BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

In The Matter of the Application of Southern California Gas Company (U 904 G) for Authorization to Implement Revenue Requirement for Costs to Enable Commencement of Phase 2 Activities for Angeles Link	A.24-12-XXX

APPLICATION OF SOUTHERN CALIFORNIA GAS COMPANY (U 904 G) FOR AUTHORIZATION TO IMPLEMENT REVENUE REQUIREMENT FOR COSTS TO ENABLE COMMENCEMENT OF PHASE 2 ACTIVITIES FOR ANGELES LINK

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Pursuant to California Public Utilities Code section 701, Rules 2.1 and 2.2 of the Rules of Practice and Procedure (Rules) of the California Public Utilities Commission (Commission), and Decision (D.) 22-12-055 (Phase 1 Decision), Southern California Gas Company (SoCalGas) hereby submits this Application for Authorization to Implement Revenue Requirement for Costs to Enable Commencement of Phase 2 Activities for Angeles Link (Application). SoCalGas respectfully requests to implement a revenue requirement based on a forecasted cost of approximately $266 million to conduct Phase 2 activities that could ultimately support the affordability of the clean energy transition.

SoCalGas is a regulated utility that builds, maintains, and operates gas infrastructure that meets the needs of our customers—which today and in the future requires planning for and investing in clean fuels consistent with State policy, including clean renewable hydrogen. SoCalGas intends to lead the transition to a resilient and decarbonized clean fuels energy system in California through innovation, collaboration, and investment in clean energy infrastructure

while leveraging its expertise in the safe delivery of energy and longstanding customer relationships.

Angeles Link is envisioned as a non-discriminatory, open-access pipeline system dedicated to public use for the transport of clean renewable hydrogen at scale. Clean renewable hydrogen transported by pipeline can be an efficient and affordable means of supporting the State's decarbonization and clean air goals by virtue of the key attributes of the technology: it can serve as a clean fuel alternative to the use of natural gas and diesel in the hard-to-electrify power generation, transportation, and industrial sectors; it can support electrification and renewable energy expansion by providing clean firm dispatchable power; and it can help minimize the inefficient curtailment of renewable energy by storing it for later use. In other words, clean renewable hydrogen, with its broad application and reach, can play multiple necessary roles; thus, an investment in a pipeline system transporting clean renewable hydrogen could efficiently support multiple decarbonization pathways. Moreover, as the U.S. Department of Energy (DOE) recognizes, hydrogen pipelines are the lowest-cost alternative for delivering large volumes of gaseous hydrogen over long distances.[1] Accordingly, Angeles Link could promote the affordability of the clean energy transition.

I. INTRODUCTION

On February 17, 2022, SoCalGas filed Application (A.) 22-02-007 to track incremental costs associated with Angeles Link for stakeholder engagement and engineering, design, and

[1] DOE, *Pathways to Commercial Liftoff: Clean Hydrogen* (March 2023) at 15: *available at:* https://liftoff.energy.gov/wp-content/uploads/2023/03/20230320-Liftoff-Clean-H2-vPUB.pdf (noting that "[d]edicated hydrogen pipeline transport" has "[t]he lowest levelized cost at high volumes (50+ [tons per day]) and long distances due to low opex costs"); see id. at p. 14 ("[p]ipelines are the preferred solution at large volumes, but will likely not be needed until ~2030 when offtake scales"); id. at 16 ("[d]edicated hydrogen pipelines can move large volumes over long distances to achieve economies of scale").

environmental feasibility studies to develop a first-of-its-kind hydrogen pipeline transport system to deliver clean renewable hydrogen into the Los Angeles Basin. SoCalGas detailed how Angeles Link could benefit ratepayers and the State by advancing California's net zero goals, increasing the use of clean fuels, and creating new jobs and economic benefits, while furthering the State's clean energy policy objectives. When this Commission issued the Phase 1 Decision in December 2022 allowing SoCalGas to record costs associated with an initial phase of feasibility studies for Angeles Link (referred to herein as Phase 1), it recognized that (i) "[Angeles Link] may bring public interest benefits to the state, and especially the Los Angeles area, because clean renewable hydrogen has the potential to decarbonize the state and the Los Angeles Basin's energy future;" and (ii) "it serves the public interest for SoCalGas to perform feasibility studies of [Angeles Link] immediately."[2] Since that time, the importance of clean renewable hydrogen for California has only grown: the California Hydrogen Hub was selected to be awarded up to $1.2 billion in federal funding expected to spur billions of dollars in investments in clean hydrogen, and Governor Newsom has directed the Governor's Office of Business and Economic Development (GO-Biz) to collaborate with state agencies—including this Commission—and stakeholders to develop a Hydrogen Market Development Strategy. Meanwhile, SoCalGas has completed Phase 1 consistent with the Phase 1 Decision, confirming that Angeles Link is technically feasible, viable, cost-effective, and could offer substantial public interest benefits. Therefore, SoCalGas is ready to proceed to Phase 2, in which SoCalGas intends to select a preferred route for Angeles Link and further develop its engineering and design and conduct other activities to support future permit applications and implementation.

[2] Phase 1 Decision at 16.

The State has recognized the role clean renewable hydrogen can play in achieving its decarbonization goals, particularly for the hard-to-electrify power generation, transportation, and industrial sectors. Accelerating a shift to hydrogen requires swift action, as SoCalGas noted when it filed A.22-02-007, referencing Governor Newsom's 2021 request to the Commission to accelerate progress toward the State's net zero goals[3] and his 2021 Emergency Proclamation to expedite clean energy projects and relieve demand on the electrical grid in the face of extreme climate impacts across the West.[4] The urgency remains—last year, the State identified that the clean renewable hydrogen market needs to be scaled up 1,700 times by 2045 to meet the State's carbon neutrality goal.[5]

This Commission echoed both the urgency and potential benefits of advancing a clean renewable hydrogen project in authorizing the Angeles Link Memorandum Account (ALMA), concluding that "the public interest is served if SoCalGas studies whether Angeles Link is feasible, cost-effective, and viable"[6] and that "it serves the public interest for SoCalGas to perform feasibility studies of the Project *immediately*."[7] The Commission also recognized clean renewable hydrogen's "promise as a potential solution to decarbonize California's energy future and bring economic opportunities and new jobs to the Los Angeles region" and acknowledged

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3 State of California – Office of Governor Gavin Newsom, *Governor Newsom Holds Virtual Discussion with Leading Climate Scientists on State's Progress Toward Carbon Neutrality* (July 9, 2021), *available at*: https://www.gov.ca.gov/2021/07/09/governor-newsom-holds-virtual-discussion-with-leading-climate-scientists-on-states-progress-toward-carbon-neutrality/.

4 State of California – Office of Governor Gavin Newsom, *Proclamation of a State of Emergency* (July 30, 2021), *available at*: https://www.gov.ca.gov/wp-content/uploads/2021/07/Energy-Emergency-Proc-7-30-21.pdf.

5 State of California – Office of Governor Gavin Newsom, *Letter to Director Myers (GO-Biz)* (August 3, 2023), *available at*: https://www.gov.ca.gov/wp-content/uploads/2023/08/Letter-to-Director-Meyers.pdf.

6 Phase 1 Decision at 68 (Conclusion of Law (COL) 4).

7 *Id.* at 16 (emphasis added); *see also, id*. at 61-62 (Findings of Fact (FOF) 1, 3, 6, 7).

that the Phase 1 studies "will contribute more broadly to the understanding of hydrogen's role in decarbonizing the State's economy."[8]

SoCalGas has now completed the required Phase 1 feasibility studies, with stakeholders engaged throughout the process, and is pleased to report that the Phase 1 studies confirm the Commission's findings in the Phase 1 Decision. The Phase 1 studies demonstrate that it is technically feasible for SoCalGas to design, permit, and construct a safe, reliable, and scalable pipeline system to connect hydrogen producers to points of expected demand. The findings also indicate Angeles Link, as currently envisioned, is viable, with significant demand estimated for SoCalGas's service territory (1.9 to 5.9 million metric tons per year (MMTPY)[9]) as well as sufficient water, land, and technology resources available for third parties to produce enough clean renewable hydrogen to meet the throughput scenarios currently assumed to be delivered by Angeles Link (a range of 0.5 to 1.5 MMTPY). The Phase 1 studies also confirm that Angeles Link is cost effective compared to other alternatives assessed and a feasible and cost-effective decarbonization option for many hard-to-electrify end users.

The Phase 1 studies also validate the assessment of the Commission's Phase 1 Decision that Angeles Link could provide public interest benefits to SoCalGas ratepayers and the broader community. Angeles Link could bolster the reliability and resiliency of the energy system, thereby mitigating potentially widespread negative economic impacts from service interruptions to the State's electric grid. Electricity consumption in Southern California is expected to double by 2045, and a 24-hour electrical outage in 2045 has been estimated to have a potential total cost

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[8] CPUC, *CPUC Acts to Advance Understanding of Hydrogen's Role as Decarbonization Strategy* (December 15, 2022), *available at*: https://webproda.cpuc.ca.gov/news-and-updates/all-news/cpuc-acts-to-advance-understanding-of-hydrogen-role-as-decarbonization-strategy.

[9] The units "metric tons" and "tonnes" are equivalent but different from "tons," i.e., "U.S. tons." One metric ton, or tonne, is equivalent to 1.10 ton, or U.S. ton.

of more than $100 billion.[10] Angeles Link could support meaningful energy decarbonization and air quality benefits, including the potential reduction of 4.5 to 9 million metric tons of carbon dioxide equivalent (CO2e) per year (the equivalent of the annual greenhouse gas (GHG) emissions of removing approximately 725,000 to 1 million gasoline passenger vehicles off the road each year) and approximately 5,200 tons per year of NOx emissions by 2045. In turn, air quality benefits could translate into substantial public health benefits associated with avoided premature mortality alone in the range of $183 to $552 million per year by 2045—with many of the benefits accruing to disadvantaged communities.[11] Angeles Link could also create nearly 53,000 direct construction-related jobs and nearly a total of 75,000 jobs when considering indirect and induced jobs. Critically, Phase 2 of Angeles Link has another important feature: continuation of a transparent process that engages with and considers the input of stakeholders.

Angeles Link can also advance the State's clean energy policy objectives by displacing the use of natural gas in the Los Angeles Basin to support, along with other clean energy projects and reliability efforts, a comprehensive approach to eventually reduce reliance on the Aliso Canyon underground natural gas storage facility, consistent with State goals and energy reliability requirements, and complementary to the Commission's efforts in the Order Instituting Investigation, I.17-02-002 (SB 380 Proceeding).

In addition, the Phase 1 Decision recognized that Angeles Link could "help position California to receive federal funding [for clean hydrogen hubs] through the Infrastructure Investment and Jobs Act [IIJA]."[12] Accordingly, the Phase 1 Decision directed SoCalGas to join

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[10] Testimony of Josh Schellenberg at JS-11.

[11] *See* Testimony of Dr. Sonja Sax at SS-2, SS-18 to SS-19.

[12] Phase 1 Decision at 2, 62 (FOF 10).

the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES)[13] in support of the State of California's application for federal funding for a hydrogen hub.[14] SoCalGas did, and ARCHES' application for federal funding included Angeles Link, detailing the San Joaquin Valley and Lancaster pipeline segments. That application was selected to receive up to $1.2 billion in federal funding for the California Hydrogen Hub—a network of clean hydrogen producers, consumers, and connective infrastructure to build and expand clean renewable hydrogen infrastructure across California. The California Hydrogen Hub was the first in the nation to sign a funding agreement with the U.S. Department of Energy (DOE), which agreement also contemplates $11.4 billion in private investment, for an overall $12.6 billion infusion of capital in the California Hydrogen Hub. Angeles Link is an integral part of the California Hydrogen Hub—composing over 76% of the pipeline infrastructure detailed by ARCHES for the hub in its application[15]—and could help catalyze the clean hydrogen economy in Central and Southern California by providing the necessary pipeline infrastructure and providing certainty for hydrogen producers and end users to enable market transformation. Consistent with the State's climate leadership, SoCalGas currently understands ARCHES envisions the California

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[13] ARCHES is "California's designated U. S. Department of Energy hydrogen hub, established to accelerate the deployment of renewable, clean hydrogen projects and infrastructure to advance a zero-carbon economy." ARCHES H2, *Meet ARCHES* (October 2023), *available at:* https://archesh2.org/wp-content/uploads/2023/10/Meet-Arches_October-2023.pdf (internal parentheticals omitted).

[14] Phase 1 Decision at 2.

[15] ARCHES stated in its application for federal funding: "Similarly, although a large statewide interconnected pipeline network is not included within the hub timeframe and funding request due to the magnitude of funding and timeframe required to realize such an enterprise (although 165 miles of new regional pipelines are included as an initial investment in the network), the initial projects are chosen to be able to realize and use such a common carrier system as it is introduced in parallel efforts of both utility and private companies in the future." ARCHES Technical Submission to DOE (April 2023) at 8, *available at:* https://archesh2.org/wp-content/uploads/2024/08/ARCHES-Technical-Volume-Redacted.pdf.

Hydrogen Hub to be operational by the end of 2033. Accordingly, SoCalGas aims to align timing expectations and sharing of other relevant market, community, or technical information with ARCHES to support the California Hydrogen Hub to best leverage federal funds for the benefit of all Californians and unlock the hydrogen economy.

Following the selection of the California Hydrogen Hub for federal funding, Governor Newsom directed GO-Biz to develop an all-of-government Hydrogen Market Development Strategy. The framework for the yet-to-be-released strategy indicates it will be organized around a shared North Star: ***to leverage clean renewable hydrogen to decarbonize the state's transportation, energy, and industrial sectors***.[16] Angeles Link could be a key contributor to this effort. The availability of open-access, i.e., non-discriminatory,[17] connective pipeline infrastructure dedicated to public use—like Angeles Link—is essential to create, deliver, and use hydrogen efficiently, safely, reliably, and affordably. As the State's first open-access hydrogen pipeline system, Angeles Link could help to scale the hydrogen economy and promote affordability through the use of a public utility model, which is subject to Commission regulation, and can leverage SoCalGas's dedicated, experienced workforce to deliver critically needed hydrogen transportation services for heat, light and power, rather than relying exclusively

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[16] GO-Biz, *California Hydrogen Market Development Strategy – Objectives & Public Engagement* (December 2023) *available at:* https://business.ca.gov/wp-content/uploads/2023/12/H2-Strategy-Framing-Doc-12-26-23.pdf.

[17] Here, the term "nondiscriminatory" is used describe pipeline infrastructure that is accessible to all potential hydrogen producers and end-users consistent with a published tariff. Accordingly, the term should be read interchangeably with the term "open-access," as it is commonly used by the Commission. (*See* CPUC*, Glossary of Acronyms and Other Frequently Used Terms*, *available at*: https://www.cpuc.ca.gov/news-and-updates/newsroom/glossary/o ["Open Access: A regulatory mandate to allow others to use a utility's transmission and distribution facilities to move bulk power from one point to another on a nondiscriminatory basis for a cost-based fee."].)

on unregulated entities awaiting market development, bilaterally negotiated contracts, and transportation rates with no Commission oversight, transparency, or consumer protection.

The Commission has previously recognized its obligation to "make an orderly transition to clean energy while maintaining safe and reliable electric service."[18] SoCalGas and other state utilities can play an essential role in the effort to address climate change challenges and to achieve California's carbon neutrality goals while maintaining energy system safety, reliability, and resiliency. A collective effort will be required to achieve the State's ambitious goals.

As one of the nation's largest operators of an energy fuel delivery network, serving approximately 21 million consumers over approximately 24,000 square miles in more than 500 rural, suburban, and urban communities, and consistent with its sustainability strategy, SoCalGas is well-positioned to support the California Hydrogen Hub and California's broader hydrogen economy. Indeed, the utility model provides the California Hydrogen Hub with a steady, reliable, and financially durable participant. SoCalGas has decades of experience designing, engineering, permitting, and building major energy transportation projects that can be leveraged for the State's hydrogen economy. SoCalGas's regulated public utility model—with non-discriminatory pipelines dedicated to public use—will provide the market certainty of access, transparent and fair rates, and safe and reliable operations for the transport of bulk volumes necessary to scale the hydrogen economy. Angeles Link could contribute significantly to the

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[18] D.21-09-045 at 14 (noting that Pub. Util. Code, § 380 subd. (b) "requires [the Commission] to establish resource adequacy requirements to ensure the reliability of electrical service in California while advancing, to the extent possible, the state's goals for clean energy, reducing air pollution, and reducing emissions of greenhouse gases," and that Pub. Util. Code, § 454.51 subd. (a) requires the Commission to "[i]dentify a diverse and balanced portfolio of resources needed to ensure a reliable electricity supply that provides optimal integration of renewable energy in a cost-effective manner."); *See* Decision 22-12-057 at 60 (recognizing that SB 1075 "requires CARB, in conjunction with the CPUC and the CEC, to provide policy recommendations regarding the use of hydrogen to help achieve California's climate, clean energy, and clean air objectives."); *see also,* A.22-09-006 (hydrogen blending pilots proceeding), R.13-02-008 (examining standards for hydrogen).

State's hydrogen vision and a net-zero future. As noted below, because of the long-lead time to placing a pipeline system in service, work on Angeles Link must continue now.

As described above, SoCalGas has now completed the Phase 1 studies and is ready to move to Phase 2, having satisfied the Phase 1 Decision's directives: (1) SoCalGas executed feasibility studies for the Project, with external stakeholders engaged, informed, and providing feedback along the way; (2) SoCalGas tracked the associated costs in the ALMA; and (3) SoCalGas joined ARCHES and Angeles Link was included in ARCHES's successful clean hydrogen hub application to the DOE. The Phase 1 work has confirmed the feasibility and potential benefits of Angeles Link and the role it can serve to help the State reach its decarbonization goals.[19]

In Phase 2, SoCalGas intends to (i) identify a preferred system route; (ii) conduct refined and additional analyses (including refined system design, safety, environmental, and related work) to advance Angeles Link to a 30% engineering design; (iii) develop a Class 3 estimate;[20] (iv) conduct programmatic activities (e.g., project governance, workforce, training and risk management plans, affordability considerations and economic analyses); and (v) continue engaging with stakeholders and communities. As discussed herein, Phase 2 activities will build

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[19] Please see Appendix B for a table mapping compliance with the Phase 1 Decision.

[20] Class 3 estimates are commonly referred to as "budgetary estimates" and are developed when project design has progressed to a 10% to 40% design. Typically, when engineering is 10% to 40% complete, a higher level of accuracy is anticipated and may fall within the range of -20% to +30%. According to AACE, Class 3 estimates are "generally prepared to form the basis for budget authorization, appropriation, and/or funding. As such, they typically form the initial control estimate against which all actual costs and resources will be monitored." Estimating classes are described in AACE International (AACEi), *Recommended Practice No. 97R-18 Cost Estimate Classification System - As Applied in Engineering, Procurement, and Construction for the Pipeline Transportation Infrastructure Industries* (AACEi RP 97R-18) (August 7, 2020) at 5, *available at:* https://web.aacei.org/docs/default-source/rps/97R-18.pdf.

upon the results of Phase 1, and the Phase 1 stakeholder engagement activities with the PAG an CBOSG that have allowed for meaningful feedback.

SoCalGas has prepared a detailed cost forecast for the Phase 2 activities and requests a revenue requirement for the execution of those activities. Because the estimate remains a forecast, SoCalGas also requests approval to establish a two-way, interest-bearing balancing account—the Angeles Link Balancing Account (ALBA)—to record authorized and actual Phase 2 costs with opportunities to refund or request recovery of reasonable differences. In other words, SoCalGas would refund ratepayers if actual costs are less than those authorized. If actual costs are higher than authorized, SoCalGas would have an opportunity to establish the reasonableness of additional costs consistent with the Commission's standards in a standalone application, its next general rate case, or other appropriate proceeding. Implementing a revenue requirement, rather than recording costs and seeking a later reasonableness review, could save ratepayers approximately $31 million in accrued interest.

As an additional measure to promote the affordability of the costs of Phase 2 activities, and in light of the widespread ratepayer and public interest benefits that could be realized by advancing the study of and ultimately implementing Angeles Link, SoCalGas proposes to allocate the costs of Phase 2 activities across all ratepayers utilizing the equal cents per therm (ECPT) cost allocation methodology, which has been previously authorized by the Commission for activities for the public good. Doing so results in a reduction of burden on any one class of customer and recognizes the benefits to existing ratepayers across SoCalGas's service territory by advancing to Phase 2 and the ultimate realization of Angeles Link. The illustrative rate impact on the average residential customer bill of 37 therms/month, taking into account accrued interest savings, is an average increase of approximately $0.35 per monthly bill over three years,

or approximately $12.60 in total. All ratepayers will benefit directly from this work and each has an interest in a feasible and affordable means of decarbonization that supports the reliability of the energy system.

The Commission unquestionably has the jurisdiction to grant this Application. Angeles Link will transport hydrogen "gas," which will be used to provide "light, heat and power" consistent with the Public Utility Code. This Application requests a prompt decision to enable SoCalGas to commence Phase 2 activities given the long-lead time associated with designing, permitting, and constructing pipeline systems. Building long linear facilities in California takes time. Phase 2 activities for Angeles Link alone are expected to take approximately 30 months to complete, and are necessary to inform a potential future application for a Certificate of Public Convenience and Necessity (CPCN). Phase 2 activities will also help inform development of permit applications, like a CPCN, which must be obtained prior to construction. The operational timeline SoCalGas seeks to achieve in order to align with the California Hydrogen Hub is ambitious, considering the regulatory and environmental approvals that SoCalGas must obtain. SoCalGas intends to work expeditiously to align with ARCHES' goal to have the California Hydrogen Hub operational, which it understands to be by December 31, 2033, but will need assistance, namely (i) a prompt decision from the Commission on this Application to enable SoCalGas to dedicate the resources needed to continue to advance Angeles Link planning in a timely manner; and (ii) the State's support to facilitate timely review and permitting of clean energy projects that support and advance the State's policies, like Angeles Link.

Approving this Application would be a definitive, necessary step forward in support of California's energy transition—a transition that simply cannot wait—and would send clear signals: to market participants, that their investments in clean renewable hydrogen are warranted

because a credible method of transportation at scale is supported by the State; to utilities, that they can and should play a key role in the State's decarbonization efforts; to ratepayers, that the Commission will use its jurisdiction and oversight to affordably promote the reliability of California's energy system advancing the State's decarbonization goals; and to the rest of the country and world, that California is implementing a replicable path to a decarbonized future.

II. A CLEAN RENEWABLE HYDROGEN ECONOMY IS ADVANCING IN CALIFORNIA

A. There Is Significant Government Action to Support a Clean Renewable Hydrogen Economy in California and Beyond

There has been tremendous momentum at state, federal, and local levels to promote clean energy investments and decarbonize hard-to-electrify sectors in the two years since the Phase 1 Decision was issued.[21] During that time, State and federal agencies have been increasingly focused on developing and promoting California's budding hydrogen economy and have issued policies designed to accelerate hydrogen investments. These recent efforts underscore the urgent need to advance Angeles Link as a definitive step forward in implementing those policy goals. California's leadership in moving to a clean energy economy is needed now more than ever.

1. *"California Is All In on Clean, Renewable Hydrogen"*

California, as the fifth-largest global economy, has long led the national and global effort to combat climate change. Since the Phase 1 Decision, there is growing recognition that the

[21] There is also a commitment to clean energy investments at the international level. *See, e.g.,* United Nations – Framework Convention on Climate Change*, Conference of the Parties – Outcome of the first global stocktake* (December 13, 2023) at 5, *available at:* https://unfccc.int/sites/default/files/resource/cma2023_L17_adv.pdf (urging "[a]ccelerating zero- and low-emission technologies … in hard to abate sectors, and low-carbon hydrogen production."); International Energy Agency (IEA), *Global Hydrogen Review 2023* at 14, *available at:* https://www.iea.org/reports/global-hydrogen-review-2023 ("There is consensus that low-emission hydrogen is a key opportunity for decarbonising sectors where emissions are hard to abate.").

State will need clean renewable hydrogen to meet its decarbonization goals. On August 3, 2023, Governor Gavin Newsom declared "California is all in on clean, renewable hydrogen – an essential aspect of how we'll power our future and cut pollution," and directed GO-Biz to develop an all-of-government Hydrogen Market Development Strategy, similar to the Zero-Emission Market development strategy published by GO-Biz in 2021.[22, 23] In making the request, Governor Newsom stressed that,"[a] key component of the [the California Air Resources Board's (CARB)] 2022 Scoping Plan is rapidly scaling up clean energy resources, including the production, conveyance, storage, and strategic consumption of clean, renewable hydrogen; ***we need to scale up the market 1,700 times by 2045 to meet our carbon neutrality goal***."[24]

CARB's Scoping Plan—which serves as a comprehensive strategy for how California can achieve its GHG emissions reduction goals—concludes that, to "maintain reliability and affordability" in the electric sector, California needs a more diverse portfolio of clean energy

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[22] State of California – Office of Governor Gavin Newsom, *Executive Order N-8-23* (May 2023), *available at:* https://www.gov.ca.gov/wp-content/uploads/2023/05/5.19.23-Infrastructure-EO.pdf.

[23] The Hydrogen Market Development Strategy is intended to draw inspiration from Go-Biz's successful Zero-Emission Vehicle (ZEV) Action Plans and Market Development Strategy, which have effectively guided California's transition to zero-emission transportation. (See Office of the Governor, Governor Newsom Announces New Strategy to Develop a Hydrogen Economy of the Future (August 8, 2023), available at: https://www.gov.ca.gov/2023/08/08/governor-newsom-announces-new-strategy-to-develop-a-hydrogen-economy-of-the-future/; see also GO-Biz, Zero Emission Vehicle Market Development Strategy, available at: https://business.ca.gov/industries/zero-emission-vehicles/zev-strategy-2/.) The ZEV Strategy, initiated under Executive Order N-79-20, set ambitious targets, such as achieving 100% zero-emission vehicle sales by 2035. Through a structured framework focusing on vehicles, infrastructure, end users, and workforce, California has reached significant achievements: nearly 2 million ZEVs sold, ahead of the 1.5 million by 2025 goal, substantial advancements in battery electric vehicle charging infrastructure, and the creation of over 26,000 jobs in ZEV-related manufacturing. (GO-Biz, Zero Emission Vehicle Market Development Strategy, available at: https://business.ca.gov/industries/zero-emission-vehicles/zev-strategy-2/.)

[24] State of California – Office of Governor Gavin Newsom, *Letter to Director Myers (GO-Biz)* (August 3, 2023), *available at:* https://www.gov.ca.gov/wp-content/uploads/2023/08/Letter-to-Director-Meyers.pdf (emphasis added).

resources, particularly those that can provide clean firm power when solar and wind cannot.[25] Specifically, CARB indicates new zero-carbon resources are required to meet the State's 2045 zero-carbon retail electricity targets, including hydrogen as a new incremental electric generation resource, with approximately 4 gigawatts (GW) of hydrogen capacity needed by 2035, and 9 GW by 2045.[26] CARB also found that clean renewable hydrogen is needed to replace fossil fuels in heavy-duty transport and industrial applications.[27]

Governor Newsom indicated the Hydrogen Market Development Strategy should be developed in consultation with CARB, the California Energy Commission (CEC), ARCHES, and this Commission, and identified the North Star around which the State's hydrogen strategy should be organized: "leverage hydrogen to accelerate clean energy deployment and decarbonize our transportation and industrial sectors."[28, 29] Although the strategy itself has not

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[25] The 2022 CARB Scoping plan notes that "California must accelerate deployment of diverse clean energy resources to maintain reliability and affordability in the face of climate change." (*Id.* at 198.) The Plan explains that "fossil gas power plants provide about 75 percent of the flexible capacity for grid reliability as more renewable power enters the system," and that, "[m]oving forward, other resources such as storage and demand-side management are essential to maintain reliability with high concentrations of renewables." (*Id.* at 204.) On this point, "[h]ydrogen 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." (*Id.*)

[26] *Id.*

[27] CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (December 2022), *available at:* https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf.

[28] *Id*. at 2.

[29] The directive also calls for the strategy to build upon CARB's 2022 Scoping Plan and leverage the upcoming SB 1075 (Skinner, Chapter 363, Statutes of 2022) hydrogen report, which is to be developed by CARB in coordination with CEC, CPUC, and other organizations to cover the deployment, development, and use of hydrogen across all sectors as a key part of achieving the State's climate, air quality, and energy goals. *See* CARB, *SB 1075 Report: Hydrogen Development, Deployment, and Use*, *available at*: https://ww2.arb.ca.gov/our-work/programs/sb-1075-hydrogen/about. The CEC will look at forecasting demand for and supply of hydrogen, but the bulk of the SB 1075 report topic areas are being developed and detailed by CARB, including: Hydrogen Policy Structure, Hydrogen Infrastructure, Uses for Non-Renewable Hydrogen, Curtailed Electricity and Hydrogen, Comparing Hydrogen to Alternatives, Drinking Water Integration, Processes for

yet been released, a framework was identified in December 2023, outlining primary objectives such as supporting the State's climate, air quality, clean energy, and environmental goals while driving affordability, reliability, and safety. It also aims to foster a resilient and competitive market, iteratively assess barriers to cost-effective use of clean renewable hydrogen, and identify strategies to capture opportunities and overcome challenges. Additionally, it seeks to ensure local project-affected communities have a clear voice in decision-making; focus job creation efforts on communities most in need; facilitate project development; enable safe, reliable, and cost-effective storage and distribution of clean renewable hydrogen while minimizing leakage and ensuring operational safety; prioritize the use of clean renewable hydrogen in difficult-to-decarbonize applications; and leverage state assets to increase access to hydrogen fueling by transit and public users.[30]

The CEC's 2023 Integrated Energy Policy Report (IEPR) also identifies clean renewable hydrogen's potential to support electric generation, transportation electrification, and industrial decarbonization.[31] The IEPR reports: "California is electrifying much of the transportation and building sectors while rapidly scaling up deployment of low-carbon, renewable generation like solar and wind that are increasingly paired with lithium-ion battery storage. Yet these resources alone may not be sufficient to reach economy-wide decarbonization."[32]

Transmission & Distribution, Life-Cycle Emissions Analysis, and Air Pollution & Other Environmental Impacts.

30 *Id.* at 2-4.

31 CEC, *2023 Integrated Energy Policy Report* at Chapter 2: Potential Growth of Clean and Renewable Hydrogen, *available at:* https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2023-integrated-energy-policy-report.

32 *Id.* at 62.

To ensure that decarbonization projects supporting California's ambitious goals can come to fruition promptly, Governor Newsom issued Executive Order N-8-23. This order established a cabinet-level Infrastructure Strike Team dedicated to streamlining critical clean infrastructure projects, including a working group focused on hydrogen. The Governor's directive recognizes that "major infrastructure projects have too often been bogged down in regulatory processes and a siloed approach to permitting and regulatory approvals," and aims to help "the State move forward on major projects with speed and determination."[33]

Even further, the State authorized funding to support a future net-zero emissions economy. California's Climate Commitment, Governor Newsom's comprehensive plan to fight climate change, included significant funding dedicated to clean, reliable, and affordable energy including "industrial decarbonization and green hydrogen" and "a new streamlined permitting for clean energy projects."[34] The CEC's Clean Hydrogen Program was established by AB 209 (2022) to provide financial incentives to eligible in-state hydrogen projects for demonstration or scale-up of production, processing, delivery, storage or end use.[35]

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[33] State of California – Office of Governor Gavin Newsom, *Executive Order N-8-23* (May 19, 2023), *available at:* https://www.gov.ca.gov/wp-content/uploads/2023/05/5.19.23-Infrastructure-EO.pdf. The President of the Commission is requested to participate on the Infrastructure Strike Team. (*Id.*)

[34] State of California – Office of Governor Gavin Newsom, *California Climate Commitment – New, World Leading Climate Action* (September 2022) at 2, *available at:* https://www.gov.ca.gov/wp-content/uploads/2022/09/Fact-Sheet-California-Climate-Commitment.pdf.

[35] While some funding for projects has been delayed, it remains an important program for incentivizing hydrogen development.

