazardous materials report	
Appendix G	Agency Consultation and Public Outreach Report and Records of Correspondence	
Appendix H	Construction Fire Prevention Plan[6]	

Potentially Required[7] Appendices and Supporting Materials

Order	Title	Applicant Notes, Comments
Appendix I	Noise Technical Studies	
Appendix J	Traffic Studies	
Appendix K	Geotechnical Investigations (may preliminary at time of PEA filing)	
Appendix L	Hazardous Substance Control and Emergency Response Plan / Hazardous Waste and Spill Prevention Plan	

4 References will be organized by section but contained in a single chapter called, "References."

5 Include summary and timing of all correspondence to and from any Tribes and the State Historic Preservation Office/Native American Heritage Commission, including Sacred Lands File search results, and full description of any issues identified by Tribes in their interactions with the Applicant.

6 The Construction Fire Prevention Plan will be provided to federal, state, and local fire agencies for review and comment as applicable to where components of the proposed project would be located. CPUC will approve the final Construction Fire Prevention Plan. Record of the request for review and comment and any comments received from these agencies will be provided to CPUC CEQA Unit Staff.

7 Anticipated Appendix and study requirements should be discussed with CPUC CEQA Unit Staff during Pre-filing.

Appendix M	Erosion and Sedimentation Control Best Management Practice Plan / Draft Storm Water Pollution Prevention Plan (may be preliminary at time of PEA filing)	
Appendix N	FAA Notice and Criteria Tool Results	
Appendix O	Revegetation or Site Restoration Plan	
Appendix P	Health and Safety Plan	
Appendix Q	Existing Easements[8]	
Appendix R	Blasting Plan (may be preliminary at time of PEA filing)	
Appendix S	Traffic Control/Management Plan (may be preliminary at time of PEA filing)	
Appendix T	Worker Environmental Awareness Program (may preliminary at time of PEA filing)	
Appendix U	Helicopter Use and Safety Plan (may be preliminary at time of PEA filing)	
Appendix V	Electric and Magnetic Fields Management Plan (may be part of the Application rather than the PEA)	

[8] Easements should be provided military lands, conservation easements, or other lands where the real estate agreement specifies the range of activities that can be conducted

1 Executive Summary

This section will include, but is not limited to, the following:	PEA Section and Page Number[9]	Applicant Notes, Comments
1.1: Proposed Project Summary. Provide a summary of the proposed project and its underlying purpose and basic objectives.		
1.2: Land Ownership and Right-of-Way Requirements. Provide a summary of the existing and proposed land ownership and rights-of-way for the proposed project.		
1.3: Areas of Controversy. Identify areas of anticipated controversy and public concern regarding the project.		
1.4: Summary of Impacts a) Identify all impacts expected by the Applicant to be potentially significant. Identify and discuss Applicant Proposed Measures here and provide a reference to the full listing of Applicant Proposed Measures provided in the table described in Section 3.11 of this PEA Checklist. b) Identify any significant and unavoidable impacts that may occur.		
1.5: Summary of Alternatives. Summarize alternatives that were considered by the Applicant and the process and criteria that were used to select the proposed project.		
1.6: Pre-filing Consultation and Public Outreach Summary. Briefly summarize Pre-filing consultation and public outreach efforts that occurred and identify any significant outcomes that were incorporated into the proposed project.		
1.7: Conclusions. Provide a summary of the major PEA conclusions.		
1.8: Remaining Issues. Describe any major issues that must still be resolved.		

[9] The *PEA Section and Page Number* column and *Applicant Notes, Comments* column are intended to be filled out and provided with PEA submittals. The PEA Checklist is provided in Word to all Applicants to allow column resizing as appropriate to reduce PEA checklist length when completed for submittal. Landscape formatting may also be appropriate for completed PEA Checklist tables.

2 Introduction

2.1 Project Background

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
2.1.1: Purpose and Need a) Explain why the proposed project is needed. b) Describe localities the proposed project would serve and how the project would fit into the local and regional utility system. c) If the proposed project was identified by the California Independent System Operator (CAISO), thoroughly describe the CAISO's consideration of the proposed project and provide the following information: i. Include references to all CAISO Transmission Planning Processes that considered the proposed project. ii. Explain if the proposed project is considered an economic, reliability, or policy-driven project or a combination thereof. iii. Identify whether and how the Participating Transmission Owner recommended the project in response to a CAISO identified need, if applicable. iv. Identify if the CAISO approved the original scope of the project or an alternative and the rationale for their approval either for the original scope or an alternative. v. Identify how and whether the proposed project would exceed, combine, or modify in any way the CAISO identified project need. vi. If the Applicant was selected as part of a competitive bid process, identify the factors that contributed to the selection and CAISO's requirements for in-service date. d) If the project was not considered by the CAISO, explain why.		
(Natural Gas Storage Only) e) Provide storage capacity or storage capacity increase in billion cubic feet. If the project does not increase capacity, make this statement. f) Describe how existing storage facilities will work in conjunction with the proposed project. Describe the purchasing process (injection, etc.) and transportation arrangements this facility will have with its customers.		
2.1.2: Project Objectives a) Identify and describe the basic project objectives.[10] The objectives will include reasons for constructing the project based on its		

[10] Tangential project goals should not be included as basic project objectives, such as, minimizing environmental impacts, using existing ROWs and disturbed land to the maximum extent feasible, ensuring safety during construction and operation, building on property already controlled by the Applicant/existing site control. Goals of this type do not describe the underlying purpose or basic objectives but, rather, are good general practices for all projects.

purpose and need (i.e., address a specific reliability issue). The description of the project objectives will be sufficiently detailed to permit CPUC to independently evaluate the project need and benefits to accurately consider them in light of the potential environmental impacts. The basic project objectives will be used to guide the alternatives screening process, when applicable. b) Explain how implementing the project will achieve the basic project objectives and underlying purpose and need. c) Discuss the reasons why attainment of each basic objective is necessary or desirable.		
2.1.3: Project Applicant(s). Identify the project Applicant(s) and ownership of each component of the proposed project. Describe each Applicant's utility services and their local and regional service territories.		

2.2 Pre-filing Consultation and Public Outreach[11]

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
2.2.1: Pre-filing Consultation and Public Outreach a) Describe all Pre-filing consultation and public outreach that occurred, such as, but not limited to: i. CAISO ii. Public agencies with jurisdiction over project areas or resources that may occur in the project area iii. Native American tribes affiliated with the project area iv. Private landowners and homeowner associations v. Developers for large housing or commercial projects near the project area vi. Other utility owners and operators vii. Federal, state, and local fire management agencies b) Provide meeting dates, attendees, and discussion summaries, including any preliminary concerns and how they were addressed and any project alternatives that were suggested. c) Clearly identify any significant outcomes of consultation that were incorporated into the proposed project. d) Clearly identify any developments that could coincide or conflict with project activities (i.e., developments within or adjacent to a proposed ROW).		
2.2.2: Records of Consultation and Public Outreach. Provide contact information, notification materials, meeting dates and materials, meeting notes, and records of communication organized by entity as an Appendix to the PEA (Appendix G).		

[11] CPUC CEQA Unit Staff request that consultation and public outreach that occurs during the Pre-filing period and throughout environmental review include the assigned CPUC Staff person and CPUC consultant.

2.3 Environmental Review Process

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
2.3.1: Environmental Review Process. Provide a summary of the anticipated environmental review process and schedule.		
2.3.2: CEQA Review a) Explain why CPUC is the appropriate CEQA Lead agency. b) Identify other state agencies and any federal agencies that may have discretionary permitting authority over any aspect of the proposed project. c) Identify all potential involvement by federal, state, and local agencies not expected to have discretionary permitting authority (i.e., ministerial actions). d) Summarize the results of any preliminary outreach with these agencies as well as future plans for outreach.		
2.3.3: NEPA Review (if applicable). If review according to the National Environmental Policy Act (NEPA) is expected, explain the portions of the project that will require the NEPA review process. Discuss which agency is anticipated to be the NEPA Lead agency if discretionary approval by more than one federal agency is required.		
2.3.4: Pre-filing CEQA and NEPA Coordination. Describe the results of Pre-filing coordination with CEQA and NEPA review agencies (refer to CPUC's Pre-Filing Consultation Guidelines). Identify major outcomes of the Pre-filing coordination process and how the information was incorporated into the PEA, including suggestions on the type of environmental documents and joint or separate processes based on discussions with agency staff.		

2.4 Document Organization

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
2.4: PEA Organization. Summarize the contents of the PEA and provide an annotated list of its sections.		

3 Proposed Project Description[12]

3.1 Project Overview

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
3.1: Project Overview a) Provide a concise summary of the proposed project and components in a few paragraphs. b) Described the geographical location of the proposed project (i.e., county, city, etc.). c) Provide an overview map of the proposed project location.		

3.2 Existing and Proposed System

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
3.2.1: Existing System a) Identify and describe the existing utility system that would be modified by the proposed project, including connected facilities to provide context. Include detailed information about substations, transmission lines, distribution lines, compressor stations, metering stations, valve stations, nearby renewable generation and energy storage facilities, telecommunications facilities, control systems, SCADA systems, etc. b) Provide information on users and the area served by the existing system features. c) Explain how the proposed project would fit into the existing local and regional systems. d) Provide a schematic diagram of the existing system features. e) Provide detailed maps and associated GIS data for existing facilities that would be modified by the proposed project.		
3.2.2: Proposed Project System a) Describe the whole of the proposed project by component, including all new facilities and any modifications, upgrades, or expansions to existing facilities and any interrelated activities that are part of the whole of the action. b) Clearly identify system features that would be added, modified, removed, disconnected and left in place, etc. c) Identify the expected capacities of the proposed facilities, highlighting any changes from the existing system. If the project would not change existing capacities, make this statement. For electrical projects, provide the anticipated capacity increase in amps or megawatts or in the typical units for the types of facilities proposed. For gas projects, provide the total volume of gas to be		

[12] Applicant review of the Administrative Draft Project Description or sections of the Administrative Draft Project Description prepared for the CEQA document may be requested by CPUC CEQA Unit Staff to ensure technical accuracy.

delivered by the proposed facilities, anticipated system capacity increase (typically in million cubic feet per day), expected customers, delivery points and corresponding volumes, and the anticipated maximum allowable operating pressure(s). d) Describe the initial buildout and eventual full buildout of the proposed project facilities. For example, if an electrical substation or gas compressor station would be installed to accommodate additional demand in the future, then include the designs for both the initial construction based on current demand and the design for all infrastructure that could ultimately be installed within the planned footprint of an electric substation or compressor station. e) Explain whether the electric line or gas pipeline will create a second system tie or loop for reliability. f) Provide information on users and the area served by the proposed system features, highlighting any differences from the existing system. g) Provide a schematic diagram of the proposed system features. h) Provide detailed maps and associated GIS data for proposed facilities that would be installed, modified, or relocated by the proposed project.		
3.2.3: System Reliability. Explain whether the electric line or gas pipeline will create a second system tie or loop for reliability. Clearly explain and show how the proposed project relates to and supports the existing utility systems.		
3.2.4: Planning Area. Describe the system planning area served or to be served by the project. Clearly define the Applicant's term for the planning area (e.g., Electrical Needs Area or Distribution Planning Area).		

3.3 Project Components

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
Required for all Project Types		
3.3.1: Preliminary Design and Engineering a) Provide preliminary design and engineering information for all above-ground and below-ground facilities for the proposed project. The approximately locations, maximum dimensions of facilities, and limits of areas that would be needed to construction and operate the facilities should be clearly defined.[13] b) Provide preliminary design drawings for project features and explain the level of completeness (i.e., percentage). c) Provide detailed project maps (approximately 1:3,000 scale) and associated GIS data of all facility locations and boundaries with attributes and spatial geometry that corresponds to information in the Project Description.		

[13] Refer to Attachment 1 for mapping and GIS data requirements for the project layout and design.

3.3.2: Segments, Components, and Phases a) Define all project segments, components, and phases for the proposed project. b) Provide the length/area of each segment or component, and the timing of each development phase. c) Provide an overview map showing each segment and provide associated GIS data (may be combined with other mapping efforts).		
3.3.3: Existing Facilities a) Identify the types of existing facilities that would be removed or modified by the proposed project (i.e., conductor/cable, poles/towers, substations, switching stations, gas storage facilities, gas pipelines, service buildings, communication systems, etc.). b) Describe the existing facilities by project segment and/or component, and provide information regarding existing dimensions, areas/footprints, quantities, locations, spans, etc. c) Distinguish between above-ground and below-ground facilities and provide both depth and height ranges for each type of facility. For poles/towers, provide the installation method (i.e., foundation type or direct bury), and maximum above-ground heights and below-ground depths. d) Explain what would happen to the existing facilities. Would they be replaced, completely removed, modified, or abandoned? Explain why. e) Identify the names, types, materials, and capacity/volumes ranges (i.e., minimum and maximum) of existing facilities that would be installed or modified by the proposed project. f) Provide diagrams with dimensions representing existing facilities to provide context on how the proposed facilities would be different. g) Briefly describe the surface colors, textures, light reflectivity, and any lighting of existing facilities.		
3.3.4: Proposed Facilities a) Identify the types of proposed facilities to be installed or modified by the proposed project (e.g., conductor/cable, poles/towers, substations, switching stations, gas storage facilities, gas pipelines, service buildings, communication systems). b) Describe the proposed facilities by project segment and/or component, and provide information regarding maximum dimensions, areas/footprints, quantities, locations, spans, etc. c) Distinguish between above-ground and below-ground facilities and provide both depth and height ranges for each type of facility. For poles/towers, provide the installation method (i.e., foundation type or direct bury), and maximum above-ground heights and below-ground depths.		

d) Identify where facilities would be different (e.g., where unique or larger poles would be located, large guy supports or snub poles). e) Provide details about civil engineering requirements (i.e., permanent roads, foundations, pads, drainage systems, detention basins, spill containment, etc.). f) Distinguish between permanent facilities and any temporary facilities (i.e., poles, shoo-fly lines, mobile substations, mobile compressors, transformers, capacitors, switch racks, compressors, valves, driveways, and lighting). g) Identify the names, types, materials, and capacity/volumes ranges (i.e., minimum and maximum) of proposed facilities that would be installed or modified by the proposed project. h) Provide diagrams with dimensions representing existing facilities. i) Briefly describe the surface colors, textures, light reflectivity, and any lighting of proposed facilities.		
3.3.5: Other Potentially Required Facilities a) Identify and describe in detail any other actions or facilities that may be required to complete the project. For example, consider the following questions: i. Could the project require the relocation (temporary or permanent), modification, or replacement of unconnected utilities or other types of infrastructure by the Applicant or any other entity? ii. Could the project require aviation lighting and/or marking? iii. Could the project require additional civil engineering requirements to address site conditions or slope stabilization issues, such as pads and retaining walls, etc.? b) Provide the location of each facility and a description of the facility.		
3.3.6: Future Expansions and Equipment Lifespans a) Provide detailed information about the current and reasonably foreseeable plans for expansion and future phases of development. b) Provide the expected usable life of all facilities. c) Describe all reasonably foreseeable consequences of the proposed project (e.g., future ability to upgrade gas compressor station to match added pipeline capacity).		
Required for Certain Project Types		
3.3.7: Below-ground Conductor/Cable Installations (as Applicable) a) Describe the type of line to be installed (e.g., single circuit cross-linked polyethylene-insulated solid-dielectric, copper-conductor cables). b) Describe the type of casing the cable would be installed in (e.g., concrete-encased duct bank system) and provide the dimensions of the casing.		

c) Describe the types of infrastructure would likely be installed within the duct bank (e.g., transmission, fiber optics, etc.).		
3.3.8: Electric Substations and Switching Stations (as Applicable) a) Provide the number of transformer banks that will be added at initial and full buildout of the substation. Identify the transformer voltage and number of each transformer type. b) Identify any gas insulated switchgear that will be installed within the substation. c) Describe any operation and maintenance facilities, telecommunications equipment, and SCADA equipment that would be installed within the substation.		
3.3.9: Gas Pipelines (as Applicable). For each segment: a) Identify pipe diameter, number and length of exposed sections, classes and types of pipe to be installed, pressure of pipe, and cathodic protection for each linear segment. b) Describe new and existing inspection facilities (e.g., pig launcher sites). c) Describe system cross ties and laterals/taps. d) Identify the spacing between each valve station. e) Describe the compressor station, if needed, for any new or existing pipeline. f) Describe all pipelines and interconnections with existing and proposed facilities: i. Number of interconnections and locations and sizes; ii. All below-ground and above-ground installations; and iii. All remote facility locations for metering, telemetry, control.		
3.3.10: Gas Storage Facilities – Background and Resource Information (as Applicable) a) Provide detailed background information on the natural gas formation contributing to the existing or proposed natural gas facility, including the following: i. Description of overlying stratigraphy, especially caps ii. Description of production, injection, and intervening strata iii. Types of rock iv. Description of types of rocks in formation, including permeability or fractures v. Thickness of strata b) Provide a graphic and/or table showing formation thicknesses. c) Identify and describe any potential gas migration pathways, such as faults, permeable contacts, abandoned wells, underground water or other pipelines. d) Provide a summary and detailed cross-section diagrams of the geologic formations and structures of the oil/gas field or area. e) Provide the first well drilling and production history, abandonment procedures, inspections, etc. f) Describe production zones, including depth, types of formations, and characteristics of field/area.		

g) Describe the existing and proposed storage capacity and limiting factors, such as injection or withdrawal capacities. h) Describe existing simulation studies that were used to predict the reservoir pressure response under gas injection and withdrawal operations, and simulation studies for how the system would change as proposed. Provide the studies as a PEA Appendix. i) Provide the history of the oil/gas field or area.		
3.3.11: Gas Storage Facilities – Well-Head Sites (as Applicable). Describe the location, depth, size and completion information for all existing, abandoned, proposed production and injection, monitoring, and test wells.		
3.3.12: Gas Storage Facilities – Production and Injection (as Applicable) a) Provide the proposed storage capacity of production and injection wells. b) Provide production and injection pressures, depths, and rates. c) Provide production and injection cycles by day, week, and year. d) Describe existing and proposed withdrawal/production wells (i.e., size, depth, formations, etc.). e) Describe existing and proposed cushion gas requirements. f) Describe any cushion gas injection—formation the well is completed in (cushion gas formation), and injection information.		
3.3.13: Gas Storage Facilities – Electrical Energy (as Applicable). Describe all existing and proposed electric lines, telecommunications facilities, and other utilities/facilities (e.g., administrative offices, service buildings, and non-hazardous storage), and chemical storage associated with the proposed project.		
3.3.14: Telecommunication Lines (as Applicable) a) Identify the type of cable that is proposed and length in linear miles by segment. b) Identify any antenna and node facilities that are part of the project. c) For below-ground telecommunication lines, provide the depth of cable and type of conduit. d) For above-ground telecommunication lines, provide: i. Types of poles that will be installed (if new poles are required) ii. Where existing poles will be used iii. Any additional infrastructure (e.g., guy wires) or pole changes required to support the additional cable on existing poles		

3.4 Land Ownership, Rights-of-Way, and Easements

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
3.4.1: Land Ownership. Describe existing land ownership where each project component would be located. State whether the proposed		

project would be located on property(ies) owned by the Applicant or if additional property would be required.		
3.4.2: Existing Rights-of-Way or Easements a) Identify and describe existing rights-of-way (ROWs) or easements where project components would be located. Provide the approximately lengths and widths in each project area. b) Clearly state if project facilities would be replaced, modified, or relocated within existing ROWs or easements.		
3.4.3: New or Modified Rights-of-Way or Easements a) Describe new permanent or modified ROWs or easements that would be required. Provide the approximately lengths and widths in each project area. b) Describe how any new permanent or modified ROWs or easements would be acquired. c) Provide site plans identifying all properties/parcels and partial properties/parcels that may require acquisition and the anticipated ROWs or easements. Provide associated GIS data. d) Describe any development restrictions within new ROWs or easements, e.g., building clearances and height restrictions, etc. e) Describe any relocation or demolition of commercial or residential property/structures that may be necessary.		
3.4.4: Temporary Rights-of-Way or Easements f) Describe temporary ROWs or easements that would be required to access project areas, including ROWs or easements for temporary construction areas (i.e., staging areas or landing zones). g) Explain where temporary construction areas would be located with existing ROWs or easements for the project or otherwise available to the Applicant without a temporary ROW or easement. h) Describe how any temporary ROWs or easements would be acquired.		

3.5 Construction

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
3.5.1 Construction Access (All Projects)		
3.5.1.1: Existing Access Roads a) Provide the lengths, widths, ownership details (both public and private roads), and surface characteristics (i.e., paved, graveled, bare soil) of existing access roads that would be used during construction. Provide the area of existing roads that would be used (see example in Table 3 below). b) Describe any road modifications or stabilization that would be required prior to construction, including on the adjacent road		

shoulders or slopes. Identify any roads that would be expanded and provide the proposed width increases. c) Describe any procedures to address incidental road damage cause by project activities following construction. d) Provide detailed maps and associated GIS data for all existing access roads.		

Table 3. Access Roads

Type of Road	Description	Area Proposed Project
Existing Dirt Road	Typically double track. May have been graded previously. No other preparation required, although a few sections may need to be re-graded and crushed rock applied in very limited areas for traction.	_____ acres
New Permanent	Would be xx feet wide, bladed. No other preparation required although crushed rock may need to be applied in very limited areas for traction.	_____ acres
Overland Access	No preparation required. Typically grassy areas that are relatively flat. No restoration would be necessary.	_____ acres

3.5.1.2: New Access Roads a) Identify any new access roads that would be developed for project construction purposes, such as where any blading, grading, or gravel placement could occur to provide equipment access outside of a designated workspace.[14] b) Provide lengths, widths, and development methods for new access roads. c) Identify any temporary or permanent gates that would be installed. d) Clearly identify any roads that would be temporary and fully restored following construction. Otherwise it will be assumed the new access road is a permanent feature. e) Provide detailed maps and associated GIS data for all new access roads.		
3.5.1.3: Overland Access Routes a) Identify any overland access routes that would be used during construction, such as where vehicles and equipment would travel over existing vegetation and where blading, grading, or gravel placement would occur. b) Provide lengths and widths for new access roads. c) Provide detailed maps and associated GIS data for all overland access routes.		
3.5.1.4: Watercourse Crossings a) Identify all temporary watercourse crossings that would be required during construction. Provide specific methods and procedures for temporary watercourse crossings.		

[14] Temporary roads that would not require these activities should be considered an overland route.

b) Describe any bridges or culverts that replacement or installation of would be required for construction access. c) Provide details about the location, design and construction methods.		
3.5.1.5: Helicopter Access. If helicopters would be used during construction: a) Describe the types and quantities of helicopters that would be used during construction (e.g., light, medium, heavy, or sky crane), and a description of the activities that each helicopter would be used for. b) Identify areas for helicopter takeoff and landing. c) Describe helicopter refueling procedures and locations. d) Describe flight paths, payloads, and expected hours and durations of helicopter operation. e) Describe any safety procedures or requirements unique to helicopter operations, such as but not limited to obtaining a Congested Area Plan from the Federal Aviation Administration (FAA).		
3.5.2 Staging Areas (All Projects)		
3.5.2.1: Staging Area Locations a) Identify the locations of all staging area(s). Provide a map and GIS data for each.[15] b) Provide the size (in acres) for each staging area and the total staging area requirements for the project.		
3.5.2.2: Staging Area Preparation a) Describe any site preparation required, if known, or generally describe what might be required (i.e., vegetation removal, new access road, installation of rock base, etc.). b) Describe what the staging area would be used for (i.e., material and equipment storage, field office, reporting location for workers, parking area for vehicles and equipment, etc.). c) Describe how the staging area would be secured. Would a fence be installed? If so, describe the type and extent of the fencing. d) Describe how power to the site would be provided if required (i.e., tap into existing distribution, use of diesel generators, etc.). e) Describe any temporary lightning facilities for the site. f) Describe any grading activities and/or slope stabilization issues.		

[15] While not all potential local site staging areas will be known prior to selection of a contractor, it is expected that approximate area and likely locations of staging areas be disclosed. The identification of extra or optional staging areas should be considered to reduce the risk of changes after project approval that could necessitate further CEQA review.

3.5.3 Construction Work Areas (All Projects)		
3.5.3.1: Construction Work Areas a) Describe known work areas that may be required for specific construction activities (e.g., pole assembly, hillside construction)[16] b) Describe the types of activities that would be performed at each work area. Work areas may include but are not necessarily limited to: i. Helicopter landing zones and touchdown areas ii. Vehicle and equipment parking, passing, or turnaround areas iii. Railroad, bridge, or watercourse crossings iv. Temporary work pads for facility installation, modification, or removal v. Excavations and associated equipment work areas vi. Temporary guard structures vii. Pull-and-tension/stringing sites viii. Jack and bore pits, drilling areas and pull-back areas for horizontal directional drills ix. Retaining walls		
3.5.3.2 Work Area Disturbance a) Provide the dimensions of each work area including the maximum area that would be disturbed during construction (e.g., 100 feet by 200 feet) (see example in Table 4 below). b) Provide a table with temporary and permanent disturbance at each work area (in square feet or acres), and the total area of temporary and permanent disturbance for the entire project (in acres).		
3.5.3.3: Temporary Power. Identify how power would be provided at work area (i.e., tap into existing distribution, use of diesel generators, etc.). Provide the disturbance area for any temporary power lines.		
3.5.4 Site Preparation (All Projects)		
3.5.4.1: Surveying and Staking. Describe initial surveying and staking procedures for site preparation and access.		
3.5.4.2: Utilities a) Describe the process for identifying any underground utilities prior to construction (i.e., underground service alerts, etc.). b) Describe the process for relocating any existing overhead or underground utilities that aren't directly connected to the project system. c) Describe the process for installing any temporary power or other utility lines for construction.		

[16] Understanding that each specific work area may not be determined until the final work plan is submitted by the construction contractor, estimate total area likely to be disturbed.

Table 4. Work Areas

	Proposed Project (approximate metrics)
Pole Diameter:	
• Wood	_____ inches
• Self-Supporting Steel	_____inches
Lattice Tower Base Dimension:	
• Self-Supporting Lattice Structure	_____feet
Auger Hole Depth:	
• Wood	_____ to _____ feet
• Self-Supporting Steel	_____ to _____ feet
Permanent Footprint per Pole/Tower:	
• Wood	_____ sq. feet
• Self-Supporting Steel	_____ sq. feet
• Self-Supporting Steel Tower	_____ sq. feet
Number of Poles/Towers:	
• Wood	_____
• Self-Supporting Steel	_____
• Self-Supporting Steel Tower	_____
Average Work Area around Pole/Towers (e.g., for old pole removal and new pole installation):	
• Tangent structure work areas	_____ sq. feet
• Dead End / Angle structure work areas	_____ sq. feet
Total Permanent Footprint for Poles/Towers	Approximately _____ acres

3.5.4.3: Vegetation Clearing a) Describe what types of vegetation clearing may be required (e.g., tree removal, brush removal, flammable fuels removal) and why (e.g., to provide access, etc.). b) Provide calculations of temporary and permanent disturbance of each vegetation community and include all areas of vegetation removal in the GIS database. Distinguish between disturbance that would occur in previously developed areas (i.e., paved, graveled, or otherwise urbanized), and naturally vegetated areas. c) Describe how each type of vegetation removal would be accomplished. d) Describe the types of equipment that would be used for vegetation removal.		
3.5.4.4: Tree Trimming Removal a) For electrical projects, distinguish between tree trimming as required under CPUC General Order 95-D and tree removal. b) Identify the types, locations, approximate numbers, and sizes of trees that may need to be removed or trimmed substantially. c) Identify potentially protected trees that may be removed or substantially trimmed, such as but not limited to riparian trees, oaks trees, Joshua trees, or palm trees.		

d) Describe the types of equipment that would typically be used for tree removal.		
3.5.4.5: Work Area Stabilization. Describe the processes to stabilize temporary work areas and access roads including the materials that would be used (e.g., gravel).		
3.5.4.6: Grading a) Describe any earth moving or substantial grading activities (i.e., grading below a 6-inch depth) that would be required and identify locations where it would occur. b) Provide estimated volumes of grading (in cubic yards) including total cut, total fill, cut that would be reused, cut that would be hauled away, and clean fill that would be hauled to the site.		
3.5.5 Transmission Line Construction (Above Ground)		
3.5.5.1: Poles/Towers a) Describe the process and equipment for removing poles, towers, and associated foundations for the proposed project (where applicable). Describe how they would be disconnected, demolished, and removed from the site. Describe backfilling procedures and where the material would be obtained. b) Describe the process and equipment for installing or otherwise modifying poles and towers for the proposed project. Describe how they would be put into place and connected to the system. Identify any special construction methods (e.g., helicopter installation) at specific locations or specific types of poles/towers. c) Describe how foundations, if any, would be installed. Provide a description of the construction method(s), approximate average depth and diameter of excavation, approximate volume of soil to be excavated, approximate volume of concrete or other backfill required, etc. for foundations. Describe what would be done with soil removed from a hole/foundation site. d) Describe how the poles/towers and associated hardware would be delivered to the site and assembled. e) Describe any pole topping procedures that would occur, identify specific locations and reasons, and describe how each facility would be modified. Describe any special methods that would be required to top poles that may be difficult to access.		
3.5.5.2: Aboveground and Underground Conductor/Cable a) Provide a process-based description of how new conductor/cable would be installed and how old conductor/cable would be removed, if applicable. b) Identify where conductor/cable stringing/installation activities would occur. c) Provide a diagram of the general sequencing and equipment that would be used. d) Describe the conductor/cable splicing process.		

e) Provide the general or average distance between pull-and-tension sites. Describe the approximate dimensions and where pull-and-tension sites would generally be required (as indicated by the designated work areas), such as the approximate distance to pole/tower height ratio, at set distances, or at significant direction changes. Describe the equipment that would be required at these sites. f) For underground conductor/cable installations, describe all specialized construction methods that would be used for installing underground conductor or cable. If vaults are required, provide their dimensions and location/spacing along the alignment. Provide a detailed description for how the vaults would be delivered to the site and installed. g) Describe any safety precautions or areas where special methodology would be required (e.g., crossing roadways, stream crossing).		
3.5.5.3: Telecommunications. Identify the procedures for installation of proposed telecommunication cables and associated infrastructure.		
3.5.5.4: Guard Structures. Identify the types of guard structures that would be used at crossings of utility lines, roads, railroads, highways, etc. Describe the different types of guard structures or methods that may be used (i.e., buried poles and netting, poles secured to a weighted object, bucket trucks, etc.). Describe any pole installation and removal procedures associated with guard structures. Describe guard structure installation and removal process and duration that guard structures would remain in place.		
3.5.5.5: Blasting a) Describe any blasting that may be required to construct the project. b) If blasting may be required, provide a Blasting Plan that identifies the blasting locations; types and amounts of blasting agent to be used at each location; estimated impact radii; and, noise estimates. The Blasting Plan should be provided as an Appendix to the PEA. c) Provide a map identifying the locations where blasting may be required with estimated impact radii. Provide associated GIS data.		
3.5.6 Transmission Line Construction (Below Ground)		
3.5.6.1: Trenching a) Describe the approximate dimensions of the trench (e.g., depth, width). b) Provide the total approximate volume of material to be removed from the trench, the amount to be used as backfill, and any amount to subsequently be removed/disposed of offsite in cubic yards. c) Describe the methods used for making the trench (e.g., saw cutter to cut the pavement, backhoe to remove, etc.). d) Provide off-site disposal location, if known, or describe possible option(s). e) Describe if dewatering would be anticipated and if so, how the trench would be dewatered, the anticipated flows of the water,		

whether there would be treatment, and how the water would be disposed of. f) Describe the process for testing excavated soil or groundwater for the presence of pre-existing environmental contaminants that could be exposed from trenching operations. g) If a pre-existing hazardous waste were encountered, describe the process of removal and disposal. h) Describe the state of the ground surface after backfilling the trench. i) Describe standard Best Management Practices to be implemented.		
3.5.6.2: Trenchless Techniques (Microtunnel, Jack and Bore, Horizontal Directional Drilling) a) Identify any locations/features for which the Applicant expects to use a trenchless (i.e., microtunneling, jack and bore, horizontal directional drilling) crossing method and which method is planned for each crossing. b) Describe the methodology of the trenchless technique. c) Provide the approximate location and dimensions of the sending and receiving pits. d) Describe the methodology of excavating and shoring the pits. e) Provide the total volume of material to be removed from the pits, the amount to be used as backfill, and the amount subsequently to be removed/disposed of offsite in cubic yards. f) Describe process for safe handling of drilling mud and bore lubricants. g) Describe the process for detecting and avoiding "fracturing-out" during horizontal directional drilling operations. h) Describe the process for avoiding contact between drilling mud/lubricants and stream beds. i) If engineered fill would be used as backfill, indicate the type of engineered backfill and the amount that would be typically used (e.g., the top 2 feet would be filled with thermal-select backfill). j) Describe if dewatering is anticipated and, if so, how the pits would be dewatered, the anticipated flows of the water, whether there would there be treatment, and how the water would be disposed of. k) Describe the process for testing excavated soil or groundwater for the presence of pre-existing environmental contaminants. Describe the process of disposing of any pre-existing hazardous waste that is encountered during excavation. l) Describe any standard BMPs that would be implemented for trenchless construction.		
3.5.7 Substation, Switching Stations, Gas Compressor Stations		
3.5.7.1: Installation or Facility Modification. Describe the process and equipment for removing, installing, or modifying any substations, switching stations, or compressor stations including: a) Transformers/ electric components b) Gas components c) Control and operation buildings d) Driveways		

e) Fences f) Gates g) Communication systems (SCADA) h) Grounding systems		
3.5.7.2: Civil Works. Describe the process and equipment required to construct any slope stabilization, drainage, retention basins, and spill containment required for the facility.		
3.5.8 Gas Pipelines		
3.5.8.1: Gas Pipeline Construction. Describe the process for proposed pipeline construction including site development, trenching and trenchless techniques, pipe installation, and backfilling.		
3.5.8.2: Water Crossings. Describe water feature crossings that will occur during trenching, the method of trenching through stream crossings, and the process for avoiding impacts to the water features required for pipeline construction. Identify all locations where the pipeline will cross water features. Cite to any associated geotechnical or hydrological investigations completed and provide a full copy of each report as an Appendix to the PEA.[17]		
3.5.8.3: Gas Pipeline Other Requirements a) Describe hydrostatic testing process including pressures, timing, source of flushing water, discharge of water. b) Describe energy dissipation basin, and the size and length of segments to be tested. c) Describe pig launching locations and any inline inspection techniques used during or immediately post construction.		
3.5.9 Gas Storage Facilities		
3.5.9.1: Gas Storage Construction a) Describe the process for constructing the gas storage facility including constructing well pads and drilling wells. b) Describe the specific construction equipment that would be used, such as the type of drill rig (i.e., size, diesel, electric, etc.), depth of drilling, well-drilling schedule and equipment.		
3.5.9.2: Drilling Muds and Fluids. Describe the use of any drilling muds, fluids, and other drilling materials. Provided estimated types and quantities.		
3.5.10 Public Safety and Traffic Control (All Projects)		
3.5.10.1: Public Safety a) Describe specific public safety considerations during construction and best management practices to appropriately manage public safety. Clearly state when and where they each safety measure would be applied.		

[17] If a geotechnical study is not available at the time of PEA filing, provide the best information available.

b) Identify procedures for managing work sites in urban areas, covering open excavations securely, installing barriers, installing guard structures, etc. c) Identify specific project areas where public access may be restricted for safety purposes and provide the approximate durations and timing of restricted access at each location.		
3.5.10.2: Traffic Control a) Describe traffic control procedures that would be implemented during construction. b) Identify the locations, process, and timing for closing any sidewalks, lanes, roads, trails, paths, or driveways to manage public access. c) Identify temporary detour routes and locations. d) Provide a preliminary Traffic Control Plan(s) for the project.		
3.5.10.3: Security. Describe any security measures, such as fencing, lighting, alarms, etc. that may be required. State if security personnel will be stationed at project areas and anticipated duration of security.		
3.5.10.4: Livestock. Describe any livestock fencing or guards that may be necessary to prevent livestock from entering project areas. State if the fencing would be electrified and if so, how it would be powered.		
3.5.11 Dust, Erosion, and Runoff Controls (All Projects)		
3.5.11.1: Dust. Describe specific best management practices that would be implemented to manage fugitive dust.		
3.5.11.2: Erosion. Describe specific best management practices that would be implemented to manage erosion.		
3.5.11.3: Runoff. Describe specific best management practices that would be implemented to manage stormwater runoff and sediment.		
3.5.12 Water Use and Dewatering (All Projects)		
3.5.12.1: Water Use. Describe the estimated volumes of water that would be used by construction activity (e.g., dust control, compaction, etc.). State if recycled or reclaimed water would be used and provide estimated volumes. Identify the anticipated sources where the water would be acquired or purchased. Identify if the source of water is groundwater and the quantity of groundwater that could be used.		
3.5.12.2: Dewatering a) Describe dewatering procedures during construction, including pumping, storing, testing, permitted discharging, and disposal requirements that would be followed. b) Describe the types of equipment and workspace considerations to be used to dewater, store, transport, or discharge extracted water.		
3.5.13 Hazardous Materials and Management (All Projects)		
3.5.13.1: Hazardous Materials a) Describe the types, uses, and volumes of all hazardous materials that would be used during construction. b) State if herbicides or pesticides may be used during construction.		

c) If a pre-existing hazardous waste were encountered, describe the process of removal and disposal.		
3.5.13.2: Hazardous Materials Management a) Identify specific best management practices that would be followed for transporting, storing, and handling hazardous materials. b) Identify specific best management practices that would be followed in the event of an incidental leak or spill of hazardous materials. c) Provide a Hazardous Substance Control and Emergency Response Plan / Hazardous Waste and Spill Prevention Plan as an Appendix to the PEA, if appropriate.		
3.5.14 Waste Generation and Management (All Projects)		
3.5.14.1: Solid Waste a) Describe solid waste streams from existing and proposed facilities during construction. b) Identify procedures to be implemented to manage solid waste, including collection, containment, storage, treatment, and disposal. c) Provide estimated total volumes of solid waste by construction activity or project component. d) Describe the recycling potential of solid waste materials and provide estimated volumes of recyclable materials by construction activity or project component. e) Identify the locations of appropriate disposal and recycling facilities where solid wastes would be transported.		
3.5.14.2: Liquid Waste a) Describe liquid waste streams during construction (i.e., sanitary waste, drilling fluids, contaminated water, etc.) b) Describe procedures to be implemented to manage liquid waste, including collection, containment, storage, treatment, and disposal. c) Provide estimated volumes of liquid waste generated by construction activity or project component. d) Identify the locations of appropriate disposal facilities where liquid wastes would be transported.		
3.5.14.3: Hazardous Waste a) Describe potentially hazardous waste streams during construction and procedures to be implemented to manage hazardous wastes, including collection, containment, storage, treatment, and disposal. b) If large volumes of hazardous waste are anticipated, such as from a pre-existing contaminant in the soil that must be collected and disposed of, provide estimated volumes of hazardous waste that would be generated by construction activity or project component. c) Identify the locations of appropriate disposal facilities where hazardous wastes would be transported.		
3.5.15 Fire Prevention and Response (All Projects)		
3.5.15.1: Fire Prevention and Response Procedures. Describe fire prevention and response procedures that would be implemented during		

construction. Provide a Construction Fire Prevention Plan or specific procedures as an Appendix to the PEA.		
3.5.15.2: Fire Breaks. Identify any fire breaks (i.e., vegetation clearance) requirements around specific project activities (i.e., hot work). Ensure that such clearance buffers are included in the limits of the defined work areas, and the vegetation removal in that area is attributed to Fire Prevention and Response (refer to 3.5.4.3: Vegetation Clearing).		