2. *There Are Active Federal Efforts to Promote a Clean Hydrogen Economy*

The IIJA allocated $8 billion to fund regional hydrogen hubs (H2Hubs) across the country.[36] In June 2023, pursuant to the IIJA, DOE published the U.S. National Clean Hydrogen Strategy and Roadmap (Roadmap), which established a framework for large-scale use of hydrogen across the 2030, 2040, and 2050 horizons.[37] The Roadmap recognizes hydrogen's "potential to help address the climate crisis, enhance energy security and resilience, and create economic value."[38] To "ensure that clean hydrogen is developed and adopted as an effective decarbonization tool for maximum benefit" to the U.S., the Roadmap prioritizes three key strategies: (1) target high-impact uses of clean hydrogen in industrial, transportation, and power sector applications; (2) reduce the cost of producing clean hydrogen; and (3) develop regional networks to enable hydrogen production closer to end users.[39] The Hydrogen Interagency Task Force was formed in August 2023 to execute the Roadmap's goals across all federal agencies.[40]

In March 2023, DOE also released a report titled "Pathways to Commercial Liftoff: Clean Hydrogen" (Hydrogen Liftoff Report) to "catalyze more rapid and coordinated action

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[36] Infrastructure Investment and Jobs Act, P. L. No. 117–58, Div. D, Title III, § 40314, 135 Stat. 429 (2021). An additional $1.5 billion was allocated to clean hydrogen electrolysis to reduce the cost of clean hydrogen and clean hydrogen manufacturing and recycling programs to support domestic clean hydrogen supply chains. *Id*.

[37] DOE, *U.S. National Clean Hydrogen Strategy and Roadmap* (June 2023) 1, *available at:* https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf. The Roadmap articulates a goal of 10 million metric tonnes ("MMT") per year of clean hydrogen by 2030, 20 MMT per year by 2040, and 50 MMT per year by 2050. *(Id.)*

[38] *Id.* at 1.

[39] *Id.* at 2.

[40] DOE, *Hydrogen Stakeholder Webinar: National Clean Hydrogen Strategy and Roadmap and Interagency Coordination* (August 18, 2023), *available at:* https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/webinar-national-hydrogen-strategy-interagency-collaboration.pdf.

across the full technology value chain."[41] The Hydrogen Liftoff Report explains that "[t]he U.S. clean hydrogen market is poised for rapid growth," and identifies that, "[t]he opportunity for clean hydrogen in the U.S. . . . is 50 [MMTPY] by 2050" and "demand has the potential to scale from < 1 [MMTPY] to ~10 [MMTPY] in 2030."[42] The Hydrogen Liftoff Report also identifies solutions to accelerate market uptake, including "invest[ment] in the development of hydrogen distribution and storage infrastructure."[43] When discussing the role that hydrogen can play in replacing natural gas in the electric sector, the Hydrogen Liftoff Report explains that "[o]pen access for pipeline transport and storage of hydrogen ***is the key trigger*** to enable low-cost hydrogen energy storage for long duration and for resilience events."[44]

DOE has already launched other programs to facilitate the development of the H2Hubs. DOE's H2 Matchmaker connects hydrogen suppliers and users by identifying collaborations and opportunities to expand development,[45] while DOE's $1 billion hydrogen demand-side initiative[46] seeks to enable market stability for both producers and end users in the H2Hubs

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41 DOE, *Pathways to Commercial Liftoff: Clean Hydrogen* (March 2023) at 1, *available at:* https://liftoff.energy.gov/wp-content/uploads/2023/03/20230320-Liftoff-Clean-H2-vPUB.pdf.

42 *Id.*

43 *Id.* at 5.

44 *Id.* at 51 (emphasis added); see also *id*. at 15 (noting that "[d]edicated hydrogen pipeline transport" has "[t]he lowest levelized cost at high volumes (50+ [tons per day]) and long distances due to low opex costs"); *id.* at 16 ("[d]edicated hydrogen pipelines can move large volumes over long distances to achieve economies of scale"). In the webinar dedicated to the launch of the Hydrogen Liftoff Report, the DOE stated: "We also know that for the clean hydrogen economy to reach its full potential, we need open access infrastructure." *See*, YouTube – DOE Channel, *Pathways to Commercial Liftoff: Fireside Chat and Clean Hydrogen Deep-Dive* (March 23, 2023) at 34:00, *available at:* https://youtu.be/3i7qZfJ5G9Q.

45 DOE – Office of Energy Efficiency and Renewable Energy (EERE), *H2 Matchmaker*, *available at*: https://www.energy.gov/eere/fuelcells/h2-matchmaker. *See also*, DOE - Office of Clean Energy Demonstrations (OCED), *Regional Clean Hydrogen Hubs, available at:* https://www.energy.gov/oced/regional-clean-hydrogen-hubs-0.

46 DOE, B*iden-Harris Administration to Jumpstart Clean Hydrogen Economy with New Initiative to Provide Market Certainty and Unlock Private Investment* (July 5, 2023), *available at*:

during the early years of production to realize the full potential of clean hydrogen on a national scale.[47]

To additionally support H2Hub growth, and as required by Section 13204 of the Inflation Reduction Act of 2022 (IRA), in December 2023 the Treasury Department and the Internal Revenue Service proposed rules for claiming the 45V Clean Hydrogen Production Tax Credit.[48] The 45V tax credit, which provides up to $3 per kilogram of hydrogen produced by projects with low lifecycle greenhouse gas emissions (GHGs), is a critical supply-side incentive for hydrogen adoption.[49] It "stands to be the most consequential policy supporting the deployment of clean hydrogen in U.S. history" and "provides much-needed certainty to existing and aspiring hydrogen producers."[50]

In November 2024, the United States re-affirmed its commitment to hydrogen by endorsing the Hydrogen Pledge of the United Nations 29th Conference of Parties (COP) to the United Nations Convention on Climate Change, which brings together world leaders to negotiate and agree on actions to tackle climate change, limit GHG emissions, and halt global warming. COP outcomes are important because climate agreements reached at the summit can signal

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https://www.energy.gov/articles/biden-harris-administration-jumpstart-clean-hydrogen-economy-new-initiative-provide-market.

47 DOE – OCED, *Regional Clean Hydrogen Hubs Selections for Award Negotiations*, *available at:* https://www.energy.gov/oced/regional-clean-hydrogen-hubs-selections-award-negotiations.

48 The White House, *Treasury Sets Out Proposed Rules for Transformative Clean Hydrogen Incentives* (December 22, 2023), *available at:* https://www.whitehouse.gov/cleanenergy/clean-energy-updates/2023/12/22/treasury-sets-out-proposed-rules-for-transformative-clean-hydrogen-incentives/.

49 DOE, *Assessing Lifecycle Greenhouse Gas Emissions Associated with Electricity Use for the Section 45V Clean Hydrogen Production Tax Credit* (December 2023) at 1, *available at:* https://www.energy.gov/sites/default/files/2023-12/Assessing_Lifecycle_Greenhouse_Gas_Emissions_Associated_with_Electricity_Use_for_the_Section_45V_Clean_Hydrogen_Production_Tax_Credit.pdf.

50 The White House, *Treasury Sets Out Proposed Rules for Transformative Clean Hydrogen Incentives* (December 22, 2023), *available at:* https://www.whitehouse.gov/cleanenergy/clean-energy-updates/2023/12/22/treasury-sets-out-proposed-rules-for-transformative-clean-hydrogen-incentives/.

forthcoming national and state-level policies. The Hydrogen Pledge endorses aim to scale up clean hydrogen and achieve near-zero greenhouse gas emissions from hydrogen production, with a focus on end-use sectors that are difficult to decarbonize. The pledge also underscores the importance of ensuring that hydrogen systems are maximally beneficial to the climate, including by minimizing hydrogen losses across the value chain.[51]

3. *There Are Local and Regional Efforts to Promote a Clean Hydrogen Economy*

Local jurisdictions in and around the Los Angeles Basin are actively laying the groundwork for a clean hydrogen economy, complementing the state and federal initiatives discussed above. For example, the City of Lancaster in Los Angeles County has announced its intent to become the nation's first "Hydrogen City."[52] Lancaster is developing a comprehensive plan to integrate clean hydrogen into its energy, transportation, and municipal infrastructure, including by participating in ARCHES.[53] It recently created a new branch—Lancaster Energy—dedicated to sustainable energy solutions with a focus on building a hydrogen economy.[54]

The City of Los Angeles and the Los Angeles Department of Water and Power (LADWP) are embracing clean hydrogen's role in the transition to a decarbonized power generation sector. LADWP's proposed use of hydrogen for power generation aims to leverage the versatility of

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[51] U.S. Department of State – Bureau of Oceans and International Environmental and Scientific Affairs, *COP 29: U.S.-Endorsed Action Agenda Declarations* (November 22, 2024), *available at:* https://www.state.gov/cop-29-u-s-endorsed-action-agenda-declarations/.

[52] Antelope Valley Times, *Lancaster Becomes First Hydrogen City in the Nation* (November 10, 2020), *available at:* https://theavtimes.com/2020/11/10/lancaster-becomes-first-hydrogen-city-in-the-nation/.

[53] PR Newswire, *The City of Lancaster Celebrates ARCHES Designation as Regional Hydrogen Hub* (October 23, 2023), *available at:* https://www.prnewswire.com/news-releases/the-city-of-lancaster-celebrates-arches-designation-as-regional-hydrogen-hub-301963803.html.

[54] City of Lancaster, *City of Lancaster Announces Leadership Transition and New Sustainable Energy Initiative* (July 9, 2024), *available at:* https://www.cityoflancasterca.org/Home/Components/News/News/10192/.

clean hydrogen as a clean energy carrier.[55] Los Angeles County, with its ambitious Climate Action Plan, has also recognized the potential of clean hydrogen in reducing greenhouse gas emissions.[56] The plan includes strategies to incorporate clean hydrogen as a key component of the county's transportation ecosystem, promoting the adoption of hydrogen fuel cell vehicles and the development of the necessary refueling infrastructure. These local efforts are instrumental in building a robust clean hydrogen economy in the Los Angeles Basin. Angeles Link has the potential to unlock and accelerate these efforts to help meet their energy and climate goals more quickly and affordably.

The Ports of Los Angeles and Long Beach, two of the largest and busiest ports in the United States, are also at the forefront of advancing a clean hydrogen economy. Recognizing the critical role they play in regional and national logistics, both ports have initiated projects to integrate hydrogen into their operations as part of their broader sustainability goals. These efforts include pilot programs for hydrogen-powered drayage trucks and equipment, aimed at reducing emissions from port activities.[57] The ports are collaborating with industry partners and government agencies, including as partners in ARCHES, to develop the necessary infrastructure

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[55] LADWP, *Scattergood Generating Station Units 1 and 2 Green Hydrogen-Ready Modernization Project*, *available at*: https://www.ladwp.com/community/construction-projects/west-la/scattergood-generating-station-units-1-and-2-green-hydrogen-ready-modernization-project.

[56] Los Angeles County Planning, *2045 Climate Action Plan* (June 2024) at 3-36 – 3-38, *available at:* https://planning.lacounty.gov/wp-content/uploads/2024/02/2045-CAP_Board-Letter-Attachments-3.pdf.

[57] *See,* e.g., Heavy Duty Trucking (HDT) – Trucking Info, *FCEV Drayage Trucks Prove Themselves in LA Port Demonstration Project* (September 22, 2022), *available at*: https://www.truckinginfo.com/10181655/fcev-drayage-trucks-prove-themselves-in-la-port-demonstration-project.

for hydrogen fueling and storage, enabling hydrogen to be a viable alternative to traditional fuels.[58]

B. Pipelines Are Needed to Facilitate the Hydrogen Economy's Lift-Off

As the Commission and state and federal agencies continue to acknowledge, there is no doubt about hydrogen's great promise to decarbonize large sectors of the economy.[59] As production and demand-side incentives help the hydrogen economy flourish, pipeline infrastructure that can transport clean renewable hydrogen at scale will be needed—particularly, an open-access pipeline network dedicated to public use. The DOE identifies "hydrogen pipelines [as] the lowest cost-alternative for delivering large volumes of gaseous hydrogen over long distances."[60] In its Final 2023 IEPR, the CEC comments that, "[f]or applications that require large volumes of clean and renewable hydrogen such as use in electric power plants,

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[58] The Port of Los Angeles, *Hydrogen Era Dawns at San Pedro Bay Ports Complex* (October 13, 2023), *available at*: https://www.portoflosangeles.org/references/2023-news-releases/news_101323_hydogen_hub.

[59] *See, e.g.*, CPUC, *CPUC Acts to Advance Understanding of Hydrogen's Role as Decarbonization Strategy* (December 15, 2022), *available at:* https://webproda.cpuc.ca.gov/news-and-updates/all-news/cpuc-acts-to-advance-understanding-of-hydrogen-role-as-decarbonization-strategy ("Clean renewable hydrogen holds promise as a potential solution to decarbonize California's energy future and bring economic opportunities and new jobs to the Los Angeles region. Clean renewable hydrogen will likely be needed to decarbonize hard-to-electrify industries such cement, chemicals, and shipping, as well as to potentially replace fossil gas fired generation, including power plants supplied by the Aliso Canyon Natural Gas Storage Facility."). In addition, the Joint Agency Staff White Paper authored by Commission, CEC, and CARB staff and issued in the Long-Term Gas Planning OIR noted that hydrogen has garnered attention and funding as a promising alternative to natural gas and that using hydrogen to support California's clean energy future requires the use of clean renewable hydrogen production processes. Emergent hydrogen applications identified in the White Paper include the power sector, pipeline blending, industrial use, and transportation. *See* R.20-01-007, Assigned Commissioner's Ruling Scheduling Phase 2 Prehearing Conference and Providing Joint Agency Staff Gas Transition White Paper and Draft Phase 3 Scope and Schedule for Party Comment at Attachment A; R.24-09-012, Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Long-Term Gas System Planning, at Attachment A.

[60] DOE – Office of Energy Efficiency and Renewable Energy, *Alternative Fuels Data Center: Hydrogen Production and Distribution*, *available at:* https://afdc.energy.gov/fuels/hydrogen_production.html.

delivery by pipeline may be the most feasible delivery pathway."[61] The DOE additionally recognizes that, "for production and distribution networks, pipelines are the economic solution at large volumes, and will be needed when off-take scales beyond co-located production."[62] However, "the near-term limited availability of midstream infrastructure is a constraint for scaling clean hydrogen where co-located production and offtake is not feasible."[63] As Governor Newsom has emphasized, "[t]he only way to achieve California's world-leading climate goals is to build, build, build – faster."[64] Accordingly, authorizing a revenue requirement to provide the resources necessary for SoCalGas to undertake Phase 2 activities for Angeles Link promptly—particularly in light of the long lead times for permitting and constructing new energy projects in California—is a crucial next step to help California achieve its climate goals and position the State as a leader in the growing clean renewable hydrogen economy.

In addition, a recent study conducted at the request of the Secretary of the U.S. Department of Energy and in collaboration with the National Petroleum Council (NPC)[65] concluded that hydrogen can play a key role in reducing U.S. carbon emissions, particularly in

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61 CEC, *2023 Integrated Energy Policy Report* (February 2024) at 69, *available at*: https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2023-integrated-energy-policy-report.

62 DOE, *Pathways to Commercial Liftoff: Clean Hydrogen* (March 2023) at 12, *available at:* https://liftoff.energy.gov/wp-content/uploads/2023/05/20230321-H2-Pathways-to-Commercial-Liftoff-Webinar-vF_web.pdf.

63 *Id.* at 14.

64 State of California – Office of Governor Gavin Newsom, *Governor Newsome Unveils New Proposals to Build California's Clean Future, Faster* (May 19, 2023), *available at:* https://www.gov.ca.gov/2023/05/19/governor-newsom-unveils-new-proposals-to-build-californias-clean-future-faster/.

65 National Petroleum Council, *Harnessing Hydrogen – A Key Element of the U.S. Energy Future* (April 23, 2024), *available at:* https://harnessinghydrogen.npc.org/files/H2-Preface-Executive_Summary-2024-04-23.pdf.

the hard-to-electrify sectors,[66] at lower cost to society than alternative abatement methods. The study found that low-carbon intensity hydrogen, such as clean renewable hydrogen, could abate about 8% of the nation's carbon emissions by 2050 if scaled. Further, achieving net zero will require multiple technologies, including low-carbon intensity hydrogen, potentially costing up to 3% of gross domestic product (GDP) annually. Without low carbon intensity hydrogen, the cost could increase by 0.5 – 1% of GDP. The study also underscores the growth of renewable electrolytic hydrogen due to lower carbon emissions and higher future carbon costs. More specifically, the modeling indicated that low-carbon intensity hydrogen could start in regions with abundant renewable resources, existing anchoring demand, access to infrastructure, and/or supportive policies.[67] The study concluded that "[h]igh-capacity pipelines delivering large volumes of hydrogen currently offer the cheapest way to move hydrogen over longer distances and the potential to connect geographically separated supply and demand centers."[68] This conclusion demonstrates how access to hydrogen infrastructure in California could be a key link to scaling up clean renewable hydrogen.

C. ARCHES and the California Hydrogen Hub

In December 2022, the Phase 1 Decision recognized that Angeles Link "could help position California to receive federal funding provided through the IIJA," and directed SoCalGas to "join other entities that are members of [ARCHES] in support of the State of California's

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66 For this study, hard-to-abate applications include those in the Industrial, Transportation, and Power sectors.

67 National Petroleum Council, *Harnessing Hydrogen – A Key Element of the U.S. Energy Future (Report Study)* (April 23, 2024) at 24 (Section II. The Critical Role Of Hydrogen), *available at:* https://harnessinghydrogen.npc.org/files/H2-Preface-Executive_Summary-2024-04-23.pdf.

68 National Petroleum Council, *Harnessing Hydrogen – A Key Element of the U.S. Energy Future –* (*Chapter 3: LCI Hydrogen—Connecting Infrastructure)* at 8, *available at:* https://harnessinghydrogen.npc.org/files/H2-CH_3-Connecting_Infra-2024-04-23.pdf.

application for the federal funding provided through the IIJA."[69] SoCalGas did so, and Angeles Link is an integral part of the California Hydrogen Hub.

ARCHES was formed to advance the State's vision for a clean hydrogen hub while prioritizing California's values of environmental justice, equity, economic leadership, and workforce development.[70] With the support of its partners, including SoCalGas, ARCHES prepared and submitted an application for federal funding for the California Hydrogen Hub in April 2023. The California Hydrogen Hub consists of a network of clean hydrogen producers and consumers, as well as connective transportation infrastructure such as Angeles Link.[71]

In its application, ARCHES identified obstacles California had faced in launching a hydrogen economy and how the California Hydrogen Hub could change that. "DOE-funded deployment projects in ARCHES will become anchor projects to lead and guide the full decarbonization of fossil fuel-based sectors by 2045 in California. These projects provide risk reduction for all stakeholders of hydrogen industry-wide deployments by demonstrating technical, economical and societal benefits, and proof of feasibility, and thus legitimize and

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[69] Phase 1 Decision at 33. The federal funding referenced was to DOE's September 2022 Funding Opportunity Announcement DE-FOA-0002779 (FOA) to solicit applications for six to ten regional H2Hubs to receive federal funding from the 2021 IIJA.

[70] *See,* ARCHES H2, *About ARCHES H2, available at:* https://archesh2.org/about/.

[71] ARCHES H2, *Meet ARCHES Fact Sheet*, *available at:* https://archesh2.org/wp-content/uploads/2023/10/Meet-Arches_October-2023.pdf. ARCHES is anticipated to develop major deployment clusters, including around Los Angeles and into the Central Valley and Inland Empire. (*Id.* at 2.) ARCHES has estimated that the California region will result in a total hydrogen capacity of at least 17 million metric tons per year by 2045, with substantial reductions in GHG and pollutant emissions. For the presentation for annual merit review and peer evaluation meeting, *see* DOE – Hydrogen Program*, Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) Presentation* (May 9, 2024) at 9, *available at*: https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/review24/oced001_galiteva_2024_o.pdf?sfvrsn=f835161f_3.

incentivize hydrogen use across multiple sectors."[72] ARCHES's approach follows a well-established practice of how early policy interventions and investments can create markets where new technologies come into service, setting the stage for exponential growth of the hydrogen system as more producers and end users come on line and spur a positive feedback loop of bringing down costs and therefore increasing production and demand. As described in the Testimony of Josh Schellenberg,[73] through the phenomena of network effects, the value of the hydrogen hub increases with the number and scale of connections on the supply and demand side. Open-access, connective pipeline infrastructure like Angeles Link could be expected to facilitate this transformation.

On October 13, 2023, DOE selected the California Hydrogen Hub to be awarded up to $1.2 billion in federal funding.[74] In announcing its selection, DOE noted that "[t]he California Hydrogen Hub will leverage the state's leadership in clean energy technology to produce

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[72] ARCHES H2, *ARCHES Technical Submission to DOE – April 2023* at 36, *available at*: https://archesh2.org/wp-content/uploads/2024/08/ARCHES-Technical-Volume-Redacted.pdf; *see also, id*. (discussing ARCHES' intent to use DOE funds to provide market certainty for hydrogen supplies and equipment manufacturers and "mitigate the risk of 'pre-investing' in large-capacity hydrogen production and the associated infrastructure to catalyze the development of end use hydrogen consumer technologies").

[73] Testimony of Josh Schellenberg at JS-26 to JS-28.

[74] Seventy-nine applicants submitted concept papers to DOE for potential hydrogen hubs and DOE issued notices of encouragement to 33 of those projects. At least 20 potential hubs submitted full applications to DOE and ultimately ARCHES was one of the 7 selected in this highly competitive solicitation. The DOE identified the following key areas of focus in its selection process: Technical Merit and Impact, including the ability of the proposed hub to deploy infrastructure and produce at least 50-100 metric tons of clean hydrogen per day and reduce greenhouse gas emissions; Financial and Market Viability, including growth potential and market competitiveness of the proposed hub; Workplan, including the speed at which the hub could begin operations and overall project management details; Management Team and Project Partners, including the team's ability to execute the plan with a high level of success; and Community Benefits Plan, including an assessment of community and labor engagement, quality job creation and workforce development, diversity equity inclusion and accessibility, and the Justice40 initiative. *See* DOE – OCED, *Regional Clean Hydrogen Hubs Selection for Award Negotiations*, *available at:* https://www.energy.gov/oced/regional-clean-hydrogen-hubs-selections-award-negotiations.

hydrogen exclusively from renewable energy and biomass" and "will provide a blueprint for decarbonizing public transportation, heavy duty trucking, and port operations—key emissions drivers in the state and sources of air pollution that are among the hardest to decarbonize."[75] The significance of DOE's selection of the California Hydrogen Hub to receive federal funding to jumpstart California's hydrogen economy cannot be overstated. DOE's selection, after a rigorous merit review process, conveys its confidence in the viability of the California Hydrogen Hub's key elements to move toward a hydrogen economy.

Following negotiations, ARCHES and DOE signed a Cooperative Agreement for the California Hydrogen Hub to receive up to $1.2 billion in federal funding. The State's commitment to clean renewable hydrogen coupled with the California Hydrogen Hub's selection to receive federal funds portends an important ramp-up for California's hydrogen economy. As Senator Alex Padilla stated, "The path to achieving California's ambitious clean energy goals runs through ARCHES, and I'm excited to see the California Hydrogen Hub kickoff with this initial round of funding. California is leading the nation with the first hydrogen hub to sign a cooperative agreement, and we will continue to lead by decarbonizing goods movement, the energy sector, and heavy industry."[76]

To support the success of the California Hydrogen Hub, to date ARCHES has focused on two core efforts: 1) securing DOE funding and 2) gathering market insights to advance a shared understanding of the hydrogen market and overall ecosystem.[77] With funding secured,[78]

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[75] *Id.*

[76] ARCHES H2, *California's renewable hydrogen hub officially launches* (July 17, 2024), *available at*: https://archesh2.org/arches-officially-launches/.

[77] ARCHES H2, *White Paper Overview* (August 2024) at 3, *available at*: https://archesh2.org/wp-content/uploads/2024/08/ARCHES-White-Papers-Overview-8.8.24.pdf.

[78] Funding remains contingent upon ARCHES satisfying certain Go/No-Go criteria, as discussed *infra*.

ARCHES has formed working groups that are gathering sector insights and releasing white papers to provide a strong foundation for the State's forthcoming Hydrogen Market Development Strategy. SoCalGas has provided contributions to these efforts and expects to continue to do so. For example, ARCHES has indicated it intends to develop white papers on codes and standards and workforce development.[79] Based on SoCalGas's Phase 1 work, and the proposed Phase 2 activities, SoCalGas is and will be well-positioned to provide valuable feedback for the benefit of ARCHES members and the overall hydrogen economy. ARCHES' leadership plays a critical role in the clean renewable hydrogen value chain by facilitating cooperation among a range of stakeholders and promoting consistent development and uniform progress. Insights from the State's pursuit of federal funds reveal "over $50 billion worth of proposed clean, renewable hydrogen projects in California—solely based on what was submitted to ARCHES [in 2022]. While this interest is significant, more opportunities exist, especially if California fosters an environment where clean, renewable hydrogen projects become part of a larger 'eco-system' that creates tens of thousands of family-supporting jobs building, operating, and maintaining this system."[80]

D. Angeles Link Is An Integral Part of the California Hydrogen Hub

Open-access pipeline transportation systems will be the most efficient, reliable, and affordable solution to deliver large volumes of clean renewable hydrogen. Accordingly, Angeles Link is an integral part of the California Hydrogen Hub, composing 76.4% of the pipeline proposed in ARCHES' application for federal funding. In the near term, Angeles Link will

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79 *Id.*

80 GO-Biz, *California Hydrogen Market Development Strategy Framing Document* (December 2023), *available at:* https://business.ca.gov/wp-content/uploads/2023/12/H2-Strategy-Framing-Doc-12-26-23.pdf.

provide a foundation for California's hydrogen economy, connecting producers and end users within the hub. In the longer term, Angeles Link will help meet 2045 demand projections by transporting clean renewable hydrogen at scale to help achieve California's decarbonization goals, promote affordability, and help to expand the California Hydrogen Hub as hydrogen is adopted more widely. ARCHES' near-term vision is depicted below.

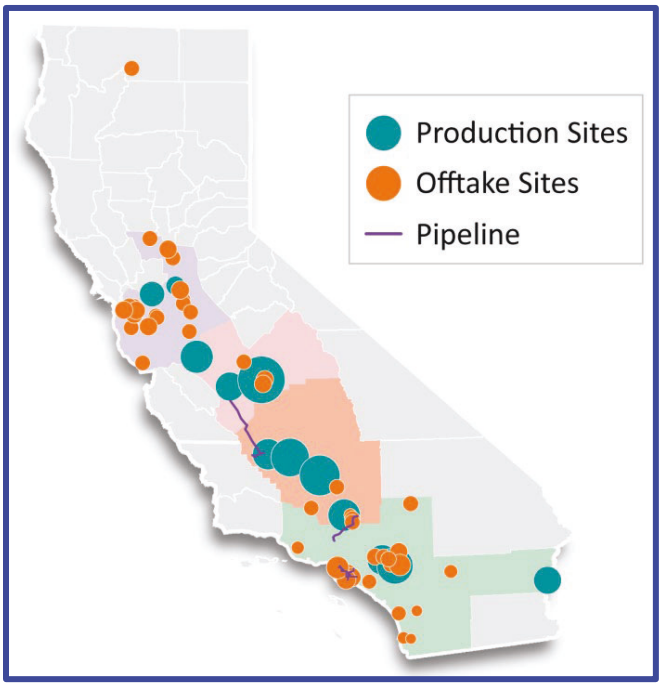

Figure 1. Primary California Hydrogen Hub Deployment Site Map (as of May 2024)[81]

ARCHES' plans for the California Hydrogen Hub extend well beyond co-located facilities and include significant hydrogen production and transportation outside of the Los Angeles Basin. Two segments of Angeles Link are envisioned to be operational by the end of 2033 to help launch the California Hydrogen Hub and provide necessary connections between producers and end users. One segment is an approximately 80-mile pipeline that currently is

[81] DOE – *Hydrogen Program, Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) Presentation* (May 9, 2024) at 9, *available at*: https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/review24/oced001_galiteva_2024_o.pdf?sfvrsn=f835161f_3.

envisioned to follow existing SoCalGas lines in the Central Valley. The other segment would run approximately 46 miles from Lancaster to the Los Angeles Basin, providing transport of hydrogen from producers in the Lancaster area directly to Los Angeles, across a mountain range and the Newhall Pass, where it would be difficult to transport hydrogen by truck. These two segments would allow safe and efficient movement of hydrogen from producers to end users and facilitate the growth of a clean renewable hydrogen economy in the region.

Based on ARCHES' timing goals to launch the California Hydrogen Hub by the end of 2033, SoCalGas expects that Angeles Link will be constructed in stages to support alignment with ARCHES' timing expectations, with the broader Angeles Link system connecting both initial segments and holistically providing pipeline infrastructure for delivering clean renewable hydrogen in Central and Southern California, including in the Los Angeles Basin and the international Ports of Los Angeles and Long Beach.[82] Considering the estimated projections of demand for clean renewable hydrogen in SoCalGas's service territory by 2045 in the Phase 1 Demand Study (discussed *infra*) of 1.9 to 5.9 MMTPY and other longer-term demand projections, Angeles Link is currently envisioned to support annual throughput of approximately 0.5 to 1.5 MMTPY over time and extend across approximately 450 miles, have pipeline diameters up to 36 inches, and operate at pressures ranging from approximately 200 to 1,200 pounds per square inch gauge (psig).[83] This would serve a portion of the demand estimated for SoCalGas's service territory. A conceptual map showing a potential directional route for Angeles Link is shown below. These concepts reflect initial potential directional routing only; potential routes will be further evaluated in Phase 2 to select and advance a preferred system route.

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[82] Testimony of Neil Navin at NN-2.

[83] *Id.* at NN-5.

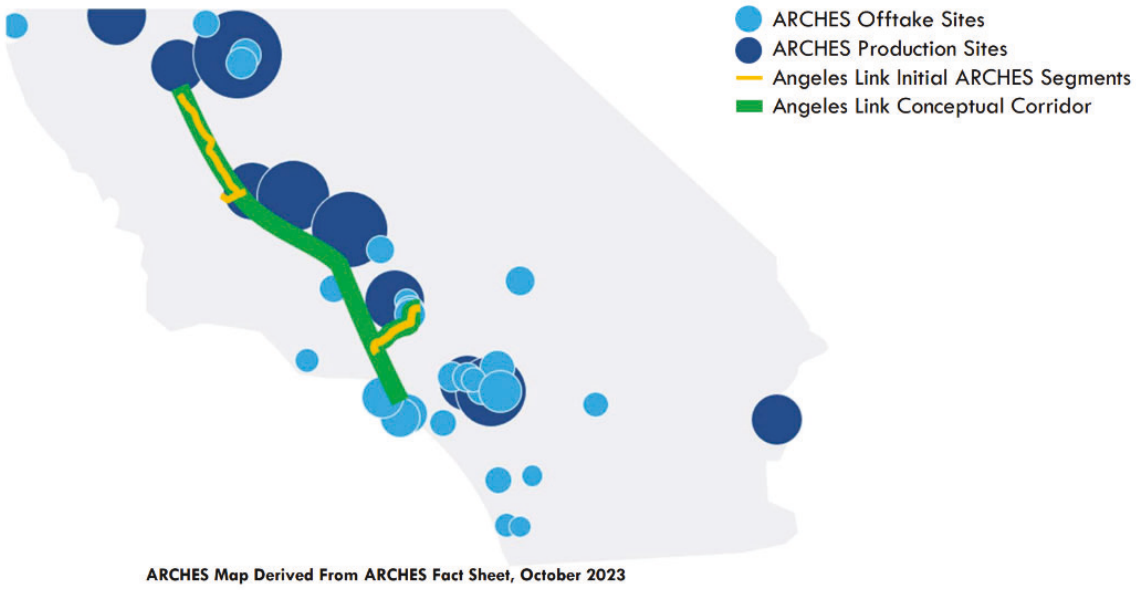

Figure 2. Conceptual Map of Angeles Link

ARCHES has designated SoCalGas a network partner for purposes of the California Hydrogen Hub.[84] SoCalGas is not accepting federal funding from the IIJA because the costs of complying with federal standards for receipt of such funds would far exceed the amount offered and thus would not be in ratepayers' best interests. Nevertheless, Angeles Link remains an integral part the California Hydrogen Hub, and it is needed both to support the California Hydrogen Hub in the near term and to lay the foundation for California's hydrogen economy and meet longer-term demand through 2045 to help achieve the State's decarbonization goals and deliver the public interest benefits described herein.

ARCHES submitted a Community Benefits Plan as part of its DOE funding application, which outlines ARCHES' strategy to ensure federal investments advance community and labor engagement, workforce investment, diversity, equity, inclusion, accessibility, and contributions to

[84] *See* ARCHES H2, *Networking – Key Founding Members and Partners, available at:* https://archesh2.org/network/.

the Federal Justice40 Initiative. Although SoCalGas is not bound by these requirements because it is not accepting federal funding from the IIJA, SoCalGas remains committed to extending its best efforts to support these goals. SoCalGas also supports implementing community benefits. If SoCalGas files a future application for a CPCN for Angeles Link, SoCalGas would also seek Commission authorization to allocate funds for community benefits to be identified at that time.

III. THE PHASE 1 STUDIES, CONDUCTED WITH STAKEHOLDER ENGAGEMENT, DEMONSTRATE ANGELES LINK IS TECHNICALLY FEASIBLE, VIABLE, COST EFFECTIVE, AND COULD OFFER PUBLIC INTEREST BENEFITS

A. The Findings of the Phase 1 Studies Support Advancing to Phase 2

The Phase 1 Decision recognized the potential public interest benefits that Angeles Link could bring to the State and especially the Los Angeles area and authorized SoCalGas to record costs associated with the feasibility studies.[85] The primary objective of these studies was to evaluate the feasibility of Angeles Link and inform more detailed analyses in future phases of developing Angeles Link. SoCalGas conducted 16 studies and assessed topics ranging from safety, production and demand, cost-effectiveness, workforce development, avoided GHG and air contaminant emissions, potential leakage, pipeline sizing, route design and configurations, and project alternatives, consistent with the Commission's directives in Ordering Paragraph 6 of the Phase 1 Decision. [86] The studies collectively confirm Angeles Link's viability and cost-effectiveness, technical feasibility, and the potential for public interest benefits.

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[85] Phase 1 Decision at 16.

[86] *Id.* at 75-77 (Ordering Paragraph (OP) 6). Appendix B hereto, Phase 1 Decision Compliance Matrix, details the requirements of Ordering Paragraph 6 and summarizes how SoCalGas has complied with each of the requirements. A full list of the Phase 1 studies is provided in the Consolidated Report attached to the Testimony of Neil Navin as NN-Attachment A.

In addition to the Phase 1 studies, the Phase 1 Decision required SoCalGas to (1) join and support ARCHES in its application for federal funding for the California Hydrogen Hub;[87] (2) conduct quarterly stakeholder engagement meetings and share data with stakeholders;[88] (3) submit quarterly reports to the Commission to provide updates on Angeles Link and the Phase 1 studies and report on any preliminary findings and results;[89] and (4) provide findings on (i) compliance with California law and policies, (ii) consistency with other Commission decisions, policies, and directives, (iii) plans to ensure hydrogen gas meets the clean renewable hydrogen standards set in the Phase 1 Decision, (iv) address and mitigate affordability concerns, and (v) address and mitigate impacts to disadvantaged communities and other environmental justice impacts.[90]

As detailed in the Testimony of Neil Navin, to fulfill the Phase 1 Decision's directives,[91] SoCalGas commissioned studies which consider affordability concerns, as appropriate, for the Phase 1 feasibility stage, impacts on disadvantaged communities, consistency with California law and public policies, and stakeholder feedback, as appropriate.[92] In accordance with Ordering Paragraphs 6(n) and 6(o), the Phase 1 studies consider compliance with California environmental laws and public policies along with consistency with other Commission decisions, policies, and directives, including the Order Instituting Rulemaking R.20-01-007, Long-Term Gas Planning

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87 *Id*. at 74 (OP 3(d)), 77 (OP 6(p)).

88 *Id*. at 76-78 (OP 6(m), 7, 8).

89 *Id*. at 74-75 (OP 3(h)), 77-78 (OP 7-8).

90 *Id.* at 76-77 (OP 6(j)-(o)).

91 Compliance with each of the Phase 1 Decision's directives is detailed in the Phase 1 Decision Compliance Matrix appended hereto as Appendix B.

92 *Id.* at 75-77 (OP 6). For example, SoCalGas developed an Environmental and Social Justice (ESJ) Community Engagement Plan (ESJ Plan) and a Framework for Affordability Considerations (Affordability Framework), with stakeholder feedback, to comply with the Phase 1 Decision.

Order Instituting Rulemaking (Long-Term Gas Planning OIR) and R.13-02-008, Biomethane Standards and Requirements and Pipeline Open Access Rules Order Instituting Rulemaking. Multiple studies demonstrate how Angeles Link will comply with and further California's environmental laws, directives, and policies, including those of the Commission. For example, the Environmental & ESJ Analysis evaluates potential environmental impacts of possible pipeline routes and configurations and finds that Angeles Link can be constructed and operated in accordance with environmental laws and public policies. It further concludes that Angeles Link is being undertaken in furtherance of the State's climate goals, as outlined in Assembly Bill (AB) 32 Climate Change Scoping Plan to "scal[e] up new options such as renewable hydrogen for hard-to-electrify end uses and biomethane where needed"[93] and Governor's Executive Order to develop California's Hydrogen Market Development Strategy.[94] The High-Level Feasibility Assessment & Permitting Analysis (Permitting Analysis) analyzed the potential regulatory and permitting requirements under California environmental laws, including potentially required authorizations from various state agencies. The GHG Emissions Evaluation (GHG Study) conducted an initial evaluation of overall GHG benefits associated with Angeles Link to demonstrate how clean renewable hydrogen could support environmental laws and public policies.

Furthermore, the ESJ Plan was developed with the Commission's Environmental and Social Justice Action Plan goals in mind. The Production Planning & Assessment (Production Study) evaluates clean renewable hydrogen production potential and uses the definition of clean

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93 CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (November 16, 2022) at 2, *available at:* https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp-es.pdf.

94 State of California – Office of Governor Gavin Newsom, *Executive Order N-79-20* (September 23, 2020), *available at:* https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf.

renewable hydrogen that is consistent with other CPUC decisions, policies, and directives, including the Long-Term Gas OIR and the Biomethane OIR. As stated in the recent Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Perform Long-Term Gas System Planning, R.24-09-012, the successor proceeding to the Long-Term Gas Planning OIR, "the primary purpose of gas transition planning is to facilitate decarbonization activities over time in a way that supports equity, safety and affordability, and mitigates reliability challenges, commodity price spikes and other potential adverse outcomes."[95] The High-Level Economic Analysis and Cost Effectiveness study (Cost Effectiveness Study) helps further this goal by comparing Angeles Link with other decarbonization methods, such as other hydrogen delivery alternatives, electrification, and carbon capture and sequestration (CCS).

Through the Phase 1 stakeholder engagement process, described below and in the Testimony of Neil Navin, stakeholders had multiple forums for providing feedback that was addressed by SoCalGas and incorporated into the studies as appropriate. As required by the Phase 1 Decision, SoCalGas provided quarterly reports to the Commission and stakeholders to provide updates on the progress of the Phase 1 studies.[96] In compliance with the Phase 1 Decision, SoCalGas made reports of the results and data of the Phase 1 studies available to the

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[95] R.24-09-012, Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Safe and Reliable Gas Systems in California and Long-Term Gas System Planning (October 4, 2024) at 2, *available at*: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M542/K029/542029029.PDF.

[96] *See* Phase 1 Decision at 49. Copies of the quarterly reports are posted on SoCalGas's website. *See* SoCalGas, *Angeles Link: Quarterly Reports*, *available at:* https://www.socalgas.com/sustainability/hydrogen/angeles-link. The quarterly reports provided status updates on the 16 studies, identify and respond to stakeholder feedback received, and attach materials presented at PAG and CBOSG meetings.

public.[97] The full studies, including the data analysis to support the studies, are publicly available on SoCalGas's website for the benefit of all SoCalGas ratepayers and others interested in entering and supporting California's burgeoning hydrogen economy as well as the general public and to help inform State and Commission action.[98] The studies are specific to Angeles Link but provide a comprehensive complement to a growing body of work regarding the role that clean renewable hydrogen can play in California's clean energy future. The Angeles Link Phase 1 Studies Consolidated Report (Consolidated Report) distills the key findings of the Phase 1 studies and concisely describes what they collectively convey about Angeles Link.[99]

The breadth of topics analyzed in Phase 1 was wide, and many of the studies are highly technical and voluminous. Accordingly, in addition to providing the Consolidated Report, SoCalGas proposes to conduct a public workshop in this proceeding to review the studies and answer questions from intervenors and other interested persons.

1. *The Phase 1 Studies Demonstrate Angeles Link Is Viable and Cost Effective*

The Phase 1 Studies confirm that (1) there is sufficient potential market demand for clean renewable hydrogen in SoCalGas's service territory to warrant a hydrogen pipeline system to connect producers and end users;[100] (2) there is sufficient land for and potential sources of

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97 The Phase 1 Decision recognized that sharing this information "should be beneficial to the development of the clean renewable hydrogen industry and thus serve the public interest." (Phase 1 Decision at 62 (FOF 7).)

98 In order to make this information broadly accessible, the Phase 1 studies and Consolidated Report are made available consistent with the Information and Communication Technology (ICT) standards under Section 508 of the Rehabilitation Act. *See* U.S. Access Board, *Information and Communication Technology Revised 508 Standards and 255 Guidelines, available at:* https://www.access-board.gov/ict/.

99 The Consolidated Report is available on SoCalGas's website at https://www.socalgas.com/regulatory/angeleslink and is appended to the Testimony of Neil Navin as NN-Attachment A.

100 Consolidated Report at 6.

renewable energy, as well as water supplies to enable third-party production of clean renewable hydrogen and serve the projected demand over time;[101] and (3) pipeline transportation of hydrogen via Angeles Link could provide economies of scale that make clean renewable hydrogen a cost-effective decarbonization alternative for multiple categories of end users.[102]

With respect to potential market demand, the Demand Study evaluated potential clean renewable hydrogen demand across the mobility, power generation, and industrial sectors within SoCalGas's service territory through 2045. The study projects demand growth, ranging from 1.9 MMTPY in the conservative scenario to 5.9 MMTPY in the ambitious scenario.[103] Specifically, the power generation sector could require between 0.7 and 2.7 MMTPY, driven by regulations like Senate Bill 100, which mandates that 100% of all retail electricity sales come from carbon-free sources by 2045. The industrial sector's demand is projected to range from 0.2 to 1.5 MMTPY.[104] The mobility sector could require between 1.0 and 1.7 MMTPY, driven by heavy-duty vehicles due to the Advanced Clean Fleets regulation.[105] These projections estimate the potential market for clean renewable hydrogen in SoCalGas's service territory, a portion[106] of which could be served by Angeles Link.[107]

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101 *Id.*

102 *Id.*

103 *Id.*

104 *Id*.

105 *Id.*

106 Angeles Link's projected throughput range is approximately 0.5 – 1.5 MMTPY.

107 As a point of comparison, ARCHES has projected 2045 statewide demand in the amount of approximately 17 MMTPY. DOE – OCED, *California Regional H2Hub Community Briefing* (DOE California Hub Briefing) (October 25, 2023) at 26, *available at:* https://www.energy.gov/sites/default/files/2023-10/H2Hubs_California_Community_Briefing.pdf.

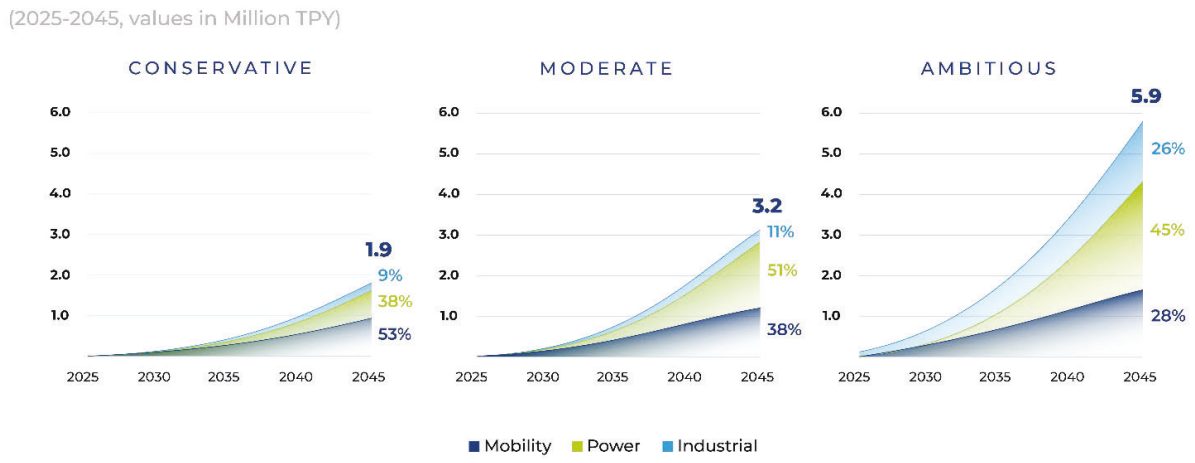

Figure 3. Clean Renewable Hydrogen Demand Forecast in SoCalGas's Service Territory, by Scenario[108]

With respect to third-party production to serve projected demand, the Production Planning & Assessment Study (Production Study) assessed potential sources of clean renewable hydrogen production from renewable sources such as solar and wind, and identified three primary production areas within SoCalGas's service territory that could, alone or in some combination, potentially produce clean renewable hydrogen to meet the projected 0.5 – 1.5 MMTPY Angeles Link throughput range: San Joaquin Valley, Lancaster, and Blythe.[109] The Production Study also found that various storage options, such as line pack (e.g., storage within the pipeline), construction of a parallel pipe in a portion or portions of the pipeline system (i.e., dual run), on-site storage at third-party clean renewable hydrogen production sites or end use locations, and/or dedicated aboveground or underground storage, could help to balance supply and demand.[110]

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[108] Consolidated Report at 7.

[109] *Id.*

[110] *Id.* at 7-8.

The Water Resources Evaluation assessed the availability of water resources necessary for clean renewable hydrogen production and found that the water required to meet the potential demand for clean renewable hydrogen production within SoCalGas's service territory represents a small fraction (0.02-0.10%) of California's annual water usage.[111] Multiple existing water supplies could be utilized, and new supplies could be developed if necessary. The evaluation also outlined potential water acquisition methods for third party producers to pursue to acquire water, such as through exchange agreements, local water agencies (e.g., purchasing available supply), and water markets (e.g., adjudicated groundwater rights), or through land purchases with water rights.

The Project Options and Alternatives Study (Alternatives Study) and High-Level Economics Analysis and Cost Effectiveness Study (Cost Effectiveness Study) fed into each other, along with information from the Environmental Analysis, to evaluate the relative suitability and cost-effectiveness of alternatives to Angeles Link, namely hydrogen delivery alternatives, e.g., trucking and a localized hub in the Los Angeles Basin,[112] and non-hydrogen alternatives, i.e., electrification and CCS. The Cost Effectiveness Study found that, among the hydrogen delivery alternatives, clean renewable hydrogen transported via Angeles Link is the most cost-effective means to deliver hydrogen into the Los Angeles Basin at scale.[113] The study

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111 *Id.* at 7

112 The Phase 1 Decision required SoCalGas to study the feasibility of a localized hub in the Los Angeles Basin as an alternative to Angeles Link. (Phase 1 Decision at 74 (OP 3(c)), 76 (OP 6(d)).) Accordingly, SoCalGas assessed a localized hub in both the Alternatives Study, Cost Effectiveness Study, and Environmental Study. Based on the Phase 1 assessments, due to the limitations to build dedicated renewable electricity resources within the Los Angeles Basin, clean renewable hydrogen production costs alone for the localized hub exceed the cost of other hydrogen delivery alternatives and are not scalable to meet projected future demand. (*See* Testimony of Neil Navin at NN-17 to NN-18.)

113 Consolidated Report at 8.

further found that, among non-hydrogen alternatives, Angeles Link was cost-effective for certain end uses when compared to electrification (including for long-haul transportation, retrofitted gas-fueled generation facilities, and certain industrial end uses) and CCS (including for the power and cogeneration sectors, and for mobility end uses, where CCS is not an option).[114] The Alternatives Study concluded that (i) pipeline delivery of hydrogen, as proposed by Angeles Link, is the most feasible, reliable, resilient, and cost-effective hydrogen delivery option at scale across Central and Southern California; and (ii) clean renewable hydrogen could be a viable alternative to other non-hydrogen decarbonization pathways, such as CCS and electrification.[115] The Alternatives Study also shows that, consistent with CARB's 2022 Scoping Plan, clean renewable hydrogen could work synergistically with electrification to support the State's decarbonization goals.[116]

2. *The Phase 1 Studies Establish Angeles Link Is Technically Feasible and Can Be Designed and Implemented to Minimize Impacts*

Angeles Link has been evaluated for its technical feasibility (e.g., whether it can be designed, constructed, and operated safely and reliably), with key findings from various studies confirming that a hydrogen pipeline delivery system connecting producers and end users in Central and Southern California is feasible. The studies also highlight that Angeles Link can be designed and implemented in a way that minimizes environmental and social impacts, with considerations for safety, reliability, and communities throughout its development and operation.[117]

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[114] *Id.* at 8-9.

[115] *Id.* at 9.

[116] *Id.* at 9-10.

[117] *Id.* at 10-11.

The Evaluation of Applicable Safety Requirements (Safety Evaluation) demonstrated that there are limited regulatory differences between hydrogen and natural gas pipeline transportation, and SoCalGas's expertise in natural gas pipeline construction, operation, and maintenance can be leveraged to safely design, construct, operate, and maintain a hydrogen pipeline system.[118] This includes utilizing and adapting existing safety regulations and industry standards to suit the specific properties and characteristics of hydrogen and developing new standards and practices specific to the transport of hydrogen. The evaluation also detailed how safety considerations can be incorporated into Angeles Link's design (including the determination of preliminary pipeline sizing, compression requirements, and pipeline material selection) and, subsequently, how construction and operating and maintenance requirements can be developed and implemented. Given the foundational nature of safety to Angeles Link, and in response to stakeholder feedback, SoCalGas requested a third-party review of the draft evaluation by the Hydrogen Safety Panel.[119] The Panel's recommendations were incorporated as appropriate into the final evaluation.

The Hydrogen Leakage Assessment evaluated potential hydrogen leakage associated with general hydrogen infrastructure (compression and transmission, as well as third-party production and third-party storage), and potential leakage associated specifically with Angeles Link

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[118] *Id.* at 11.

[119] The Center for Hydrogen Safety is a global non-profit organization dedicated to promoting hydrogen safety and best practices as an industry leader providing guidance, education, and collaboration to held realize the successful and transformative benefits of hydrogen. (*See* Center for Hydrogen Safety, *available at:* https://www.aiche.org/chs.) The Hydrogen Safety Panel, a part of the Center for Hydrogen Safety, was created to address concerns about hydrogen as a safe and sustainable energy carrier and its principal objective is to promote the safe operation, handling, and use of hydrogen and hydrogen systems. (*See* Center for Hydrogen Safety, *Hydrogen Safety Panel, available at:* https://www.aiche.org/chs/hydrogen-safety-panel; Hydrogen Tools, *Hydrogen Safety Panel, available at:* https://h2tools.org/hsp.)

infrastructure (i.e., transmission of hydrogen via pipeline, including compression). The assessment included a preliminary high-level volumetric estimate of the potential for leakage associated with general hydrogen infrastructure to be between 1,200 metric tons per year (MT/yr) and 13,800 MT/yr.[120] With respect to Angeles Link infrastructure, the assessment estimated the potential for associated leakage to be between 850 MT/yr and 4,065 MT/yr for the throughput scenarios. The study also highlighted mitigation measures in the design and engineering of new infrastructure, such as leak detection systems on compressors, leakage capture and return mechanisms, purge systems, and dry seals. The study identified specific leak detection and measurement methods with emerging tools and technologies. It found that operating and maintenance practices such as leak detection and repair programs using high-performance hydrogen gas sensors can further minimize leakage and, collectively with other mitigation measures, reduce potential leakage from Angeles Link by 90 percent from assumed leakage rates in the literature.

The Pipeline Sizing & Design Criteria (Design Study) evaluated the potential range of pipeline sizes, materials, pressures, and maintenance operations required to safely design, construct, and maintain Angeles Link. Multiple sizing options and both single and dual-run pipeline configurations were assessed to maintain functional flexibility to allow for fluctuating or growing demand. The system is expected to utilize pipelines with diameters ranging from 16 to 36 inches and, to maintain system efficiency and reliability at maximum throughput, two or three compressor stations may be required.[121] The study highlighted that, as Angeles Link is further designed and developed, and in alignment with the development of system requirements, the role

[120] Consolidated Report at 14.

[121] *Id.* at 11.

of storage to support regional hydrogen producers and end users over time should be considered.[122]

The Preliminary Routing/Configuration Analysis (Routing Analysis) identified several potential directional preferred routes for the system, considering various factors such as engineering requirements and environmental and social impacts. The study examined existing pipeline corridors, rights-of-way, franchise rights, and designated federal energy corridors, as well as the need for new rights-of-way. Based on current information, the analysis identified four potential directional route configurations and, in response to stakeholder feedback, identified a potential directional route variation that reduces traversing through disadvantaged communities (DACs).[123] When combined, these potential directional route configurations traversed a total of approximately 1,300 miles, providing a wide range of options within which to narrow down the preferred route for the Angeles Link system, which is anticipated to be approximately 450 miles.

[122] The role of storage will be further assessed in Phase 2. *See* Testimony of Amy Kitson at AK-5 to AK-6.

[123] Consolidated Report at 19. These route configurations reflect current understanding of various factors relevant to siting, including the locations of potential hydrogen producers and offtakers, and are subject to refinement in Phase 2 as additional information becomes available. Please refer to the Testimony of Amy Kitson for discussion of route refinements and selection of a preferred system route in Phase 2.

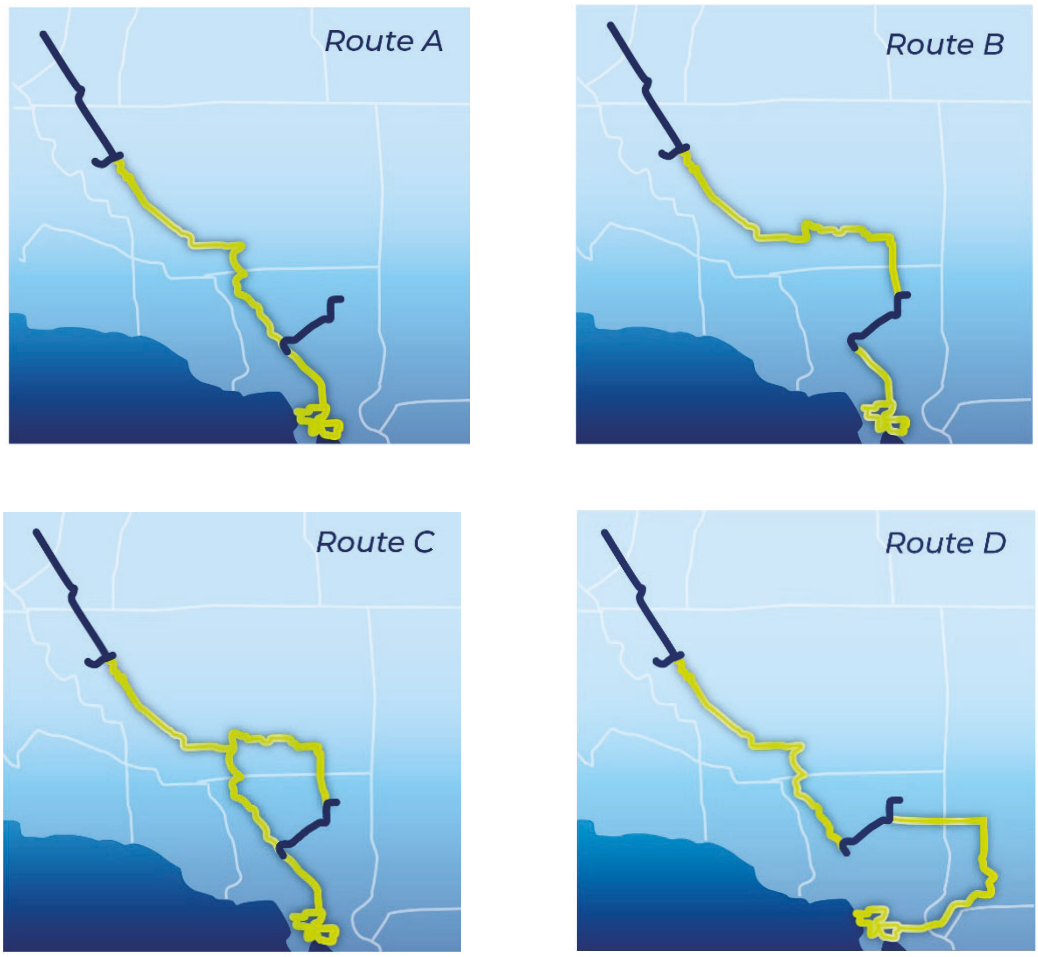

Figure 4. Potential Directional Route Options[124]

[124] *Id.* at 12-13.

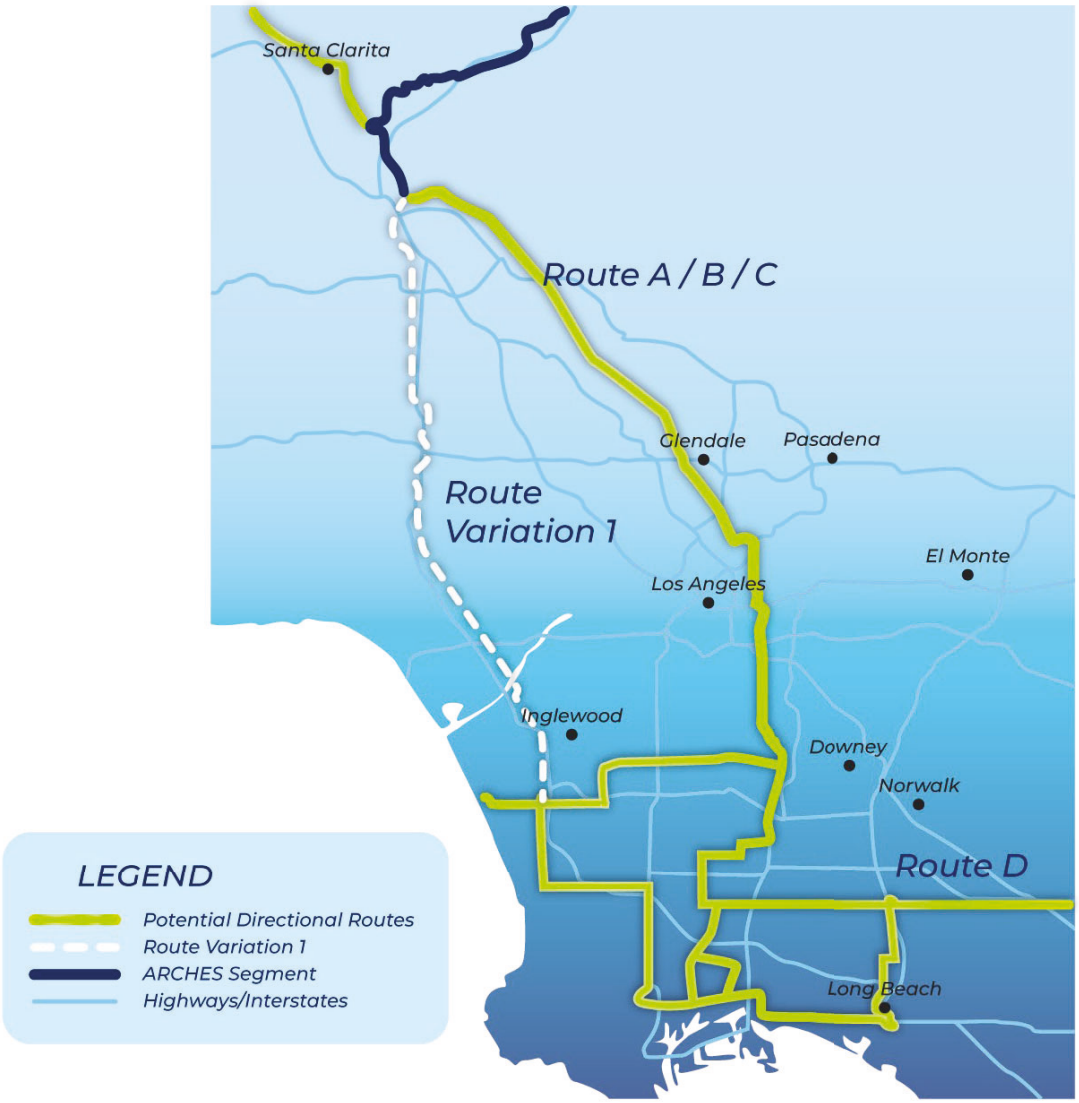

Figure 5. Illustration of Potential Directional Routes and Route Variation 1[125]

The High-Level Feasibility & Permitting Analysis (Permitting Analysis) assessed the potential environmental and regulatory approvals required to construct Angeles Link. The study analyzed the 1,300 miles of potential directional pipeline routes considered in the Routing Analysis and included a high-level review of federal, state, and local jurisdictional lands and

[125] Consolidated Report at 12.

waters, military bases, existing transportation corridors, highway and railroad crossings, state and federally protected plants and wildlife, and land owned by special districts. Permitting is anticipated to involve multiple federal agencies like the Bureau of Land Management and U.S. Fish and Wildlife Service and state agencies like this Commission and California Department of Fish and Wildlife. The Permitting Analysis found that permitting timelines potentially range from months to several years and suggested that timelines could be reduced if permit streamlining legislation applicable to Angeles Link is adopted.[126]

The Environmental Analysis evaluated the potential environmental impacts of Angeles Link as well as specified alternatives identified in the Project Options and Alternatives Study. The analysis demonstrated that while there will be potential construction, operation, and maintenance impacts associated with Angeles Link, including potential impacts related to air quality, GHG emissions, biological resources, cultural resources, energy, hazards, hydrology, and land use, many of these impacts could be minimized or avoided through established best management practices and avoidance measures.[127] The analysis also highlighted that undergrounding most of the infrastructure, as Angeles Link would do, minimizes certain permanent impacts. As Angeles Link progresses, a proposed project and project alternatives will be further evaluated in compliance with relevant laws and policies, including the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

3. *The Phase 1 Studies Identify Public Interest Benefits that Could Be Provided by Angeles Link*

The Phase 1 studies also demonstrate that Angeles Link could result in multiple public interest benefits consistent with those identified in the Phase 1 Decision. The Phase 1 studies

[126] *Id.* at 13.

[127] *Id.* at 14.

show that, at the anticipated throughput scenarios, Angeles Link can deliver substantial GHG reductions, improved air quality due to reductions in NOx, $PM_{2.5}$, and PM_{10} emissions, particularly in DAC communities,[128] and tens of thousands of jobs.

The GHG Emissions Evaluation (GHG Study) demonstrated the potential GHG benefits that could be provided by Angeles Link. The analysis shows that in 2045, based on anticipated throughput, the Angeles Link system could reduce GHG emissions by between 4.5 to 9 MMTPY of CO2e.[129] These reductions are primarily attributable to the mobility sector, followed by the power generation and hard-to-electrify industrial end user sectors. GHG reductions in the mobility sector are equivalent to removing 725,000 to more than 1 million gasoline passenger vehicles from the road for the low and high throughput scenarios, respectively. While Angeles Link infrastructure would have associated emissions, the study highlights that they are relatively small compared to the estimated GHG reductions associated with end users. In response to stakeholder feedback, the study incorporated a preliminary high-level volumetric estimate of potential leakage and assessed its impact on projected GHG reductions. The evaluation concluded that the overall impact of potential leakage on estimated GHG reductions is likely to be less than 1 percent.[130]

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[128] The reductions in air pollutant emissions would translate into substantial public health benefits, as discussed in the Introduction*, supra*, and detailed in the accompanying Testimony of Dr. Sonja Sax.