3.6 Construction Workforce, Equipment, Traffic, and Schedule

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
3.6.1: Construction Workforce a) Provide the estimated number of construction crew members. In the absence of project-specific data, provide estimates based on past projects of a similar size and type. b) Describe the crew deployment. Would crews work concurrently (i.e., multiple crews at different sites); would they be phased? How many crews could be working at the same time and where? c) Describe the different types of activities to be undertaken during construction, the number of crew members for each activity (i.e. trenching, grading, etc.), and number and types of equipment expected to be used for the activity. Include a written description of the activity. See example in Table 5.		
3.6.2: Construction Equipment. Provide a tabular list of the types of equipment expected to be used during construction of the proposed project including the horsepower. Define the equipment that would be used by each phase as shown in the example table below (Table 5).		

Table 5. Construction Equipment and Workforce

Work Activity				Activity Production				
Equipment Description	Estimated Horse-power	Probable Fuel Type	Equipment Quantity	Estimated Workforce	Estimated Start Date	Estimated End Date	Duration of Use (Hrs./Day)	Estimated Production
Survey				**4**	**January 2020**	**December 2020**		**358 Miles**
1-Ton Truck, 4x4	300	Diesel	2		January 2020	December 2020	10	1 Mile/Day
Staging Yards				**5**	**DOP**			
1-Ton Truck, 4x4	300	Diesel	1		Duration of Project		4	
R/T Forklift	350	Diesel	1				5	
Boom/Crane Truck	350	Diesel	1				5	
Water Truck	300	Diesel	2				10	
Jet A Fuel Truck	300	Diesel	1				4	
Truck, Semi-Tractor	500	Diesel	1				6	
Road Work				**6**	**January 2020**	**March 2020**		**426 Miles**
1-Ton Truck, 4x4	300	Diesel	2		January 2020	March 2020	5	
Backhoe/Front Loader	350	Diesel	1		January 2020	March 2020	7	
Track Type Dozer	350	Diesel	1		January 2020	March 2020	7	
Motor Grader	350	Diesel	1		January 2020	March 2020	5	
Water Truck	300	Diesel	2		January 2020	March 2020	10	
Drum Type Compactor	250	Diesel	1		January 2020	March 2020	5	
Excavator	300	Diesel	1		January 2020	February 2020	7	
Lowboy Truck/Trailer	500	Diesel	1		January 2020	February 2020	4	

3.6.3: Construction Traffic a) Describe how the construction crews and their equipment would be transported to and from the proposed project site. b) Provide vehicle type, number of vehicles, and estimated hours of operation per day, week, and month for each construction activity and phase. c) Provide estimated vehicle trips and vehicles miles traveled (VMT) for each construction activity and phase. Provide separate values for construction crews commuting, haul trips, and other types of construction traffic.		
3.6.4: Construction Schedule a) Provide the proposed construction schedule (e.g., month and year) for each segment or project component, and for each construction activity and phase. b) Provide and explain the sequencing of construction activities, and if they would or would not occur concurrently. c) Provide the total duration of each construction activity and phase in days or weeks. d) Identify seasonal considerations that may affect the construction schedule, such as weather or anticipated wildlife restrictions, etc. The proposed construction should account for such factors.		
3.6.5: Work Schedule a) Describe the anticipated work schedule, including the days of the week and hours of the day when work would occur. Clearly state if work would occur at night or on weekends and identify when and where this could occur. b) Provide the estimated number of days or weeks that construction activities would occur at each type of work area. For example, construction at a stationary facility or staging area may occur for the entire duration of construction, but construction at individual work areas along a linear project would be limited to a few hours, days or weeks, and only a fraction of the total construction period.		

3.7 Post-Construction

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
3.7.1: Configuring and Testing. Describe the process and duration for post-construction configuring and testing of facilities. Describe the number of personnel and types of equipment that would be involved.		
3.7.2: Landscaping. Describe any landscaping that would be installed. Provide a conceptual landscape plan that identifies the locations and types of plantings that will be used. Identify whether plantings will include container plants or seeds. Include any water required for landscaping in the description of water use above.		

3.7.3 Demobilization and Site Restoration		
3.7.3.1: Demobilization. Describe the process for demobilization after construction activities, but prior to leaving the work site. For example, describe final processes for removing stationary equipment and materials, etc.		
3.7.3.2: Site Restoration. Describe how cleanup and post-construction restoration would be performed (i.e., personnel, equipment, and methods) on all project ROWs, sites, and extra work areas. Things to consider include, but are not limited to, restoration of the following: a) Restoring natural drainage patterns b) Recontouring disturbed soil c) Removing construction debris d) Vegetation e) Permanent and semi-permanent erosion control measures f) Restoration of all disturbed areas and access roads, including restoration of any public trails that are used as access, as well as any damaged sidewalks, agricultural infrastructure, or landscaping, etc. g) Road repaving and striping, including proposed timing of road restoration for underground construction within public roadways		

3.8 Operation and Maintenance

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
3.8.1: Regulations and Standards a) Identify and describe all regulations and standards applicable to operation and maintenance of project facilities. b) Provide a copy of any applicable Wildfire Management Plan and describe any special procedures for wildfire management.		
3.8.2: System Controls and Operation Staff a) Describe the systems and methods that the Applicant would use for monitoring and control of project facilities (e.g., on-site control rooms, remote facilities, standard monitoring and protection equipment, pressure sensors, automatic shut-off valves, and site and equipment specific for monitoring and control such as at natural gas well pads). b) If new full-time staff would be required for operation and/or maintenance, provide the number of positions and purpose.		
3.8.3: Inspection Programs a) Describe the existing and proposed inspection programs for each project component, including the type, frequency, and timing of scheduled inspections (i.e., aerial inspection, ground inspection, pipeline inline inspections). b) Describe any enhanced inspections, such as within any High Fire Threat Districts consistent with applicable Wildfire Management Plan requirements.		

c) Describe the inspection processes, such as the methods, number of crew members, and how access would occur (i.e., walk, vehicle, all-terrain vehicle, helicopter, drone, etc.). If new access would be required, describe any restoration that would be provided for the access roads.		
3.8.4: Maintenance Programs a) Describe the existing and proposed maintenance programs for each project component. b) Describe scheduled maintenance or facility replacement after the designated lifespan of the equipment. c) Identify typical parts and materials that require regular maintenance and describe the repair procedures. d) Describe any access road maintenance that would occur. e) Describe maintenance for surface or color treatment. f) Describe cathodic protection maintenance that would occur. g) Describe ongoing landscaping maintenance that would occur.		
3.8.5: Vegetation Management Programs a) Describe vegetation management programs within and surrounding project facilities. Distinguish between any different types of vegetation management. b) Describe any enhanced vegetation management, such as within any High Fire Threat Districts consistent with any applicable Wildfire Management Plan requirements. Identify the areas where enhanced vegetation management would be conducted.		

3.9 Decommissioning

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
3.9.1: Decommissioning. Provide detailed information about the current and reasonably foreseeable plans for the disposal, recycling, or future abandonment of all project facilities.		

3.10 Anticipated Permits and Approvals

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
3.10.1: Anticipated Permits and Approvals. Identify all necessary federal, state, regional, and local permits that may be required for the project. For each permit, list the responsible agency and district/office representative with contact information, type of permit or approval, and status of each permit with date filed or planned to file. For example: a) Federal Permits and Approvals i. U.S. Fish and Wildlife Service ii. U.S. Army Corps of Engineers iii. Federal Aviation Administration iv. U.S. Forest Service		

v. U.S. Department of Transportation – Office of Pipeline Safety vi. U.S. Environmental Protection Agency (Resource Conservation and Recovery Act; Comprehensive Environmental Response, Compensation, and Liability Act) b) State and Regional Permits i. California Department of Fish and Wildlife ii. California Department of Transportation iii. California State Lands Commission iv. California Coastal Commission v. State Historic Preservation Office, Native American Heritage Commission vi. State Water Resources Control Board vii. California Division of Oil, Gas and Geothermal Resources viii. Regional Air Quality Management District ix. Regional Water Quality Control Board (National Pollutant Discharge Elimination System General Industrial Storm Water Discharge Permit) x. Habitat Conservation Plan Authority (if applicable) See also Table 6 of example permitting requirements and processes.		
3.10.2: Rights-of-Way or Easement Applications. Demonstrate that applications for ROWs or other proposed land use have been or soon will be filed with federal, state, or other land-managing agencies that have jurisdiction over land that would be affected by the project (if any). Discuss permitting plans and timeframes and provide the contact information at the federal agency(ies) approached.		

3.11 Applicant Proposed Measures

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
3.11 Applicant Proposed Measures a) Provide a table with the full text of any Applicant Proposed Measure. Where applicable, provide a copy of Applicant procedures, plans, and standards referenced in the Applicant Proposed Measures. b) Within Chapter 5, describe the basis for selecting a particular Applicant Proposed Measure and how the Applicant Proposed Measure would reduce the impacts of the project.[18] c) Carefully consider each CPUC Draft Environmental Measure identified in Chapter 5 of this PEA Checklist. The CPUC Draft Environmental Measures will be applied to the proposed project where applicable.		

[18] Applicant Proposed Measures that use phrases, such as, "as practicable" or other conditional language are not acceptable and will be superseded by Mitigation Measures if required to avoid or reduce a potentially significant impact.

Table 6. Example Permitting Requirements and Processes

Note: In addition to the CPCN or PTC, the applicant may also be required to secure resource agency permits for the project.

Disclaimer: Below is a general list of permits required for transmission projects. Permit requirements for individual projects may vary slightly depending on project conditions.

Agency	Permit	Regulation	Protected Resource	Trigger	Application Process	Timing
				Federal		
Army Corps of Engineers	404 Permit	Clean Water Act	Waters of the United States (including wetlands)	Placement of dredge or fill material into waters of the U.S., including wetlands. If project impacts less than 0.5 acres a **nationwide permit (NWP)** is typically issued	**NWP:** prepare a preconstruction notification (PCN) along with the draft Corps's application (Engineer Form 4345). Information in the PCN includes, but is not limited to: results of wetland delineation including areas of waters of the U.S.; temporary and permanent impacts to waters of the U.S. and discussion of avoidance; construction techniques, timeline, and equipment that would be used; special status species that potentially occur in the project area, and discussion of mitigation (if applicable) to replace wetlands	**NWP:** takes approximately nine months from the date of application submittal (depending on level of impacts and level of consultation required by other agencies). Initial review is 30 days after which application is deemed complete or additional information is requested.
				If project would impact more than 0.5 acres a **regional or individual permit** may be required.	**Regional or Individual Permit:** Same requirements as NWP as well as preparation and submittal of 404(b)(1) Alternatives analysis which identifies the Least Environmentally Damaging Practicable Alternative (LEDPA). Public notice also required	**Regional or Individual Permit:** An additional three to six months may be required on top of the nine months expected for an NWP. A 30 day public notice is also required to inform the public about the project before the Corps issues the permit.
USFWS	Section 7 Consultation	Federal Endangered Species Act	Federally Listed Species	Potential impact to a federally listed threatened or endangered species	Biological Assessment (BA) prepared and submitted to Corps. BA contains information on each species and describes potential for "take" of species and/or habitat.	The timeline for processing and receiving a formal **Biological Opinion (BO)** from USFWS can be six months to a year from when the Corps has initiated consultation and depending on the level of impact to listed species. The typical timeline for issuance of a BO is no less than 135 days after acceptance of the BA as complete.
US Department of Agriculture, Forest Service	Special Use Authorization	National Forest Management Act/NEPA	National Forest lands	Use of federal lands managed by the USDA Forest Service for a transmission line. Typically constitutes a Major Federal Action which in turn triggers NEPA analysis.	**Special Use Authorization Application:** prepare a special use application for consideration by the Forest Service. Prior to submitting a proposal, applicant is required to arrange a preapplicaiton meeting at the local Forest Service office. Application typically includes project plan, operating plans, liability insurance, licenses/registrations and other documents. If it is determined that NEPA is required either an EA or EIS would be prepared. The NEPA document may be prepared jointly with the CEQA document.	Revies of Special Use Authorization applications is often dependent upon what level of NEPA analysis is required. An EA is typically 9-12 months, and EIS is generally 18 months. NEPA process may occur concurrently with CEQA process.
US Department of the Interior, Bureau of Land Management	Right-of-Way Grant	Federal Land Policy and Management Act/NEPA	Federal Lands	Use of federal lands managed by the BLM for a transmission line. Typically constitutes a Major Federal Action which in turn triggers NEPA analysis.	**Right-of-Way Application**: Contact the BLM office with management responsibility. Obtain an application form "Application for Transportation and Utility Systems and Facilities on Federal Lands". Arrange a pre-application meeting with a BLM Realty Specialist or appropriate staff member. Submit completed application to the appropriate BLM office. If it is determined that NEPA is required either an EA or EIS would be prepared. The NEPA document may be prepared jointly with the CEQA document.	BLM attempts to review completed applications within 60 days of submittal. Full timing is often dependent upon what level of NEPA analysis is required. An EA is typically 9-12 months, and EIS is generally 18 months. NEPA process may occur concurrently with CEQA process.

Agency	Permit	Regulation	Protected Resource	Trigger	Application Process	Timing
			State (continued)			
State Historic Preservation Officer (SHPO)	Section 106 National Historic Preservation Act (NHPA)	National Historic Preservation Act	Cultural and/or historical resources	Required if there are potential impacts to cultural and/or historical resources that are listed or eligible for listing on the National Register of Historic Places.	Information on cultural and historical resources gathered during the draft CEQA document preparation is included in a 106 Technical Report and submitted to the Corps along with the Area of Potential Effect (APE) map. The information is then evaluated by the Corps' cultural resources evaluator for potential adverse effects within the APE. Depending upon the level of potential adverse effect, the Corps then forwards its finding to SHPO for concurrence or begins the process for a Memorandum of Agreement (MOA). Native American consultation is also mandatory for the 106 process but can begin during preparation of the environmental document. All letters and correspondence for the Native American consultation must be provided to the Corps.Consultation with federally-recongized tribes may require a more extensive consultation.	Once SHPO has received the Corps' determination, it has approximately 60 days to agree or request additional information. However, SHPO has recently become more involved in projects and this timeframe is only an estimate and if a potential adverse effect to cultural or historical resources could occur, the SHPO process can take up to a year or more. Depending on the level of impacts to cultural resources, the Corps may determine no effect and issue the permit before receiving concurrence from SHPO.
California State Lands Commission (CSLC)	Right of Way Lease Agreement	Division 6 of the California Public Resources Code	California Sovereign Lands	May be triggered if the transmission line crosses state lands under the jurisdiction of the CSLC, which includes the beds of 1) more than 120 rivers, streams and sloughs; 2) nearly 40 non-tidal navigable lakes, such as Lake Tahoe and Clear Lake; 3) the tidal navigable bays and lagoons; and 4) the tide and submerged lands adjacent to the entire coast and offshore islands of the State from the mean high tide line to three nautical miles offshore.	Leases or permits may be issued to qualified applicants and the Commission shall have broad discretion in all aspects of leasing including category of lease or permit and which use, method or amount of rental is most appropriate, whether competitive bidding should be used in awarding a lease, what term should apply, how rental should be adjusted during the term, whether bonding and insurance should be required and in what amounts, whether an applicant is qualified based on what it deems to be in the best interest of the State.	Most coordination should be done concurrently with the CEQA process to ensure that any CSLC-required issues are addressed under CEQA. Once a final route/alternative is selected, the lease process may take two to three months for final Commission approval.
			Local / Other			
Air Quality Management District or Air Pollution Control District	Permit to Construct	Federal Clean Air Act	Air Quality	Depends on the air disctrict involved; may not be required for most transmission projects. Some air districts have a trigger level based on disturbed acreage.	Application forms need to be prepared and submiited to the local AQMD or APCD	Typically 30 to 90 days after submittal of a complete application.

19

[19] Permitting is project specific. This table is provided for discussion purposes.

3.12 Project Description Graphics, Mapbook, and GIS Requirements

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
3.12.1: Graphics. Provide diagrams of the following as applicable: a) All pole, tower, pipe, vault, conduit, and retaining wall types b) For poles, provide typical drawings with approximate diameter at the base and tip; for towers, estimate the width at base and top. c) A typical detail for any proposed underground duct banks and vaults d) All substation, switchyard, building, and facility layouts e) Trenching, drilling, pole installation, pipe installation, vault installation, roadway construction, facility removal, helicopter uses, conductor installation, traffic control, and other construction activities where a diagram would assist the reader in visualizing the work area and construction approach f) Typical profile views of proposed aboveground facilities and existing facilities to be modified within the existing and proposed ROW (e.g., typical cross-section of existing and proposed facilities by project segment). g) Photos of representative existing and proposed structures		
3.12.2: Mapbook. Provide a detailed mapbook on an aerial imagery basemap at a scale between 1:3000 and 1:6000 (or as appropriate and legible) that show mileposts, roadways, and all project components and work areas including: a) All proposed above-ground and underground structure/facility locations (e.g., poles, conductor, substations, compressor stations, telecommunication lines, vaults, duct bank, lighting, markers, etc.) b) All existing structures/facilities that would be modified or removed c) Identify by milepost where existing ROW will be used and where new ROW or land acquisition will be required. d) All permanent work areas including permanent facility access e) All access roads including, existing, temporary, and new permanent access f) All temporary work areas including staging, material storage, field offices, material laydown, temporary work areas for above ground (e.g., pole installation) and underground facility construction (e.g., trenching and duct banks), helicopter landing zones, pull and tension sites, guard structures, shoo flys etc. g) Areas where special construction methods (e.g., jack and bore, HDD, blasting, retaining walls etc.) may need to be employed		

h) Areas where vegetation removal may occur i) Areas to be heavily graded and where slope stabilization measures would be employed including any retaining walls		
3.12.3: GIS Data. Provide GIS data for all features and ROW shown on the detailed mapbook.		
3.12.4: GIS Requirements. Provide the following information for each pole/tower that would be installed and for each pole/tower that would be removed: a) Unique ID number and type of pole (e.g., wood, steel, etc.) or tower (e.g., self-supporting lattice) both in a table and in the attributes of the GIS data provided b) Identify pole/tower heights and conductor sizes in the attributes of the GIS data provided.		
3.12.5: Natural Gas Facilities GIS Data. For natural gas facilities, provide GIS data for system cross ties and all laterals/taps, valve stations, and new and existing inspection facilities (e.g., pig launcher sites).		

4 Description of Alternatives

All Applicants will assume that alternatives will be required for the environmental analysis and that an EIR will be prepared unless otherwise instructed by CPUC CEQA Unit Staff in writing prior to application filing. See PEA Requirements at the beginning of this checklist document. The consideration and discussion of alternatives will adhere to CEQA Guidelines Section 15126.6. The description of alternatives will be provided in this chapter of the PEA, and the comparison of each alternative to the proposed project is provided in PEA Chapter 6. The amount of detail required for the description of various alternatives to the proposed project and what may be considered a reasonable range of alternatives will be discussed with CPUC during Pre-filing.