[129] Consolidated Report at 15.

[130] *Id.*

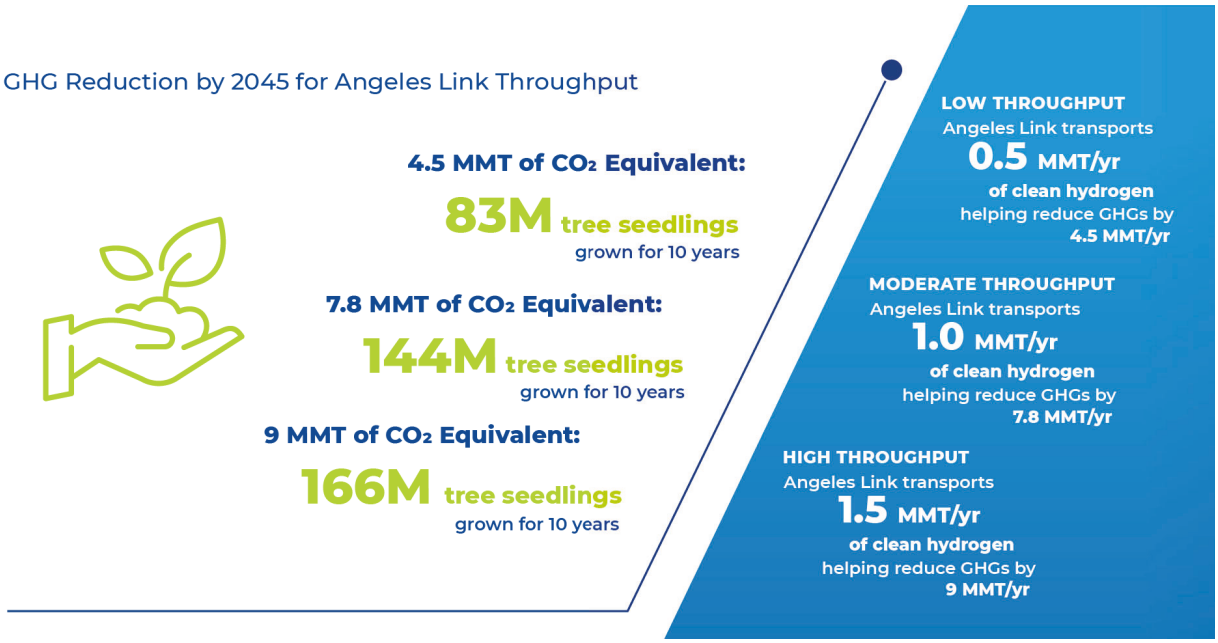

Figure 6. Visualizing the Impact: GHG Reductions Through Angeles Link[131]

The NOx and Air Emissions Assessment evaluated the potential NOx and particulate matter emissions reductions associated with Angeles Link. The analysis showed that in 2045 the Angeles Link system could result in a reduction of approximately 3,800 to 5,200 tons per year of NOx emissions, up to 2,339 tons per year of $PM_{2.5}$ emissions, and up to 3,539 tons per year of PM_{10}, primarily due to fuel displacement in the mobility sector.[132] This is equivalent to approximately 90% of the NOx reductions that the South Coast Air Quality Management District has proposed to be achieved by 2037 for total stationary (i.e., not mobile) commercial and large combustion source NOx control measures in its 2022 Air Quality Management Plan. The assessment also included a geographical spatial evaluation of estimated NOx emissions reductions and demonstrated that many of the potential air quality benefits will accrue in DAC communities.

[131] Angeles Link Phase 1 Greenhouse Gas (GHG) Emissions Evaluation at 1.10.

[132] Consolidated Report at 16.

The Workforce Planning & Training Evaluation assessed the potential job creation and workforce development associated with Angeles Link. The evaluation discussed how SoCalGas's existing workforce planning programs can be adapted to support hydrogen infrastructure, leveraging the Company's longstanding experience in safely and reliably operating and maintaining a pipeline system.[133] The evaluation also demonstrated that Angeles Link can create nearly 53,000 direct construction-related jobs at peak and a total of approximately 75,000 jobs at peak when considering indirect as well as induced jobs that occur through wage earners spending income.[134] Angeles Link workforce development can support the local economy while constructing, operating, and maintaining Angeles Link safely.

4. *Engagement with Disadvantaged Communities and Affordability Considerations Were Prioritized and Will Be Continued in Further Activities As Identified in the ESJ Plan and Affordability Framework*

The ESJ Plan was developed in response to stakeholder feedback to engage directly with DACs along potential preferred hydrogen pipeline corridors and solicit their input on Angeles Link.[135] The ESJ Plan identified engagement approaches or mechanisms recommended by CBOSG members for SoCalGas to draw upon in Phase 2 to support ESJ stakeholder engagement efforts. The ESJ Plan also includes an ESJ community screening assessment (ESJ Screening), which provides baseline DAC designation information and other demographic information for the potential preferred routes identified in the Routing Analysis. Of the 564 census tracts crossed by the 1,300 miles of conceptual pipeline routes, the plan identifies 373 census tracts with a DAC designation, as defined in the ESJ Plan. Additionally, the ESJ Plan discusses how Angeles

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[133] *Id.*

[134] Direct construction-related jobs are those specific to the actual construction and administration of the construction of Angeles Link, such as laborers. Indirect and induced impacts refer to jobs and economic output deriving from Angeles Link's construction needs and direct job creation.

[135] Consolidated Report at 14.

Link supports the Commission's applicable ESJ goals, including enhancing public participation, increasing investment in clean energy resources to benefit ESJ communities, improving local air quality and public health, and promoting high-road career paths and economic opportunities for residents of ESJ communities.[136]

With the feedback of stakeholders, SoCalGas also developed the Framework for Affordability Considerations (Affordability Framework) to inform plans to address and mitigate affordability concerns.[137] Among other things, the Affordability Framework describes the Commission's regulatory framework for evaluating affordability and approving rates and identifies projected costs of the clean energy transition more broadly to provide context for the proposed investment in Angeles Link. The Affordability Framework also discusses Angeles Link specifically, including how affordability was considered in Phase 1, and identifies potential strategies for addressing cost effectiveness and affordability in the future, including opportunities that would require legislative action or Commission approval.

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[136] Angeles Link's ESJ Plan goals were developed with the Commission's Environmental and Social Justice Action Plan (ESJ Action Plan) goals in mind. The ESJ Action Plan serves as a commitment to integrating ESJ principles across the Commission's regulatory activities, with goals focused on health, safety, consumer protection, and program benefits. In Phase 1, SoCalGas supported these goals by incorporating equity and access considerations into Angeles Link's planning framework, thereby enhancing public participation in Commission regulatory activities. As described *infra*, SoCalGas proposes to implement the ESJ Plan and continue stakeholder outreach in Phase 2, including by gathering feedback from communities historically overlooked in typical project development processes. Angeles Link's focus on delivering decarbonized, renewable energy to Central and Southern California, including the Los Angeles Basin, also aligns with the ESJ Action Plan's goal of increasing investment in clean energy resources to benefit ESJ communities and improve local air quality and public health.

[137] *See* Angeles Link Phase 1 Framework for Affordability Considerations at 23.

B. The Phase 1 Studies Were Conducted with Engagement and Feedback from Stakeholders and Are Available for the Benefit of the Public.

The Phase 1 studies were conducted with robust stakeholder feedback. In accordance with the Phase 1 Decision requirement to hold at least quarterly stakeholder meetings throughout Phase 1, SoCalGas engaged with the Commission's Energy Division when establishing the stakeholder engagement framework that included the Planning Advisory Group (PAG), composed of representatives from industry, labor, academia, tribal governments, and environmental organizations, and the Community Based Organization Stakeholder Group (CBOSG), composed of community-based organizations.[138] Based on requests from the PAG and CBOSG for more frequent information sharing, SoCalGas added additional workshops between quarterly meetings. Ultimately, SoCalGas held a total of 27 meetings and workshops with the 70 participating organizations from the PAG and CBOSG, as well as more than 30 one-on-one meetings with members to solicit their feedback on the Phase 1 feasibility studies and PAG and CBOSG process over the course of almost two years. These stakeholder meetings included topics across the Phase 1 studies such as hydrogen safety, the hydrogen market, technical feasibility, environmental impacts, environmental justice, project design, and development study updates. In response to requests from PAG and CBOSG members, SoCalGas invited a third party to conduct a "Hydrogen 101" educational presentation and the potential impacts and benefits of hydrogen at a July 2023 meeting.[139]

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[138] Testimony of Neil Navin at NN-9; Consolidated Report at 5. In accordance with Ordering Paragraph 8(c), SoCalGas coordinated with the Energy Division to devise a plan and set of procedures to compensate CBOs. Details are provided in the Detailed Plan and Set of Procedures for Community Based Organization Compensation approved in Advice Letter No. 6146G.

[139] SoCalGas, *Angeles Link Q3 Quarterly Report (Phase One) for the Period July 1, 2023, through September 30, 2023*, *available at:* https://www.socalgas.com/sites/default/files/2024-01/ALP1_QuarterlyReport_Q3-2023_FINAL.pdf.

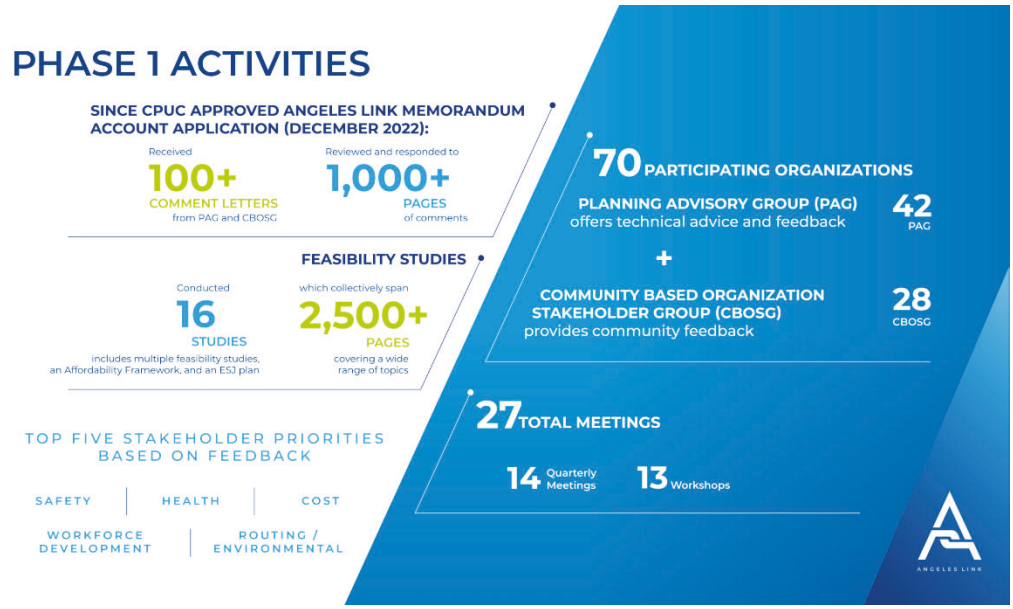

Figure 7. Phase 1 Stakeholder Engagement

SoCalGas presented opportunities for the PAG and CBOSG to provide feedback at four key milestones in the course of conducting each study: (1) the draft description of the scope of work, (2) the draft "technical approach," e.g., the methodology for conducting each study, (3) preliminary findings based on initial data and results from the analysis, and (4) the draft report.[140] These milestones were selected because they represented critical points at which relevant feedback could meaningfully influence the Phase 1 studies or inform future considerations.[141] To facilitate access to information, SoCalGas created a "Living Library" for PAG and CBOSG members, hosting a wide range of documents, including preliminary findings, draft feasibility studies, presentations, meeting recordings, transcripts, and comment letters received from stakeholders.

Through this process, SoCalGas incorporated stakeholder input during the development

[140] SoCalGas also provided opportunities for the PAG and CBOSG to provide feedback on drafts of the ESJ Plan and the Affordability Framework.

[141] Testimony of Neil Navin at NN-9 to NN-10.

and conduct of the work on the Phase 1 studies. For example, in response to stakeholder feedback, a route variation that could potentially minimize impacts to disadvantaged communities (DACs) was identified for further consideration in Phase 2 and incorporated into the Routing Analysis.[142] As discussed above, to address the concerns of community stakeholders, an ESJ Plan was developed to be implemented in Phase 2 of Angeles Link to engage DACs near potential preferred routes.[143] Also as described above, SoCalGas requested the Center for Hydrogen Safety's Hydrogen Safety Panel to conduct a third-party review of the draft Safety Evaluation of Applicable Safety Requirements and incorporated appropriate feedback into the final evaluation.

The stakeholder engagement process SoCalGas utilized in Phase 1 enhanced the typical planning process: timely hearing the perspectives of members with specific areas of focus strengthened SoCalGas's overall planning of Angeles Link and will facilitate the planning and development of a clean energy project that is appropriately responsive to community needs and concerns.[144]

IV. PROCEEDING TO PHASE 2 WOULD ADVANCE PURSUIT OF THE MANY PUBLIC INTEREST BENEFITS THAT COULD BE PROVIDED BY ANGELES LINK

In the Phase 1 Decision, the Commission identified many public interest benefits that could accrue broadly to SoCalGas ratepayers and California from studying and ultimately implementing Angeles Link:[145]

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[142] *Id.* at NN-21, NN-27 to NN-28; Consolidated Report at 5.

[143] Testimony of Neil Navin at NN-21, NN-27 to NN-28; Consolidated Report at 5.

[144] Testimony of Maryam Brown at MB-6.

[145] *See,* e.g., Phase 1 Decision at 61 (identifying decarbonization, economic opportunities and new jobs as benefits), 62 (identifying stakeholder engagement, transparency, and data sharing benefits), 26-27 (benefits of positioning the State for federal funding).

- "The Angeles Link Project has the potential to bring public interest benefits to the state and especially the Los Angeles area, because clean renewable hydrogen has the potential to decarbonize the state's and the Los Angeles Basin's energy use and bring economic opportunities and new jobs to the Los Angeles region."[146]
- "The findings from numerous studies demonstrate that clean renewable hydrogen is a potential solution to help decarbonize the state's and the Los Angeles Basin's energy use because it is one of the only few viable carbon-free energy alternatives for hard-to-electrify industries, electric generation, and the heavy-duty transportation sector."[147]
- "The data and analyses that SoCalGas plans to share with stakeholders resulting from its Phase One studies should be beneficial to the development of the clean renewable hydrogen industry and thus serve the public interest."[148]
- "Investing in the Angeles Link Project serves the public interest by potentially bringing hydrogen at scale to lower the costs of hydrogen and creating economic opportunities and new jobs."[149]
- "SoCalGas' commitment to engage and consult with stakeholders representing a diverse set of interests through the [Planning Advisory Group] serves the public interest, because it not only provides transparency of the planning process, but also ensures that all interests affected by the Project are considered in the planning process."[150]

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146 *Id.* at 61 (FOF 1).

147 *Id.* at 61-62 (FOF 2).

148 *Id.* at 62 (FOF 7).

149 *Id.* (FOF 3).

150 *Id.* (FOF 6).

- "The Angeles Link Project could help position California to receive federal funding provided through the IIJA."[151]

Angeles Link also has the potential to bring benefits in the form of enhanced energy system reliability and resiliency. Moreover, as a utility-owned first-mover open-access pipeline system to transport clean renewable hydrogen, Angeles Link could contribute to fostering the hydrogen economy by coupling certainty of access with SoCalGas's expertise in safe and reliable pipeline transport. As discussed above, the Phase 1 studies show Angeles Link could contribute to significantly reduced GHG emissions and improved air quality; in turn, as described in the Testimony of Dr. Sonja Sax, the air quality benefits would be expected to lead to public health benefits and related significant cost savings. The Phase 1 studies also demonstrate job creation and economic opportunity benefits. One of the public interest benefits identified in the Phase 1 Decision has already been realized: Angeles Link was part of the application that positioned the California Hydrogen Hub to finalize an agreement with DOE to receive federal funding up to $1.2 billion for an overall $12.6 billion infusion of capital for the California Hydrogen Hub.[152]

Crucially, Angeles Link could promote the affordability of the clean energy transition and meeting the State's carbon neutrality goals. Clean renewable hydrogen has several key attributes that are not offered by other decarbonization modalities: it can serve as a clean alternative fuel to replace the use of natural gas and diesel in the hard-to-electrify power generation, transportation, and industrial sectors; it can support electrification and renewable energy expansion by providing clean firm dispatchable power; and it can avoid the inefficient curtailment of renewable energy by storing it for later use. Thus, investing in a pipeline system transporting clean renewable

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[151] *Id.* (FOF 62).

[152] ARCHES H2, *California's renewable hydrogen hub officially launches* (July 17, 2024), *available at:* https://archesh2.org/arches-officially-launches/.

hydrogen could efficiently support multiple decarbonization pathways and thereby promote the affordability of decarbonizing. Of course, these benefits will only accrue if SoCalGas has the necessary resources and Commission support to design, develop, and ultimately implement Angeles Link in a timely fashion. Accordingly, the public interest continues to be served by authorizing a revenue requirement so SoCalGas can conduct necessary Phase 2 activities to advance Angeles Link.

A. Angeles Link Could Promote Achieving California's Decarbonization Goals While Enhancing the Reliability and Resilience of the Energy System

California's energy transition is driven by its adoption of some of the most advanced climate policies in the country, aiming to achieve carbon neutrality by 2045 and significantly reduce GHGs.[153] After passing the Global Warming Solutions Act (AB 32) in 2006, California saw early GHG emissions reduction progress from implementing available and common-sense solutions, such as imposing requirements on waste management and mandating procurement of renewable electricity and divestment from coal electricity.[154] While California's annual GHG emissions have continued to trend downward over the last two decades, the rate of reduction has slowed in recent years,[155] and there are still significant strides to be made. Achieving further reductions will become increasingly challenging as the State targets deeper cuts, particularly the need to reduce emissions from hard-to-electrify sectors such as power generation, heavy-duty

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[153] In 2022, the California Legislature passed Assembly Bill (AB) 1279, which mandates the State to achieve statewide carbon neutrality by 2045. That same year, California passed Senate Bill (SB) 1020, which reaffirms the State's commitment to a carbon-free retail electric grid by December 31, 2045, with interim milestones in 2030, 2035, and 2040.

[154] CEC, *Emission Performance Standard - SB 1368*, *available at*: https://www.energy.ca.gov/rules-and-regulations/energy-suppliers-reporting/emission-performance-standard-sb-1368.

[155] CARB, *Updated emissions data show overall downward trend continuing*, *available at*: https://ww2.arb.ca.gov/news/updated-emissions-data-show-overall-downward-trend-continuing.

transportation, and industry. These sectors made up more than half of the State's GHG inventory from 2000-2022[156] and, accordingly, are a focus for innovative decarbonization strategies. For example, the CEC has identified "hard-to-electrify industrial processes, transportation, and grid reliability as key areas with a high potential for increased use of low-carbon hydrogen made directly from renewable resources."[157]

Natural gas "plays an important role in maintaining electric reliability because of the ability of this gas to be dispatched on command."[158] In 2023, over 30% of the natural gas used in California was for electricity generation,[159] accounting for 43% of in-state electric generation and almost 37% of total electricity consumption in California.[160] To decarbonize economy-wide at the scale required to attain the State's climate goals, going forward, clean fuels will be needed to both maintain electric grid reliability to meet increasing demand and displace the use of natural gas.[161] Clean renewable hydrogen can be a zero-carbon enabler of electrification by providing critical clean firm power for the grid. Clean renewable hydrogen and electrification

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156 CARB, *Current California GHG Emission Inventory Data*, *available at*: https://ww2.arb.ca.gov/ghg-inventory-data.

157 CEC, *2022 Integrated Energy Policy Report Update* (May 10, 2023) at 8, *available at:* https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2022-integrated-energy-policy-report-update.

158 CEC, *Adopted 2023 Integrated Energy Policy Report with Errata* (Feb. 14, 2024) at A-1, *available at*: https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2023-integrated-energy-policy-report.

159 U.S. Energy Information Administration (EIA), *Natural Gas Consumption by End Use, available at:* https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCA_a.htm.

160 CEC, *2023 Total System Electric Generation, available at:* https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2023-total-system-electric-generation. The CEC noted for 2021 that natural gas comprised 38% of electricity generation serving California. CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (December 2022) at 196, *available at:* https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf.

161 Due in part to successful energy efficiency efforts, California already uses less electricity per capita than any other state but Hawaii. *See,* EIA, *California State Energy Profile*, *available at:* https://www.eia.gov/state/print.php?sid=CA.

are complementary, and ARCHES concurs that both "electrons and molecules"[162, 163] are needed to "reliably decarbonize all sectors of the economy."[164] Indeed, a recent report by Edison International found that until sufficient clean firm resources, like clean renewable hydrogen, are deployed, natural gas generation capacity in California will continue to be needed for reliability and affordability.[165] This is particularly true as the State and the Commission evaluate ways to reduce reliance on natural gas, including natural gas storage at Aliso Canyon, while still meeting necessary electric reliability requirements.

1. *Power Generation Sector*

The CEC's statewide forecast estimates a 40% increase in electricity sales by 2040 over 2022 levels, and the increase in demand can be attributed largely to electrification since the population is only expected to increase by 2.8% over the same period.[166,167] CARB estimates a

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[162] The idea of "electrons and molecules" has become central to many visions for a future clean industrial and energy system. Most energy will be carried to users as electricity, mostly on the grid; some will be carried as clean "molecules" that can be used at the point where energy is needed. Hydrogen, which can be generated from electricity (e.g., green hydrogen made from renewable power using electrolyzers), can also be used to generate electricity (e.g., with hydrogen-capable turbines and with fuel cells). Indeed, because hydrogen is easier to store and transport in large quantities than electric power, it is expected to play a pivotal role as a clean molecule that enables clean electrons—a clean firm power source essential to assuring reliability and resilience of the electric grid.

[163] Currently, molecules comprise up to 80% of total energy consumption in California. *See,* CARB, *AB 32 GHG Inventory Sectors Modeling Data Spreadsheet*, *available at:* https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-PATHWAYS-data-E3.xlsx.

[164] ARCHES H2, *Meet ARCHES* at 2 (October 2023), *available at:* https://archesh2.org/wp-content/uploads/2023/10/Meet-Arches_October-2023.pdf.

[165] *See* Edison International, *Reaching Net Zero* (September 2024) at 2, *available at:* https://download.newsroom.edison.com/create_memory_file/?f_id=66f21a2d3d63324765a45f1b&content_verified=True.

[166] For electricity managed sales (planning forecast)*, see* CEC, *2023 Integrated Energy Policy Report* (February 2024) at 129-130*, available at*: https://efiling.energy.ca.gov/GetDocument.aspx?tn=254463. For economic and demographic forecast updates*, see id. at* 109-122.

[167] This is a departure from the past, when load growth was fairly consistent with population growth. For example, California's population increased about 0.7 percent per year from 2000-2022, and load growth over the same period was about 0.5 percent per year.

26% increase in electricity demand over 2022 levels by 2030 and a 76% increase in demand over 2022 levels by 2045.[168] These forecasted increases in demand coincide with the State's mandates that 100% of retail sales of electricity come from renewable and zero-carbon resources by 2045, with interim benchmarks of 60% by 2030, 90% by 2035, and 95% by 2045.[169] In the Los Angeles Basin, LADWP has even more ambitious goals, targeting supplying 100% renewable energy by 2035.[170] The 2021 SB 100 Joint Agency Report projected the State will need 148 GW of new clean energy resources by 2045, more than four times the 35 GW that were available in 2022.[171]

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[168] CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (December 2022) at 202, *available at:* https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents. *See also*, *id*. at 8 ("[T]he grid will need to grow at unprecedented rates and ensure reliability, affordability, and resiliency through the next two decades and beyond."); *id.* at 195, ("Moving forward, a clean, affordable, and reliable electricity grid will serve as a backbone to support deep decarbonization across California's economy."); *id.* at 275 ("[I]increased 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."); *see also,* State of California – Office of Governor Gavin Newson, *Building the Electricity Grid of the Future: California's Clean Energy Transition* (May 2023) at 4, *available at:* https://www.gov.ca.gov/wp-content/uploads/2023/05/CAEnergyTransitionPlan.pdf ("Electrifying California's economy and building a reliable, safe, affordable, and clean electric grid are cornerstones of both our climate leadership and our economic plan for the future."). In addition, new energy users, like data centers, are driving additional demand. For example, in the United States, electricity demand from data centers is expected to grow by approximately 10 percent per year, reaching 35 GW by 2030, up from 17 GW in 2022. *See* McKinsey & Company, Investing in the rising data center economy (Jan. 17, 2023), available at https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/investing-in-the-rising-data-center-economy.

[169] Senate Bill 100 (De León, 2018), *available at:* https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100; Senate Bill 1020 (Laird, 2022), *available at:* https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB1020.

[170] NREL, *LA100: The Los Angeles 100% Renewable Energy Study and Equity Strategies*, *available at:* https://www.nrel.gov/analysis/los-angeles-100-percent-renewable-study.html.

[171] State of California – Office of Governor Gavin Newsom, *Governor Newsom Updates the Roadmap to California's Clean* Energy *Future* (May 25, 2023), *available at:* https://www.gov.ca.gov/2023/05/25/governor-newsom-updates-the-roadmap-to-californias-clean-energy-future/.

The intermittent nature of weather-dependent renewable electricity generation, coupled with fluctuations in daily and seasonal energy demand, necessitate integrating clean firm power like clean renewable hydrogen to bridge the gaps. As intermittency from integration of renewables increases and electric demand continues to grow, the need for firm power generation also increases. Today, that role is served by natural gas, which can be dispatched as needed to meet electricity needs. As CARB recognizes, both historically and currently, the gas system provides an essential service to support the reliability of the electric system as a greater base of renewables is integrated. The 2022 Scoping Plan notes that, as more renewable power enters the system, 75% of the flexible capacity for grid reliability is provided by gas-fueled power plants.[172] Thus, clean fuels will be needed to supplement and replace the use of natural gas to both maintain electric grid reliability and decarbonize economy-wide at the scale required to help attain the State's climate goals. Clean renewable hydrogen can serve this need: it can be readily dispatched to meet energy demand when needed to support the electric grid. The Angeles Link Phase 1 Studies highlight the projected demand for clean renewable hydrogen in the power generation sector in SoCalGas's service territory, which could require between 0.7 and 2.7 MMTPY by 2045.[173]

The State recognizes that its existing electricity supply and infrastructure portfolio is insufficient to meet the forecasted demand. Governor Gavin Newsom released *Building the Electricity Grid of the Future: California's Clean Energy Transition Plan*, which acknowledges

[172] CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (December 2022) at 204, *available at*: https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf.

[173] Consolidated Report at 6.

that the modern electrical grid needs, among other things, clean hydrogen.[174] ARCHES has expressed consistent needs, observing: "The entire power system of the fourth-largest economy cannot be decarbonized completely via conservation, solar, wind, and battery technologies alone. Renewable clean hydrogen is needed in addition to these technologies to operate the 100% carbon-free reliable, resilient, stable, and flexible grid of the future while complying with stringent state, regional, and federal reliability standards."[175] "As we continue to transition to more electric technologies, the demand on electricity will only continue to increase. Supplementing our existing power portfolio with clean hydrogen will ensure that the energy sectors employ both electrons and molecules to enable us to reliably decarbonize all sectors of the economy, while maintaining economic leadership and advancing environmental, health and social justice objectives."[176] ARCHES further notes: "Renewable clean hydrogen is an important solution for helping to decarbonize California's power sector to advance the state's climate, clean electricity, resilience, and equity goals."[177]

CARB describes the critical role clean renewable hydrogen can play in the power generation sector by providing incremental clean firm capacity to support electric reliability and help decarbonize the existing power generation fleet, noting in its 2022 Scoping Plan: "Hydrogen produced from renewable resources and renewable feedstocks can serve a dual role

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[174] State of California, *Building the Electricity Grid of the Future: California's Clean Energy Transition Plan* (May 2023) at 6, *available at:* https://www.gov.ca.gov/wp-content/uploads/2023/05/CAEnergyTransitionPlan.pdf.

[175] ARCHES H2, *Technical Submission to DOE – April 2023* at 19, *available at*: https://archesh2.org/wp-content/uploads/2024/08/ARCHES-Technical-Volume-Redacted.pdf.

[176] ARCHES H2, *Meet* ARCHES (October 2023), *available at:* https://archesh2.org/wp-content/uploads/2023/10/Meet-Arches_October-2023.pdf.

[177] ARCHES H2, *White Paper Overview* (August 2024) at 13, *available at*: https://archesh2.org/wp-content/uploads/2024/08/ARCHES-White-Papers-Overview-8.8.24.pdf.

as a low-carbon fuel for existing combustion turbines or fuel cells, and as energy storage for later use."[178] Accordingly, CARB identifies the need for approximately 4 GW of hydrogen combustion capacity in 2035, and 9 GW in 2045 to meet demand targets.[179] Likewise, the International Energy Agency finds that "[h]ydrogen can also support the integration of variable renewables in the electricity system, being one of the few options for storing energy over days, weeks or months,"[180] which supports electric grid reliability and resiliency.[181] Hydrogen's ability to store renewable energy is important, particularly given the drastic growth in the rate of curtailment—a 546% increase from 2017 to 2022, with 2023 levels even higher.[182]

Despite these widely recognized reliability and resiliency benefits, DOE has determined that "the near-term limited availability of midstream infrastructure is a constraint for scaling clean hydrogen where co-located production and offtake is not feasible."[183] For hydrogen to play a significant role in the electric generation sector and to expand its utilization to meet

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178 CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (December 2022) at 204, *available at:* https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf.

179 *Id.* at 203-204.

180 International Energy Agency, *Hydrogen: What is the Role in Clean Energy Transitions?*, *available at:* https://www.iea.org/energy-system/low-emission-fuels/hydrogen. The CEC also notes the unique role clean renewable hydrogen can play in energy storage, noting that "[a]doption of clean and renewable electrolytic hydrogen for electric power applications should prioritize challenging applications such as long-duration storage that are challenging to accomplish with existing technologies." CEC, 2023 Integrated Energy Policy Report at 82, *available at:* https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2023-integrated-energy-policy-report.

181 *See also*, DOE, *Pathways to Commercial Liftoff: Long Duration Energy Storage* (March 2023) at 15, available at https://liftoff.energy.gov/wp-content/uploads/2023/10/Pathways-to-Commercial-Liftoff-LDES-May-5_UPDATED-v10.pdf ("[h]ydrogen is the primary technology expected to provide seasonal shifting for applications in need of 160+ hours duration in addition other end-uses (e.g., industrials).")

182 Ecoblock, *California's Growing Solar and Wind Problem* (December 5, 2023), *available at:* https://ecoblock.berkeley.edu/blog/californias-growing-solar-and-wind-problem/.

183 DOE, *Pathways to Commercial Liftoff: Clean Hydrogen* (March 2023) at 14, *available at:* https://liftoff.energy.gov/wp-content/uploads/2023/03/20230320-Liftoff-Clean-H2-vPUB.pdf.

substantial and fluctuating demand, it is essential to begin developing open-access hydrogen pipelines capable of delivering bulk volumes to support the reliability and resiliency of the electric grid, and invest in that infrastructure now. The Phase 1 Cost Effectiveness Study concludes that Angeles Link is the most feasible and cost-effective hydrogen delivery option at scale across Central and Southern California, compared to alternatives like a localized hydrogen hub and trucking.[184]

Without investments in clean firm power, the reliability and resiliency of the State's electric grid is at risk, and customers are more likely to experience service disruptions. The costs of electric service disruptions are described in the accompanying Testimony of Josh Schellenberg, who developed the interruption cost model that estimates the value of electric reliability. He describes that electric reliability planners currently face a "hyper-complex risk environment" due to a rapidly changing resource mix, extreme weather complexities, and other risk factors.[185] Mr. Schellenberg notes that electricity consumption in Southern California is expected to double by 2045, with the societal impacts of power outages expected to increase precipitously as the grid fully decarbonizes. Accordingly, utility customers in Southern California benefit from proactively identifying system needs, particularly for firm, in-basin clean energy resources. He further describes that the estimated direct cost of an electric outage in SoCalGas's service territory varies from around $590 million for a momentary outage to nearly $11 billion for a 24-hour outage, with even higher costs under extreme weather conditions.[186] The estimated outage costs are expected to *at least double* by 2045, as various high-value end-

[184] Consolidated Report at 4.