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
4.1 Alternatives Considered. Identify alternatives to the proposed project.[20] Include the following: a) All alternatives to the proposed project that were suggested, considered, or studied by the CAISO or by CAISO stakeholders b) Alternatives suggested by the public or agencies during public outreach efforts conducted by the Applicant c) Reduced footprint alternatives, including, e.g., smaller diameter pipelines and space for fewer electric transformers d) Project phasing options (e.g., evaluate the full build out for environmental clearance but consider an initial, smaller buildout that would only be expanded [in phases] if needed) e) Alternative facility and construction activity sites (e.g., substation, compressor station, drilling sites, well-head sites, staging areas) f) Renewable, energy conservation, energy efficiency, demand response, distributed energy resources, and energy storage alternatives g) Alternatives that would avoid or limit the construction of new transmission-voltage facilities or new gas transmission pipelines h) Other technological alternatives (e.g., conductor type) i) Route alternatives and route variations j) Alternative engineering or technological approaches (e.g., alternative types of facilities, or materials, or configurations) k) Assign an identification label and brief, descriptive title to each alternative described in this PEA chapter (e.g., Alternative A: No Project; Alterative B: Reduced Footprint 500/115-kV Substation; Alternative C: Ringo Hills 16-inch Pipeline Alignment; Alternative D1: Lincoln Street Route Variation; etc.). Each alternative will be easily identifiable by reading the brief title. Provide a description of each alternative. The description of each alternative will discuss to what extent it would be potentially feasible,		

[20] Reduced footprint alternatives; siting alternatives; renewable, energy conservation, energy efficiency, demand response, distributed energy resources, and energy storage alternatives; and non-wires alternatives (electric projects only) are typically required. For linear projects, route alternatives and route variations are typically required as well.

meet the project's underlying purpose, meet most of the basic project objectives, and avoid or reduce one or more potentially significant impacts. If the Applicant believes that an alternative is infeasible or the implementation is remote and speculative (CEQA Guidelines Section 15126.6(f)(3), clearly explain why. If significant environmental effects are possible without mitigation, alternatives will be provided in the PEA that are capable of avoiding or reducing any potentially significant environmental effects, even if the alternative(s) substantially impede the attainment of some project objectives or are costlier.[21]		
4.2 No Project Alternative. Include a thorough description of the No Project Alternative. The No Project Alternative needs to describe the range of actions that are reasonably foreseeable if the proposed project is not approved. The No Project Alternative will be described to meet the requirements of CEQA Guidelines Section15126.6(e).		
4.3 Rejected Alternatives. Provide a detailed discussion of all alternatives considered by the Applicant that were not selected by the Applicant for a full description in the PEA and analysis in PEA Chapter 5. The detailed discussion will include the following: a) Description of the alternative and its components b) Map of any alternative sites or routes c) Discussion about the extent to which the alternative would meet the underlying purpose of the project and its basic objectives d) Discussion about the feasibility of implementing the alternative e) Discussion of whether the alternative would reduce or avoid any significant environmental impacts of the proposed project f) Discussion of any new significant impacts that could occur from implementation of the alternative g) Description of why the alternative was rejected h) Any comments from the public or agencies about the alternative during PEA preparation		
For Natural Gas Storage Projects:		
4.4 Natural Gas Storage Alternatives. In addition to the requirements included above, alternatives to be considered for proposed natural gas storage projects include the following, where applicable: a) Alternative reservoir locations considered for gas storage including other field locations and other potential storage areas b) Alternative pipelines, road, and utility siting c) Alternative suction gas requirements, and injection/withdrawal options		

[21] CPUC CEQA Unit Staff will determine whether an alternative could *substantially* reduce one or more potentially significant impacts of the proposed project (CEQA Guidelines Section 15125.5). Applicants are strongly advised to provide more rather than less alternatives for CPUC's consideration or as determined during Pre-filing.

5 Environmental Analysis

Include a description of the environmental setting, regulatory setting, and impact analysis for each resource area. The resource areas addressed will include each environmental factor (resource area) identified in the most recent adopted version of the CEQA Guidelines Appendix G checklist and any additional relevant resource areas and impact questions that are defined in this PEA checklist.

1. Environmental Setting
    a. For each resource area, the PEA will include a detailed description of the natural and built environment in the vicinity of the proposed project area (e.g., topography, land use patterns, biological environment, etc.) as applicable to the resource area. Both regional and local environmental setting information will be provided.
    b. All setting information provided will relate in some way to the impacts of the proposed project discussed in the PEA's impacts analysis, however CPUC's impacts analysis may be more thorough, which may necessitate additional setting information than the Applicant might otherwise provide.
2. Regulatory Setting
    a. Organized by federal, State, regional, and local sections
    b. Describe the policy or regulation and briefly explain why it is applicable to the proposed project.
        i. Identify in the setting all laws, regulations, and policies that would be applicable for CPUC's exclusive jurisdiction over the siting and design of electric and gas facilities. Public utilities under CPUC's jurisdiction are expected to consult with local agencies regarding land use matters. Local laws, regulations, and policies will be considered for the consideration of potential impacts during CPUC's CEQA review (e.g., encroachment, grading, erosion control, scenic corridors, overhead line undergrounding, tree removal, fire protection, permanent and temporary noise limits, zoning requirements, general plan polices, and all local and regional laws, regulations, and policies).
3. Impact Questions
    a. Includes all impact questions in the current version of CEQA Guidelines, Appendix G.
    b. Additional impact questions that are frequently relevant to utility projects are provided in Attachment 4, CPUC Draft Environmental Measures.
4. Impact Analyses
    a. Discussion organized by CEQA Guidelines, Appendix G impact items and any Additional CEQA Impact Questions in the PEA Checklist. Assess all potential environmental impacts and make determinations, such as, No Impact, Less than Significant, Less than Significant with Mitigation, Significant and Unavoidable, or Beneficial Impact with respect to construction, operations, and maintenance activities.
    b. The impact analyses provided in PEA Chapter 5, Environmental Analysis, need not be as thorough as those to be prepared by CPUC for the CEQA environmental document. A preliminary determination will be provided but with only brief justification unless otherwise directed by CPUC Staff in writing during Pre-filing.
5. CPUC Draft Environmental Measures
    a. CPUC Draft Environmental Measures are provided for some of the resource areas in Attachment 4, CPUC Draft Environmental Measures. The measures may be applied to the proposed project as written or modified by the CPUC during its environmental review if the measure would avoid or reduce a potentially significant impact.

b. The CPUC Draft Environmental Measures should be discussed with the CPUC's CEQA Unit Staff during Pre-filing, especially with respect to the development of Applicant Proposed Measures.
c. In general, impact avoidance is preferred to the reduction of potentially significant impacts.

Additional requirements specific to each resource area are identified in the following sections.

5.1 Aesthetics

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.1.1 Environmental Setting		
5.1.1.1: Landscape Setting. Briefly described the regional and local landscape setting.		
5.1.1.2: Scenic Resources. Identify and describe any vistas, scenic highways, national scenic areas, or other scenic resources within and surrounding the project area (approximately 5-mile buffer but may be greater if necessary). Scenic resources may also include but are not limited to historic structures, trees, or other resources that contribute to the scenic values where the project would be located.		
5.1.1.3: Viewshed Analysis a) Conduct a viewshed analysis for the project area (approximately 5-mile buffer but may be greater if necessary). b) Describe the project viewshed, including important visibility characteristics for the project site, such as viewing distance, viewing angle, and intervening topography, vegetation, or structures. c) Provide a supporting map (or maps) showing project area, landscape units, topography (i.e., hillshade), and the results of the viewshed analysis. Provide associated GIS data.		
5.1.1.4: Landscape Units. Identify and describe landscape units (geographic zones) within and surrounding the project area (approximately 5-mile buffer but may be greater if necessary) that categorizes different landscape types and visual characteristics, with consideration to topography, vegetation, and existing land uses. Landscape units should be developed based on the existing landscape characteristics rather than the project's features or segments.		
5.1.1.5: Viewers and Viewer Sensitivity. Identify and described the types of viewers expected within the viewshed and landscape units. Describe visual sensitivity to general visual change based on viewing conditions, use of the area, feedback from the public about the project, and landscape characteristics.		

5.1.1.6: Representative Viewpoints a) Identify representative viewpoints from publicly accessible locations (up to approximately 5-mile buffer but may be greater if appropriate). The number and location of the viewpoints must represent a range of views of the project site from major roads, highways, trails, parks, vistas, landmarks, and other scenic resources near the project site. Multiple viewpoints should be included where the project site would be visible from sensitive scenic resources to provide context on different viewing distances, perspectives, and directions. b) Provide the following information for each viewpoint: i. Number, title, and brief description of the location ii. Types of viewers iii. Viewing direction(s) and distance(s) to the nearest proposed project features iv. Description of the existing visual conditions and visibility of the project site as seen from the viewpoint and shown in the representative photographs c) Provide a supporting map (or maps) showing project features and representative viewpoints with arrows indicating the viewing direction(s). Provide associated GIS data (may be combined with GIS data request below for representative photographs).		
5.1.1.7: Representative Photographs a) Provide high resolution photographs taken from the representative viewpoints in the directions of all proposed project features.[22] Multiple photographs should be provided where project features may be visible in different viewing directions from the same location. b) Provide the following information for each photograph: i. Capture time and date ii. Camera body and lens model iii. Lens focal length and camera height when taken c) Provide GIS data associated with each photograph location that includes coordinates (<1 meter resolution), elevations, and viewing directions, as well as the associated viewpoint.		
5.1.1.8: Visual Resource Management Areas a) Identify any visual resource management areas within and surrounding the project area (approximately 5-mile buffer). b) Describe any project areas within visual resource management areas.		

[22] All representative photographs should be taken using a digital single-lens reflex camera with standard 50-millimeter lens equivalent, which represents an approximately 40-degree horizontal view angle. The precise photograph coordinates and elevations should be collected using a high accuracy GPS unit.

c) Provide a supporting map (or maps) showing project features and visual resource management areas. Provide associated GIS data.		
5.1.2 Regulatory Setting		
5.1.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards regarding aesthetics and visual resource management.		
5.1.3 Impact Questions		
5.1.3.1: Impact Questions. The impact questions include all aesthetic impact questions in the current version of CEQA Guidelines, Appendix G. **5.1.3.2:** Additional CEQA Impact Questions: None.		
5.1.4 Impact Analysis		
5.1.4.1: Visual Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines Appendix G for this resource area and any additional impact questions listed above.		
The following information will be included in the PEA or a technical Appendix to support the aesthetic impact analysis:		
5.1.4.2: Analysis of Selected Viewpoints. Identify the methodology and assumptions that were applied in selecting key observation points for visual simulation. It is recommended that viewpoints are selected where viewers may be sensitive to visual change (public views) and in areas that are visually sensitive, or heavily trafficked or visited.[23]		
5.1.4.3: Visual Simulation a) Identify methodology and assumptions for completing the visual simulations. The simulations should include photorealistic 3-D models of project features and any land changes within the KOP view. The visual simulations should depict conditions: i. Immediately following construction, and ii. After vegetation establishment in all areas of temporary impact to illustrate the visual impact from vegetation removal. b) Provide high resolution images for the visual simulations.		
5.1.4.4: Analysis of Visual Change a) Identify the methodology and assumptions for completing the visual change analysis.[24] The methodology should be consistent with applicable visual resource management criteria. b) Provide a description of the visual change for each selected viewpoint. Describe any conditions that would change over time, such as vegetation growth.		

[23] The KOP selection process should be discussed with CPUC during Pre-filing
[24] The visual impact assessment methodology should be discussed with CPUC during Pre-filing

c) Describe the effects of visual change that would result in the entire project area, as indicated by the selected viewpoints that were simulated and analyzed.		
5.1.4.5: Lighting and Marking. Identify all new sources of permanent lighting. Identify any proposed structures or lines that could require FAA notification. Identify any structures or line segments that could require lighting and marking based on flight patterns and FAA or military requirements. Provide supporting documentation in an Appendix (e.g., FAA notice and criteria tool results).		
5.1.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.2 Agriculture and Forestry Resources

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.2.1 Environmental Setting		
5.2.1.1: Agricultural Resources and GIS a) Identify all agricultural resources that occur within the project area including: i. Areas designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance ii. Areas under Williamson Act contracts and provide information on the status of the Williamson Act contract iii. Any areas zoned for agricultural use in local plans iv. Areas subject to active agricultural use b) Provide GIS data for agricultural resources within the proposed project area.		
5.2.1.2: Forestry Resources and GIS a) Identify all forestry resources within the project area including: i. Forest land as defined in Public Resources Code 12220(g)25 ii. Timberland as defined in Public Resource Code section 4526 iii. Timberland zoned Timberland Production as defined in Government Code section 51104(g) b) Provide GIS data for all forestry resources within the proposed project area.		
5.2.2 Regulatory Setting		
5.2.2: Agriculture and Forestry Regulations. Identify all federal, state, and local policies for protection of agricultural and forestry resources that apply to the proposed project.		

[25] Forest land is defined in Public Resources Code as, "land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits."

5.2.3 Impact Questions		
5.2.3.1: Agriculture and Forestry Impact Questions. The impact questions include all agriculture and forestry impact questions in the current version of CEQA Guidelines, Appendix G. **5.2.3.2:** Additional CEQA Impact Questions: None.		
5.2.4 Impact Analyses		
5.2.4.1: Agriculture and Forestry Impacts. Provide an impact analysis for each checklist item identified in CEQA Guidelines Appendix G for this resource area and any additional impact questions listed above.		
Incorporate the following discussions into the analysis of impacts:		
5.2.4.2: Prime Farmland Soil Impacts. Calculate the acreage of Prime Farmland soils that would be affected by construction and operation and maintenance.		
5.2.4.3. Williamson Act Impacts. Describe the approach to resolve potential conflicts with Williamson Act contract (if applicable)		
5.2.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.3 Air Quality

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.3.1 Environmental Setting		
5.3.1.1: Air Quality Plans Identify and describe all applicable air quality plans and attainment areas. Identify the air basin(s) for the project area. If the project is located in more than one attainment area and/or air basin, provide the extent in each attainment area and air basin.		
5.3.1.2: Air Quality. Describe existing air quality in the project area. a) Identify existing air quality exceedance of National Ambient Air Quality Standards and California Ambient Air Quality Standards in the air basin. b) Provide the number of days that air quality in the area exceeds state and federal air standards for each criteria pollutant that where air quality standards are exceeded. c) Provide air quality data from the nearest representative air monitoring station(s).		
5.3.1.3: Sensitive Receptor Locations. Identify the location and types of each sensitive receptor locations[26] within 1,000 feet of the project area. Provide GIS data for sensitive receptor locations.		

[26] Sensitive Receptor locations may include hospitals, schools, and day care centers, and such other locations as the air district board or California Air Resources Board may determine (California Health and Safety Code § 42705.5(a)(5)).

5.3.2 Regulatory Setting		
5.3.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards regarding aesthetics and visual resource management.		
5.3.2.2: Air Permits. Identify and list all necessary air permits.		
5.3.3 Impact Questions		
5.3.3.1: Impact Questions. The impact questions include all air quality impact questions in the current version of CEQA Guidelines, Appendix G. **5.3.3.2:** Additional CEQA Impact Questions: None.		
5.3.4 Impact Analysis		
5.3.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines Appendix G for this resource area and any additional impact questions listed above.		
The following information will be presented in the PEA or a technical Appendix to support the air quality impact analysis:		
5.3.4.2: Air Quality Emissions Modeling. Model project emissions using the most recent version of CalEEMod and/or a current version of other applicable modeling program. Provide all model input and output data sheets in Microsoft Excel format to allow CPUC to evaluate whether project data was entered into the modeling program accurately. The assumptions used in the air quality modeling must be consistent with all PEA information about the project's schedule, workforce, and equipment. The following information will be addressed in the emissions modeling, Air Quality Appendix, and PEA: a) Quantify the expected emissions of criteria pollutants from all project-related sources. Quantify emissions for both construction and operation (e.g., compressor equipment). b) Identify manufacturer's specifications for all proposed new emission sources. For proposed new, additional, or modified compressor units, include the horsepower, type, and energy source. c) Describe any emission control systems that are included in the air quality analysis (e.g., installation of filters, use of EPA Tier II, III, or IV equipment, use of electric engines, etc.). d) When multiple air basins may be affected by the project, model air emissions within each air basin and provide a narrative (supported by calculations) that clearly describes the assumptions around the project activities considered for each air basin. Provide modeled emissions by attainment area or air basin (supported by calculations).		

5.3.4.3: Air Quality Emissions Summary. Provide a table summarizing the air quality emissions for the project and applicable thresholds for each applicable attainment area. Include a summary of uncontrolled emissions (prior to application of any APMs) and controlled emissions (after application of APMs). Clearly identify the assumptions that were applied in the controlled emissions estimates.		
5.3.4.4: Health Risk Assessment. Complete a Health Risk Assessment when air quality emissions have the potential to lead to human health impacts[27]. If health impacts are not anticipated from project emissions, the analysis should clearly describe why emissions would not lead to health impacts.		
5.3.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.4 Biological Resources

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
5.4.1 Environmental Setting		
5.4.1.1: Biological Resources Technical Report. Provide a Biological Resources Technical Report as an Appendix to the PEA that includes all information specified in Attachment 2.		
The following biological resources information will be presented in the PEA:		
5.4.1.2: Survey Area (Local Setting). Identify and describe the biological resources survey area as documented in the Biological Resources Technical Report. All temporary and permanent project areas must be within the survey area.		
5.4.1.3: Vegetation Communities and Land Cover a) Identify, describe, and quantify vegetation communities and land cover types within the biological resources survey area. b) Clearly identify any sensitive natural vegetation communities that meet the definition of a biological resource under CEQA (i.e., rare, designated, or otherwise protected), such as, but not limited to, riparian habitat. c) Provide a supporting map (or maps) showing project features and vegetation communities and land cover type.		

[27] Refer to Office of Environmental Health Hazard Assessment (OEHHA) most recent guidance for preparation of Health Risk Assessments to determine whether a Health Risk Assessment is required for the project. The need for an HRA should also be discussed with CPUC during Pre-filing.

5.4.1.4: Aquatic Features a) Identify, describe, and quantify aquatic features within the biological resources survey area that may provide potentially suitable aquatic habitat for rare and special-status species. b) Identify and quantify potentially jurisdictional aquatic features and delineated wetlands, according to the Wetland Delineation Report and Biological Resources Technical Report. c) Provide a supporting map (or maps) showing project features and aquatic resources.		
5.4.1.5: Habitat Assessment. Identify rare and special-status species with potential to occur in the project region (approximately a 5-mile buffer but may be larger if necessary). For each species, provide the following information: a) Common and scientific name b) Status and/or rank c) Habitat characteristics (i.e., vegetation communities, elevations, seasonal changes, etc.) d) Blooming characteristics for plants e) Breeding and other dispersal (range) behavior for wildlife f) Potential to occur within the survey area (i.e., Present, High Potential, Moderate Potential, Low Potential, or Not Expected), with justification based on the results of the records search, survey findings, and presence of potentially suitable habitat g) Specific types and locations of potentially suitable habitat that correspond to the vegetation communities and land cover and aquatic features		
5.4.1.6: Critical Habitat a) Identify and describe any critical habitat for rare or special-status species within and surrounding the project area (approximately a 5-mile buffer). b) Provide a supporting map (or maps) showing project features and critical habitat.		
5.4.1.7: Native Wildlife Corridors and Nursery Sites a) Identify and describe regional and local wildlife corridors within and surrounding the project area (approximately a 5-mile buffer), including but not limited to, landscape and aquatic features that connect suitable habitat in regions otherwise fragmented by terrain, changes in vegetation, or human development. b) Identify and describe regional and local native wildlife nursery sites within and surrounding the project area (approximately a 5-mile buffer), as identified through the records search, surveys, and habitat assessment.		

c) Provide a supporting map (or maps) showing project features, native wildlife corridors, and native nursery sites.		
5.4.1.8: Biological Resource Management Areas a) Identify any biological resource management areas (i.e., conservation or mitigation areas, HCP or NCCP boundaries, etc.) within and surrounding the project area (approximately 5-mile buffer). b) Identify and quantify any project areas within biological resource management areas. c) Provide a supporting map (or maps) showing project features and biological resource management areas.		
5.4.2 Regulatory Setting		
5.4.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards regarding biological resources.		
5.4.2.2: Habitat Conservation Plan. Provide a copy of any relevant Habitat Conservation Plan.		
5.4.3 Impact Questions		
5.4.3.1: Impact Questions. The impact questions include all biological resource impact questions in the current version of CEQA Guidelines, Appendix G. **5.4.3.2:** Additional CEQA Impact Question: Would the project create a substantial collision or electrocution risk for birds or bats?		
5.4.4 Impact Analysis		
5.4.4.1: Impact Analysis Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for Biological Resources and any additional impact questions listed above.		
The following information will be included in the impact analysis:		
5.4.4.2: Quantify Habitat Impacts. Provide the area of impact in acres by each habitat type. Quantify temporary and permanent impacts. For all temporary impacts provide the following: a) Description of the restoration and revegetation approach b) Vegetation species that would be planted within the area of temporary disturbance c) Procedures to reduce invasive weed encroachment within areas of temporary disturbance d) Expected timeframe for restoration of the site		
5.4.4.3: Special-Status Species Impacts. Identify anticipated impacts on special-status species. Identify any take permits that are anticipated for the project. If an existing habitat conservation plan (HCP) or natural communities conservation plan (NCCP) would be used for the project, provide current accounting of take coverage included in the HCP/NCCP		

to demonstrate that there is sufficient habitat coverage remaining under the existing permit.		
5.4.4.4: Wetland Impacts. Quantify the area (in acres) of temporary and permanent impacts on wetlands. Include the following details: a) Provide a table identifying all wetlands, by milepost and length, crossed by the project and the total acreage of each wetland type that would be affected by construction. b) Discuss construction and restoration methods proposed for crossing wetlands. c) If wetlands would be filled or permanently lost, describe proposed measures to compensate for permanent wetland losses. d) If forested wetlands would be affected, describe proposed measures to restore forested wetlands following construction.		
5.4.4.5: Avian Impacts. Describe avian obstructions and risk of electrocution from the project. Describe any standards that will be implemented as part of the project to reduce the risk of collision and electrocution.		
5.4.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.5 Cultural Resources[28]

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.5.1 Environmental Setting		
5.5.1.1: Cultural Resource Reports. Provide a cultural resource inventory and evaluation report that addresses the technical requirement provided in Attachment 3.		
5.5.1.2: Cultural Resources Summary. Summarize cultural resource survey and inventory results and survey methods. Do not provide any confidential cultural resource information within the PEA chapter.		
5.5.1.3: Cultural Resource Survey Boundaries. Provide a map with mileposts showing the boundaries of all survey areas in the report. Provide the GIS data for the survey area. Provide confidential GIS data for the resource locations and boundaries separately under confidential cover.		
5.5.2 Regulatory Setting		
5.5.2.1: Regulatory Setting. Identify applicable federal and state regulations for protection of cultural resources.		

[28] For a description and evaluation of cultural resources specific to Tribes, see Section 5.18, Tribal Cultural Resources.

5.5.3 Impact Questions		
5.5.3.1: Impact Questions. The impact questions include all cultural resource impact questions in the current version of CEQA Guidelines, Appendix G. **5.5.3.2:** Additional CEQA Impact Questions: None.		
5.5.4 Impact Analysis		
5.5.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis		
5.5.4.2: Human Remains. Describe the potential for encountering human remains or grave goods during the trenching or any other phase of construction. Describe the procedures that would be used if human remains are encountered.		
5.5.4.3: Resource Avoidance. Describe avoidance procedures that would be implemented to avoid known resources.		
5.5.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.6 Energy

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.6.1 Environmental Setting		
5.6.1.1: Existing Energy Use. Identify energy use of existing infrastructure if the proposed project would replace or upgrade an existing facility.		
5.6.2 Regulatory Setting		
5.6.2.1: Regulatory Setting. Identify applicable federal, state, or local regulations or policies applicable to energy use for the proposed project.		
5.6.3 Impact Questions		
5.6.3.1: Impact Questions: The impact questions include all energy impact questions in the current version of CEQA Guidelines, Appendix G. **5.6.3.2:** Additional CEQA Impact Question: Would the project add capacity for the purpose of serving a non-renewable energy resource?		

5.6.4 Impact Analysis		
5.6.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis:		
5.6.4.2: Nonrenewable Energy. Identify renewable and non-renewable energy projects that may interconnected to or be supplied by the proposed project.		
5.6.4.3: Fuels and Energy Use a) Provide an estimation of the amount of fuels (gasoline, diesel, helicopter fuel, etc.) that would be used during construction and operation and maintenance of the project. Fuel estimates should be consistent with Air Quality calculations supporting the PEA. b) Provide the following information on energy use: i. Total energy requirements of the project by fuel type and end use ii. Energy conservation equipment and design features iii. Identification of energy supplies that would serve the project		
5.6.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.7 Geology, Soils, and Paleontological Resources

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
5.7.1 Environmental Setting		
5.7.1.1: Regional and Local Geologic Setting. Briefly describe the regional and local physiography, topography, and geologic setting in the project area.		
5.7.1.2: Seismic Hazards a) Provide the following information on potential seismic hazards in the project area: i. Identify and describe regional and local seismic risk including any active faults within and surrounding the project area (will be a 10-mile buffer unless otherwise instructed in writing by CEQA Unit Staff during Pre-filing) ii. Identify any areas that are prone to seismic-induced landslides iii. Provide the liquefaction potential for the project area b) Provide a supporting map (or maps) showing project features and major faults, areas of landslide risk, and areas at high risk of liquefaction. Provide GIS data for all faults, landslides, and areas of high liquefaction potential.		

5.7.1.3: Geologic Units. Identify and describe the types of geologic units in the project area. Include the following information for each geologic unit: a) Summarize the geologic units within the project area. b) Identify any previous landslides in the area and any areas that are at risk of landslide. c) Identify any unstable geologic units. d) Provide a supporting map (or maps) showing project features and geologic units. Clearly identify any areas with potentially hazardous geologic conditions. Provide associated GIS data.		
5.7.1.4: Soils. Identify and describe the types of soils in the project area. a) Summarize the soils within the project area. b) Clearly identify any soils types that could be unstable (e.g., at risk of lateral spreading, subsidence, liquefaction, or collapse). c) Provide information on erosion susceptibility for each soil type that occurs in the project area. d) Provide a supporting map (or maps) showing project features and soils. Provide associated GIS data.		
5.7.1.5: Paleontological Report. Provide a paleontological report that includes the following: a) Information on any documented fossil collection localities within the project area and a 500-foot buffer. b) A paleontological resource sensitivity analysis based on published geological mapping and the resource sensitivity of each rock type. c) Supporting maps and GIS data.		
5.7.2 Regulatory Setting		
5.7.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards regarding geology, soils, and paleontological resources.		
5.7.3 Impact Questions		
5.7.3.1: Impact Questions. The impact questions include all geology, soils, and paleontological resource impact questions in the current version of CEQA Guidelines, Appendix G. **5.7.3.2:** Additional CEQA Impact Questions: None.		
5.7.4 Impact Analysis		
5.7.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis:		

5.7.4.2: Geotechnical Requirements. Identify any geotechnical requirements that would be implemented to address effects from unstable geologic units or soils. Describe how the recommendation would be applied (i.e., when and where).		
5.7.4.3: Paleontological Resources. Identify the potential to disturb paleontological resources based on the depth of proposed excavation and paleontological sensitivity of geologic units within the project area.		
5.7.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.8 Greenhouse Gas Emissions

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
5.8.1 Environmental Setting		
5.8.1.1: GHG Setting. Provide a description of the setting for greenhouse gases (GHGs). The setting should consider any GHG emissions from existing infrastructure that would be upgraded or replaced by the proposed project.		
5.8.2 Regulatory Setting		
5.8.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards for greenhouse gases.		
5.8.3 Impact Questions		
5.8.3.1 Impact Questions. The impact questions include all greenhouse gas impact questions in the current version of CEQA Guidelines, Appendix G. **5.8.3.2:** Additional CEQA Impact Questions: None.		
5.8.4 Impact Analysis		
5.8.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis:		
5.8.4.2: GHG Emissions. Provide a quantitative assessment of GHG emissions for construction and operation and maintenance of the proposed project. Provide model results and all model files. Modeling will be conducted using the latest version of the emissions model at the time of application filing (e.g., most recent version of CalEEMod). GHG emissions will be provided for the following conditions: a) Uncontrolled emissions (before APMs are applied) b) Controlled emissions considering application of APMs i. Based on the modeled GHG emissions, quantify the project's contribution to and analyze the project's effect on		

climate change. Identify and provide justification for the timeframe considered in the analysis. ii. Discuss any programs already in place to reduce GHG emissions on a system-wide level. This includes the Applicant's voluntary compliance with the EPA SF6 reduction program, reductions from energy efficiency, demand response, LTPP, etc. iii. For any significant impacts, identify potential strategies that could be employed by the project to reduce GHGs during construction or operation and maintenance consistent with OPR Advisory on CEQA and Climate Change.		
Natural Gas Storage		
5.8.4.3: Natural Gas Storage Accident Conditions. In addition to the requirements above, identify the potential GHG emissions that could result in the event of a gas leak.		
5.8.4.4: Monitoring and Contingency Plan. Provide a comprehensive monitoring plan that would be implemented during project operation to monitor for gas leaks. The plan should identify a monitoring schedule, description of monitoring activities, and actions to be implemented if gas leaks are observed.		
5.8.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.9 Hazards, Hazardous Materials, and Public Safety[29]

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.9.1 Environmental Setting		
5.9.1.1: Hazardous Materials Report. Provide a Phase I Environmental Site Assessment or similar hazards report for the proposed project area. Describe any known hazardous materials locations within the project area and the status of the site.		
5.9.1.2: Airport Land Use Plan. Identify any airport land use plan(s) within the project area.		
5.9.1.3: Fire Hazard. Identify if the project occurs within federal, state, or local fire responsibility areas and identify the fire hazard severity rating for all project areas, including temporary work areas and access roads.		
5.9.1.4: Metallic Objects. For electrical projects, identify any metallic pipelines or cables within 25 feet of the project.		

[29] For fire risk specific to state responsibility areas or lands classified as very high fire hazard severity zones, see Section 5.20, Wildfire.

5.9.1.5: Pipeline History (for Natural Gas Projects). Provide a narrative describing the history of the pipeline system(s) to which the project would connect, list of previous owner and operators, and detailed summary of the pipeline systems' safety and inspection history.		
5.9.2 Regulatory Setting		
5.9.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards for hazards, hazardous materials, and public safety.		
5.9.2.2: Touch Thresholds. Identify applicable standards for protection of workers and the public from shock hazards.		
5.9.3 Impact Questions		
5.9.3.1: Impact Questions. The impact questions include all hazards and hazardous materials impact questions in the current version of CEQA Guidelines, Appendix G. **5.9.3.2:** Additional CEQA Impact Questions: a) Would the project create a significant hazard to air traffic from the installation of new power lines and structures? b) Would the project create a significant hazard to the public or environment through the transport of heavy materials using helicopters? c) Would the project expose people to a significant risk of injury or death involving unexploded ordnance? d) Would the project expose workers or the public to excessive shock hazards?		
5.9.4 Impact Analysis		
5.9.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis:		
5.9.4.2: Hazardous Materials. Identify the hazardous materials (i.e., chemicals, solvents, lubricants, and fuels) that would be used during construction and operation of the project. Estimate the quantity of each hazardous material that would be stored on site during construction and operation.		
5.9.4.3: Air Traffic Hazards. If the project involves construction of above-ground structures (including structure replacement) within the airport land use plan area, provide a discussion of how the project would or would not conflict with height restrictions identified in the airport land use plan and how the project would comply with any FAA or military requirements for the above ground facilities.		
5.9.4.4: Accident or Upset Conditions. Describe how the project facilities would be designed, constructed, operated, and maintained to		

minimize potential hazard to the public from the failure of project components as a result of accidents or natural catastrophes.		
5.9.4.5: Shock Hazard. For electricity projects, identify infrastructure that may be susceptible to induced current from the proposed project. Describe strategies (e.g., cathodic protection) that the project would employ to reduce shock hazards and avoid electrocution of workers or the public.		
For Natural Gas and Gas Storage:		
5.9.4.6: Health and Safety Plan. Include in the Health and Safety Plan, plans for addressing gas leaks, fires, etc. Identify sensitive receptors, methods of evacuation, and protection measures. The Plan will be provided as an Appendix to the PEA.		
5.9.4.7: Health Risk Assessment. Provide a Health Risk Assessment including risk from potential gas leaks, fires, etc. Identify sensitive receptors that would be affected and potential impacts on them if there is a gas release.[30]		
5.9.4.8: Gas Migration. Describe potential for and effects of gas migration through natural and manmade pathways. a) Provide Applicant Proposed Measures for avoiding gas emissions at the surface from gas migration pathways. b) Provide Applicant Proposed Measures for avoiding emissions of mercaptan and/or other odorizing agents.		
5.9.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.10 Hydrology and Water Quality

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.10.1 Environmental Setting		
5.10.1.1: Waterbodies. Identify by milepost all ephemeral, intermittent, and perennial surface waterbodies crossed by the project. For each, list its water quality classification, if applicable.		
5.10.1.2: Water Quality. Identify any downstream waters that are on the state 303(d) list and identify whether a total maximum daily load (TMDL) has been adopted or the date for adoption of a TMDL. Identify existing sources of impairment for downstream waters. Describe any management plans that are in place for downstream waters.		
5.10.1.3: Groundwater Basin. Identify all known EPA and state groundwater basins and aquifers crossed by the project.		

[30] Refer to the requirements for Health Risk Assessments in Section 5.3.4.4.

5.10.1.4: Groundwater Wells and Springs. Identify the locations of all known public and private groundwater supply wells and springs within 150 feet of the project area.		
5.10.1.5: Groundwater Management. Identify the groundwater management status of any groundwater resources in the project area and any groundwater resources that may be used by the project. Describe if groundwater resources in the basin have been adjudicated. Identify any sustainable groundwater management plan that has been adopted for groundwater resources in the project area or describe the status of groundwater management planning in the area.		
5.10.2 Regulatory Setting		
5.10.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards regarding hydrologic and water quality.		
5.10.3 Impact Questions		
5.10.3.1: Impact Questions. The impact questions include all hydrology and water quality impact questions in the current version of CEQA Guidelines, Appendix G. **5.10.3.2:** Additional CEQA Impact Questions: None.		
5.10.4 Impact Analysis		
5.10.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in the current version of CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis:		
5.10.4.2: Hydrostatic Testing. Identify all potential sources of hydrostatic test water, quantity of water required, withdrawal methods, treatment of discharge, and any waste products generated.		
5.10.4.3: Water Quality Impacts. Describe impacts to surface water quality, including the potential for accelerated soil erosion, downstream sedimentation, and reduced surface water quality.		
5.10.4.4: Impermeable Surfaces. Describe increased run-off and impacts on groundwater recharge due to construction of impermeable surfaces. Provide the acreage of new impermeable surfaces that will be created as a result of the project.		
5.10.4.5: Waterbody Crossings. Identify by milepost all waterbody crossings. Provide the following information for crossing: a) Identify whether the waterbody has contaminated waters or sediments. b) Describe the waterbody crossing method and any approaches to avoid the waterbody. c) Describe typical additional work area and staging area requirements at waterbody and wetland crossings.		

d) Describe any dewatering or water diversion that will be required during construction near the waterbody. Identify treatment methods for any dewatering. e) Describe any proposed restoration methods for work near or within the waterbody.		
5.10.4.6: Groundwater Impacts. If water would be obtained from groundwater supplies, evaluate the project's consistency with any applicable sustainable groundwater management plan.		
5.10.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.11 Land Use and Planning

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
5.11.1 Environmental Setting		
5.11.1.1: Land Use. Provide a description of land uses within the area traversed by the project route as designated in the local General Plan (e.g., residential, commercial, agricultural, open space, etc.).		
5.11.1.2: Special Land Uses. Identify by milepost and segment all special land uses within the project area including: a) All land administered by federal, state, or local agencies, or private conservation organizations b) Any designated coastal zone management areas c) Any designated or proposed candidate National or State Wild and Scenic Rivers crossed by the project d) Any national landmarks		
5.11.1.3: Habitat Conservation Plan. Provide a copy of any Habitat Conservation Plan applicable to the project area or proposed project. Also required for Section 5.4, Biological Resources.		
5.11.2 Regulatory Setting		
5.11.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards for land use and planning.		
5.11.3 Impact Questions		
5.11.3.1: Impact Questions. The impact questions include all land use questions in the current version of CEQA Guidelines, Appendix G. **5.11.3.2:** Additional CEQA Impact Questions: None.		
5.11.4 Impact Analysis		
5.11.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		

5.11.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.12 Mineral Resources

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
5.12.1 Environmental Setting		
5.12.1.1: Mineral Resources. Provide information on the following mineral resources within 0.5 mile of the proposed project area: a) Known mineral resources b) Active mining claims c) Active mines d) Resource recovery sites		
5.12.2 Regulatory Setting		
5.12.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards for minerals.		
5.12.3 Impact Questions		
5.12.3.1: Impact Questions. The impact questions include all mineral resource impact questions in the current version of CEQA Guidelines, Appendix G. **5.12.3.2:** Additional CEQA Impact Questions: None.		
5.12.4 Impact Analysis		
5.12.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
5.12.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.13 Noise

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
5.13.1 Environmental Setting		
5.13.1.1: Noise Sensitive Land Uses. Identify all noise sensitive land uses within 1,000 feet of the proposed project. Provide GIS data for sensitive receptors within 1,000 feet of the project.		
5.13.1.2: Noise Setting. Provide the existing noise levels (Lmax, Lmin, Leq, and Ldn sound level and other applicable noise parameters) at noise sensitive areas near the proposed project. All noise measurement data and the methodology for collecting the data will be provided in a noise study as an Appendix to the PEA.		

5.13.2 Regulatory Setting		
5.13.2.1: Regulatory Setting. Identify applicable state, and local laws, policies, and standards for noise.		
5.13.3 Impact Questions		
5.13.3.1 Impact Questions. The impact questions include all noise questions in the current version of CEQA Guidelines, Appendix G. **5.13.3.2:** Additional CEQA Impact Questions: None.		
5.13.4 Impact Analysis		
5.13.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis:		
5.13.4.2: Noise Levels a) Identify noise levels for each piece of equipment that could be used during construction. b) Provide a table that identifies each phase of construction, the equipment used in each construction phase, and the length of each phase at any single location (see example in Table 7 below). c) Estimate cumulative equipment noise levels for each phase of construction. d) Include phases of operation if noise levels during operation have the potential to frequently exceed pre-project existing conditions. e) Identify manufacturer's specifications for equipment and describe approaches to reduce impacts from noise.		