[185] Testimony of Josh Schellenberg at JS-2 to JS-3 (*quoting* North American Electric Reliability Corporation (NERC) President and CEO, in part).

[186] *Id.* at JS-9 to JS-10 (*see* Table 2: Outage Cost Estimates for SoCalGas Territory by Duration).

uses, such as heating, transportation, and certain industrial processes, are electrified.[187] With inflation and considering indirect spillover costs, Mr. Schellenberg estimates the total cost of an electrical outage of 24 hours or more in SoCalGas's service territory could be more than $100 billion in 2045.[188]

Angeles Link could help avoid these catastrophic occurrences by providing clean firm power in the Los Angeles Basin to support energy system reliability and resiliency. It could also, in conjunction with other future clean energy projects and reliability efforts, support decreased reliance on Aliso Canyon, thereby supporting another Commission objective.[189]

2. *Industrial Sector*

The DOE has recognized the key role hydrogen can play in decarbonizing the industrial sector.[190] This is particularly relevant for California, as it is the largest economy in the U.S.[191]

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[187] *Id.* at 10-11.

[188] *Id.* at 11.

[189] *See* Investigation (I.) 17-02-002, Order Instituting Investigation pursuant to Senate Bill 380 to determine the feasibility of minimizing or eliminating the use of the Aliso Canyon natural gas storage facility located in the County of Los Angeles while still maintaining energy and electric reliability for the region.

[190] "Hydrogen can also play a key role in decarbonizing the industrial sector to enable a net-zero economy by 2050, including steelmaking, chemicals, and high-temperature industrial heat generation." U.S. Department of Energy (DOE), *U.S. National Clean Hydrogen Strategy and Roadmap*, (June 2023) at 21, *available at:* https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf. The Roadmap adds that, "Over half of emissions from industry today are due to the direct combustion of fossil fuels to produce heat and power for industrial processes. While lower grades of heat generation are typically feasible to electrify, about 30 percent of heat used in industry is at temperatures above 300°C and would likely require clean fuels to decarbonize. Furnaces that burn pure hydrogen or blends of hydrogen with natural gas are key options in these applications." *Id.* at 29.

[191] State of California – Office of Governor Gavin Newsom, *California's economy leads the nation* (July 15, 2024), *available at:* https://www.gov.ca.gov/2024/07/15/californias-economy-leads-the-nation/.

and the fifth largest economy in the world.[192] It is the largest manufacturing employment state in the country,[193] with manufacturers accounting for $394.83 billion in 2021, or 12.32% of the total output in the state, and employing 7.55% of its workforce.[194] Clean renewable hydrogen could assist the State in meeting its decarbonization goals while maintaining its economic status and keeping industry in California.

The CEC has identified industrial processes as among the top prospects for hydrogen to pursue decarbonization goals: "Grid reliability and hard-to-electrify sectors such as medium- and heavy-duty (MDHD) on-road transportation, off-road applications including non-road sectors such as aviation, rail, maritime, and industrial processes are areas with a high potential for increased use of low-carbon or clean hydrogen."[195]

As California looks to find additional decarbonization strategies, it can look to its large industrial base, whose size and diversity of end users in a wide range of industrial applications, such as metals, food and beverage, stone, glass, and cement, aerospace and defense, chemicals, and refineries, provide many opportunities.[196] Approximately 23% of the State's GHG emissions

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192 State of California – Office of Governor Gavin Newsom, *California Remains the World's 5th Largest Economy* (April 2024), *available at:* https://www.gov.ca.gov/2024/04/16/california-remains-the-worlds-5th-largest-economy/.

193 U.S. Bureau of Labor Statistics, *2023 Quarterly Census of Employment and Wages*, *available at:* https://www.bls.gov/cew/publications/employment-and-wages-annual-averages/2023/; *see also,* U.S. Bureau of Labor Statistics*, Employment and Wages Data Viewer – Manufacturing, available at:* https://data.bls.gov/cew/apps/table_maker/v4/table_maker.htm#type=14&year=2024&size=0,1,2,3,4,5,6,7,8,9&hlind=1013&supp=1.

194 National Association of Manufacturers (NAM), *California Manufacturing Facts, available at:* https://nam.org/state-manufacturing-data/2022-california-manufacturing-facts/.

195 CEC, *Final* Staff *Report SB 643 Clean Hydrogen Production and Refueling Infrastructure for MDHD FCEVs and Off-Road Applications* (January 24, 2024), *available at:* https://www.energy.ca.gov/publications/2023/senate-bill-643-clean-hydrogen-fuel-production-and-refueling-infrastructure.

196 *See* Demand Study at 26.

come from industrial activity in Central and Southern California.[197] California cannot fully decarbonize without having a viable strategy for the industrial sector. Several environmental and environmental justice groups concurred in their 2023 comments to CARB, urging that the agencies draft an SB 1075 report that "prioritizes early green hydrogen deployment in sectors that have no known path to electrification, like feedstock use for industry."[198] Although the State has not yet adopted significant policies to decarbonize the industrial sector, aside from the cap-and-trade program and laws affecting specific industries, such as SB 596 for the cement industry, the potential for clean renewable hydrogen delivery through pipeline systems like Angeles Link could change that.[199] The Phase 1 studies highlight the potential for clean renewable hydrogen to decarbonize hard-to-electrify industrial processes, finding that the projected demand growth within SoCalGas's service territory in the industrial sector ranges from 0.2 to 1.5 million MMTPY. Angeles Link could transport clean renewable hydrogen to meet this demand.[200]

3. *Transportation Sector*

Angeles Link can also support the State's strategy for reducing emissions from the transportation sector. To reduce GHG and criteria air pollutant emissions from the transportation sector, the State has committed to phasing out internal combustion engines. Both the Advanced

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197 *Id*. at 69.

198 Climate Center, Asian Pacific Environmental Network, Earthjustice, Greenlining Institute, Center for Biological Diversity, Center on Race, Poverty & the Environment, and Sierra Club – California, *Joint Comments – SB 1075 Report:* Hydrogen *Development, Deployment, and Use: September 5 Kickoff Workshop* (September 19, 2023) *available at*: https://ww2.arb.ca.gov/system/files/webform/public_comments/5756/SB%201075%20Implementation%20Report%20-%20Joint%20Comments%209-19-23.pdf.

199 SoCalGas's *The Role of Clean Fuels and Gas Infrastructure in Achieving California's Net Zero Climate Goal* also discusses the role decarbonized hydrogen can play in the industrial sector as well as the important role of regulation in driving affordability. *Available at:* https://www.socalgas.com/sites/default/files/2021-10/SCG_Whitepaper_Full-Report.pdf.

200 Consolidated Report at 6.

Clean Fleets (ACF) regulation and the Advanced Clean Cars (ACC) I and II regulations are part of the State's broader strategy to reduce emissions and transition to zero-emissions vehicles (ZEV). The ACC regulations focus on increasing the sales of ZEV passenger cars and trucks by 2035.[201] The ACF, which focuses on fleets, works in parallel with the Advanced Clean Trucks (ACT) regulation, which focuses on the transition of drayage trucks, local delivery trucks, and government fleets to zero emissions by 2035.[202] The ACCs further support the ACT and ACF by including measures such as the Zero-Emission Vehicle Program, which requires vehicle manufacturers to produce a percentage of ZEVs.[203] Work trucks, day cab tractors, and buses with three axles would be required to transition to ZEV by 2039, and sleeper cab tractors and specialty vehicles by 2042.[204] These regulations are designed to create a market for ZEVs: the ACC II helps ensure that consumers have ZEV options, while the ACF requires fleet operators to adopt the ZEVs.

The Angeles Link Phase 1 Studies highlight the projected demand for clean renewable hydrogen in the mobility sector within SoCalGas's service territory, driven by heavy-duty vehicles and regulations like the ACF. This demand could range from 1.0 to 1.7 MMTPY.[205] Clean renewable hydrogen delivery infrastructure can support this transition. Hydrogen can both serve as an alternative clean fuel source for hydrogen fuel cell electric vehicles in the transportation sector and, as described above, support the reliability and resiliency of the expanding electric grid as more battery electric vehicles require charging to hit the road. For

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201 Title 13 California Code of Regulations (CCR) § 1962.4. § 1962.4.

202 13 CCR §§ 2013, 2014, 2015, 2016.

203 13 CCR § 1962.4(c)(1)(B).

204 13 CCR 2015.2(a).

205 Consolidated Report at 6.

heavy-duty vehicles in particular, hydrogen serves as a key alternative to batteries due to the significant challenges posed by battery electrification, where the weight and size of the batteries required to achieve a range comparable to diesel trucks could reduce payload capacity, and because of significant advantages for the logistics and transportation industry by virtue of the ability of hydrogen fuel cells to be refueled much faster than recharging electric batteries. Indeed, as the CPUC previously noted, "[c]lean renewable hydrogen is one of the only few viable carbon-free energy alternatives for . . . heavy-duty transportation sector in the Los Angeles Basin."[206] Angeles Link could help support the adoption of this critical alternative to battery electrification and support the State's ACF efforts by providing a reliable and efficient mechanism to transport clean renewable hydrogen in Central and Southern California.

B. Improved Air Quality and Resulting Public Health Benefits

Governor Newsom has noted, "the transportation sector is responsible for more than half of all of California's carbon pollution, 80 percent of smog-forming pollution and 95 percent of toxic diesel emissions – all while communities in the Los Angeles Basin and Central Valley see some of the dirtiest and most toxic air in the country."[207] Angeles Link could help address this issue. Replacing natural gas and diesel end uses in the hard-to-electrify sectors with clean renewable hydrogen would enable meaningful reductions of GHG, NOx—a known precursor to ozone—and $PM_{2.5}$ emissions. Indeed, the results from the Phase 1 studies indicate that, based on estimated demand scenarios, GHG emissions could be significantly reduced by 4.5 MMTPY to 9

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[206] Phase 1 Decision at 2.

[207] State of California – Office of Governor Gavin Newsom, *Governor Newsom Announces California Will Phase Out Gasoline-Powered Cars & Drastically Reduce Demand for Fossil Fuel in California's Fight Against Climate Change* (September 2020), *available at:* https://www.gov.ca.gov/2020/09/23/governor-newsom-announces-california-will-phase-out-gasoline-powered-cars-drastically-reduce-demand-for-fossil-fuel-in-californias-fight-against-climate-change/.

MMTPY in 2045—the equivalent of 1 to 2 million gasoline passenger vehicles.[208] The Phase 1 study also finds that NOx emissions could be reduced by 3,800 and 5,200 tons per year (tpy)—the equivalent of approximately 90% of the NOx reductions that the South Coast Air Quality Management District has proposed to be achieved by 2037 for total stationary commercial and large combustion source NOx control measures in its 2022 Air Quality Management Plan.[209] These reductions would improve air quality and can yield significant public health benefits, especially in DACs near heavily trafficked transportation corridors that are disproportionately impacted by poor air quality, such as the South Coast and San Joaquin Valley air basins, which are in extreme non-attainment for certain health-based National Ambient Air Quality Standards.[210] The 2022 Air Quality Management Plan (AQMP) recognizes that despite some air quality improvements, the South Coast Air Basin still fails to meet the federal and state standards for ozone and particulate matter 2.5 ($PM_{2.5}$). The impacts of air pollutants such as ozone and $PM_{2.5}$ can have significant economic consequences, including healthcare costs, reduced labor productivity, and lower agricultural yields.[211] For example, in the United States, pollution-

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208 *See* U.S. Environmental Protection Agency, *Greenhouse Gas Equivalencies Calculator*, *available at:* https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

209 *See* Testimony of Neil Navin at NN-24.

210 The South Coast Air Quality Management District and San Joaquin Valley Air Basin are the only areas in the county that are in extreme nonattainment for the new and prior ozone NAAQS, and as such have the worst air quality in the Nation. *See* Testimony of Sonja Sax at SS-9. The South Coast Air Quality Management District is home to approximately 17 million people and another over 4 million people live in the San Joaquin Valley Air Pollution Control District, including SoCalGas ratepayers. *See,* South Coast Air Quality Management District (SCAQMD), AQ-SPEC – Air Quality Sensor Performance Evaluation Center, *available at:* https://www.aqmd.gov/aq-spec/aboutscaqmd; *see also,* San Joaquin Valley Air Pollution Control District, *2024 Air Monitoring Network Plan* (July 1, 2024), *available at:* https://ww2.valleyair.org/media/12lbj31l/sjvapcd-2024-air-monitoring-network-plan.pdf.

211 OCED, *The Economic Consequences of Outdoor Air Pollution* (June 9, 2016), *available at:* https://www.oecd.org/en/publications/the-economic-consequences-of-outdoor-air-pollution_9789264257474-en.html.

related illnesses such as cardiovascular and respiratory conditions, account for significant healthcare costs. These illnesses were estimated to cause 107,000 premature deaths and estimated $820 billion in annual healthcare costs.[212] Overall, the benefits of reducing air pollution far outweigh the costs, leading to substantial savings and a healthier, more productive economy.

CARB has reported that implementing its 2022 Scoping Plan, which calls for the use of clean renewable hydrogen as a new option for hard-to-electrify end uses, would result in an estimated $75 billion in 2035 and $189 billion in 2045 for avoided $PM_{2.5}$ alone, and that the highest portion of the benefits are observed in DACs.[213] In accompanying testimony, Dr. Sax describes how the reductions in exposure to pollutants estimated in the Phase 1 studies can have significant health benefits, particularly avoided premature mortality (mainly respiratory and cardiovascular mortality) from reduced PM2.5 and NOx emissions, and that economic benefits associated with avoided premature mortality alone could range from approximately $183 million to $552 million (in 2018 dollars) per year by 2045—again, with the highest benefits accruing to DAC communities.[214]

ARCHES has similarly described substantial environmental and public health benefits associated with the California Hydrogen Hub. For example, ARCHES has identified that in the

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[212] Clarity*, A deep dive on the economic impacts of air pollution* (July 5, 2023), *available at:* https://www.clarity.io/blog/a-deep-dive-economic-impacts-of-air-pollution.

[213] *See*, e.g., CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (December 2022) at 132, *available at:* https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf (Figure 3-6: Total health benefits estimated from air quality improvements in the Scoping Plan Scenario).

[214] Testimony of Dr. Sonja Sax at SS-1. Benefits are likely to be higher as this analysis does not quantify the health impacts from reduced emissions of other air pollutants (e.g., O_3) or other potential avoided health outcomes (e.g., respiratory and cardiovascular hospital admissions or emergency room visits). *Id.*

San Joaquin Valley, home to numerous DACs with disproportional pollution burdens[215] and where vehicle emissions comprise about half of measured airborne $PM_{2.5}$,[216] emissions could be reduced by replacing diesel fuel with clean renewable hydrogen. ARCHES has quantified substantial benefits associated with the California Hydrogen Hub, including: $2.95 billion/year in health cost savings; 6,900 MMTPY less NOx; 326 MMTPY less PM_{10} and $PM_{2.5}$; 13,292 fewer days of work lost per year; 2,097 fewer hospitalizations per year; and 48 fewer premature deaths per year.[217]

C. Job Creation Benefits

Adoption of clean renewable hydrogen presents an opportunity to create new jobs, including for skilled energy industry workers to "transition to new renewable clean hydrogen jobs requiring similar capabilities."[218] As described *supra*, based on current assumptions, Angeles Link is expected to result in an estimated 53,000 direct construction-related jobs at peak and 75,000 jobs at peak if indirect as well as induced impacts are considered. While the analysis does not specifically identify union jobs, it is relevant to note that in excess of 90% of the construction workforce on an upcoming SoCalGas infrastructure project is expected to be union represented.

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215 San Joaquin Valley Regional Planning Agencies, *Environmental Justice*, *available at:* https://sjvcogs.org/general-plans-findings-recommendations/environmental-justice/.

216 ARCHES H2, *ARCHES Community Benefits Plan* at 5 (November 2023), *available at:* https://archesh2.org/wp-content/uploads/2023/11/ARCHES_CB_PROPOSAL_for-release.pdf.

217 *Id.* at 1.

218 ARCHES H2, *White Paper Overview* at 7 (2024), *available at*: https://archesh2.org/wp-content/uploads/2024/08/ARCHES-White-Papers-Overview-8.8.24.pdf.

For the California Hydrogen Hub, ARCHES has estimated the hub will result in 222,400 new jobs.[219] These new jobs include opportunities such as operations, architectural, and engineering managers; health and safety professionals; and social and community service workers.[220] ARCHES further expects creation of new jobs as power plant operators, mechanics, installers and repairers, and supervisors, as well as a rise in occupations such as water treatment operators, inspectors, truck drivers, sales representatives, clerks, laborers, and movers.[221]

D. Stakeholders Benefit from SoCalGas's Commitment to a Transparent Process

SoCalGas has demonstrated a strong commitment to transparency and stakeholder engagement throughout Phase 1 of Angeles Link and proposes to continue and expand that engagement in Phase 2. The Phase 1 stakeholder engagement process was pivotal in providing SoCalGas with valuable insights and establishing the foundation for a community-centric approach to addressing environmental justice concerns within the development framework for Angeles Link. Because the varied PAG and CBOSG members have specific areas of focus, they offered perspectives that enhanced SoCalGas's overall planning for Angeles Link and strategies to address its possible impacts. This engagement process led to SoCalGas gaining a deeper understanding of community needs, concerns, and priorities related to Angeles Link, such as workforce development, improved air quality, and economic advancement opportunities. The

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219 ARCHES H2, *ARCHES Community Benefits Plan* at 8 (November 2023), *available at:* https://archesh2.org/wp-content/uploads/2023/11/ARCHES_CB_PROPOSAL_for-release.pdf.

220 *Id.*

221 *Id.* ARCHES anticipates, on average, these positions will earn $85,554 - $145,600 annually based on expected hourly wages in 2030 of $41 - $70. *Id.*

Phase 1 stakeholder engagement process established productive working relationships with stakeholders and resulted in valuable feedback for the Phase 1 studies.[222]

The stakeholder engagement process emphasized the inclusion of disadvantaged communities and environmental justice concerns. For example, based on feedback to minimize impacts on DACs, SoCalGas added a route variation for further consideration in Phase 2, along with the four potential directional route configurations to reduce the extent of the pipeline route located in DACs.[223]

Furthermore, consistent with the Phase 1 Decision's requirement for SoCalGas to identify plans for "addressing and mitigating impacts to disadvantaged communities and other environmental justice concerns" prior to incurring costs for Phase 2,[224] SoCalGas developed the community-focused ESJ Plan in response to and with stakeholder feedback. The ESJ Plan identifies engagement approaches or mechanisms recommended by CBOSG members for SoCalGas to draw upon in Phase 2 to support ESJ stakeholder engagement efforts. CBOSG member Soledad Enrichment Action stated in a letter: "The proactive approach SoCalGas has taken in developing the ESJ Plan, which includes engaging with community-based organizations, faith-based groups, and other stakeholders, is all about doing this once and doing it right. This commitment to transparency and community engagement, particularly in disadvantaged communities, ensures that the voices of those most adversely impacted by environmental and social justice issues are heard and included."[225] SoCalGas looks forward to implementing the

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222 Consolidated Report at 18.

223 *Id.* at 12-13.

224 Phase 1 Decision at 76 (OP 6(l)).

225 SoCalGas, *Angeles Link Q3 2024 Quarterly Report (Phase One) for the Period July 1, 2023, through September 30, 2024* at 260, *available at:* https://www.socalgas.com/sites/default/files/Appendix_3_SoCalGas-Response-to-Comments.pdf.

ESJ Plan in Phase 2 to further gather feedback from communities historically overlooked in typical project development processes with the goal to minimize and address potential impacts.

E. Angeles Link Could Promote the Affordability of the Clean Energy Transition

As described in the Affordability Framework and *supra*, and commensurate with the urgency to act and the benefits to be realized, neither the costs of the clean energy transition, nor the costs of not acting, are expected to be insignificant. Angeles Link could support the affordability of the clean energy transition, particularly because clean renewable hydrogen could support multiple decarbonization pathways.

As set forth in the Affordability Framework, CARB's modeling of its Proposed Scenario estimated that achieving the 2022 Scoping Plan's decarbonization targets would result in annual costs of $21 billion in 2035 and $22 billion in 2045.[226] Although the No Combustion Scenario was excluded from the final scoping plan, CARB's draft plan estimated it could cost $59 billion in 2045—approximately double the estimated annual cost of the Proposed Scenario, which includes renewable hydrogen as a key resource.[227]

The expected costs of *not* decarbonizing must also be considered in assessing affordability. For example, CARB's 2022 Scoping Plan estimates social costs—which CARB defines as the costs of an action on people, the environment, or society—in terms of avoided economic damages, for each measure considered in the Scoping Plan Scenario. CARB estimates

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[226] *See* Affordability Framework at 7; *see also*, CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (December 2022) at 121, *available at:* https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf.

[227] *Id.,* Appendix H at 112, *available at:* https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents (Alternative 1 in Figure H-24: Direct costs from PATHWAYS in a single year relative to the Reference Scenario for the Proposed Scenario (Alternative 3) and Alternatives in 2035 and 2045).

that the avoided economic damages of decarbonizing the industrial energy supply alone could exceed $2.5 billion in 2045, and that the avoided economic damages from the total Scoping Plan Scenario in 2045 could reach almost $24 billion.[228] The 2022 Scoping Plan estimates statewide cumulative health benefits of $78 billion in 2035 and $199 billion in 2045 due to reductions in hospitalizations, asthma cases, and lost work and school days.[229] The federal Office of Management and Budget found that the federal government could spend an additional $25 billion to $128 billion annually due to climate-related risks.[230] "Thus, unmitigated climate change is expected to leave a more significant imprint on the Federal budget over the course of this century."[231] On the other hand, the benefits of achieving net-zero GHG emissions are substantial: for example, a recent UCLA study found that the monetary savings of achieving net-zero GHG emissions in California by 2050 exceed the costs by $109 billion per year.[232]

Clean firm power (such as power generated from clean renewable hydrogen), in combination with traditional renewable resources, provides the most cost-effective way to achieve the State's decarbonization goals and maintain energy system reliability and resiliency,

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228 CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (December 2022) at 151 (Table 3-9), *available at:* https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf .

229 *See,* e.g., *id.* at 132 (Figure 3-6: Total health benefits estimated from air quality improvements in the Scoping Plan Scenario).

230 OMB, *Federal Budget Exposure to Climate Risk* (April 2022) at 277, *available at:* https://www.whitehouse.gov/wp-content/uploads/2022/04/ap_21_climate_risk_fy2023.pdf. In addition, the IEA has found that the cost of inaction disproportionately affects low- and middle-income populations because it increases the costs or reduces the reliability of services. *See* IEA, *Strategies for Affordable and Fair Clean Energy Transitions* (2024) at 62-63, *available at*: https://iea.blob.core.windows.net/assets/86f2ba8c-f44b-494a-95cc-e75863cebf95/StrategiesforAffordableandFairCleanEnergyTransitions.pdf.

231 OMB, *Federal Budget Exposure to Climate Risk* (April 2022) at 277, *available at*: https://www.whitehouse.gov/wp-content/uploads/2022/04/ap_21_climate_risk_fy2023.pdf.

232 UCLA – Sustainable LA Grand Challenge, *Environmental and Public Health Benefits from Achieving Sustainable Energy in California*, *available at:* https://sustainablela.ucla.edu/research-portal/project/environmental-and-public-health-benefits-achieving-sustainable-energy.

particularly as demand for electricity grows and intermittency must be managed effectively.[233] A study by the Environmental Defense Fund, E3, and groups from Princeton University and Stanford University (EDF/E3 Study) demonstrates that traditional "[r]enewable energy can inexpensively provide at least half of the carbon-free energy needed by 2045, but clean firm technologies complement [traditional] renewable energy to ensure reliability while keeping whole system costs low."[234] The EDF/E3 study shows that an all-renewable decarbonization scenario is estimated to cost approximately 15 cents per kilowatt-hour (kWh).[235] That cost, however, could be reduced to approximately 7-10 cents per kWh if renewable energy provides about half of the carbon-free energy needed by 2045, with clean firm technologies complementing the portfolio.[236] The EDF/E3 study concludes that having more than one clean firm power option helps reduce costs even further.[237] CARB's 2022 Scoping Plan concludes that clean renewable hydrogen is needed to replace natural gas and diesel in heavy-duty transport and industrial applications[238] and identifies the need for a more diverse portfolio of clean energy resources to "maintain reliability and affordability" in the electric generation sector—particularly those resources that can provide clean firm power when solar and wind cannot.[239]

As discussed *supra*, DOE considers open access for pipeline transport and storage of hydrogen to be "the key trigger to enable low-cost hydrogen energy storage for long duration and

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233 EDF/E3, *Clean Firm Power is the Key to California's Carbon-Free Energy Future* (March 24, 2021), *available at*: https://issues.org/california-decarbonizing-power-wind-solar-nuclear-gas/.

234 *Id*.

235 *Id*. (*see* Figure 2).

236 *Id.*

237 *Id.*

238 CARB, *2022 Scoping Plan for Achieving Carbon Neutrality* (December 2022) at 73-74, 78, 190, 207, 209, *available at*: https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf.

239 *Id*. at 198.

for resilience events." DOE also notes that "an open-access H2Hub in a region with net-zero grid requirements could likely use hydrogen for long term and seasonal storage for otherwise curtailed power."[240] Given that the key attributes of clean renewable hydrogen allow it to support multiple decarbonization pathways, and that pipelines are the most cost-effective means to transport hydrogen at scale, an investment in Angeles Link can promote the affordability of California's clean energy transition.

V. PHASE 2 ACTIVITIES MUST COMMENCE PROMPTLY TO ALIGN WITH THE CALIFORNIA HYDROGEN HUB

A. Phase 2 Activities

Based on the results of the Phase 1 studies, SoCalGas now proposes to conduct Phase 2 activities, which include (i) conducting analyses to identify a preferred system route; (ii) conducting refined and additional analyses (including refined system design, safety, environmental, and related work) to advance Angeles Link to a 30% engineering design; (iii) developing a Class 3 estimate; (iv) conducting programmatic activities (e.g., establishing project governance, developing workforce, training, and risk management plans, and affordability considerations and economic analyses); and (v) conducting stakeholder and community engagement activities.[241] These activities are necessary to be able to develop future permit

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[240] DOE, *Pathways to Commercial Liftoff: Clean Hydrogen* (March 2023) at 41, *available at*: https://liftoff.energy.gov/wp-content/uploads/2023/03/20230320-Liftoff-Clean-H2-vPUB.pdf; *see also id.* at 39.

[241] All Phase 2 activities will be conducted for all of Angeles Link. The Phase 1 Decision requires "[c]ompliance with California environmental law and public policies." (Phase 1 Decision at 77 (OP 6(n)).) CEQA and NEPA both prohibit the segmentation of projects to ensure that environmental reviews are comprehensive and not circumvented by dividing a larger project into smaller components. This prohibition ensures that the full scope of a project is evaluated in its entirety so that environmental impacts are not minimized. Thus, like Phase 1, Phase 2 will continue to analyze the whole of Angeles Link, so that the information required for future environmental analyses during the permitting process will be appropriately developed.

applications, including an application for a CPCN, which must be obtained prior to construction. SoCalGas estimates Phase 2 activities will take approximately 30 months following a Commission decision on this Application to complete and will cost approximately $266 million dollars fully loaded.[242]

1. *Engineering Design and Related Activities*

As described in the Testimonies of Amy Kitson and Brian Walker, Phase 2 would commence with activities to identify a preferred system route for Angeles Link. SoCalGas proposes to build on the activities conducted during Phase 1 to gather additional data and refine initial findings that will help inform the selection of a preferred pipeline route for Angeles Link. After the preferred system route is selected, preliminary studies would be conducted and technical details and other requirements needed to conduct a Front End Engineering and Design (FEED) would be advanced. The FEED study would bring Angeles Link's engineering design to approximately 30%. Reaching this level of design maturity facilitates development of a detailed schedule of activities and a Class 3 cost estimate. As described in the Testimony of Neil Navin and discussed further *infra*, the timing to achieve this level of planning and design is necessary to align with ARCHES' and DOE's expectations for the California Hydrogen Hub.[243]

To support the FEED-related work and development of a Class 3 estimate, SoCalGas proposes to refine and conduct additional analysis on topics such as route selection, compressor station siting and selection, system operational needs, pipeline and equipment materials, hydrogen integrity program development, technology readiness, data management and

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242 *See* Testimony of Brian Walker at BW-1.

243 DOE, *Funding Opportunity Announcement DE-FOA-0002779* (September 22, 2022) at 19, *available at:* https://oced-exchange.energy.gov/FileContent.aspx?FileID=40a1ff87-622d-4ef5-8d7c-89bfe089fd11.

information systems, cybersecurity, third-party connections, and in-depth demand and production evaluations. In addition, environmental, land and right-of-way, and stakeholder engagement activities to further inform engineering design are planned to collect pertinent project data.[244] SoCalGas also proposes to conduct other activities to support design and development of Angeles Link, such as developing a risk registry and risk management program, safety plan, engineering design and material specifications, hydrogen-specific gas standards, workforce development and training plans, an initial operations plan, a framework for data management and informational technology, and a cybersecurity assessment and plan. Further, in response to stakeholder feedback in Phase 1, SoCalGas proposes to conduct an economic analysis that will integrate updated market data and the route selected to estimate the expected levelized cost of hydrogen to be delivered by Angeles Link, which in turn can help inform appropriate rate design.

2. *Stakeholder Engagement*

As detailed in the Testimony of Amy Kitson, in Phase 2, SoCalGas will build upon its Phase 1 stakeholder engagement activities to meet with and solicit input from a broader range of stakeholders, including communities, their representatives, and tribal governments along potential routes. SoCalGas proposes to continue convening stakeholders, including a PAG, to meet at major project milestones, but no less than quarterly. Additionally, SoCalGas plans to expand PAG membership to include organizations from outside the Los Angeles Basin that represent communities and stakeholders near the proposed routes evaluated in Phase 2. SoCalGas plans to invite Phase 1 PAG and CBOSG members to participate in the Phase 2 PAG and also convene public community meetings. The PAG would be invited to provide input on route selection, community engagement, community benefits, and other Phase 2 activities of

[244] Testimony of Brian Walker at BW-2.

interest to stakeholders (e.g., safety and workforce training and development strategy). In addition, SoCalGas will utilize the ESJ Plan to inform its community engagement efforts and, similar to Phase 1, SoCalGas plans to compensate CBOs for their participation in the Phase 2 stakeholder engagement process.

3. *Regulatory and Project Management*

As described in the Testimony of Amy Kitson, SoCalGas will continue to manage compliance with Commission directives and reporting requirements during Phase 2. SoCalGas will also manage engagement with ARCHES to support the California Hydrogen Hub. And, as set forth in the Affordability Framework, SoCalGas will continue activities to address the affordability of Angeles Link.

SoCalGas will establish project management and reporting standards applicable to Angeles Link activities. SoCalGas will provide oversight at a programmatic level by developing and implementing controls including scope management, master program schedule tracking, program-wide documentation management, and financial reporting. SoCalGas will also implement and monitor proactive cost management processes by utilizing various tools to standardize cost, schedule, and risk reporting.

4. *Phase 2 Schedule and Costs*

The Phase 2 activities are expected to take approximately 30 months following a Commission decision on this Application to complete, with a total cost forecast of $265.5 million fully loaded.[245]

[245] As described in the Testimony of Nasim Ahmed and Michael W. Foster, the "fully loaded" costs are inclusive of direct costs, overheads approved in SoCalGas's applicable general rate case, and escalation for inflation. A revenue requirement is calculated with adjustments to fully loaded costs to account for other costs required to support the expenditures (e.g., working cash and franchise fees and uncollectibles).

Angeles Link	2025				2026				2027				2028			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Contracting Activities																
Contracting Activities																
Phase 2 - Pre-FEED/FEED																
Pre-FEED																
Route & Facilities Planning																
Compressor Station Study																
FEED																
Route & Facilities Design																
Compressor Station Design																

Figure 8. Angeles Link Phase 2 Schedule[246]

The schedule is anticipated to be iterative in nature and will be adjusted during the course of pre-FEED and FEED as new information is obtained, such as when the preferred system route is selected and pre-FEED activities are completed.