Table 7. Construction Noise Levels

Equipment Required	Equipment Noise Levels (Leq; 50 feet)	Phase Noise Level (Leq; 50 feet)	Phase Duration at Each Location	Receptor Nearest to Construction Phase	Noise Level at Nearest Receptor (Leq)	Exceeds Noise Standard at Nearest Receptor?	Distance to Not Exceed Standard
Site Preparation/Grading							
Dozer	78 dBA	82 dBA	5 days	Residence on Main Street; 100 feet from Substation Site	76 dBA	Yes	112 feet
Gradall	79 dBA						
Dump Truck	73 dBA						
Construct Tower Foundation							
Auger Rig	77 dBA	82 dBA	11 days	School on Education Avenue; 130 feet from Tower A12	73 dBA	No	N/A
Dump Truck	73 dBA						
Excavator	77 dBA						
Concrete Truck	75 dBA						

For Natural Gas:		
5.13.4.3: Compressor Station Noise. Provide site plans of compressor stations or other noisy, permanent equipment, showing the location of the nearest noise sensitive areas within 1 mile of the proposed ROW. If new compressor station sites are proposed, measure or estimate the existing ambient sound environment based on current land uses and		

activities. For existing compressor stations (operated at full load), include the results of a sound level survey at the site property line and nearby noise-sensitive areas. Include a plot plan that identifies the locations and duration of noise measurements.		
5.13.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.14 Population and Housing

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
5.14.1 Environmental Setting		
5.14.1.1: Population Estimates. Identify population trends for the areas (county, city, town, census designated place) where the project would take place.		
5.14.1.2: Housing Estimates. Identify housing estimates and projections in areas where the project would take place.		
5.14.1.3: Approved Housing Developments a) Provide the following information for all housing development projects within 1 mile of the proposed project that have been recently approved or may be approved around the PEA and application filing date: i. Project name ii. Location iii. Number of units and estimated population increase iv. Approval date and construction status v. Contact information for developer (provided in the public outreach Appendix) b) Ensure that the project information provided above is consistent with the PEA analysis of cumulative project impacts.		
5.14.2 Regulatory Setting		
5.14.2.1: Regulatory Setting. Identify any applicable federal, state or local laws or regulations that apply to the project.		
5.14.3 Impact Questions		
5.14.3.1: Impact Questions. The impact questions include all population and housing impact questions in the current version of CEQA Guidelines, Appendix G. **5.14.3.2:** Additional CEQA Impact Questions: None.		
5.14.4 Impact Analysis		
5.14.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		

Include the following information in the impact analysis:		
5.14.4.2: Impacts to Housing. Identify if any existing or proposed homes occur within the footprint of any proposed project elements or right-of-way. Describe housing impacts (e.g., demolition and relocation of residents) that may occur as a result of the proposed project.		
5.14.4.3: Workforce Impacts. Describe on-site manpower requirements, including the number of construction personnel who currently reside within the impact area, who would commute daily to the site from outside the impact area or would relocate temporarily within the impact area. Chapter 4 of this document can be referenced as applicable. Identify any permanent employment opportunities that would be create by the project and the workforce conditions in the area that the jobs would be created.		
5.14.4.4: Population Growth Inducing. Provide information on the project's growth inducing impacts, if any. The information will include, but is not necessarily limited to, the following: a) Any economic or population growth in the surrounding environment that will directly or indirectly result from the project b) Any obstacles to population growth that the project would remove c) Any other activities directly or indirectly encouraged or facilitated by the project that would cause population growth leading to a significant effect on the environment, either individually or cumulatively		
5.14.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.15 Public Services

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
5.15.1 Environmental Setting		
5.15.1.1 Service Providers a) Identify the following service providers that serve the project area and provide a map showing the service facilities that could serve the project: i. Police ii. Fire (identify service providers within local and state responsibility areas) iii. Schools iv. Parks v. Hospitals		

b) Provide the documented performance objectives and data on existing emergency response times for service providers in the area (e.g., police or fire department response times).		
5.15.2 Regulatory Setting		
5.15.2.1 Regulatory Setting. Identify any applicable federal, state or local laws or regulations for public services that apply to the project.		
5.15.3 Impact Questions		
5.15.3.1: Impact Questions. The impact questions include all public services impact questions in the current version of CEQA Guidelines, Appendix G. **5.15.3.2:** Additional CEQA Impact Questions: None.		
5.15.4 Impact Analysis		
5.15.4.1 Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis:		
5.15.4.2: Emergency Response Times a) Describe whether the project would impede ingress and egress of emergency vehicles during construction and operation. b) Include an analysis of impacts on emergency response times during project construction and operation, including impacts during any temporary road closures. Describe approaches to address impacts on emergency response times.		
5.15.4.3: Displaced Population. If the project would create permanent employment or displace people, evaluate the impact of the new employment or relocated people on governmental facilities and services and describe plans to reduce the impact on public services.		
5.15.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.16 Recreation

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
5.16.1 Environmental Setting		
5.16.1.1: Recreational Setting a) Describe the regional and local recreation setting in the project area including: i. Any recreational facilities or areas within and surrounding the project area (approximately 0.5-mile buffer) including the recreational uses of each facility or area		

ii. Any available data on use of the recreational facilities including volume of use b) Provide a map (or maps) showing project features and recreational facilities and provide associated GIS data.		
5.16.2 Regulatory Setting		
5.16.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards regarding recreation.		
5.16.3 Impact Questions		
5.16.3.1: Impact Questions. The impact questions include all recreation impact questions in the current version of CEQA Guidelines, Appendix G. **5.16.3.2:** Additional CEQA Impact Questions: a) Would the project reduce or prevent access to a designated recreation facility or area? b) Would the project substantially change the character of a recreational area by reducing the scenic, biological, cultural, geologic, or other important characteristics that contribute to the value of recreational facilities or areas? c) Would the project damage recreational trails or facilities?		
5.16.4 Impact Analysis		
5.16.4.1: Impact Analysis: Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
5.16.4.2: Impact Details. Clearly identify the maximum extent of each impact, and when and where the impacts would or would not occur. Organize the impact assessment by project phase, project component, and/or geographic area, as necessary.		
5.16.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.17 Transportation

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.17.1 Environmental Setting		
5.17.1.1: Circulation System. Briefly describe the regional and local circulation system in the project area, including modes of transportation, types of roadways, and other facilities that contribute to the circulation system.		
5.17.1.2: Existing Roadways and Circulation a) Identify and describe existing roadways that may be used to access the project site and transport materials during		

construction or are otherwise adjacent to or crossed by linear project features. Provide the following information for each road: i. Name of the road ii. Jurisdiction or ownership (i.e., State, County, City, private, etc.) iii. Number of lanes in both directions of travel iv. Existing traffic volume (if publicly available data is unavailable or significantly outdated, then it may be necessary to collect existing traffic counts for road segments where large volumes of construction traffic would be routed or where lane or road closures would occur) v. Closest project feature name and distance b) Provide a supporting map (or maps) showing project features and the existing roadway network identifying each road described above. Provide associated GIS data. The GIS data should include all connected road segments within at least 5 miles of the project.		
5.17.1.3: Transit and Rail Services a) Identify and describe transit and rail service providers in the region. b) Identify any rail or transit lines within 1,000 feet of the project area. c) Identify specific transit stops, and stations within 0.5 mile of the project. Provide the frequency of transit service. d) Provide a supporting map (or maps) showing project features and transit and rail services within 0.5 mile of the project area. Provide associated GIS data.		
5.17.1.4: Bicycle Facilities a) Identify and describe any bicycle plans for the region. b) Identify specific bicycle facilities within 1,000 feet of the project area. c) Provide a supporting map (or maps) showing project features and bicycle facilities. Provide associated GIS data.		
5.17.1.5: Pedestrian Facilities a) Identify and describe important pedestrian facilities near the project area that contribute to the circulation system, such as important walkways. b) Identify specific pedestrian facilities that would be near the project, including on the road segments identified per 5.17.1.2. c) Provide a supporting map (or maps) showing project features and important pedestrian facilities. Provide associated GIS data.		

5.17.1.6: Vehicle Miles Traveled (VMT). Provide the average VMT for the county(s) where the project is located.		
5.17.2 Regulatory Setting		
5.17.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards regarding transportation.		
5.17.3 Impact Questions		
5.17.3.1: Impact Questions. All impact questions for this resource area in the current version of CEQA Guidelines, Appendix G. **5.17.3.2:** Additional CEQA Impact Questions: a) Would the project create potentially hazardous conditions for people walking, bicycling, or driving or for public transit operations? b) Would the project interfere with walking or bicycling accessibility? c) Would the project substantially delay public transit?		
5.17.4 Impact Analysis		
5.17.4.1: Impact Analysis. Provide an impact analysis for each significance criteria identified in Appendix G of the CEQA Guidelines for transportation and any additional impact questions listed above[31].		
Include the following information in the impact analysis:		
5.17.4.2: Vehicle Miles Traveled (VMT) a) Identify whether the project is within 0.5 mile of a major transit stop or a high-quality transit corridor. b) Identify the number of vehicle daily trips that would be generated by the project during construction and operation by light duty (e.g., worker vehicles) and heavy-duty vehicles (e.g., trucks). Provide the frequency of trip generation during operation. c) Quantify VMT generation for both project construction and operation. d) Provide an excel file with the VMT assumptions and model calculations, including all formulas and values. e) Evaluate the project VMT relative to the average VMT for the area in which the project is located.		
5.17.4.3: Traffic Impact Analysis. Provide a traffic impact study. The traffic impact study should be prepared in accordance with guidance from the relevant local jurisdiction or Caltrans, where appropriate.		
5.17.4.4: Hazards. Identify any traffic hazards that could result from construction and operation of the project. Identify any lane closures and traffic management that would be required to construct the project.		

[31] Discuss with CPUC during Pre-filing whether a traffic study is needed.

5.17.4.5: Accessibility. Identify any closures of bicycle lanes, pedestrian walkways, or transit stops during construction or operation of the project.		
5.17.4.6: Transit Delay. Identify any transit lines that could be delayed by construction and operation of the project. Provide the maximum extent of the delay in minutes and the duration of the delay.		
5.17.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.18 Tribal Cultural Resources[32]

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.18.1 Environmental Setting		
5.18.1.1: Outreach to Tribes. Provide a list of all tribes that are on the Native American Heritage Commission (NAHC) list of tribes that are affiliated with the project area. Provide a discussion of outreach to Native American tribes, including tribes notified, responses received from tribes, and information of potential tribal cultural resources provided by tribes. Any information of potential locations of tribal cultural resources should be submitted in an Appendix under clearly marked confidential cover. Provide copies of all correspondence with tribes in an Appendix.		
5.18.1.2: Tribal Cultural Resources. Describe tribal cultural resources (TCRs) that are within the project area. a) Summarize the results of attempts to identify possible TCRs using publicly available documentary resources. The identification of TCRs using documentary sources should include review of archaeological site records and should begin during the preparation of the records search report (see Attachment 3). During the inventory phase, a formal site record would be prepared for any resource identified unless tribes object. b) Summarize attempts to identify TCRs by speaking directly with tribal representatives.		
5.18.1.3: Ethnographic Study. The ethnographic study should document the history of Native American use of the area and oral history of the area.		
5.18.2 Regulatory Setting		
5.18.2.1: Regulatory Setting. Identify any applicable federal, state or local laws or regulations for tribal cultural resources that apply to the project.		

[32] For a description of historical resources and requirements for cultural resources that are not tribal cultural resources, refer to Section 5.5 Cultural Resources.

5.18.3 Impact Questions		
5.18.3.1: Impact Questions. The impact questions include all tribal cultural resources impact questions in the current version of CEQA Guidelines, Appendix G. **5.18.3.2:** Additional CEQA Impact Questions: None.		
5.18.4 Impact Analysis		
5.18.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis:		
5.18.4.2: Information Provided by Tribes. Include an analysis of any impacts that were identified by the tribes during the Applicant's outreach.		
5.18.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.19 Utilities and Service Systems

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.19.1 Environmental Setting		
5.19.1.1: Utility Providers. Identify existing utility providers and the associated infrastructure that serves the project area.		
5.19.1.2: Utility Lines. Describe existing utility infrastructure (e.g., water, gas, sewer, electrical, stormwater, telecommunications, etc.) that occurs in the project ROW. Provide GIS data and/or as-built engineering drawings to support the description of existing utilities and their locations.		
5.19.1.3: Approved Utility Projects. Identify utility projects that have been approved for construction within the project ROW but that have not yet been constructed.[33]		
5.19.1.4: Water Supplies. Identify water suppliers and the water source (e.g., aqueduct, well, recycled water, etc.). For each potential water supplier, provide data on the existing water capacity, supply, and demand.		
5.19.1.5: Landfills and Recycling. Identify local landfills that can accept construction waste and may service the project. Provide documentation of landfill capacity and estimated closure date. Identify any recycling centers in the area and opportunities for construction and demolition waste recycling.		

[33] Note that this project information should be consistent with the cumulative project description included in Chapter 7.

5.19.2 Regulatory Setting		
5.19.2.1: Regulatory Setting. Identify any applicable federal, state or local laws or regulations for utilities that apply to the project.		
5.19.3 Impact Questions		
5.19.3.1: Impact Questions. All impact questions for this resource area in the current version of CEQA Guidelines, Appendix G. **5.19.3.2:** Additional CEQA Impact Question: Would the project increase the rate of corrosion of adjacent utility lines as a result of alternating current impacts?		
5.19.4 Impact Analysis		
5.19.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis:		
5.19.4.2: Utility Relocation. Identify any project conflicts with existing utility lines. If the project may require relocation of existing utilities, identify potential relocation areas and analyze the impacts of relocating the utilities. Provide a map showing the relocated utility lines and GIS data for all relocations.		
5.19.4.3: Waste a) Identify the waste generated by construction, operation, and demolition of the project. b) Describe how treated wood poles would be disposed of after removal, if applicable. c) Provide estimates for the total amount of waste materials to be generated by waste type and how much of it would be disposed of, reused, or recycled.		
5.19.4.4: Water Supply a) Estimate the amount of water required for project construction and operation. Provide the potential water supply source(s). b) Evaluate the ability of the water supplier to meet the project demand under a multiple dry year scenario. c) Provide a discussion as to whether the proposed project meets the criteria for consideration as a project subject to Water Supply Assessment Requirements under Water Code Section 10912. d) If determined to be necessary under Water Code Section 10912, submit a Water Supply Assessment to support conclusions that the proposed water source can meet the project's anticipated water demand, even in multiple dry year scenarios. Water Supply Assessments should be approved by		

the water supplier and consider normal, single-dry, and multiple-dry year conditions.		
5.19.4.5: Cathodic Protection. Analyze the potential for existing utilities to experience corrosion due to proximity to the proposed project. Identify cathodic protection measures that could be implemented to reduce corrosion issues and where the measures may be applied.		
5.19.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.20 Wildfire

This section will include, but is not limited to, the following:	**PEA Section and Page Number**	**Applicant Notes, Comments**
5.20.1 Environmental Setting		
5.20.1.1: High Fire Risk Areas and State Responsibility Areas a) Identify areas of high fire risk or State Responsibility Areas (SRAs) within the project area. Provide GIS data for the Wildland Urban Interface (WUI) and Fire Hazard Severity Zones (FHSZ) mapping along the project alignment. Include areas mapped by CPUC as moderate and high fire threat districts as well as areas mapped by CalFire. b) Identify any areas the utility has independently identified as High FHSZ known to occur within the proposed project vicinity.		
5.20.1.2: Fire Occurrence. Identify all recent (within the last 10 years) large fires that have occurred within the project vicinity. For each fire, identify the following: a) Name of the fire b) Location of fire c) Ignition source and location of ignition d) Amount of land burned e) Boundary of fire area in GIS		
5.20.1.3: Fire Risk. Provide the following information for assessment of baseline fire risk in the area: a) Provide fuel modeling using Scott Burgan fuel models, or other model of similar quality. b) Provide values of wind direction and speed, relative humidity, and temperature for representative weather stations along the alignment for the previous 10 years, gathered hourly. c) Digital elevation models for the topography in the project region showing the relationship between terrain and wind patterns, as well as localized topography to show the effects of terrain on wind flow, and on a more local area to show effect of slope on fire spread.		

d) Describe vegetation fuels within the project vicinity and provide data in map format for the project vicinity. USDA Fire Effects Information System or similar data source should be consulted to determine high-risk vegetation types. Provide the mapped vegetation fuels data in GIS format.		
5.20.1.4: Values at Risk. Identify values at risk along the proposed alignment. Values at risk may include: Structures, improvements, rare habitat, other values at risk, (including utility-owned infrastructure) within 1000 feet of the project. Provide some indication as to its vulnerability (wood structures vs. all steel features). Communities and/or populations near the project should be identified with their proximity to the project defined.		
5.20.1.5: Evacuation Routes. Identify all evacuation routes that are adjacent to or within the project area. Identify any roads that lack a secondary point of access or exit (e.g., cul-de-sacs).		
5.20.2 Regulatory Setting		
5.20.2.1: Regulatory Setting. Identify applicable federal, state, and local laws, policies, and standards for wildfire.		
5.20.2.2: CPUC Standards. Identify any CPUC standards that apply to wildfire management of the new facilities.		
5.20.3 Impact Questions		
5.20.3.1: Impact Questions. All impact questions for this resource area in the current version of CEQA Guidelines, Appendix G. **5.20.3.2:** Additional CEQA Impact Questions: None.		
5.20.4 Impact Analysis		
5.20.4.1: Impact Analysis. Provide an impact analysis for each checklist item identified in CEQA Guidelines, Appendix G for this resource area and any additional impact questions listed above.		
Include the following information in the impact analysis:		
5.20.4.2: Fire Behavior Modeling. For any new electrical lines, provide modeling to support the analysis of wildfire risk.		
5.20.4.3: Wildfire Management. Describe approaches that would be implemented during operation and maintenance to manage wildfire risk in the area. Provide a copy of any Wildfire Management Plan.		
5.20.5 CPUC Draft Environmental Measures		
Refer to Attachment 4, CPUC Draft Environmental Measures.		

5.21 Mandatory Findings of Significance[34]

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
5.21.1: Impact Assessment for Mandatory Findings of Significance. Provide an impact analysis for each of the mandatory findings of significance provided in Appendix G of the CEQA Guidelines. The impact analysis can reference relevant information and conclusion from the biological resources, cultural resources, air quality, hazards, and cumulative sections of the PEA, where applicable.		

6 Comparison of Alternatives

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
6.1: Alternatives Comparison a) Compare the ability of each alternative described in Chapter 4 against the proposed project in terms of its ability to avoid or reduce a potentially significant impact. The alternatives addressed in this section will each be: i. Potentially feasible ii. Meet the underlying purpose of the proposed project iii. Meet most of the basic project objectives, and iv. Avoid or reduce one or more potentially significant impacts. b) The relative effect of the various potentially significant impacts may be compared using the following or similar descriptors and an accompanying analysis: i. Short-term versus long-term impacts ii. Localized versus widespread impacts iii. Ability to fully mitigate impacts c) Impacts that the Applicant believes would be less than significant with mitigation may also be included in the analysis, but only if the steps listed above fail to distinguish among the remaining few alternatives.		
6.2: Alternatives Ranking. Provide a detailed table that summarizes the Applicant's comparison results and ranks the alternatives in order of environmental superiority.[35]		

[34] PEAs need only include a Mandatory Findings of Significance section if CPUC CEQA Unit Staff determine that a Mitigated Negative Declaration may be the appropriate type of document to prepare for the project, as determined through Pre-filing consultation. If no such determination has been made, then a Mandatory Findings of Significance section and the requirements below are not required.

[35] If the proposed project does not rank #1 on the list, the Applicant should provide the rationale for selecting the proposed project.

7 Cumulative and Other CEQA Considerations

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
7.1 Cumulative Impacts		
7.1.1: List of Cumulative Projects a) Provide a detailed table listing past, present, and reasonably foreseeable future projects within and surrounding the project area (approximately 2-mile buffer)[36]. The following information should be provided for each project in the table: i. Project name and type ii. Brief description of the project location(s) and associated actions iii. Distance to and name of the nearest project component iv. Project status and anticipated construction schedule v. Source of the project information and date last checked (for each individual project), including links to any public websites where the information was obtained so it can be reviewed and updated (the project information should be current when the PEA is filed) b) Provide a supporting map (or maps) showing project features and cumulative project locations and/or linear features. Provide associated GIS data.		
7.1.2: Geographic Scope. Define the geographic scope of analysis for each resource topic. The geographic scope of analysis for each resource topic should consider the extent to which impacts can be cumulative. For example, the geographic scope for cumulative noise impacts would be more limited in scale than the geographic scope for biological resource impacts because noise attenuates rapidly with distance. Explain why the geographic scope is appropriate for each resource.		
7.1.3: Cumulative Impact Analysis. Provide an analysis of cumulative impacts for each resource topic included in Chapter 5. Evaluate whether the proposed project impacts are cumulatively considerable[37] for any significant cumulative impacts.		
7.2 Growth-Inducing Impacts		
7.2.1: Growth-Inducing Impacts. Provide an evaluation of the following potential growth-inducing impacts:		

[36] Information on cumulative projects may be obtained from federal, state, and local agencies with jurisdiction over planning, transportation, and/or resource management in the area. Other projects the Applicant is involved in or aware of in the area should be included.

[37] "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

a) Would the proposed project foster any economic or population growth, either directly or indirectly, in the surrounding environment? b) Would the proposed project cause any increase in population that could further tax existing community service facilities (i.e., schools, hospitals, fire, police, etc.)? c) Would the proposed project remove any obstacles to population growth? d) Would the proposed project encourage and facilitate other activities that would cause population growth that could significantly affect the environment, either individually or cumulatively?		

8 List of Preparers

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
8.1: List of Preparers. Provide a list of persons, their organizations, and their qualifications for all authors and reviewers of each section of the PEA.		

9 References

This section will include, but is not limited to, the following:	PEA Section and Page Number	Applicant Notes, Comments
9.1: Reference List a) Organize all references cited in the PEA by section within a single chapter called "References." b) Within the References chapter, organize all of the Chapter 5 references under subheadings for each resource area section.		
9.2: Electronic References a) Provide complete electronic copies of all references cited in the PEA that cannot be readily obtained for free on the Internet. This includes any company-specific documentation (e.g., standards, policies, and other documents). b) If the reference can be obtained on the Internet, the Internet address will be provided.		

PEA Checklist Attachments

Attachment 1: GIS Data Requirements

This Attachment includes specific requirements and format of GIS data that is intended to be applicable to all PEAs. The specific GIS data requirements may be updated on a project-specific basis during Pre-filing coordination with CPUC's CEQA Unit Staff.

1. GIS data will be provided in an appropriate format (i.e., point, line, polygon, raster) and scale to adequately verify assumptions in the PEA and supporting materials and determine the level of environmental impacts. At a minimum, all GIS data layers will include the following metadata properties:
    a. The source (e.g., report reference), date, title, and preparer (name or company)
    b. Description of the contents and any limitations of the data
    c. Reference scale and accuracy of the data
    d. Complete attributes that correspond to the detailed mapbook, project description, and figures presented in the PEA and/or supporting application materials, including unique IDs, labels, geometry, and other appropriate project details
2. Where precise boundaries of project features may change (e.g., staging areas and temporary construction work areas), the Applicant will provide GIS data layers with representative boundaries to evaluate potential environmental impacts as a worst-case scenario.
3. Provide GIS data for:
    a. All proposed and alternative project facilities including but not limited to existing and proposed/alternative ROWs; substations and switching stations; pole/tower locations; conduit; vaults, pipelines; valves; compressor stations; metering stations; valve stations, gas wellheads; other project buildings, facilities, and components (both temporary and permanent); telecommunication and distribution lines modifications or upgrades related to the project; marker ball and lighting locations; and mileposts, facility perimeters, and other demarcations or segments as applicable
    b. All proposed areas required for construction and construction planning, including all proposed and alternative disturbance areas (both permanent and temporary); access roads; geotechnical work areas; extra work areas (e.g., staging areas, parking areas, lay-down areas, work areas at and around specific pole/tower sites, pull and tension sites, helicopter landing areas); airport landing areas; underground installation areas (e.g. trenches, vaults, underground work areas); horizontal directional drilling, jack and bore, or tunnel areas; blasting areas; and any areas where special construction methods may need to be employed
    c. Within the PEA checklist there are also specific requirements for environmental resources within Chapter 5. All environmental resource GIS data must meet the minimum mapping standards specified in this Attachment.

Attachment 2: Biological Resource Technical Report Standards

Definitions

The following biological resources will be considered within the scope of the PEA and the Biological Resources Technical Report:

Sensitive Vegetation Communities and Habitats

a) Sensitive vegetation communities/habitats identified in local or regional plans, policies, or regulations, or designated by CDFW38 or USFWS
b) Areas that provide habitat for locally unique biotic species/communities (e.g., oak woodlands, grasslands, and forests)
c) Habitat that contains or supports rare, endangered, or threatened wildlife or plant species as defined by CDFW and USFWS
d) Habitat that supports CDFW Species of Special Concern
e) Areas that provide habitat for rare or endangered species and that meet the definition in CEQA Guidelines Section 15380
f) Existing game and wildlife refuges and reserves
g) Lakes, wetlands, estuaries, lagoons, streams, and rivers
h) Riparian corridors

Special-Status Species

a) Species listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (ESA) (50 CFR § 17.12 [listed plants], 17.11 [listed animals] and various notices in the Federal Register [proposed species])
b) Species that are candidates for possible future listing as threatened or endangered under the federal ESA (61 FR § 40, February 28, 1996)
c) Species listed or proposed for listing by the State of California as threatened or endangered under the California ESA (14 CCR § 670.5)
d) Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 et seq.)
e) Species that meet the definitions of rare and endangered under CEQA. CEQA Guidelines Section 15380 provides that a plant or animal species may be treated as "rare or endangered" even if not on one of the official lists.
f) Plants considered by the California Native Plant Society (CNPS) to be "rare, threatened or endangered in California" (California Rare Plant Rank 1A, 1B, 2A, and 2B) as well as California Rare Plant Rank 3 and 4 plant species
g) Species designated by CDFW as Fully Protected or as a Species of Special Concern
h) Species protected under the Federal Bald and Golden Eagle Protection Act
i) Birds of Conservation Concern or Watch List species
j) Bats considered by the Western Bat Working Group to be "high" or "medium" priority (Western Bat Working Group 2015)

[38] CDFW's Rarity Ranking follows NatureServe's Heritage Methodology (Faber-Langendoen, et al. 2016) in which communities are given a G (global) and S (state) rank based on their degree of imperilment (as measured by rarity, trends, and threats). Communities with a Rarity Ranking of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable) are considered sensitive by CDFW.

Biological Resource Technical Report Minimum Requirements

Report Contents

The Biological Resource Technical Report will include the following information at a minimum.

a) **Preliminary Agency Consultation.** Describe any pre-survey contact with agencies. Describe any agency approvals that were required for biologists or agency protocols that were applied to the survey effort. Provide copies of correspondence and meeting notes with the names and contact information for agency staff and the dates of consultation as an appendix to the Biological Resources Technical Report.
b) **Records Search.** Provide the results of all database and literature searches for biological resources within and surrounding the project area. Identify all sources reviewed (e.g., CNDDB, CNPS, USFWS, etc.).
c) **Biological Resource Survey Method.** Identify agency survey requirements and protocols applicable to each biological survey that was conducted. Identify the areas where each survey occurred. Identify any limitations for the surveys (e.g., survey timing or climatic conditions) that could affect the survey results.
d) **Vegetation Communities and Land Cover.** Identify all vegetation communities or land cover types (e.g., disturbed or developed) within the biological survey area. The biological survey area should include a 1,000-foot buffer from project facilities to support CPUC's evaluation of indirect effects.
e) **Aquatic Resources.** Identify any wetlands, streams, lakes, reservoirs, estuarine, or other aquatic resources within the biological survey area. Provide a wetland delineation and all data sheets including National Wetlands Inventory maps (or the appropriate state wetland maps, if National Wetlands Inventory maps are not available) that show all proposed facilities and include milepost locations for proposed pipeline routes. Provide a copy of agency verification of the wetland delineation if the delineation has been verified by the U.S. Army Corps of Engineers or CDFW. If the delineation has not been verified, describe the process and timing for obtaining agency verification.
f) **Habitat Assessments.** Evaluate the potential for suitable habitat in the biological survey area for each species identified in the database and literature search.
g) **Native Wildlife Corridors and Nursery Sites.** Identify any wildlife corridors or nursery sites that occur within the biological survey area.
h) **Survey Results.** Describe all survey results and include a copy of any focused (e.g., rare plant, protocol special-status wildlife) biological resources survey reports.

Mapping and GIS Data

Provide detailed maps (at approximately 1:3,000 scale or similar), and all associated GIS data for the Biological Resources Technical Report and any supporting biological survey reports, including:

a) Biological survey area for each survey that was conducted
b) Vegetation communities and land cover types
c) Aquatic resource delineation
d) Special-status plant locations
e) Special-status wildlife locations
f) Avian point count locations
g) Critical habitat
h) California Coastal Commission or Bay Conservation and Development Commission jurisdictional areas

Attachment 3: Cultural Resource Technical Report Standards

Cultural Resource Inventory Report

Provide a cultural resource inventory report that includes archaeological, unique archaeological, and built-environment resources within all areas that could be affected by the proposed project including areas of indirect effect. The inventory report will include the results of both a literature search and pedestrian survey. The contents will address the requirements in *Archaeological Resource Management Reports: Recommended Contents and Guidelines*. The methodology and results of the inventory should be sufficient to provide the reader with an understanding of the nature, character, and composition of newly discovered and previously identified cultural resources so that the required recommendations about the resource(s) CRHR eligibility are clearly understood. No information regarding the location of the cultural resources will be included in these descriptions. The required Department of Parks and Recreation (DPR) 523 forms, including location information and photographs of the resources, are to be included in a removable confidential appendix to the report.[39]

The inventory report will meet the following requirements:

a) The report should clearly discuss the methods used to identify unique archaeological resources (e.g., how the determination was made about the resources' eligibility).
b) The report should identify large resources such as districts and landscapes where resources indicate their presence, even if federal agencies disagree. It is understood that often only a few contributing elements may be in the project area, and that the boundaries of the large resource may need to be revisited as part of future projects. It is acknowledged that boundaries of districts and landscapes can be difficult to define and there is not always good recorded data on these resources.
c) In the case of archaeological resources, the report should discuss whether each one is also a unique archaeological resource and explain why or why not.
d) Descriptions of resources should include spatial relationships to other nearby resources, raw materials sources, and natural features such as water sources and mountains.
e) The evidence that indicates a particular function or age for a resource should be explicitly described with a clear explanation, not simply asserted.

Cultural Resource Evaluation Report

Provide a cultural resource evaluation report. The report contents required by the state of California are outlined in the *Archaeological Resource Management Reports: Recommended Contents and Guidelines*. The evaluation report should also include:

a) Resource descriptions and evaluations together, and not in separate volumes or report sections. This will facilitate understanding of each resource.
b) An evaluation of each potential or eligible California Register of Historical Resources (CRHR) resource within the public archaeology laboratory (PAL) for all seven aspects of integrity[40] using specific examples for each resource. This evaluation needs to be included in the evaluation

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39 Any aspect of the PEA and associated data that Applicants believe to be confidential will be provided in full but may be marked confidential if allowed pursuant to General Order 66 or latest applicable Commission rule (e.g., see Public Records Act Proceeding R.14-11-001).

40 The seven aspects of integrity are location, design, setting, materials, workmanship, feeling, and association, as defined in "***Types of Historical Resources and Criteria for Listing in the California Register of Historical Resources***" [14 CCR 4852(c)]).

report for all resources that could be affected by the project even if the resources were not previously evaluated. Previous evaluations should be reviewed to address change over time.

c) An evaluation of each potential or eligible CRHR resource within the PAL under all four criteria using specific examples for each resource. This evaluation needs to be included in the evaluation report for all resources that could be affected by the project even if the resources were not previously evaluated. The cultural resources professional should make their own recommendation regarding eligibility, which does not need to agree with previous recommendations for CRHR or NRHP, as long as it is clearly explained.
d) For **prehistoric archaeological resources**, Criteria 1, 2 and 3[41] should be explicitly considered. Research efforts to search for important events and persons related to the resource must be described. This evaluation needs to be included in the evaluation report for all resources that could be affected by the project even if the resources were not previously evaluated. The cultural resources professional should make their own recommendation, which does not need to agree with previous recommendations for CRHR or NRHP eligibility, as long as it is clearly explained.
e) While **potential unique archaeological resources** could be identified in the records search report or inventory report, the justification for each individual resource to be considered a resource under CEQA should be presented in this report.
f) If surface information collected during survey is sufficient to make an eligibility recommendation, this reasoning should be outlined explicitly for each resource. This is particularly the case for resources that are believed to have buried subsurface components.
g) If archaeological testing or additional historical research was required in order to evaluate a resource, the evaluation report will be explicit about why the work was required, the results for each resource, and the subsequent eligibility recommendation.
h) For large projects with multiple similar resources where the eligibility justifications for similar resources are essentially identical, it is acceptable to discuss these resources as a group. However, eligibility justifications for each individual resource is preferred, so if the grouping strategy is used, the criteria used to group resources must be clearly justified.
i) Large resources such as districts and landscapes may be challenging to fully evaluate in the context of a single project. CPUC encourages the identification and evaluation of these resources with the understanding that often only a few contributing elements may be located within the project area, and that the boundaries of the large resource may need to be revisited as part of future projects. It is understood that a full evaluation of the resource may be beyond the scope of one project. Regardless, the potential for the project to affect any resources within a district or landscape must be defined.

[41] Criteria for Designation on the California Register are as follows (defined in http://ohp.parks.ca.gov/?page_id=21238):

- Criterion 1: Associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States.
- Criterion 2: Associated with the lives of persons important to local, California or national history.
- Criterion 3: Embodies the distinctive characteristics of a type, period, region or method of construction or represents the work of a master or possesses high artistic values.
- Criterion 4: Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation.

Attachment 4: CPUC Draft Environmental Measures

About this Attachment: The following CPUC Draft Environmental Measures are provided for consideration during PEA development. They should be discussed with the CPUC's CEQA Unit Staff during Pre-filing, especially with respect to the development of Applicant Proposed Measures. The CPUC Draft Environmental Measures may form the basis for mitigation measures in the CEQA document if appropriate to the analysis of potentially significant impacts. These and other CPUC Draft Environmental Measures may be formally incorporated into Chapter 5 of future versions of the PEA Checklist.

5.1 Aesthetics

Aesthetics Impact Reduction During Construction

All project sites will be maintained in a clean and orderly state. Construction staging areas will be sited away from public view where possible. Nighttime lighting will be directed away from residential areas and have shields to prevent light spillover effects. Upon completion of project construction, project staging and temporary work areas will be returned to pre-project conditions, including re-grading of the site and re-vegetation or re-paving of disturbed areas to match pre-existing contours and conditions.

5.3 Air Quality

Dust Control During Construction

The Applicant shall implement measures to control fugitive dust in compliance with all local air district(s) standards. Dust control measures shall include the following at a minimum:

- All exposed surfaces with the potential of dust-generating shall be watered or covered with coarse rock to reduce the potential for airborne dust from leaving the site.
- The simultaneous occurrence of more than two ground disturbing construction phases on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- Cover all haul trucks entering/leaving the site and trim their loads as necessary.
- Use wet power vacuum street sweepers to sweep all paved access road, parking areas, staging areas, and public roads adjacent to project sites on a daily basis (at minimum) during construction. The use of dry power sweeping is prohibited.
- All trucks and equipment, including their tires, shall be washed off prior to leaving project sites.
- Apply gravel or non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at project sites.
- Water and/or cover soil stockpiles daily.
- Vegetative ground cover shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- All vehicle speeds shall be limited to fifteen (15) miles per hour or less on unpaved areas.
- Implement dust monitoring in compliance with the standards of the local air district.
- Halt construction during any periods when wind speeds are in excess of 50 mph.

5.5 Cultural Resources

Human Remains (Construction and Maintenance)

Avoidance and protection of inadvertent discoveries that contain human remains shall be the preferred protection strategy with complete avoidance of such resources ensured by redesigning the project. If human remains are discovered during construction or maintenance activities, all work shall be diverted from the area of the discovery, and the CPUC shall be informed immediately. The Applicant shall contact the County Coroner to determine whether or not the remains are Native American. If the remains are determined to be Native American, the Coroner will contact the Native American Heritage Commission (NAHC). The NAHC will then identify the person or persons it believes to be the most likely descendant of the deceased Native American, who in turn would make recommendations for the appropriate means of treating the human remains and any associated funerary objects.

If the remains are on federal land, the remains shall be treated in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA). If the remains are not on federal land, the remains shall be treated in accordance with Health and Safety Code Section 7050.5, CEQA Section 15064.5(e), and Public Resources Code Section 5097.98.

5.8 Greenhouse Gas Emissions

Greenhouse Gas Emissions Reduction During Construction

The following measures shall be implemented to minimize greenhouse gas emissions from all construction sites:

- If suitable park-and-ride facilities are available in the project vicinity, construction workers shall be encouraged to carpool to the job site.
- The Applicant shall develop a carpool program to the job site.
- On road and off-road vehicle tire pressures shall be maintained to manufacturer specifications. Tires shall be checked and re-inflated at regular intervals.
- Demolition debris shall be recycled for reuse to the extent feasible.
- The contractor shall use line power instead of diesel generators at all construction sites where line power is available.
- The contractor shall maintain construction equipment per manufacturing specifications.

5.19 Utilities and Service Systems

Notify Utilities with Facilities Above and Below Ground

The Applicant shall notify all utility companies with utilities located within or crossing the project ROW to locate and mark existing underground utilities along the entire length of the project at least 14 days prior to construction. No subsurface work shall be conducted that would conflict with (i.e., directly impact or compromise the integrity of) a buried utility. In the event of a conflict, areas of subsurface excavation or pole installation shall be realigned vertically and/or horizontally, as appropriate, to avoid other utilities and provide adequate operational and safety buffering. In instances where separation between third-party utilities and underground excavations is less than 5 feet, the Applicant shall submit the intended construction methodology to the owner of the third-party utility for review and approval at least 30 days prior to construction. Construction methods shall be adjusted as necessary to assure that the integrity of existing utility lines is not compromised.

5.20 Wildfire

Construction Fire Prevention Plan

A project-specific Construction Fire Prevention Plan for both construction and operation of the project shall be submitted for review prior to initiation of construction. A draft copy of the Plan shall be provided to the CPUC and state and local fire agencies at least 90 days before the start of any construction activities in areas designated as Very High or High Fire Hazard Severity Zones. Plan reviewers shall also include

federal, state, or local agencies with jurisdiction over areas where the project is located. The final Plan shall be approved by the CPUC at least 30 days prior to the initiation of construction activities. The Plan shall be fully implemented throughout the construction period and include the following at a minimum:

- The purpose and applicability of the Plan
- Responsibilities and duties
- Preparedness training and drills
- Procedures for fire reporting, response, and prevention that include:
    - Identification of daily site-specific risk conditions
    - The tools and equipment needed on vehicles and to be on hand at sites
    - Reiteration of fire prevention and safety considerations during tailboard meetings
    - Daily monitoring of the red-flag warning system with appropriate restrictions on types and levels of permissible activity
- Coordination procedures with federal and local fire officials
- Crew training, including fire safety practices and restrictions
- Method(s) for verifying that all Plan protocols and requirements are being followed

A project Fire Marshal or similar qualified position shall be established to enforce all provisions of the Construction Fire Prevention Plan as well as perform other duties related to fire detection, prevention, and suppression for the project. Construction activities shall be monitored to ensure implementation and effectiveness of the Plan.

Fire Prevention Practices (Construction and Maintenance)

The Applicant shall implement ongoing fire patrols during the fire season as defined each year by local, state, and federal fire agencies. These dates vary from year to year, generally occurring from late spring through dry winter periods. During Red Flag Warning events, as issued daily by the National Weather Service, all construction/maintenance activities shall cease, with an exception for transmission line testing, repairs, unfinished work, or other specific activities which may be allowed if the facility/equipment poses a greater fire risk if left in its current state.

All construction/maintenance crews and inspectors shall be provided with radio and cellular telephone access that is operational in all work areas and access routes to allow for immediate reporting of fires. Communication pathways and equipment shall be tested and confirmed operational each day prior to initiating construction/maintenance activities at each work site. All fires shall be reported to the fire agencies with jurisdiction in the area immediately upon discovery of the ignition.

All construction/maintenance personnel shall be trained in fire-safe actions, initial attack firefighting, and fire reporting. All construction/maintenance personnel shall be trained and equipped to extinguish small fires in order to prevent them from growing into more serious threats. All construction/maintenance personnel shall carry at all times a laminated card and be provided a hard hat sticker that list pertinent telephone numbers for reporting fires and defining immediate steps to take if a fire starts. Information on laminated contact cards and hard hat stickers shall be updated and redistributed to all construction/maintenance personnel and outdated cards and hard hat stickers shall be destroyed prior to the initiation of construction/maintenance activities on the day the information change goes into effect.

Construction/maintenance personnel shall have fire suppression equipment on all construction vehicles. Construction/maintenance personnel shall be required to park vehicles away from dry vegetation. Water tanks and/or water trucks shall be sited or available at active project sites for fire protection during construction. The Applicant shall coordinate with applicable local fire departments prior to construction/maintenance activities to determine the appropriate amounts of fire equipment to be carried on vehicles and, should a fire occur, to coordinate fire suppression activities.