As discussed in the Testimony of Brian Walker, SoCalGas developed a cost forecast to complete Phase 2 pre-FEED, FEED, and Class 3 cost estimating activities using AACEi principles and common practices associated with projects in development. For these activities, SoCalGas developed an activity-based bottom-up approach to identify direct costs. As discussed in the Testimony of Amy Kitson, cost forecasts for certain project development and programmatic activities were estimated by using a zero-based forecast methodology for company labor estimates and industry best practice for external resources. As with all project estimates, the forecast for Phase 2 work includes assumptions, constraints, uncertainty, and perceptions of risk. Considering risks and the current maturity level of Angeles Link, estimated at about 1%, a contingency amount was included with the forecast.[247] Using the AACEi contingency

[246] *See* Testimony of Brian Walker at BW-19.

[247] Contingency is "an amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in aggregate,

methodology, SoCalGas identified an average contingency percentage that was included in the forecasts presented herein. This percentage is within the range of expected contingency for projects that are in a preliminary stage of development and reflects SoCalGas's careful consideration of risks.[248] Contingency is expected to be expended during the execution of Phase 2; however, it is not a provision to cover major or cardinal changes in scope or execution.

Total Forecasted Cost Summary (in Millions)					
Phase 2 Activity	**2025**	**2026**	**2027**	**2028**	**Total**
Contracting Activities (Non-Labor)	$1.8	-	-	-	$1.8
Project Development and Programmatic Activities (Non-Labor)	-	$11.2	$11.2	$5.6	$28.0
Engineering Design Services (Non-Labor)	-	$50.7	$79.2	$45.2	$175.1
Company Labor	$2.2	$9.8	$11.3	$5.5	$28.8
Total Direct O&M Costs	**$4.0**	**$71.7**	**$101.8**	**$56.2**	**$233.6**
Total Fully Loaded O&M Costs	**$5.7**	**$81.2**	**$115.0**	**$63.6**	**$265.5**

Table 1. Summary of Phase 2 Costs

B. California Hydrogen Hub Timing Requirements

Phase 2 activities must be commenced promptly to best position SoCalGas and Angeles Link to support meeting ARCHES' and DOE's timeline for the California Hydrogen Hub to be

in additional costs." AACEi, *Recommended Practice 10S-90: Cost Engineering Terminology* (July 24, 2024) at 31, *available at:* https://web.aacei.org/docs/default-source/rps/10s-90.pdf. Contingency is "typically estimated using statistical analysis or judgment based on past asset or project experience." *Id.*

[248] The Commission has ruled in SoCalGas's favor regarding the estimation of contingency in this manner in both D.19-03-025 and D.19-09-051.

operational. As discussed below, DOE's funding for the California Hydrogen Hub is contingent on certain project milestones being met in accordance with a set timeline, and ARCHES envisions facilities and infrastructure—including portions of Angeles Link—to begin being operational by December 31, 2033.

According to DOE's Funding Opportunity Announcement DE-FOA-0002779 (FOA) to solicit applications for regional H2Hubs to receive federal funding from the IIJA, DOE funding for the H2Hubs is divided into a four-phased structure intended to manage scope, schedule, deliverables, and budget for each hub. DOE Phase 1 involves "detailed project planning" and encompasses initial planning and analysis activities to ensure that the overall H2Hub concept is technologically and financially viable. Deliverables for this first phase include FEED (approximately 30%) and a Class 3 cost estimate. DOE has stated that applicants should plan approximately 12-18 months for DOE Phase 1, depending on the extent of advanced planning and analysis each team has already completed.[249] As discussed in the Testimony of Brian Walker, Angeles Link Phase 2 would generally match these technical design requirements.

DOE Phase 2 is the "project development, permitting, and financing" phase where H2Hubs will finalize engineering designs and business development, site access, labor agreements, permitting, offtake agreements, and community engagement activities. DOE expects that DOE Phase 2 activities will take up to 2 to 3 years.[250] This phase would be equivalent to seeking a CPCN and similar activities.

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[249] DOE, *Funding Opportunity Announcement DE-FOA-0002779 FOA* (September 22, 2022) at 20, *available at:* https://oced-exchange.energy.gov/FileContent.aspx?FileID=40a1ff87-622d-4ef5-8d7c-89bfe089fd11.

[250] *Id*. at 20-21.

DOE Phase 3 is the "installation, integration, and construction" phase. DOE expects that DOE Phase 3 activities may take approximately 2 to 4 years, but applicants may propose shorter or longer durations as long as the overall H2Hub project length does not exceed 12 years.[251] Finally, DOE Phase 4 is the "ramp-up and sustained operations" phase, where H2Hubs are intended to reach full operation including data collection to analyze the H2Hub's operations, performance, and financial viability. DOE expects that DOE Phase 4 activities may take approximately 2 to 4 years but may extend longer depending on H2Hub-specific characteristics, including factors such as the rate of production ramp-up.[252]

Angeles Link is an integral part of the California Hydrogen Hub. Aligning the timing of Angeles Link with ARCHES' project development schedule and the timing expectations of DOE can best leverage federal funds for the benefit of all Californians, including SoCalGas ratepayers, and unlock the hydrogen economy. SoCalGas intends to support meeting timing and schedule goals for the California Hydrogen Hub, such as through information sharing on market development, community engagement, permitting and approvals support, and other technical cooperation.

The following timeline overlays the DOE phases with SoCalGas's expected schedule to conduct future activities to advance Angeles Link. This schedule shows the activities that must occur for the Hub Segments to be operational by the end of 2033. Based on currently known information, in order for SoCalGas to be best positioned to support the California Hydrogen Hub, SoCalGas must adhere to this schedule.[253]

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[251] *Id*. at 21.

[252] *Id*. at 22.

[253] As noted elsewhere, prompt review for permitting will also be required.

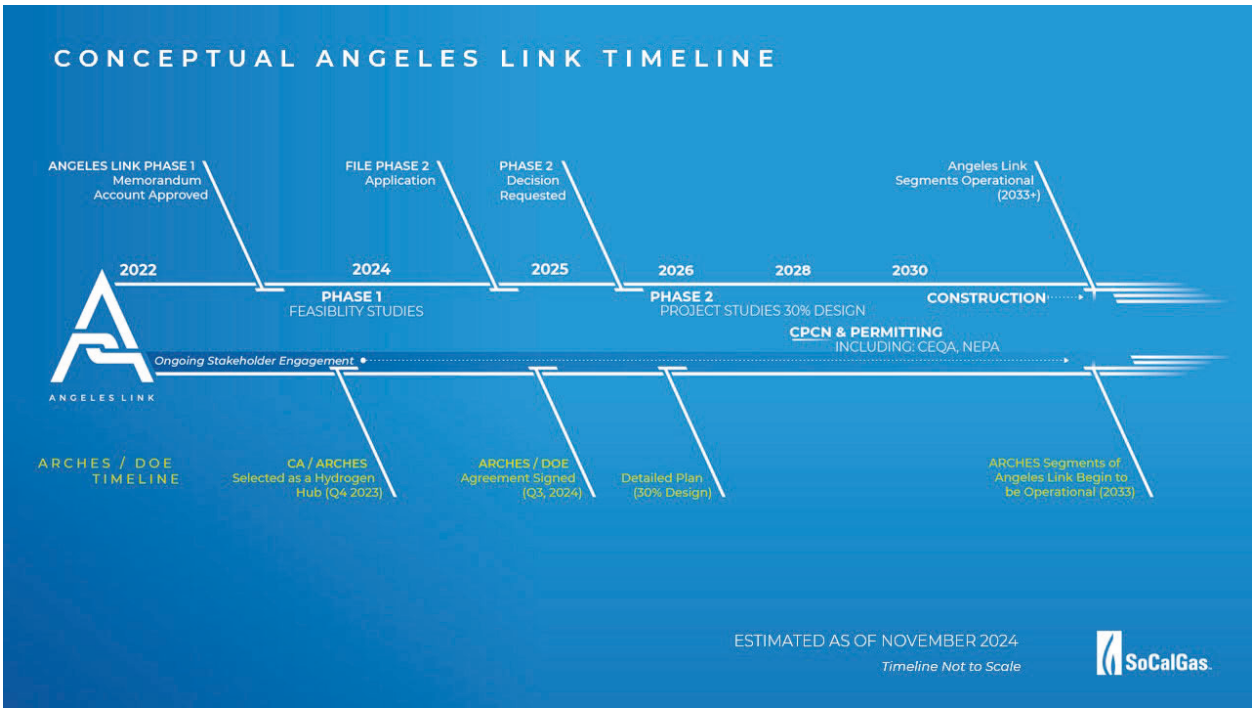

Figure 9. Conceptual Angeles Link Timeline

The Public Advocates Office recently analyzed the development timelines of approved and commissioned electric transmission projects to understand development bottlenecks and found "the average project took over a decade to be built and a comparatively short period was spent on physical construction."[254] It found further: "The majority of the project development time was attributable to planning and review, by both oversight agencies and project developers. For example, project developers spent a notable amount of time outside of official regulatory review processes to conduct detailed engineering, business development, and environmental analyses. These activities are necessary to complete project application for the California Public Utilities Commission-led economic and environmental reviews."[255] Similar timeframes are

254 The Public Advocates Office, *Transmission Project Development Timelines in California* (June 12, 2023) at 1, *available at:* https://www.publicadvocates.cpuc.ca.gov/press-room/reports-and-analyses/transmission-project-development-timelines-in-california.

255 *Id.*

anticipated for Angeles Link. Accordingly, in order for SoCalGas to be positioned to meet ARCHES' operational goal of December 31, 2033 for the California Hydrogen Hub, and assuming permitting streamlining, SoCalGas would need to commence Phase 2 activities at the start of 2026.[256]

VI. AUTHORIZING A REVENUE REQUIREMENT WITH BROAD ALLOCATION ACROSS RATEPAYERS SUPPORTS THE AFFORDABILITY OF PHASE 2 COSTS

This Application and the supporting testimony present a detailed cost forecast for Phase 2 activities for Commission review and approval. To promote fairness to the utility and the affordability of Phase 2 costs for ratepayers, and in light of the benefits to all SoCalGas ratepayers, SoCalGas requests that the Commission authorize SoCalGas to (a) create the interest-bearing ALBA, effective as of the date of this Application, to record authorized and actual operating and maintenance (O&M) costs incurred for later refund or review for reasonableness by the Commission; (b) implement a revenue requirement to recover those forecasted costs as they are incurred rather than in a lump sum following a reasonableness review to smooth any increases in rates over time and save ratepayers an estimated $31 million in accrued interest; and (c) allocate the forecasted costs for Phase 2 activities broadly across all ratepayers using the ECPT cost allocation methodology to minimize costs for residential customers. All Phase 2 activities proposed herein are O&M expenses, and thus reflect the actual cost to SoCalGas without any return on investment.

[256] Testimony of Neil Navin at NN-31.

This cost recovery proposal is a change from the approach for Phase 1 activities, where SoCalGas was authorized to record up to $26 million[257] in the ALMA for consideration in a future reasonableness review. Given the more significant investment required for Phase 2, and the imperative to support the California Hydrogen Hub in a timely fashion, a revenue requirement is a more prudent approach for Phase 2. As discussed below, the Commission's approval of a revenue requirement based on an authorized forecast is a sensible exercise of regulatory authority that upholds fairness for SoCalGas and its ratepayers. It is a balanced approach that secures financial savings for ratepayers by mitigating long-term debt and associated high interest rates and also provides a stable financial platform for SoCalGas to continue its vital work in decarbonization on the accelerated basis required by the California Hydrogen Hub, thereby contributing to California's clean energy future while maintaining rate stability and promoting affordability. By authorizing a revenue requirement for the forecasted costs of Phase 2, the Commission would be supporting SoCalGas's critical role in the California Hydrogen Hub and the positive impact it can have on California's hydrogen economy more broadly while affirming its commitment to the State's sustainable energy goals, and the protection of ratepayer interests while supporting the utility's fiscal health.

Adopting the cost recovery proposal offered by SoCalGas for Phase 2 activities will result in ratepayers saving an estimated $31 million in foregone interest accrual. To illustrate the impact, the average residential customer bill of 37 therms/month would increase by $12.60 over the course of 3 years, or an average of about $0.35 per monthly bill during that period. To contextualize the rate impact of proceeding to Phase 2 activities, the Public Purpose Program

[257] The Commission also authorized SoCalGas to file a Tier 2 Advice Letter to seek up to an additional 15% upon demonstration that the increase is needed to complete Phase 1 activities. (Phase 1 Decision at 75 (OP 4).)

Surcharge (PPPS) for the average residential customer would be about $190 over the same 3-year period at current PPPS levels, or about $5.28 per monthly bill during that period—about 15.5 times higher than the expected impact from Phase 2 activities[258].

SoCalGas presents a comprehensive set of affordability metrics in the Testimony of Michael W. Foster. These metrics are designed to assess the financial impact on ratepayers and demonstrate that the proposed cost recovery remains within reasonable bounds.

The affordability metrics include the Affordability Ratio (AR) and the Hours at Minimum Wage (HM) metrics, which provide an analysis of the financial burden on households across different climate zones. Specifically, the AR metrics quantify the percentage of a household's discretionary income required to cover essential utility services, while the HM metrics calculate the number of hours a minimum wage worker would need to work to pay their monthly gas bill.

For the peak year of 2027, the analysis indicates that the implementation of Phase 2 costs will result in a modest increase in essential usage bills. For instance, the average residential customer in Zone 1 will experience an increase of approximately 0.2% in their essential usage bill, translating to an additional $0.07 per month,[259] while the AR50 metric for Zone 1 is projected to decrease by 3.1%.[260]

Furthermore, the testimony highlights the impact of the CARE program, which provides significant discounts to low-income households, thereby supporting affordability. Incorporating the CARE discount results in an average HM metric of 1.79 hours in peak year 2027 for customers in SoCalGas's service territory rather than an average HM metric of 2.44 hours in

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[258] *See* SoCalGas Advice Letter 6216-G for Public Purposes Program Surcharges, *available at* https://tariffsprd.socalgas.com/view/filing/?utilId=SCG&bookId=GAS&flngKey=4636&flngId=6216-G&flngStatusCd=Approved.

[259] Testimony of Michael Foster at MWF-3.

[260] *Id.* at MWF-14.

2027 without taking into account the CARE discount, reflecting fewer hours worked at minimum wage to pay monthly gas bills.[261]

The energy burden analysis considers the percentage of income spent on an energy bill and isolates the impact of the revenue requirement requested herein.[262] It demonstrates that, over the course of the revenue recovery period for the costs sought in this Application, the energy burden metrics improve. This shows that considering the incremental revenue requirement sought in this Application, essential gas bills for customers in both the 50th and 20th income percentiles will decline as a percentage of income, namely 11.9% and 11.7%, respectively, compared to current rates.[263]

The detailed analysis provided in the testimony supports the conclusion that the cost recovery proposal is fair and equitable, balancing the need to make timely investments to support a clean energy future with the imperative of maintaining affordable utility services for all customers.

A. Authorizing a Revenue Requirement Supports Affordability

Authorizing a revenue requirement promotes fairness to both SoCalGas and ratepayers. Ratepayers would experience reduced costs stemming from the various financial benefits associated with a revenue requirement, including avoidance of interest paid on balances of accumulated costs if they were to be recorded and later subject to an after-the-fact reasonableness review, and improved annual cash flow operation. Moreover, the impact of rate recovery would be smoothed over time.

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[261] *Id.* at MWF-15.

[262] *Id.* at MWF-15 to MWF-16.

[263] *Id.* at MWF-16 to MWF-17.

Ratepayers would avoid interest costs—approximately $31 million—if a revenue requirement is authorized based on the cost forecast. Additionally, implementing a revenue requirement stabilizes customer rates by spreading the recovery of Phase 2 costs over time, namely 36 months, as the costs are incurred. This approach helps mitigate potential bill volatility that could arise from implementing all Phase 2 costs, following a reasonableness review, at one time. Concurrent cost recovery also contributes to improved utility cash flow and reduces financing costs, which also benefit ratepayers. In addition, mitigating the risk of under-collection supports SoCalGas's creditworthiness, thus minimizing adverse impacts on its ability to secure financing at reasonable cost. Accordingly, authorizing a revenue requirement based on an approved forecast fosters financial resilience and reinforces regulatory measures aimed at promoting utility cash flows and consumer protection. Implementing a forecast revenue requirement also allows SoCalGas to maintain adequate and timely cash flow to fund the work needed to develop Angeles Link in alignment with DOE's and ARCHES' timeline.

B. Broad Cost Allocation Is Warranted by Far-Reaching Benefits and Supports Affordability

The broad socialization of Phase 2 costs across all classes of ratepayers is well-supported by the extensive benefits that Phase 2 activities and Angeles Link could offer to the energy system, the environment, and the health of all SoCalGas ratepayers. SoCalGas is embarking on a transformative project which can be a cornerstone in California's transition to a sustainable and resilient energy future. As described above and in testimony, Angeles Link could deliver a multitude of benefits—recognized by the Commission as being in the public interest—not only to direct users of the clean renewable hydrogen flowing through Angeles Link but to all SoCalGas ratepayers, by contributing to energy reliability and resiliency, decarbonization, air quality, and public health. Accordingly, SoCalGas requests that the costs associated with Phase 2

activities be allocated among all SoCalGas ratepayers using the ECPT cost allocation methodology.

The ECPT cost allocation method allocates costs across customer classes based on each customer class's respective share of total average year gas demand forecast. This methodology allows for allocated costs to be distributed more in alignment with gas consumption as opposed to costs of gas service (i.e., where the allocation of costs is tied to expenses incurred to serve each customer class). ECPT assigns less proportionate cost to core customers, particularly residential customers, relative to methodologies based on cost of gas service, thus supporting affordability through relatively lower residential bill impacts.[264] This approach reduces costs to any single class of ratepayers and aligns with Commission precedent, which underscores the principle that all ratepayers should share in the costs of projects that benefit energy system reliability and resiliency, reduce GHG emissions, and inform future State or regulatory action.[265]

SoCalGas is taking a pioneering role in the clean renewable hydrogen space with Angeles Link, setting a precedent for future clean renewable hydrogen infrastructure projects. As a "first mover," Angeles Link will serve as a key example for open-access hydrogen pipeline transport systems dedicated to public use, which are essential for kickstarting and scaling the hydrogen economy. SoCalGas proposes this cost allocation methodology solely for the Phase 2 activities

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[264] The ECPT cost allocation method allocates costs across customer classes based on each customer class's respective share of total average year gas demand forecast from the most recent Triennial Cost Allocation Proceeding decision, D.20-02-045. The current allocation split is 38.7% to core customers, of which 25.7% is allocated to the residential class, and 61.3% is allocated to non-core customers.

[265] *See, e.g.,* D.06-12-032 (decarbonization and education benefits), D.24-01-032 (system reliability benefits as well as learnings to inform future action), D.21-01-018 (resiliency benefits for disadvantaged communities and vulnerable populations as well as production of information to inform future regulatory action), D.22-09-026 (GHG reductions benefits supportive of the State's climate goals); D.23-12-036 (reliability benefits); D.22-11-040 (market transformation benefits); and D.23-04-034 (resiliency and public welfare benefits).

covered in this Application; as Angeles Link advances and specific end users are identified, it may become appropriate to allocate costs in a more targeted manner in the future. Until such time, broader cost allocation for Phase 2 is appropriate to facilitate and encourage utility investment in groundbreaking decarbonization infrastructure projects like Angeles Link that result in benefits to all ratepayers.

C. A Two-Way Balancing Account Is Fair to Ratepayers and the Utility

Authorizing a two-way balancing account, with costs incurred above the forecast subject to a reasonableness review in a standalone application, general rate case, or other appropriate proceeding, is fair to both ratepayers and the utility because it reimburses the utility for its actual costs and ratepayers are not required to pay any more than those actual costs. If SoCalGas spends less than the amount authorized by the Commission for Phase 2 activities, ratepayers will be refunded in an equal amount, with interest. If the costs of executing Phase 2 activities exceed the amount authorized, SoCalGas would have to first establish the reasonableness of those costs consistent with the Commission's standards before recovering them from ratepayers.

SoCalGas requests that the ALBA be authorized to be effective as of the date of filing this Application. Doing so saves ratepayers money and promotes fairness to the utility by allowing it to be compensated for necessary work. In order to be best positioned to meet ARCHES' timeline for operation of the California Hydrogen Hub, it is important that SoCalGas hit the ground running as soon as the Commission grants the Application. Accordingly, SoCalGas expects to conduct certain critical path contracting activities in 2025. Specifically, SoCalGas will conduct activities to identify technical development and engineering standards for pre-FEED work that will support developing a contracting strategy so SoCalGas can solicit, evaluate, and select bids for key Phase 2 activities that will enable it to commence work on Phase 2 as soon as the

Commission issues a decision in this proceeding.[266] While these activities are neither numerous nor costly, they do take some time to conduct that would impact the overall schedule if deferred (for example, the request for proposal (RFP) process can take 6 months or more from issuance to award). SoCalGas expects these activities will span 12 months and cost an estimated $6 million fully loaded. Conducting these predecessor activities will allow SoCalGas to use the competitive bidding process to secure the best costs and also promptly retain vendors to conduct critical-path work after a decision is issued. Commencing these activities in 2025 not only supports meeting the schedule, but also saves ratepayers money – about $5 million, as described in the Testimony of Brian Walker.

These costs are included in this Application because they are outside the scope of activities authorized by the Phase 1 Decision to be recorded to the ALMA. The Phase 1 Decision sets forth certain requirements regarding recording Phase 2 costs.[267] Accordingly, these Phase 2 costs should appropriately be considered in this proceeding. Moreover, it is well settled that the Commission has the authority to approve an effective date as of the filing of an application.[268]

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266 Awards would only be binding in the event the Commission authorizes Phase 2 activities.

267 "SoCalGas should join other entities that are members of the Alliance for Renewable Clean Hydrogen Energy Systems in support of the State of California's application for the federal funding provided through the IIJA prior to receiving authority to record any Phase Two costs." (Phase 1 Decision at 69 (COL 12).) "In any application SoCalGas files to request authority to record Phase Two costs, SoCalGas should present the required findings from its Phase One studies in that application" (*Id.* at 72 (COL 37).) "If warranted by extraordinary circumstances, such as the need to align with the opportunity for federal funding, it is reasonable to allow SoCalGas to file an application to record Phase Two costs before Phase One studies are concluded." (*Id.* at 72 (COL 38).) "The recording of Phase Two costs is only justified after proper review of Phase One studies." (*Id.* at 72 (COL 39); *see also*, *id.* at 75-77 (OP 6).)

268 *See* D.24-11-010, Application of Pacific Gas and Electric Company for Comprehensive Gas Advanced Metering Infrastructure Replacement Program, A.24-03-011 (November 7, 2024), OP 1 (establishing the Comprehensive Gas Advanced Metering Infrastructure Memorandum Account (GAMIMA) with an effective date of the March 14, 2024, following agreement among PG&E, Cal Advocates, and TURN); D.12-04-021, Order Instituting Rulemaking on the Commission's Own Motion to Adopt New Safety and Reliability Regulations for Natural Gas Transmission and

VII. THE COMMISSION HAS JURISDICTION TO CONSIDER THE APPLICATION

The Commission should confirm its jurisdiction over non-discriminatory open-access pipelines dedicated to public use that transport clean renewable hydrogen—like Angeles Link—now, in order to realize the Phase 2 benefits described above and in the Phase 1 Decision.

The Commission's statutory authority extends to intrastate open-access pipelines dedicated to public use that transport gas that is not propane for light, heat, or power. Hydrogen is a "gas" that Angeles Link would transport for use as "power" (e.g., for power generation or hydrogen fuel cell electric vehicles) and "heat" (e.g., for industrial applications), or both (i.e., for cogeneration). "Public utility" includes "every . . . gas corporation,"[269] which are corporations "owning, controlling, operating, or managing any gas plant for compensation within this state."[270] "Gas plant" includes "all real estate, fixtures, and personal property, owned, operated, or managed in connection with or to facilitate the production, generation, transmission, delivery, . . . or furnishing of gas, natural or manufactured . . . for light, heat, or power."[271] The Commission has interpreted Pub. Util. § 221 broadly to cover facilities, including pipeline systems, that transport or deliver gas, whether natural or manufactured.[272] Further, the

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Distribution Pipelines and Related Ratemaking Mechanisms, R.11-02-019 (April 19, 2012), OP 3 (authorizing SoCalGas and SDG&E to establish a memorandum account for the Pipeline Safety Enhancement Plan (PSEP)); D.23-05-012, Application of Southern California Gas Company and San Diego Gas & Electric Company for Authority, Among Other Things, to Update Their Gas Revenue Requirements and Base Rates Effective January 1, 2024, A.22-05-015 and A.22-05-016 (May 18, 2023), OP 1-3 (authorizing SoCalGas and SDG&E to establish memorandum accounts for tracking 2024 revenue requirements prior to final decision issuance).

269 Pub. Util. Code § 216(a)(1).

270 Pub. Util. Code § 222.

271 Pub. Util. Code § 221.

272 *See In re Sound Energy Solutions* (C.P.U.C. 2004) 2004 WL 2610071, at *13 (determining that a liquefied natural gas storage and gasification facility in Long Beach constituted a "gas plant" subject to Commission jurisdiction); *In re SoCal Edison Co.* (1980) 4 CPUC 2d 195, 1980 WL 128929, at *12 (determining that a coal gasification facility that produced synthesis gas composed of carbon monoxide and hydrogen constituted a "gas plant").

Commission has interpreted "gas" broadly to include any combustible fuel or vapor used to produce heat by burning.[273] Historically, the Commission's jurisdiction has included open-access pipelines dedicated to public use that transported manufactured gas, coal gas, and town gas (each of which included hydrogen). Because hydrogen is a "gas, natural or manufactured," and produces power by heat or burning, as Pub. Util. § 221 contemplates, the Commission has jurisdiction to oversee the planning of a potential hydrogen gas energy system as part of SoCalGas's "gas plant."

Here, there is no question that Angeles Link would be for "public use."[274] SoCalGas intends to dedicate Angeles Link to public use by transporting clean renewable hydrogen to multiple hydrogen end users, including hard-to-electrify industries, electric generation, and the heavy-duty transportation sector. In dedicating Angeles Link to the public use, SoCalGas does not intend to restrict its services to particular individuals or entities based on exclusive contracts or terms of service for reasons that are particular to them, but rather intends to hold the pipeline out to all potential hydrogen producers and end user customers pursuant to Commission-approved tariffs.[275] Accordingly, the Commission has jurisdiction to authorize a revenue requirement to enable SoCalGas to conduct Phase 2 activities regarding Angeles Link.

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[273] *See* General Orders 58-A, 58-B. Notably, Public Utilities Section 221 expressly excludes propane from Commission jurisdiction. There is no such exclusion for hydrogen. The Commission has interpreted the propane exclusion strictly, holding that other gases that may be similar to propane are not so exempt. *See In re SoCal Edison Co.* (1980) 4 CPUC 2d 156, 1980 WL 130264, at *5.

[274] *Richfield Oil Corp. v. Pub. Util. Comm*., 54 Cal.2d 419, 430-431 (1960).

[275] Approval of this Application will only authorize recording costs of planning studies for Angeles Link—operational details, including tariff terms and conditions, will be addressed in the future.

VIII. SUMMARY OF PREPARED TESTIMONY

This Application is supported by the following testimony:

Chapter 1: Maryam Brown presents policy testimony supporting this Application. In particular, this testimony describes the benefits that could be provided by Angeles Link to SoCalGas ratepayers and the communities SoCalGas serves, including making California's clean energy transition more affordable. Accordingly, this testimony also explains why implementing a revenue requirement broadly allocated across all customer classes based on a detailed cost forecast is fair to both the utility and ratepayers.

Chapter 2: Neil Navin presents testimony regarding the Angeles Link pipeline system, including its relationship to the California Hydrogen Hub; Phase 1 activities, including stakeholder engagement and the results of the Phase 1 studies; and timing requirements for proceeding with Phase 2 activities.

Chapter 3: Amy Kitson presents testimony describing the scope and forecasted costs of certain Phase 2 activities, including analyses and studies to inform route selection, scope and project definition (Pre-FEED and FEED), stakeholder engagement, project controls and management activities, and regulatory and compliance activities.

Chapter 4: Brian Walker presents testimony regarding the scope and forecasted costs of Phase 2 engineering design activities that are necessary to advance Angeles Link through route selection, scope and project definition (Pre-FEED and FEED) and develop a Class 3 estimate as well as activities to develop information for permitting.

Chapter 5: Josh Schellenberg presents testimony describing the anticipated increases in electric needs associated with electrification, the value of electric grid reliability and resiliency as the State decarbonizes, and the need for clean firm power to enhance energy system reliability and resiliency. This testimony also describes the anticipated costs of electric outages in

SoCalGas's service territory in the absence of electric system reliability, as well as the network effects of clean renewable hydrogen investments.

Chapter 6: Dr. Sonja Sax presents testimony on the public health benefits associated with the improved air quality benefits Angeles Link could provide and estimates the related potential monetized health benefits.

Chapter 7: Nasim Ahmed and Michael W. Foster present testimony regarding regulatory accounting, cost recovery, revenue requirement, cost allocation, and rates.

Chapter 8: Michael W. Foster presents testimony on Affordability Metrics, describing impacts of the forecasted revenue requirement in accordance with D.22-08-023 and presenting additional relevant analyses for consideration.

IX. STATUTORY AND PROCEDURAL REQUIREMENTS

A. Rule 2.1(a) – (c)

In accordance with Rule 2.1(a) – (c) of the Commission's Rules and Practice and Procedure, SoCalGas provides the following information:

1. *Rule 2.1(a) – Legal Name*

SoCalGas is a public utility corporation organized and existing under the laws of the State of California. SoCalGas's principal place of business and mailing address is 555 West Fifth Street, Los Angeles, California 90013.

2. *Rule 2.1(b) – Correspondence*

All correspondence and communications to SoCalGas regarding the Application should be addressed to:

ALANA MCKEAN
Regulatory Case Manager for:
SOUTHERN CALIFORNIA GAS COMPANY
555 West Fifth Street, GT-14D6

Los Angeles, California 90013
Tel: (213) 231-6412
Fax: (213) 244-4957
Email: amckean@socalgas.com

A copy should also be sent to:

AVISHA PATEL
Managing Attorney for:
SOUTHERN CALIFORNIA GAS COMPANY
555 West Fifth Street, GT-14E7
Los Angeles, California 90013
Telephone: (213) 244-2954
Facsimile: (213) 629-9620
Email: apatel@socalgas.com

3. *Rule 2.1(c)*

a. *Proposed Category of Proceeding*

SoCalGas proposes that this phase of the proceeding be categorized as "Ratesetting" under Rule 1.3(e) and 7.1(e)(2) because the Application requests a revenue requirement.

b. *Need for Hearings*

SoCalGas does not believe hearings are required to render a decision on this Application.

c. *Issues to Be Considered*

The issues to be considered are described in this Application and the accompanying testimony and exhibits. Phase 2 consists of the continued study and advancement of Angeles Link.

d. *Proposed Schedule*

SoCalGas proposes the following schedule for this Application in recognition of the operational timing goals committed by ARCHES to DOE for the California Hydrogen Hub:

EVENT	DATE
Application	December 20, 2024
Responses/Protests	within 30 days of Daily Calendar notice
Utilities' Reply Responses/Protests	within 10 days (see Rule 2.6)
Prehearing Conference	February 2025
Scoping Memo	March 2025
Public Workshop	April 2025
Intervenor Testimony	May 2025
Rebuttal Testimony	July 2025
Hearings (if necessary)	August 2025
Opening Briefs	Sept 2025
Reply Briefs	Oct 2025
Proposed Decision	Nov 2025
Commission Decision	Dec 2025

e. *Rule 2.2 – Articles of Incorporation*

A copy of SoCalGas's Restated Articles of Incorporation, as last amended, presently in effect and certified by the California Secretary of State, was previously filed with the Commission on October 1, 1998, in connection with A.98-10-012, and as incorporated herein by reference.

f. *Rule 1.9 – Service*

This is a new application. No service list has been established. Accordingly, SoCalGas is serving this Application on all parties to its Test Year 2024 GRC proceeding, A.22-05-015, and the Angeles Link Memorandum Account proceeding, A.22-02-007.

g. *Rule 3.2 Compliance Based on Category*

In accordance with Rule 3.2(a)–(d) of the Commission's Rules of Practice and Procedure, SoCalGas provides the following information.