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Updated: 4/25/2019

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Imperial	Kings	Mono	San Bernardino	Tulare
Inyo	Los Angeles	Orange	Santa Barbara	Ventura

CITIES

Adelanto	Commerce	Hesperia	Lynwood	Porterville	Tehachapi
Agoura Hills	Compton	Hidden Hills	Malibu	Rancho Cucamonga	Temecula
Alhambra	Corona	Highland	Mammoth Lakes	Rancho Mirage	Temple City
Aliso Viejo	Costa Mesa	Huntington Beach	Manhattan Beach	Rancho Palos Verdes	Thousand Oaks
Apple Valley	Covina	Huntington Park	Maywood	Rancho Santa Margarita	Torrance
Arcadia	Cudahy	Indian Wells	McFarland	Redlands	Tulare
Artesia	Culver City	Industry	Menifee	Redondo Beach	Tustin
Avalon	Cypress	Inglewood	Mission Viejo	Rialto	Twentynine Palms
Baldwin Park	Delano	Irvine	Monrovia	Ridgecrest	Upland
Barstow	Desert Hot Springs	Irwindale	Montclair	Rolling Hills	Ventura
Beaumont	Diamond Bar	Jurupa Valley	Montebello	Rolling Hills Estates	Victorville
Bell	Downey	La Canada Flintridge	Monterey Park	Rosemead	Villa Park
Bell Gardens	Duarte	La Habra	Moorpark	San Bernardino	Visalia
Bellflower	Eastvale	La Habra Heights	Moreno Valley	San Dimas	Walnut
Beverly Hills	El Monte	La Mirada	Murrieta	San Fernando	West Covina
Bishop	El Segundo	La Palma	Newport Beach	San Gabriel	West Hollywood
Blythe	Exeter	La Puente	Norco	San Jacinto	Westlake Village
Bradbury	Farmersville	La Verne	Norwalk	San Marino	Westminster
Brea	Fillmore	Laguna Beach	Ojai	Santa Ana	Whittier
Buena Park	Fontana	Laguna Hills	Ontario	Santa Barbara	Wildomar
Calabasas	Fountain Valley	Laguna Niguel	Orange	Santa Clarita	Woodlake (Three Rivers)
California City	Fullerton	Laguna Woods	Oxnard	Santa Fe Springs	Ventura
Calimesa	Garden Grove	Lake Elsinore	Palm Desert	Santa Monica	Yorba Linda
Camarillo	Gardena	Lake Forest	Palm Springs	Santa Paula	Yucaipa
Canyon Lake	Glendora	Lakewood	Palmdale	Seal Beach	Yucca Valley
Carpinteria	Goleta	Lancaster	Palos Verdes Estates	Sierra Madre	
Carson	Grand Terrace	Lawndale	Paramount	Signal Hill	
Cathedral City	Hanford	Lindsay	Perris	Simi Valley	
Cerritos	Hawaiian Gardens	Loma Linda	Pico Rivera	South El Monte	
Chino	Hawthorne	Lomita	Placentia	South Gate	
Chino Hills	Hemet	Long Beach	Pomona	South Pasadena	
Claremont	Hermosa Beach	Los Alamitos	Port Hueneme	Stanton	

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FEDERALLY RECOGNIZED TRIBES IN SCE'S SERVICE AREA

FEDERALLY RECOGNIZED TRIBES

Agua Caliente Band of Cahuilla Indians
Benton Paiute Tribe
Bishop Paiute Tribe
Bridgeport Paiute Indian Colony
Chemehuevi Indian Tribe
Colorado River Indian Tribes
Death Valley Timbisha Shoshone Tribe
Morongo Band of Mission Indians
Pechanga Band of Luiseño Indians
San Manuel Band of Mission Indians
Soboba Band of Luiseño Indians
Tule River Indian Tribe
Twenty-Nine Palms Band of Mission Indians

OTHER COMMUNITIES

In addition, SCE serves the majority of unincorporated communities and census-designated places within its service area.

2021 POWER CONTENT LABEL

Southern California Edison

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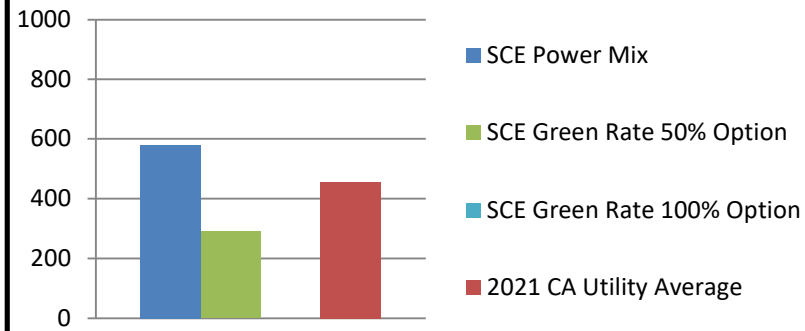
Greenhouse Gas Emissions Intensity (lbs CO_2e/MWh)			
SCE Power Mix	SCE Green Rate 50% Option	SCE Green Rate 100% Option	2021 CA Utility Average
580	**290**	**0**	**456**



Energy Resources	SCE Power Mix	SCE Green Rate 50% Option	SCE Green Rate 100% Option	2021 CA Power Mix
Eligible Renewable[1]	**31.4%**	**65.7%**	**100.0%**	**33.6%**
Biomass & Biowaste	0.1%	0.0%	0.0%	2.3%
Geothermal	5.7%	2.8%	0.0%	4.8%
Eligible Hydroelectric	0.5%	0.3%	0.0%	1.0%
Solar	14.9%	57.5%	100.0%	14.2%
Wind	10.2%	5.1%	0.0%	11.4%
Coal	**0.0%**	**0.0%**	**0.0%**	**3.0%**
Large Hydroelectric	**2.3%**	**1.1%**	**0.0%**	**9.2%**
Natural Gas	**22.3%**	**11.1%**	**0.0%**	**37.9%**
Nuclear	**9.2%**	**4.6%**	**0.0%**	**9.3%**
Other	**0.2%**	**0.1%**	**0.0%**	**0.2%**
Unspecified Power[2]	**34.6%**	**17.3%**	**0.0%**	**6.8%**
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Percentage of Retail Sales Covered by Retired Unbundled RECs[3]**:**	**3%**	**2%**	**0%**	

[1]The eligible renewable percentage above does not reflect RPS compliance, which is determined using a different methodology.

[2]Unspecified power is electricity that has been purchased through open market transactions and is not traceable to a specific generation source.

[3]Renewable energy credits (RECs) are tracking instruments issued for renewable generation. Unbundled renewable energy credits (RECs) represent renewable generation that was not delivered to serve retail sales. Unbundled RECs are not reflected in the power mix or GHG emissions intensities above.

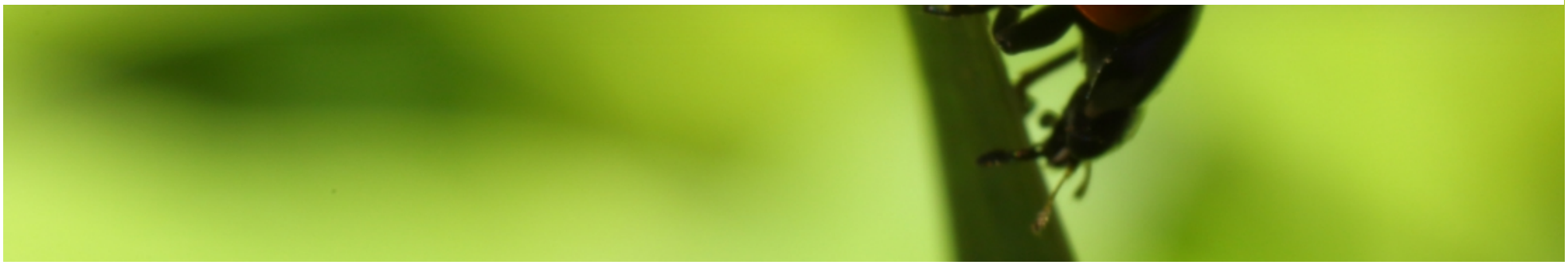
For specific information about this electricity portfolio, contact:	**Southern California Edison** **1-800-655-4555**
For general information about the Power Content Label, visit:	http://www.energy.ca.gov/pcl/
For additional questions, please contact the California Energy Commission at:	Toll-free in California: 844-454-2906 Outside California: 916-653-0237

Overview

Protocols

The Climate Registry's protocols outline best practices for greenhouse gas (GHG) accounting and our voluntary reporting program requirements. Each protocol is developed by achieving a consensus among industry, environmental, and government stakeholders, and goes through a rigorous public comment period before adoption.

THE CLIMATE REGISTRY

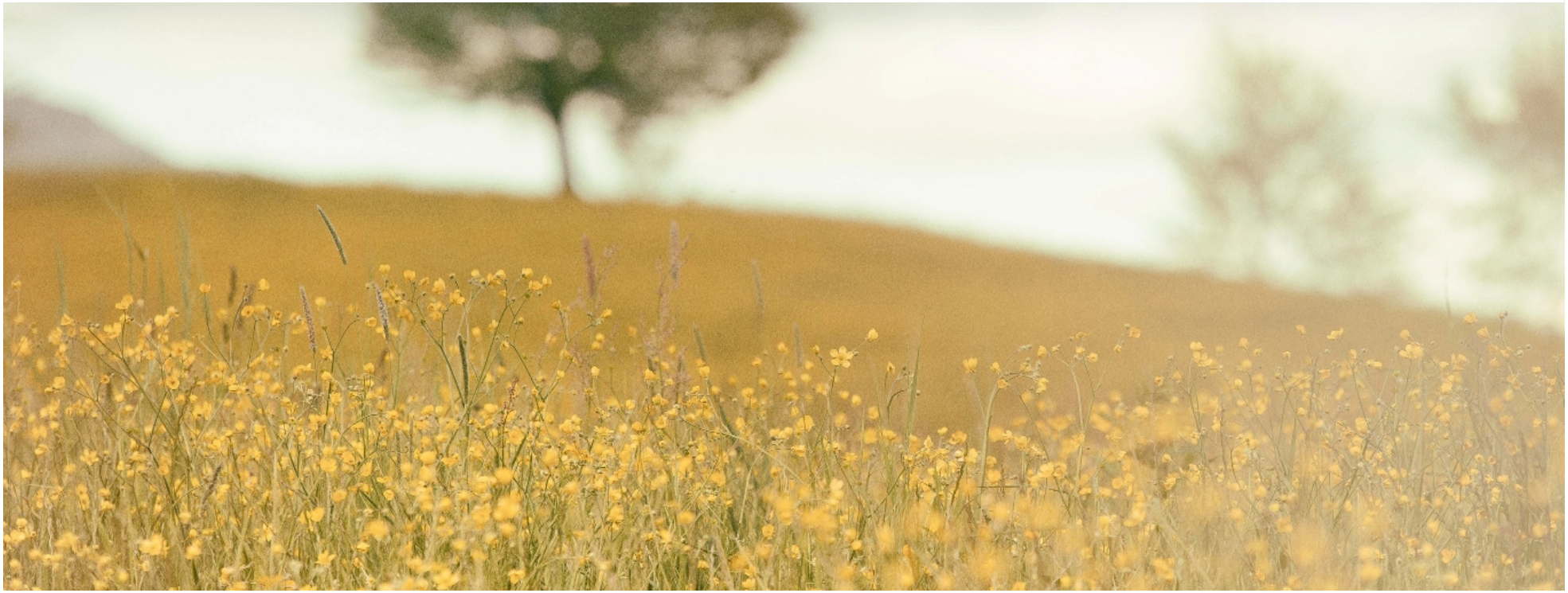


THE CLIMATE REGISTRY

Electric Power Sector Protocol

The Electric Power Sector (EPS) Protocol is designed as an appendix to the GRP, and is intended to be used in conjunction with the GRP. It provides important supplemental reporting guidance, additional requirements for the EPS, and sector-specific clarifications.

THE CLIMATE REGISTRY



Local Government Operations Protocol

The Local Government Operations Protocol is designed to provide a standarized set of guidelines to assist local governments in quantifying and reporting GHG emissions associated with their government operations.

Protocol Documents

THE CLIMATE REGISTRY

Download →

Electric Power Sector Protocol (06/2009)

Download →

Electric Power Sector Protocol 1.0 Updates and Clarifications (12/2020)

Download →

Excel Tool - Electric Power Sector Report 1.3

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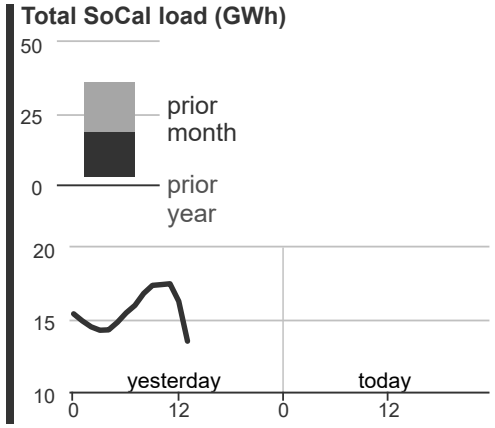
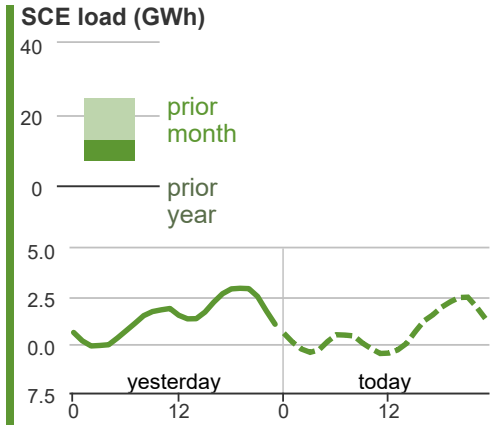
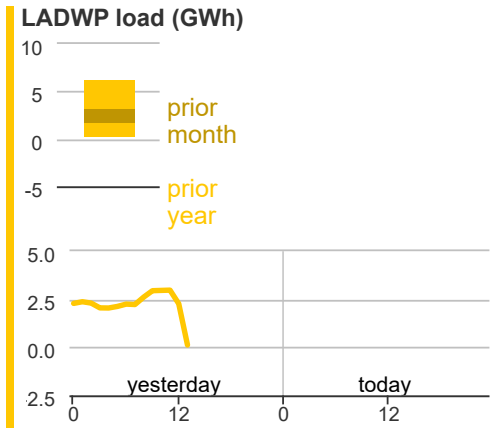


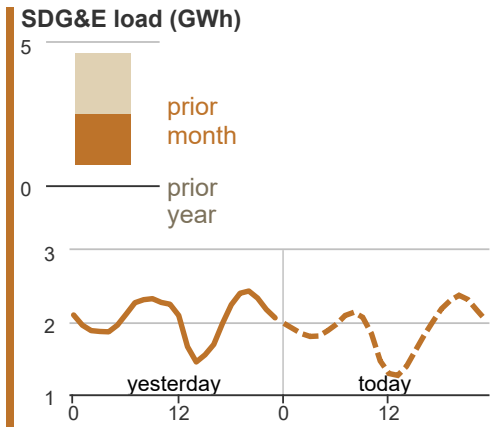
SCE Southern California Edison



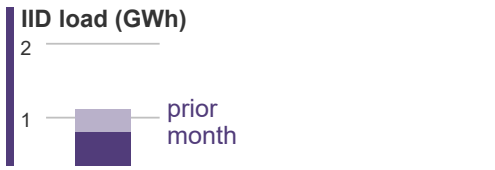
LADWP Los Angeles Department of Water and Power

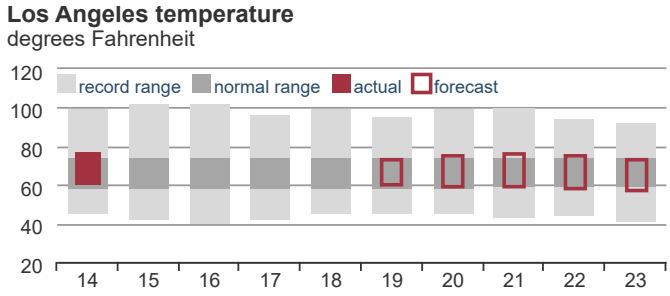


SDG&E San Diego Gas and Electric

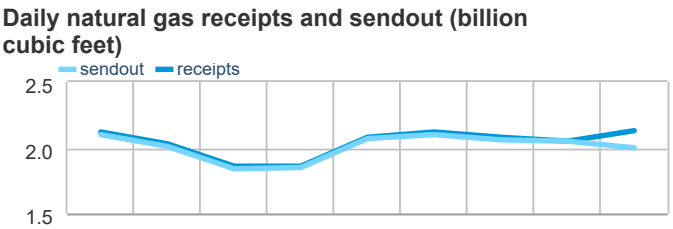


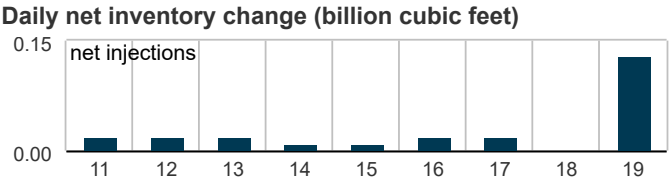
IID Imperial Irrigation District

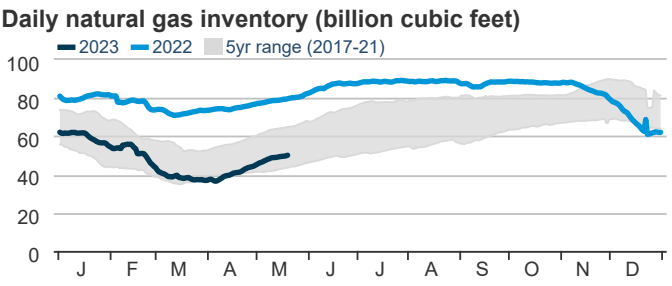


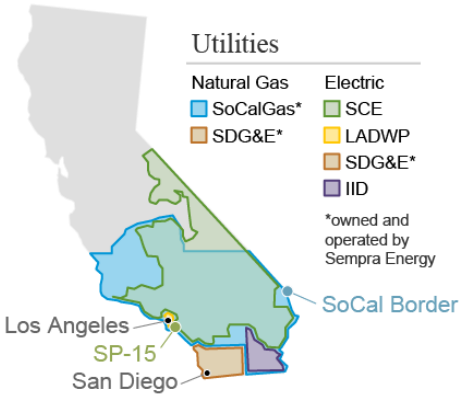


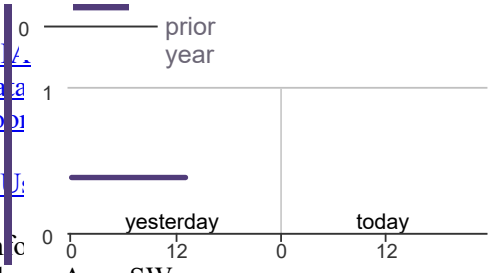
Southern California Gas (SoCalGas)











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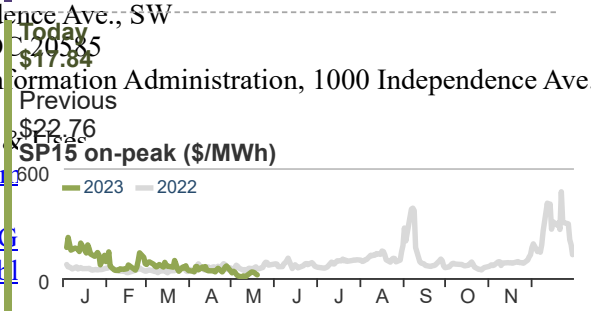

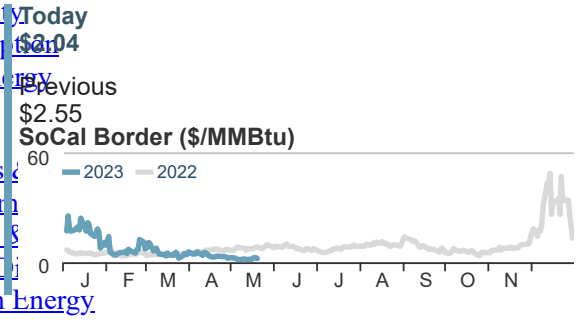

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