1. Rule 3.2(a)(1) – Balance Sheet and Income Statement

The most recent updated Balance Sheet and Income Statements for SoCalGas are attached to this Application as Attachment A.

2. Rule 3.2(a)(2) – Statement of Present Rates

A statement of all of SoCalGas's presently effective rates can be viewed electronically on SoCalGas' website: https://tariff.socalgas.com/regulatory/tariffs/tariffs-rates.shtml. Attachment B to this Application provides the table of contents from SoCalGas's tariffs on file with the Commission.

3. Rule 3.2(a)(3) – Statement of Proposed Rates

The rate changes that will result from this Application are described in described in Section VI and the testimony of witnesses Nasim Ahmed and Michael W. Foster.

4. Rule 3.2(a)(4) – Description of SoCalGas's Property and Equipment

A general description of SoCalGas's property and equipment was previously filed with the Commission on May 3, 2004, in connection with SoCalGas's A.04-05-008, and is incorporated herein by reference. SoCalGas's most recent statement of Original Cost and Depreciation Reserve is attached as Attachment C.

5. Rules 3.2(a)(5) and (6) – Summary of Earnings

A summary of earnings for SoCalGas is included in Attachment A.

6. Rule 3.2(a)(7) – Depreciation

For financial statement purposes, SoCalGas computes depreciation of utility plant on a straight-line remaining life basis at rates based on the estimated useful lives of plant properties. For federal income tax accrual purposes, SoCalGas generally computes depreciation using the straight-line method for tax property additions prior to 1954, and liberalized depreciation, which

includes Class Life and Asset Depreciation Range Systems, on tax property additions after 1954 and prior to 1981. For financial reporting and rate-fixing purposes, "flow through accounting" has been adopted for such properties. For tax property additions in years 1981 through 1986, SoCalGas has computed their tax depreciation using the Accelerated Cost Recovery System. For years after 1986, SoCalGas has computed their tax depreciation using the Modified Accelerated Cost Recovery Systems and, since 1982, have normalized the effects of the depreciation differences in accordance with the Economic Recovery Tax Act of 1981 and the Tax Reform Act of 1986.

7. Rule 3.2(a)(8) – Proxy Statement

A copy of SoCalGas's most recent proxy statement sent to all shareholders of SoCalGas's parent company, Sempra Energy, dated April 25, 2023, was provided to the Commission on May 9, 2023, and is incorporated herein by reference.

8. Rule 3.2(a)(10) - Statement re Pass Through to Customers

Any rate increase resulting from approval of this Application will not solely reflect pass through to customers of increased costs to SoCalGas for the services or commodities furnished by them.

9. Rule 3.2(b) – Notice to State, Cities, and Counties

SoCalGas, within 20 days after filing this Application, will mail a notice to the State of California and to the cities and counties in their service territories.

10. Rule 3.2(c) – Newspaper Publication

SoCalGas, within 20 days after filing this Application, will publish in newspapers of general circulation in each county in their service territories notice of this Application.

11. Rule 3.2(d) – Bill Insert Notice

SoCalGas, within 45 days after filing this Application, will provide notice of this Application to their customers along with the regular bills sent to these customers that will generally describe the proposed rate changes addressed in this Application.

X. CONCLUSION AND SPECIFIC RELIEF REQUESTED

In order for the California Hydrogen Hub and California's broader hydrogen economy to realize their full potential, action is needed from all stakeholders. The State is currently working towards launching the California Hydrogen Hub and developing its Hydrogen Market Development Strategy through GO-Biz and ARCHES to provide the vision and means for a hydrogen economy to help decarbonize California's energy system. SoCalGas intends to support these efforts by working diligently and prudently to align with DOE's and ARCHES' timing expectations for the California Hydrogen Hub and support the State's burgeoning hydrogen economy and decarbonization goals and mandates. The next step toward meeting those goals is presenting this Application, approval of which would enable SoCalGas to dedicate the resources needed to continue to advance Angeles Link planning in a timely manner. The Commission's role includes (1) confirming its jurisdiction to authorize rate recovery for costs to further study a non-discriminatory clean renewable hydrogen pipeline system dedicated to public use; (2) maintaining oversight of the study and development of intrastate clean renewable hydrogen pipelines dedicated to public use, rather than subjecting customers (including electric generators) to the mercy of operators with no obligation to serve and bilaterally negotiated transportation rates with no Commission oversight and no transparency; (3) ensuring there is a process that promotes transparency and opportunities for meaningful community engagement and stakeholder feedback; (4) supporting Angeles Link's prompt advancement of clean renewable hydrogen infrastructure in consideration of applicable DOE and ARCHES operational requirements and

timelines, and in furtherance of the State's climate goals; and (5) approving the requests in this Application, including a stakeholder engagement process that promotes transparency and opportunities for meaningful community engagement and stakeholder feedback and a reasonable rate recovery mechanism for Phase 2 costs.

For the reasons described above and in the testimony supporting this Application, SoCalGas respectfully requests the Commission to order that:

1. SoCalGas may establish the Angeles Link Balancing Account, an interest-bearing two-way balancing account to record the authorized costs approved in this proceeding and the actual operating and maintenance costs incurred for authorized Phase 2 activities, effective as of the date of this Application;
2. SoCalGas may implement a revenue requirement based on its forecasted cost estimate of $271.9 million (inclusive of Franchise Fees & Uncollectibles) using the Equal Cents Per Therm allocation methodology over 36 months commencing January 1, 2026;
3. If the foregoing revenue requirement results in an overcollection, SoCalGas shall refund the difference to customers in rates. If the foregoing revenue requirement results in an undercollection, SoCalGas may request a reasonableness review of costs exceeding the authorized forecast in a standalone application, its next general rate case, or other appropriate forum; and
4. SoCalGas may proceed with any such other activities as deemed just and reasonable.

Respectfully submitted,

By: */s/ Avisha Patel*

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E-mail: apatel@socalgas.com

December 20, 2024

OFFICER VERIFICATION AND ALISO CANYON ATTESTATION

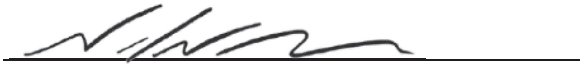
OFFICER VERIFICATION

I, Neil Navin, declare the following:

I am an officer of Southern California Gas Company and am authorized to make this verification on behalf of Southern California Gas Company. I am informed and believe that the matters stated in the foregoing **APPLICATION OF SOUTHERN CALIFORNIA GAS COMPANY (U 904 G) FOR AUTHORIZATION TO IMPLEMENT REVENUE REQUIREMENT FOR COSTS TO CONDUCT PHASE 2 ACTIVITIES FOR ANGELES LINK** are true to my own knowledge, except as to matters which are therein stated on information and belief, and as to those matters, I believe them to be true.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on December 20, 2024 at Los Angeles, California.

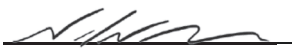


Neil Navin
Southern California Gas Company
Senior Vice President
Engineering, Major Projects, and Clean Fuels Officer

ALISO CANYON ATTESTATION

1. I am Senior Vice President of Engineering, Major Projects, and Clean Fuels Officer of Southern California Gas Company (SoCalGas). I am providing this attestation based upon the requirements of Ordering Paragraph 5 of California Public Utilities Commission (CPUC or Commission) Decision (D.) 23-09-022.
2. On December 23, 2015 the CPUC-Executive Director issued a letter to SoCalGas directing SoCalGas to provide information to the CPUC concerning costs associated with the uncontrolled release of natural gas from Well SS-25 at the Aliso Canyon Storage Field from October 23, 2015 through February 11, 2016 (the Incident).
3. Beginning in December 2015, SoCalGas has reported to the Commission the costs associated with the Incident in in the monthly Incident-related cost report submitted pursuant to the Executive Director's December 23, 2015 (Directive Report).
4. On October 28, 2022, SoCalGas, the California Public Utilities Commission's Safety and Enforcement Division ("SED") and the Public Advocates Office at the California Public Utilities Commission ("Cal Advocates") filed a Joint Motion for Adoption of Settlement Agreement in Investigation (I.)19-06-016 seeking approval of the Settlement Agreement entered into by SoCalGas, SED, and Cal Advocates (Settlement Agreement).
5. On September 12, 2023, the Commission issued Decision (D.) 23-09-002 which approved the Settlement Agreement between SoCalGas, SED, and Cal Advocates resolving I.19-06-016.
6. Ordering Paragraph 5 of D.23-09-002 states that SoCalGas shall submit an attestation by a Vice President or higher company executive with every application requesting rate recovery attesting that it has not included any expenses or costs identified in the Settlement Agreement. This attestation requirement shall apply for five years from the date of the final issuance of this decision.
7. I reviewed the costs requested in this Application and the most recent Directive Report. Based on my review of the costs, the Directive Report, and other diligence, I am informed and believe, and upon such information and belief, certify that SoCalGas has not included any expenses or costs identified in the Settlement Agreement adopted in D.23-09-002 in the enclosed Application being filed on December 20, 2024.

Executed on December 20, 2024, at Los Angeles, California.



Neil Navin
Southern California Gas Company
Senior Vice President
Engineering, Major Projects, and Clean Fuels Officer
Southern California Gas Company

APPENDIX A

GLOSSARY OF TERMS

APPENDIX A

GLOSSARY OF TERMS

Acronym	Definition
AAC	Areas of Affordability Concern
AB	Assembly Bill
ACC	Advanced Clean Cars
AACEi	Association for the Advancement of Cost Engineering International
ACF	Advanced Clean Fleets
ACT	Advanced Clean Trucks
Affordability Framework	Angeles Link Phase 1 Final Framework for Affordability Considerations
AR	Affordability Ratio
ALBA	Angeles Link Balancing Account
ALMA	Angeles Link Memorandum Account
Alternatives Study	Project Options and Alternatives Study
AMR	Automated Meter Reading
APCD	Air Pollution Control Districts
Application	Southern California Gas Company's Application for Authorization to Implement Revenue Requirement for Costs to Conduct Phase 2 Activities for Angeles Link
AQMP	Air Quality Management Plan
ARB	Air Resources Board
ARCHES	Alliance for Renewable Clean Hydrogen Energy Systems
BenMAP	United States Environmental Protection Agency Benefits Mapping
BenMAP-CE	United States Environmental Protection Agency Benefits Mapping and Analysis Program - Community Edition
CAAQS	California Ambient Air Quality Standards
CAISO	California Independent System Operator
CalEPA	California Environmental Protection Agency
CARB	California Air Resources Board
CARE	California Alternate Rates for Energy
CAMx	Comprehensive Air Quality Model with Extensions
CBOSG	Community Based Organization Stakeholder Group
CCC	California Climate Credit
CCS	Carbon Capture and Sequestration
CEC	California Energy Commission
CEJST	Environmental Protection Agency's Climate and Economic Justice Screening Tool
CEQA	California Environmental Quality Act

Acronym	Definition
CFR	Concentration-Response Function
CMAQ	Community Multi-Scale Air Quality
CO	Carbon Monoxide
CO2e	Carbon Dioxide Equivalent
Commission	California Public Utilities Commission
COP	United Nations Conference of Parties
COP 29	2024 United Nations Climate Change Conference
Cost Effectiveness Study	High-Level Economics Analysis and Cost Effectiveness Study
CPCN	Certificate of Convenience and Public Necessity
CPI	Consumer Price Index
CPUC	California Public Utilities Commission
CSI	California Solar Initiative
CSITMA	California Solar Initiative Thermal Memo Account
DAC	Disadvantaged Community
DEIA	Diversity, Equity, Inclusion, and Accessibility
Design Study	Pipeline Sizing & Design Criteria
DOE	U.S. Department of Energy
DPM	Diesel Particulate Matter
EB	Energy Burden
ECPT	Equal Cents Per Therm
EDF	Environmental Defense Fund
EERE	Department of Energy Office of Energy Efficiency and Renewable Energy
EG	Electric Generation
EIA	U.S. Energy Information Administration
EO	Executive Order
ESJ	Environmental Social Justice
ESJ Plan	Environmental Social Justice Community Engagement Plan
ESJ Screening	Environmental Social Justice Community Screening Assessment
FEED	Front End Engineering and Design
FERC	Federal Energy Regulatory Commission
FF&U	Franchise Fees and Uncollectibles
FOA	Funding Opportunity Announcement
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GO	General Order
GO-Biz	Governor's Office of Business and Economic Development
GRC	General Rate Case
GW	Gigawatts

Acronym	Definition
H2Hubs	Hydrogen Hubs
HM	Hours at Minimum Wage
Hub Segments	San Joaquin Valley and Lancaster Segments
Hydrogen Liftoff Report	Department of Energy Report "Pathways to Commercial Liftoff: Clean Hydrogen"
IEA	International Energy Agency
IEPR	Integrated Energy Policy Report
IIJA	Infrastructure Investment and Jobs Act
IRA	Inflation Reduction Act of 2022
LADWP	Los Angeles Department of Water and Power
LCOE	Levelized Cost of Electricity
LCOH	Levelized Cost of Delivered Hydrogen
MDHD	Medium-Duty and Heavy-Duty
MMTPY	Million Metric Tons Per Year
MT/yr	Metric Tons Per Year
NAAQS	National Ambient Air Quality Standards
NAM	National Association of Manufacturers
NEPA	National Environmental Policy Act
NGV	Natural Gas Vehicle
NPC	National Petroleum Council
NERC	North American Electric Reliability Corporation
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NPV	Net Present Value
NREL	National Renewable Energy Lab
O_3	Ozone
OCED	Office of Clean Energy Demonstrations
OEHHA	California Office of Environmental Health Hazard Assessment
O&M	Operating and Maintenance
OMB	Office of Management and Budget of the Executive Branch
OT	Operational Technology
PAG	Planning Advisory Group
Pb	Lead
PDM	Project Delivery Model
Permitting Analysis	High-Level Feasibility & Permitting Analysis
PG&E	Pacific Gas and Electric Company
Phase 1	Feasibility Studies for the Angeles Link Project
Phase 1 Decision	Decision 22-12-055 Approving the Angeles Link Memorandum Account to Record Phase One Costs
PHMSA	United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

Acronym	Definition
$PM_{2.5}$	Fine Particulate Matter
PM_{10}	Coarse Particulate Matter
PPIC	Public Policy Institute of California
PPPS	Public Purpose Program Surcharge
Production Study	Production Planning & Assessment Study
PSEP	Pipeline Safety Enhancement Plan
PSIG	Pounds Per Square Inch Gauge
PSPS	Public Safety Power Shutoffs
PUMA	Public Use Microdata Area
RAMP	Risk Assessment and Mitigation Phase
RFP	Request for Proposal
RIA	Regulatory Impact Assessments
Roadmap	U.S. National Clean Hydrogen Strategy and Roadmap Published by the Department of Energy
Routing Analysis	Preliminary Routing/Configuration Analysis
RUBA	Residential Uncollectible Balancing Account
Rules	Rules of Practice and Procedure
Safety Evaluation	Evaluation of Applicable Safety Requirements
SB	Senate Bill
SB 380 Proceeding	I.17-02-002, Order Instituting Investigation pursuant to Senate Bill 380 to determine the feasibility of minimizing or eliminating the use of the Aliso Canyon natural gas storage facility located in the County of Los Angeles while still maintaining energy and electric reliability for the region
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SDG&E	San Diego Gas & Electric Company
SGIP	Self-Generation Incentive Program
SIP	State Implementation Plan
SMOKE	Sparse Matrix Operator Kernel Emissions
SO_2	Sulfur Dioxide
SoCalGas	Southern California Gas Company
TCAP	Triennial Cost Allocation Proceeding
TCO	Total Cost of Ownership
TLS	Transmission Level Service
TY	Test Year
TRA	Technology Readiness Assessment
TPY	Tons Per Year
UCD	University of California, Davis
UCI	University of California, Irvine

Acronym	Definition
UCLA	University of California, Los Angeles
VOC	Volatile Organic Compound
VOS	Value of Service
ZEV	Zero-Emissions Vehicles

APPENDIX B

PHASE 1 DECISION COMPLIANCE MATRIX

This table documents SoCalGas's compliance with the Ordering Paragraphs in Decision (D.) 22-12-055 (Phase 1 Decision) that impose requirements on SoCalGas's Phase 1 activities and on SoCalGas's request to implement a revenue requirement for costs to conduct Phase 2 of Angeles Link. This table does not discuss the Ordering Paragraphs that are solely relevant to a request to recover Phase 1 costs as SoCalGas is not seeking Phase 1 cost recovery in this Application.[276]

OP	Phase 1 Decision Text	Compliance Narrative	Application Reference
3d	Prior to receiving authority to record any Phase Two costs, SoCalGas shall join other entities that are members of the Alliance for Renewable Clean Hydrogen Energy Systems in support of the State of California's application for the federal funding provided through the Infrastructure Investment and Jobs Act.	SoCalGas joined ARCHES.	Sections I, II
6	If it chooses to request Commission authority to record costs for Phase Two activities in the Angeles Link Memo Account, Southern California Gas Company (SoCalGas) shall file an application requesting such authority. In the application, SoCalGas shall provide the following required findings from its Phase One feasibility studies:	Notwithstanding that Ordering Paragraph No. 6 relates to an application to record costs for Phase Two activities in the Angeles Link Memo Account and not necessarily an application for authorization to implement a revenue requirement for forecasted costs to enable commencement of Phase 2 activities, SoCalGas provides a demonstration of consistency with Ordering Paragraph No. 6's sub-paragraphs below.	See below.
6a	Identification of the demand and end uses for the Angeles Link Project (Project);	The Demand Study evaluated future potential clean renewable hydrogen demand and end uses across three major hard-to-electrify sectors: mobility (i.e., transportation), power generation, and industrial, including both existing and future SoCalGas ratepayers who could be potential end-users of Angeles Link. The evaluation process included defining sub-sectors, researching potential hydrogen end-users, developing models and scenarios, estimating demand volumes, and conducting validation interviews with industry peers and reviewers.	Section III

[276] Accordingly, this table does not provide a demonstration of compliance with the entirety of Ordering Paragraph 3, which is relevant to future recovery of Phase 1 costs.

OP	Phase 1 Decision Text	Compliance Narrative	Application Reference
6b	Identification of the potential sources of hydrogen generation and water and estimating the costs of the hydrogen;	The Production Study identified potential third-party sources of hydrogen production, estimated costs of third-party hydrogen production, and addressed plans for ways to ensure the hydrogen transported by Angeles Link meets the clean renewable hydrogen standards set forth in the Phase 1 Decision. Additionally, the Water Resources Evaluation identified the potential sources and costs of water required by third parties to produce clean renewable hydrogen. The study included a high-level analysis of potential water supply sources, water quality requirements for electrolyzers, the associated costs for acquisition and treatment of those water sources, and the challenges and opportunities related to water supply development.	Section III
6c	Identification of the ratepayers who would be end-users, including current natural gas customers and future customers;	The Demand Study evaluated future potential clean renewable hydrogen demand and end uses across three major hard-to-electrify sectors: mobility (i.e., transportation), power generation, and industrial, including both existing and future SoCalGas ratepayers who could be potential end-users of Angeles Link. The evaluation process included defining sub-sectors, researching potential hydrogen end-users, developing models and scenarios, estimating demand volumes, and conducting validation interviews with industry peers and reviewers. Additionally, the Demand Study estimated potential clean renewable hydrogen demand by 2045 and identified potential current and future end-users, including current natural gas customers and future customers.	Section III

OP	Phase 1 Decision Text	Compliance Narrative	Application Reference
6d	Evaluation of the cost-effectiveness of the Project against alternatives, which should include a localized hydrogen hub or electrification option, and determining the methodology to measure cost-effectiveness between the alternatives;	The Alternatives Study evaluated potential hydrogen delivery alternatives (e.g., truck delivery, localized hydrogen hub) and non-hydrogen alternatives (e.g., electrification and carbon capture and storage) to Angeles Link using a multi-step evaluation framework. The first steps identified potential alternatives and assessed them against the following criteria: state policy, range, ease of implementation, scalability, reliability, and resiliency. Then, the alternatives selected were advanced to the Cost Effectiveness Study for cost analysis and the Environmental Analysis for high-level environmental assessment. The final step gathered the results from the Cost Effectiveness Study and Environmental Analysis and then evaluated each alternative for its ability to meet the objective and purpose for Angeles Link.	Section III
6e	Workforce planning and training;	The Workforce Planning & Training Evaluation estimated the potential job creation and workforce development associated with Angeles Link.	Section III
6f	Evaluations of safety concerns involved in pipeline transmission, storage, and transportation;	The Evaluation of Applicable Safety Requirements identified safety concerns involved in pipeline transmission, storage, and transportation of hydrogen and applicable safety regulatory requirements and industry standards for employees, contractors, infrastructure, and public safety. The evaluation also considered how SoCalGas can refine and expand its existing operations and maintenance procedures and safety practices to support Angeles Link. At SoCalGas's request, and in response to stakeholder feedback, the Center for Hydrogen Safety's Hydrogen Safety Panel conducted a third-party review of the draft evaluation.	Section III
6g	Assessments of the risks and mitigations for hydrogen leakage;	The Hydrogen Leakage Assessment assesses the potential for hydrogen leakage associated with new infrastructure, as well as opportunities to mitigate the potential for hydrogen leakage.	Section III

OP	Phase 1 Decision Text	Compliance Narrative	Application Reference
6h	Assessments for possible nitrogen oxide emissions resulting from the Project, including mitigation measures to control nitrogen oxide emissions;	The NOx Study evaluated potential emissions associated with Angeles Link, including appropriate controls to mitigate such emissions. The assessment evaluated potential emissions reductions associated with end users in the mobility, power generation, and hard-to-electrify industrial sectors, as well as potential NOx emissions associated with new hydrogen infrastructure to estimate overall anticipated emissions reductions. The study also found that potential NOx emissions associated with clean renewable hydrogen infrastructure are relatively small compared to the reductions resulting from end users' use of clean renewable hydrogen. The study also evaluated existing and emerging emissions reduction technologies and identified emissions control equipment that could effectively mitigate NOx emissions.	Section III
6i	Identification and comparison of possible routes and configurations;	The Preliminary Routing/Configuration Analysis evaluated potential routing and configuration options for Angeles Link. The study identified several preliminary conceptual preferred routes for the system, considering various factors such as engineering requirements and environmental and social impacts. The study examined existing pipeline corridors, designated federal energy corridors, as well as the need for new rights-of-way. Additionally, the Environmental Analysis provides a desktop assessment of potential environmental impacts of Angeles Link as well as specified alternatives identified in the Alternatives Study.	Section III
6j	Plans to ensure hydrogen gas meets the clean renewable hydrogen standards set in this decision;	The Production Study identified potential third-party sources of hydrogen production, estimated costs of third-party hydrogen production, and addressed plans for ways to ensure the hydrogen transported by Angeles Link meets the clean renewable hydrogen standards set forth in the Phase 1 Decision.	Section III

OP	Phase 1 Decision Text	Compliance Narrative	Application Reference
6k	Plans for addressing and mitigating affordability concerns;	The Affordability Framework described how Angeles Link's planning process considered and identified opportunities to mitigate affordability concerns. The framework (1) described the CPUC's general framework for evaluating affordability and approving rates; (2) discussed California's projected decarbonization costs more broadly to provide context for the proposed investment in Angeles Link; (3) summarized the work SoCalGas conducted on cost-effectiveness as a building block to consider the affordability of Angeles Link and address stakeholder feedback about affordability concerns received; and (4) identified potential strategies for addressing cost-effectiveness and affordability in Angeles Link's development in Phase 2 and beyond, including in coordination with the CPUC and stakeholders on matters that extend beyond SoCalGas's control.	Section III
6l	Plans for addressing and mitigating impacts to disadvantaged communities and other environmental justice concerns;	The ESJ Plan supports the Commission's directive to address and mitigate impacts to disadvantaged communities and other environmental concerns. The ESJ Plan also responds to stakeholder feedback to engage directly with DACs along potential preferred hydrogen pipeline corridors and solicit their input on Angeles Link. The ESJ Plan identified engagement approaches or mechanisms recommended by CBOSG members for SoCalGas to utilize for ESJ stakeholder engagement during Phase 2.	Section III

OP	Phase 1 Decision Text	Compliance Narrative	Application Reference
6m	Plans to share data from the Phase One Studies with stakeholders;	SoCalGas held 27 meetings and workshops, as well as more than 30 one-on-one meetings with PAG and CBOSG members over the course of almost two years. Stakeholder input was received through various channels, including verbal comments during in-person and virtual meetings, discussions at workshops, and written feedback. SoCalGas also created a "Living Library" for PAG and CBOSG members to facilitate access to information, hosting a wide range of documents, including preliminary findings, draft feasibility studies, presentations, meeting recordings, transcripts, and comment letters received from stakeholders. All Phase 1 studies are posted in full on SoCalGas's website, without redaction: https://www.socalgas.com/regulatory/angeleslink	Section III
6n	Compliance with California environmental law and public policies;	In accordance with Ordering Paragraphs 6(n) and 6(o), the Phase 1 studies assessed compliance with California environmental laws and public policies along with consistency with other Commission decisions, policies, and directives, including Order Instituting Rulemaking R.20-01-007 (Long-Term Gas Planning Order Instituting Rulemaking) and R.13-02-008 (Biomethane Standards and Requirements and Pipeline Open Access Rules Order Instituting Rulemaking). As described in the Phase 1 Application, Angeles Link would be a clean hydrogen energy transport system into the Los Angeles Basin to further two related State clean energy policy directives: advancing	Section III

OP	Phase 1 Decision Text	Compliance Narrative	Application Reference
6o	Consistency with other Commission decisions, policies, and directives, including Order Instituting Ratemaking (R.)20-01-007 (Long-Term Gas Planning Order Instituting Ratemaking) and R.13-02-008 (Biomethane Standards and Requirements and Pipeline Open Access Rules Order Instituting Ratemaking);	the State's decarbonization and clean air goals and displacing the use of natural gas in the Los Angeles Basin. And as the Phase 1 Decision recognized, Angeles Link "has the potential to help decarbonize the state's and the Los Angeles Basin's energy use." The findings from the Phase 1 studies provide further support that Angeles Link will advance these fundamental policy goals. Multiple studies demonstrated how Angeles Link will comply with and further California's environmental laws, directives, and policies, including those of the Commission. For example, the Environmental Analysis evaluated potential environmental impacts of possible pipeline routes and configurations and finds that Angeles Link can be constructed and operated in accordance with environmental laws and public policies. It identified the project is being undertaken in furtherance of the State's climate goals, as outlined in Assembly Bill (AB) 32 and the Climate Change Scoping Plan to "scale up new options such as renewable hydrogen for hard-to-electrify end uses and biomethane where needed" and Governor's Executive Order to develop California's Hydrogen Market Development Strategy. The High-Level Feasibility Assessment & Permitting Analysis analyzed the potential regulatory and permitting requirements under California environmental laws, including potentially required authorizations from various state agencies. The Greenhouse Gas Emissions Evaluation conducted an initial evaluation of overall GHG benefits associated with Angeles Link to demonstrate how clean renewable hydrogen could support environmental laws and public policies.	

OP	Phase 1 Decision Text	Compliance Narrative	Application Reference
6p	Efforts and progress in partnering with the State of California on its application for federal funding provided through the Infrastructure Investment and Jobs Act.	As discussed in the Testimony of Maryam Brown, Angeles Link is an integral part of the California Hydrogen Hub. Aligning the timing of Angeles Link with ARCHES' projects' development schedule and the timing expectations of DOE can best leverage federal funds for the benefit of all Californians and unlock the hydrogen economy. SoCalGas intends to support meeting timing and schedule goals, such as through information sharing on market development, community engagement, permitting and approvals support, and other technical cooperation.	Section II
7	Southern California Gas Company (SoCalGas) shall make the data, findings, and results of its Phase One feasibility studies and quarterly reports to the Commission's Deputy Executive Director for Energy and Climate Policy available to the public and not redacted, unless SoCalGas is granted confidentiality of the data in accordance with General Order 66-D.	The Quarterly Reports and full studies are publicly available on SoCalGas's website: https://www.socalgas.com/regulatory/angeleslink	Section III
8	Southern California Gas Company (SoCalGas) shall conduct quarterly stakeholder engagement meetings with parties in this proceeding and community-based organizations (CBOs) of affected interest groups, including disadvantaged communities (DAC) and environmental social justice (ESJ) communities.	In accordance with Ordering Paragraph 8, SoCalGas worked with the Commission to create a PAG, composed of representatives from industry, labor, academia, tribal governments, and environmental organizations; and a Community Based Organization Stakeholder Group (CBOSG), composed of community-based organizations. SoCalGas continually updated the stakeholder engagement process	Section III

OP	Phase 1 Decision Text	Compliance Narrative	Application Reference
8a	SoCalGas shall engage the active parties in this proceeding through the Planning Advisory Group (PAG). In coordination with Energy Division staff, the PAG shall meet at least on a quarterly basis. The parties' participation through the PAG shall be eligible for compensation through the Commission's Intervenor Compensation program for their participation in the PAG, subject to the guidelines set in Public Utilities Code Sections 1801-1812 and other limitations of the program.	based on feedback from participants and extended the length of Phase 1 to allow for additional engagement. Based on requests from the PAG and CBOSG for information to be shared more frequently, SoCalGas added additional workshops in between quarterly meetings. SoCalGas held 27 meetings and workshops, as well as more than 30 one-on-one meetings with PAG and CBOSG members over the course of almost two years. SoCalGas presented opportunities for the PAG and CBOSG to provide feedback at four key milestones in the course of conducting each study: (1) the draft description of the scope of work, (2) the draft "technical approach," e.g., the methodology for conducting each study, (3) preliminary findings based on initial data and results from the analysis, and (4) the draft report. SoCalGas coordinated with the Energy Division to develop a plan and set of procedures to compensate CBOs. Details are provided in the Detailed Plan and Set of Procedures for Community Based Organization Compensation approved in Advice No. 6146G.	
8b	SoCalGas shall proactively identify and invite the involvement from CBOs, including ESJ and DAC groups, that are equipped to serve the communities that will be impacted by the Angeles Link Project. SoCalGas shall consider how to meaningful engage with CBOs, including DAC and ESJ groups, either through inviting them to join the quarterly PAG meetings or some other quarterly stakeholder engagement process, and provide compensation to CBOs for their participation which may include a per-diem stipend for participation at quarterly stakeholder meetings. SoCalGas shall record the costs of CBO compensation in the Angeles Link Memorandum Account as part of Phase One activities.		
8c	SoCalGas shall coordinate with Energy Division and its PAG members to devise a plan and a set of procedures to compensate CBOs and file a Tier 2 advice letter with the Commission's Energy Division as soon as practicable with a detailed plan and set of procedures for CBO compensation		Section III

ATTACHMENT A

FINANCIAL STATEMENT

SOUTHERN CALIFORNIA GAS COMPANY
BALANCE SHEET
ASSETS AND OTHER DEBITS
SEPTEMBER 30, 2024

	1. UTILITY PLANT	2024
101	UTILITY PLANT IN SERVICE	$26,641,558,055
102	UTILITY PLANT PURCHASED OR SOLD	-
105	PLANT HELD FOR FUTURE USE	-
106	COMPLETED CONSTRUCTION NOT CLASSIFIED	-
107	CONSTRUCTION WORK IN PROGRESS	1,928,283,190
108	ACCUMULATED PROVISION FOR DEPRECIATION OF UTILITY PLANT	(8,346,934,009)
111	ACCUMULATED PROVISION FOR AMORTIZATION OF UTILITY PLANT	(227,215,125)
117	GAS STORED-UNDERGROUND	61,422,045
	TOTAL NET UTILITY PLANT	**20,057,114,156**

	2. OTHER PROPERTY AND INVESTMENTS	
121	NONUTILITY PROPERTY	33,370,816
122	ACCUMULATED PROVISION FOR DEPRECIATION AND AMORTIZATION OF NONUTILITY PROPERTY	(17,058,798)
123	INVESTMENTS IN SUBSIDIARY COMPANIES	-
	NONCURRENT PORTION OF ALLOWANCES	-
124	OTHER INVESTMENTS	1
125	SINKING FUNDS	-
128	OTHER SPECIAL FUNDS	-
	TOTAL OTHER PROPERTY AND INVESTMENTS	**16,312,019**

SOUTHERN CALIFORNIA GAS COMPANY
BALANCE SHEET
ASSETS AND OTHER DEBITS
SEPTEMBER 30, 2024

3. CURRENT AND ACCRUED ASSETS

		2024
131	CASH	1,776,133
132	INTEREST SPECIAL DEPOSITS	-
134	OTHER SPECIAL DEPOSITS	-
135	WORKING FUNDS	124,273
136	TEMPORARY CASH INVESTMENTS	-
141	NOTES RECEIVABLE	-
142	CUSTOMER ACCOUNTS RECEIVABLE	837,885,972
143	OTHER ACCOUNTS RECEIVABLE	38,144,057
144	ACCUMULATED PROVISION FOR UNCOLLECTIBLE ACCOUNTS	(255,416,389)
145	NOTES RECEIVABLE FROM ASSOCIATED COMPANIES	(1,028)
146	ACCOUNTS RECEIVABLE FROM ASSOCIATED COMPANIES	(1,532,286)
151	FUEL STOCK	-
152	FUEL STOCK EXPENSE UNDISTRIBUTED	-
154	PLANT MATERIALS AND OPERATING SUPPLIES	135,616,966
155	MERCHANDISE	-
156	OTHER MATERIALS AND SUPPLIES	-
158	GHG ALLOWANCE	1,478,817,820
	(LESS) NONCURRENT PORTION OF ALLOWANCES	-
163	STORES EXPENSE UNDISTRIBUTED	(1,675,527)
164	GAS STORED	153,174,369
165	PREPAYMENTS	96,680,227
171	INTEREST AND DIVIDENDS RECEIVABLE	817,589
173	ACCRUED UTILITY REVENUES	-
174	MISCELLANEOUS CURRENT AND ACCRUED ASSETS	13,252,721
175	DERIVATIVE INSTRUMENT ASSETS	2,268,298
	TOTAL CURRENT AND ACCRUED ASSETS	**2,499,933,195**

4. DEFERRED DEBITS

181	UNAMORTIZED DEBT EXPENSE	49,291,964
182	UNRECOVERED PLANT AND OTHER REGULATORY ASSETS	4,814,914,823
183	PRELIMINARY SURVEY & INVESTIGATION CHARGES	1,129,574
184	CLEARING ACCOUNTS	1,930,281
185	TEMPORARY FACILITIES	-
186	MISCELLANEOUS DEFERRED DEBITS	550,309,909
188	RESEARCH AND DEVELOPMENT	-
189	UNAMORTIZED LOSS ON REACQUIRED DEBT	8,947
190	ACCUMULATED DEFERRED INCOME TAXES	1,274,989,721
191	UNRECOVERED PURCHASED GAS COSTS	-
	TOTAL DEFERRED DEBITS	**6,692,575,219**
	TOTAL ASSETS AND OTHER DEBITS	**$ 29,265,934,589**

SOUTHERN CALIFORNIA GAS COMPANY
BALANCE SHEET
LIABILITIES AND OTHER CREDITS
SEPTEMBER 30, 2024

5. PROPRIETARY CAPITAL

		2024
201	COMMON STOCK ISSUED	(834,888,907)
204	PREFERRED STOCK ISSUED	(21,551,075)
207	PREMIUM ON CAPITAL STOCK	-
208	OTHER PAID-IN CAPITAL	-
210	GAIN ON RETIRED CAPITAL STOCK	(9,722)
211	MISCELLANEOUS PAID-IN CAPITAL	(1,481,306,680)
214	CAPITAL STOCK EXPENSE	143,261
216	UNAPPROPRIATED RETAINED EARNINGS	(5,568,441,827)
219	ACCUMULATED OTHER COMPREHENSIVE INCOME	20,647,297
	TOTAL PROPRIETARY CAPITAL	**(7,885,407,653)**

6. LONG-TERM DEBT

221	BONDS	(5,950,000,000)
224	OTHER LONG-TERM DEBT	(1,409,338,770)
225	UNAMORTIZED PREMIUM ON LONG-TERM DEBT	-
226	UNAMORTIZED DISCOUNT ON LONG-TERM DEBT	18,209,631
	TOTAL LONG-TERM DEBT	**(7,341,129,139)**

7. OTHER NONCURRENT LIABILITIES

227	OBLIGATIONS UNDER CAPITAL LEASES - NONCURRENT	(97,034,466)
228.2	ACCUMULATED PROVISION FOR INJURIES AND DAMAGES	(93,799,579)
228.3	ACCUMULATED PROVISION FOR PENSIONS AND BENEFITS	(220,309,696)
228.4	ACCUMULATED MISCELLANEOUS OPERATING PROVISIONS	-
245	NONCURRENT DERIVATIVE INSTRUMENT LIABILITIES	-
230	ASSET RETIREMENT OBLIGATIONS	(2,917,397,880)
	TOTAL OTHER NONCURRENT LIABILITIES	**(3,328,541,621)**

SOUTHERN CALIFORNIA GAS COMPANY
BALANCE SHEET
LIABILITIES AND OTHER CREDITS
SEPTEMBER 30, 2024

8. CURRENT AND ACCRUED LIABILITES

		2024
231	NOTES PAYABLE	(500,000,000)
232	ACCOUNTS PAYABLE	(591,642,699)
233	NOTES PAYABLE TO ASSOCIATED COMPANIES	-
234	ACCOUNTS PAYABLE TO ASSOCIATED COMPANIES	(39,444,423)
235	CUSTOMER DEPOSITS	(64,993,764)
236	TAXES ACCRUED	(50,254,113)
237	INTEREST ACCRUED	(98,786,132)
238	DIVIDENDS DECLARED	(323,266)
241	TAX COLLECTIONS PAYABLE	(19,128,605)
242	MISCELLANEOUS CURRENT AND ACCRUED LIABILITIES	(1,273,147,571)
243	OBLIGATIONS UNDER CAPITAL LEASES - CURRENT	(30,420,982)
244	DERIVATIVE INSTRUMENT LIABILITIES	(45,875,561)
245	DERIVATIVE INSTRUMENT LIABILITIES - HEDGES	
	TOTAL CURRENT AND ACCRUED LIABILITIES	**(2,714,017,116)**

9. DEFERRED CREDITS

252	CUSTOMER ADVANCES FOR CONSTRUCTION	(135,295,193)
253	OTHER DEFERRED CREDITS	(663,498,376)
254	OTHER REGULATORY LIABILITIES	(4,093,249,764)
255	ACCUMULATED DEFERRED INVESTMENT TAX CREDITS	(6,134,946)
257	UNAMORTIZED GAIN ON REACQUIRED DEBT	-
281	ACCUMULATED DEFERRED INCOME TAXES - ACCELERATED	-
282	ACCUMULATED DEFERRED INCOME TAXES - PROPERTY	(2,331,901,662)
283	ACCUMULATED DEFERRED INCOME TAXES - OTHER	(766,759,119)
	TOTAL DEFERRED CREDITS	**(7,996,839,060)**
	TOTAL LIABILITIES AND OTHER CREDITS	**$ (29,265,934,589)**

SOUTHERN CALIFORNIA GAS COMPANY
STATEMENT OF INCOME AND RETAINED EARNINGS
NINE MONTHS ENDED SEPTEMBER 30, 2024

1. UTILITY OPERATING INCOME

400	OPERATING REVENUES		4,162,723,994
401	OPERATING EXPENSES	2,348,507,831	
402	MAINTENANCE EXPENSES	332,107,634	
403-7	DEPRECIATION AND AMORTIZATION EXPENSES	683,921,953	
408.1	TAXES OTHER THAN INCOME TAXES	160,979,475	
409.1	INCOME TAXES	(2,683,913)	
410.1	PROVISION FOR DEFERRED INCOME TAXES	215,373,711	
411.1	PROVISION FOR DEFERRED INCOME TAXES - CREDIT	(210,029,971)	
411.4	INVESTMENT TAX CREDIT ADJUSTMENTS	(677,096)	
411.6	GAIN FROM DISPOSITION OF UTILITY PLANT	-	
411.7	LOSS FROM DISPOSITION OF UTILITY PLANT	-	
	TOTAL OPERATING REVENUE DEDUCTIONS		**3,527,499,624**
	NET OPERATING INCOME		**635,224,370**

2. OTHER INCOME AND DEDUCTIONS

415	REVENUE FROM MERCHANDISING, JOBBING AND CONTRACT WORK	-	
417	REVENUES FROM NONUTILITY OPERATIONS	-	
417.1	EXPENSES OF NONUTILITY OPERATIONS	(8,744,585)	
418	NONOPERATING RENTAL INCOME	522,519	
418.1	EQUITY IN EARNINGS OF SUBSIDIARIES	-	
419	INTEREST AND DIVIDEND INCOME	44,873,840	
419.1	ALLOWANCE FOR OTHER FUNDS USED DURING CONSTRUCTION	54,342,476	
421	MISCELLANEOUS NONOPERATING INCOME	(1,628,294)	
421.1	GAIN ON DISPOSITION OF PROPERTY	-	
	TOTAL OTHER INCOME	**89,365,956**	
421.2	LOSS ON DISPOSITION OF PROPERTY	(232,673)	
425	MISCELLANEOUS AMORTIZATION	-	
426	MISCELLANEOUS OTHER INCOME DEDUCTIONS	(12,686,412)	
	TOTAL OTHER DEDUCTIONS	**(12,919,085)**	
408.2	TAXES OTHER THAN INCOME TAXES	(282,232)	
409.2	INCOME TAXES	591,003	
410.2	PROVISION FOR DEFERRED INCOME TAXES	(101,869,957)	
411.2	PROVISION FOR DEFERRED INCOME TAXES - CREDIT	102,655,721	
420	INVESTMENT TAX CREDITS	-	
	TOTAL TAXES ON OTHER INCOME AND DEDUCTIONS	**1,094,535**	
	TOTAL OTHER INCOME, DEDUCTIONS AND TAXES		77,541,406
	INCOME BEFORE INTEREST CHARGES		712,765,776
	NET INTEREST CHARGES*		237,088,440
	NET INCOME		**$475,677,336**

**NET OF ALLOWANCE FOR BORROWED FUNDS USED DURING CONSTRUCTION. ($54,342,476)*

STATEMENT OF INCOME AND RETAINED EARNINGS
NINE MONTHS ENDED SEPTEMBER 30, 2024

3. RETAINED EARNINGS

RETAINED EARNINGS AT BEGINNING OF PERIOD, AS PREVIOUSLY REPORTED	5,093,734,289
NET INCOME (FROM PRECEDING PAGE)	475,677,336
DIVIDEND TO PARENT COMPANY	-
DIVIDENDS DECLARED - PREFERRED STOCK	(969,798)
DIVIDENDS DECLARED - COMMON STOCK	
OTHER RETAINED EARNINGS ADJUSTMENT	-
RETAINED EARNINGS AT END OF PERIOD	**$5,568,441,827**

SOUTHERN CALIFORNIA GAS COMPANY
SUMMARY OF EARNINGS
NINE MONTHS ENDED SEPTEMBER 30, 2024
(DOLLARS IN MILLIONS)

Line No.	Item	Amount
1	Operating Revenue	$4,163
2	Operating Expenses	3,527
3	Net Operating Income	$636
4	Weighted Average Rate Base	$12,345
5	Rate of Return*	7.67%

*Authorized Cost of Capital

SOUTHERN CALIFORNIA GAS COMPANY
FINANCIAL STATEMENT
SEPTEMBER 30, 2024

(a) Amounts and Kinds of Stock Authorized:

Preferred Stock	160,000	shares	Par Value $4,000,000
Preferred Stock	840,000	shares	Par Value $21,000,000
Preferred Stock	5,000,000	shares	Without Par Value
Preferred Stock	5,000,000	shares	Without Par Value
Common Stock	100,000,000	shares	Without Par Value

Amounts and Kinds of Stock Outstanding:

PREFERRED STOCK				
	6.0%	79,011	shares	1,975,275
	6.0%	783,032	shares	19,575,800
COMMON STOCK		91,300,000	shares	834,888,907

(b) Terms of Preferred Stock:
Full information as to this item is given in connection with Application No. 96-09-046, to which references are hereby made.

(c) Brief Description of Mortgage:
Full information as to this item is given in Application Nos. 03-07-008, 06-07-012, 09-09-046, 13-05-002, 16-01-034, 21-01-009 and 22-12-010 to which reference is hereby made.

(d) Number and Amount of Bonds Authorized and Issued:

First Mortgage Bonds:	Nominal Date of Issue	Par Value Authorized and Issued	Par Value Outstanding	Interest Paid in 2023
5.75% Series KK, due 2035	11-18-05	250,000,000	250,000,000	14,375,000
5.125% Series MM, due 2040	11-18-10	300,000,000	300,000,000	15,375,000
3.750% Series NN, due 2042	09-21-12	350,000,000	350,000,000	13,125,000
4.450% Series OO, due 2044	03-13-14	250,000,000	250,000,000	11,125,000
3.200% Series RR, due 2025	06-18-15	350,000,000	350,000,000	11,200,000
2.600% Series TT, due 2026	06-03-16	500,000,000	500,000,000	13,000,000
4.125% Series UU, due 2048	05-10-18	400,000,000	400,000,000	16,500,000
4.300% Series VV, due 2049	09-24-18	550,000,000	550,000,000	23,650,000
3.950% Series WW, due 2050	06-04-19	350,000,000	350,000,000	13,825,000
2.550% Series XX, due 2030	01-06-20	650,000,000	650,000,000	16,575,000
6.350% Series YY, due 2052	11-14-22	600,000,001	600,000,001	38,205,833
5.200% Series ZZ, due 2033	05-23-23	500,000,000	500,000,000	13,577,778
5.750% Series AAA, due 2053	05-23-23	500,000,000	500,000,000	15,013,889
5.600% Series BBB, due 2054	03-18-24	500,000,000	500,000,000	0
5.050% Series CCC, due 2034	08-14-24	600,000,000	600,000,000	0
Other Long-Term Debt				
1.875% SFr. Foreign Interest Payment Securities	05-14-16	4,338,770	4,338,770	81,352
5.67% Medium-Term Note, due 2028	01-15-03	5,000,000	5,000,000	283,500
2.950% Senior Note, due 2027	03-08-22	700,000,000	700,000,000	20,650,000

Note: Interest Paid are based on timing of cash outlay.

Other Indebtedness:	Date of Issue	Date of Maturity	Interest Rate	Outstanding	Interest Paid 2024
Commercial Paper & ST Bank Loans	Various	Various	Various	0	$14,548,950

Amounts and Rates of Dividends Declared:
The amounts and rates of dividends during the past five fiscal years are as follows:

Preferred Stock	Shares Outstanding @ 09-30-24	Dividends Declared 2018	2019	2020	2021	2022	2023	2024
6.0%	79,011	$118,517	$118,517	$118,517	$118,516	$118,516	$118,517	$88,887
6.0%	783,032	1,174,548	1,174,548	1,174,548	1,174,548	1,174,548	1,174,548	880,911
	862,043	$1,293,065	$1,293,065	$1,293,065	$1,293,064	$1,293,064	$1,293,065	$969,798
Common Stock Amount		$0	$50,000,000	$150,000,000	$100,000,000	$75,000,000	$100,000,000	$0 [1]

[1] Southern California Gas Company dividend to parent company, Sempra.

ATTACHMENT C
Southern California Gas Company Total Regulatory Capitalization
SEPTEMBER 30, 2024
($ Millions)

No.	Interest %	Bond	Maturity	Principal ($ millions)
1	5.750%	Series KK	11/15/35	250
2	5.125%	Series MM	11/15/40	300
3	3.750%	Series NN	09/15/42	350
4	4.450%	Series OO	03/15/44	250
5	3.200%	Series RR	06/15/25	350
6	2.600%	Series TT	06/15/26	500
7	4.125%	Series UU	06/01/48	400
8	4.300%	Series VV	01/15/49	550
9	3.950%	Series WW	02/15/50	350
10	2.550%	Series XX	02/01/30	650
11	6.350%	Series YY	11/15/52	600
12	5.200%	Series ZZ	06/01/33	500
13	5.750%	Series AAA	06/01/53	500
14	5.600%	Series BBB	04/01/54	500
15	5.050%	Series CCC	09/01/34	600
Total First Mortgage Bonds				**6,650**
Other Long-Term Debt				
16	1.875%	Swiss Francs	05/14/26	4.3
17	5.670%	Medium Term Note	01/18/28	5.0
18	2.950%	Senior Note	04/15/27	700.0
Total Other Long-Term Debt				**709.3**
Long-Term Debt before Unamortized premiums, issue expenses & loss on reacquired debt net of tax				**7,359.3**
		Unamortized discount less premium		(18.2)
		Unamortized issued expense		(49.3)
		Unamortized loss on reacquired debt net of tax		(0.1)
Total Unamortized Debt				**(67.6)**
Long-Term Debt net of Unamortized premuims, issue expenses & loss on reacquired debt net of tax				**7,291.7**
Equity Capital				
Common Stock Equity				7,864.0
Preferred Stock Equity				21.6
Total Equity				**7,885.6**
Total Regulatory Capitalization				**15,177.3**

Source:
https://sempra.sharepoint.com/:x:/r/sites/RegulatoryAccounts/Regulatory%20Account%20Files/Filings/FERC%20Form%202%20Filing_FIN-50-07%20(IND)/2024/Quarterly%20Financials/Utility%20Accounting%20Reports/Q3%202

ATTACHMENT B

STATEMENT OF EFFECTIVE RATES

TABLE OF CONTENTS

SERVICE AREA MAPS AND DESCRIPTIONS

Schedule Number	Title of Sheet	Cal. P.U.C. Sheet No.	
GR	Residential Service ..... (Includes GR, GR-C and GT-R Rates)	61871-G,61421-G,58664-G,57166-G,55622-G	T
GS	Submetered Multi-Family Service ..... (Includes GS, GS-C and GT-S Rates)	56613-G,61872-G,58666-G,42984-G 47113-G,47114-G	T
GM	Multi-Family Service ..... (Includes GM-E, GM-C, GM-EC, GM-CC, GT-ME, GT-MC and all GMB Rates)	42987-G,61873-G,61874-G,58669-G 58670-G,58671-G,41017-G,45295-G	T
G-CARE	California Alternate Rates for Energy (CARE) Program	59377-G,61775-G 59378-G,61776-G,57611-G,57612-G,57613-G	
GO-AC	Optional Rate for Customers Purchasing New Gas Air Conditioning Equipment (Includes GO-AC and GTO-AC Rates)	61832-G,58673-G 58674-G,40645-G,40646-G	
G-NGVR	Natural Gas Service for Home Refueling of Motor Vehicles (Includes G-NGVR, G-NGVRC and GT-NGVR Rates)	61875-G,43000-G 43001-G	T
GL	Street and Outdoor Lighting Natural Gas Service	61834-G,54819-G	
G-10	Core Commercial and Industrial Service (Includes GN-10, 10C, and GT-10 Rates), ...	46445-G, 61876-G 61429-G,56615-G,53314-G,53315-G	T
G-AC	Core Air Conditioning Service for Commercial and Industrial (Includes G-AC, G-ACC and GT-AC Rates)	61877-G,43252-G,53316-G,53317-G	T
G-EN	Core Gas Engine Water Pumping Service for Commercial and Industrial (Includes G-EN, G-ENC and GT-EN Rates)	61878-G,44077-G,53318-G,53319-G	T
G-NGV	Natural Gas Service for Motor Vehicles	61879-G,61880-G,56992-G 56993-G,56994-G,56995-G	T
GO-CEG	Optional Rate Core Electric Generation Service (Includes GO-CEG, GO-CEGC, and GTO-CEG Rates) ….....	57385-G,61881-G,61452-G 57388-G,57389-G,57390-G	T
GO-ET	Emerging Technologies Optional Rate for Core Commercial and Industrial	55212-G,43168-G,51152-G	
GTO-ET	Transportation-Only Emerging Technologies Optional Rate for Core Commercial and Industrial	55213-G,43169-G,51153-G	
GO-IR	Incremental Rate for Existing Equipment for Core Commercial and Industrial	55214-G,43170-G,30208-G	
GTO-IR	Transportation-Only Incremental Rate for Existing Equipment for Core Commercial and Industrial	55215-G,43171-G,30211-G	
GO-CMPR	Compression Service	48859-G,48860-G,48861-G,48862-G,48863-G,48864-G	

Schedule Number	Title of Sheet	Cal. P.U.C. Sheet No.	
GR	Residential Service ..... (Includes GR, GR-C and GT-R Rates)	62288-G,61421-G,58664-G,57166-G,55622-G	T
GS	Submetered Multi-Family Service ..... (Includes GS, GS-C and GT-S Rates)	56613-G,62289-G,58666-G,42984-G 47113-G,47114-G	T
GM	Multi-Family Service ..... (Includes GM-E, GM-C, GM-EC, GM-CC, GT-ME, GT-MC and all GMB Rates)	42987-G,62290-G,62291-G,58669-G 58670-G,58671-G,41017-G,45295-G	T
G-CARE	California Alternate Rates for Energy (CARE) Program	59377-G,61775-G 59378-G,61776-G,57611-G,57612-G,57613-G	
GO-AC	Optional Rate for Customers Purchasing New Gas Air Conditioning Equipment (Includes GO-AC and GTO-AC Rates)	62193-G,58673-G 58674-G,40645-G,40646-G	
G-NGVR	Natural Gas Service for Home Refueling of Motor Vehicles (Includes G-NGVR, G-NGVRC and GT-NGVR Rates)	62292-G,43000-G 43001-G	T
GL	Street and Outdoor Lighting Natural Gas Service	62195-G,54819-G	
G-10	Core Commercial and Industrial Service (Includes GN-10, 10C, and GT-10 Rates), ...	46445-G, 62293-G 61429-G,56615-G,53314-G,53315-G	T
G-AC	Core Air Conditioning Service for Commercial and Industrial (Includes G-AC, G-ACC and GT-AC Rates)	62294-G,43252-G,53316-G,53317-G	T
G-EN	Core Gas Engine Water Pumping Service for Commercial and Industrial (Includes G-EN, G-ENC and GT-EN Rates)	62295-G,44077-G,53318-G,53319-G	T
G-NGV	Natural Gas Service for Motor Vehicles	62296-G,62297-G,56992-G 56993-G,56994-G,56995-G	T
GO-CEG	Optional Rate Core Electric Generation Service (Includes GO-CEG, GO-CEGC, and GTO-CEG Rates) ….....	57385-G,62298-G,61452-G 57388-G,57389-G,57390-G	T
GO-ET	Emerging Technologies Optional Rate for Core Commercial and Industrial	55212-G,43168-G,51152-G	
GTO-ET	Transportation-Only Emerging Technologies Optional Rate for Core Commercial and Industrial	55213-G,43169-G,51153-G	
GO-IR	Incremental Rate for Existing Equipment for Core Commercial and Industrial	55214-G,43170-G,30208-G	
GTO-IR	Transportation-Only Incremental Rate for Existing Equipment for Core Commercial and Industrial	55215-G,43171-G,30211-G	
GO-CMPR	Compression Service	48859-G,48860-G,48861-G,48862-G,48863-G,48864-G	

G-AMOP	Residential Advanced Meter Opt-Out Program	51577-G,51578-G
G-CP	Core Procurement Service	47480-G,61092-G,61093-G,61054-G,37933-G
GT-NC	Intrastate Transportation Service for Distribution Level Customers	60945-G,60946-G,60349-G,53323-G,53324-G 53325-G,53326-G
GT-TLS	Intrastate Transportation Service for Transmission Level Customers	53327-G,60947-G,60948-G,60949-G,60353-G 53331-G,53332-G,53333-G,53334-G,53335-G 53336-G,53337-G,53338-G
GT-SWGX	Wholesale Natural Gas Service	60567-G,45341-G
G-IMB	Transportation Imbalance Service	57227-G,62080-G,61070-G,60354-G 53788-G,55072-G,55073-G
G-OSD	Off-System Delivery Service	47345-G*,47346-G,53183-G,47348-G
G-BTS	Backbone Transportation Service	58998-G,56478-G,60355-G,60827-G 47176-G,49399-G,56651-G,47179-G,57590-G,53467-G 57729-G,57730-G,57731-G,57732-G,56656-G,56657-G,56658-G
G-POOL	Pooling Service	47188-G,47189-G,42278-G
G-BSS	Basic Storage Service	43337-G,59676-G,45767-G,45768-G 45769-G,45770-G
G-AUC	Auction Storage Service	43338-G,32709-G,32710-G,32711-G 32712-G,32713-G,36314-G,32715-G
G-LTS	Long-Term Storage Service	32716-G,32717-G,59677-G,45771-G 45772-G,45773-G
G-TBS	Transaction Based Storage Service	61059-G,61213-G,59678-G,45775-G 57405-G,52898-G
G-CBS	UDC Consolidated Billing Service	51155-G,54820-G,34073-G,54821-G
G-SMT	Secondary Market Transactions of Storage Rights	45359-G,50343-G,45361-G
G-TCA	Transportation Charge Adjustment	60356-G
G-CCC	Greenhouse Gas California Climate Credit	60496-G
GO-BCUS	Biogas Conditioning/Upgrade Services	51156-G,51157-G,51158-G,51159-G 51160-G,51161-G,54919-G,54920-G,54921-G

T

G-AMOP	Residential Advanced Meter Opt-Out Program	51577-G,51578-G
G-CP	Core Procurement Service	47480-G,62299-G,62300-G,62204-G,37933-G T
GT-NC	Intrastate Transportation Service for Distribution Level Customers	61923-G,62165-G,61438-G,53323-G,53324-G 53325-G,53326-G
GT-TLS	Intrastate Transportation Service for Transmission Level Customers	53327-G,62166-G,62167-G,62168-G,61429-G 53331-G,53332-G,53333-G,53334-G,53335-G 53336-G,53337-G,53338-G
GT-SWGX	Wholesale Natural Gas Service	61936-G,45341-G
G-IMB	Transportation Imbalance Service	57227-G,62143-G,62089-G,60354-G 53788-G,55072-G,55073-G
G-OSD	Off-System Delivery Service	47345-G*,47346-G,53183-G,47348-G
G-BTS	Backbone Transportation Service	58998-G,56478-G,61928-G,62146-G 47176-G,49399-G,56651-G,47179-G,57590-G,53467-G 57729-G,57730-G,57731-G,57732-G,56656-G,56657-G,56658-G
G-POOL	Pooling Service	47188-G,47189-G,42278-G
G-BSS	Basic Storage Service	43337-G,59676-G,45767-G,45768-G 45769-G,45770-G
G-AUC	Auction Storage Service	43338-G,32709-G,32710-G,32711-G 32712-G,32713-G,36314-G,32715-G
G-LTS	Long-Term Storage Service	32716-G,32717-G,59677-G,45771-G 45772-G,45773-G
G-TBS	Transaction Based Storage Service	61059-G,61098-G,59678-G,45775-G 62011-G,52898-G
G-CBS	UDC Consolidated Billing Service	51155-G,54820-G,34073-G,54821-G
G-SMT	Secondary Market Transactions of Storage Rights	45359-G,50343-G,45361-G
G-TCA	Transportation Charge Adjustment	61444-G
G-CCC	Greenhouse Gas California Climate Credit	61445-G
GO-BCUS	Biogas Conditioning/Upgrade Services	51156-G,51157-G,51158-G,51159-G 51160-G,51161-G,54919-G,54920-G,54921-G

G-PPPS	Public Purpose Programs Surcharge	60217-G,39517-G,39518-G
G-SRF	Surcharge to Fund Public Utilities Commission Utilities Reimbursement Account	61388-G
G-MHPS	Surcharge to Fund Public Utilities Commission Master Metered Mobile Home Park Gas Safety Inspection and Enforcement Program	32828-G
G-MSUR	Transported Gas Municipal Surcharge	59585-G,59586-G
G-PAL	Operational Hub Services	61214-G,45364-G,45365-G
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PRELIMINARY STATEMENT (Continued)

Part VI Memorandum Accounts (Continued)

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PRELIMINARY STATEMENT (Continued)

ATTACHMENT C

COST AND DEPRECIATION

SoCalGas
Plant Investment and Accumulated Depreciation
As of September 30, 2024

ACCOUNT NUMBER	DESCRIPTION	ORIGINAL COSTS	ACCUMULATED RESERVE	NET BOOK VALUE
INTANGIBLE ASSETS				
301	Organization	76,457	-	76,457
302	Franchise and Consents	592,060	-	592,060
303	Cloud Compute	110,432,915	(18,577,627)	91,855,288
	Total Intangible Assets	111,101,433	(18,577,627)	92,523,805
PRODUCTION:				
325	Other Land Rights	-	-	-
330	Prd Gas Wells Const	-	-	-
331	Prd Gas Wells Eqp	-	-	-
332	Field Lines	-	-	-
334	FldMeas&RegStnEquip	-	-	-
336	Prf Eqpt	-	-	-
	Total Production	-	-	-
UNDERGROUND STORAGE:				
350	Land	4,539,484	-	4,539,484
350SR	Storage Rights	19,069,515	(17,698,400)	1,371,115
350RW	Rights-of-Way	25,354	(20,020)	5,334
351	Structures and Improvements	193,436,834	(43,303,803)	150,133,031
352	Wells	773,447,054	241,287,227	1,014,734,281
353	Lines	232,551,368	(33,086,304)	199,465,064
354	Compressor Station and Equipment	509,126,919	(104,535,694)	404,591,225
355	Measuring And Regulator Equipment	19,595,899	(5,771,918)	13,823,981
356	Purification Equipment	187,100,829	(103,032,255)	84,068,574
357	Other Equipment	135,286,097	(42,470,753)	92,815,344
	Total Underground Storage	2,074,179,353	(108,631,919)	1,965,547,434
TRANSMISSION PLANT- OTHER:				
365	Land	9,599,020	-	9,599,020
365LRTS	Land Rights	129,778,087	(29,630,116)	100,147,971
366	Structures and Improvements	199,834,393	(32,913,602)	166,920,791
367	Mains	3,767,089,842	(934,248,003)	2,832,841,839
368	Compressor Station and Equipment	657,567,676	(132,357,875)	525,209,801
369	Measuring And Regulator Equipment	448,063,653	(66,527,819)	381,535,834
370	Communication Equipment	107,832,897	(34,338,265)	73,494,633
371	Other Equipment	33,798,723	(7,527,742)	26,270,981
	Total Transmission Plant	5,353,564,291	(1,237,543,421)	4,116,020,869
DISTRIBUTION PLANT:				
374	Land	29,737,007	-	29,737,007
374LRTS	Land Rights	3,789,180	(2,409,114)	1,380,066
375	Structures and Improvements	454,664,170	(99,228,213)	355,435,957
376	Mains	7,115,923,135	(3,232,364,572)	3,883,558,562
378	Measuring And Regulator Equipment	230,939,769	(106,150,475)	124,789,294
380	Services	4,301,559,398	(2,499,304,974)	1,802,254,424
381	Meters	1,060,912,970	(419,814,631)	641,098,340
382	Meter Installation	733,344,337	(291,630,588)	441,713,749
383	House Regulators	208,257,525	(98,094,714)	110,162,811

SoCalGas
Plant Investment and Accumulated Depreciation
As of September 30, 2024

ACCOUNT NUMBER	DESCRIPTION	ORIGINAL COSTS	ACCUMULATED RESERVE	NET BOOK VALUE
387	Other Equipment	79,231,678	(37,035,311)	42,196,367
	Total Distribution Plant	14,218,359,170	(6,786,032,592)	7,432,326,578
GENERAL PLANT:				
389	Land	1,342,839	-	1,342,839
389LRTS	Land Rights	74,300	(49,023)	25,277
390	Structures and Improvements	267,707,799	(201,471,467)	66,236,332
391	Office Furniture and Equipment	2,322,496,825	(1,692,899,646)	629,597,179
392	Transportation Equipment	1,945,297	(357,968)	1,587,328
393	Stores Equipment	308,020	(93,364)	214,657
394	Shop and Garage Equipment	167,028,387	(44,017,951)	123,010,436
395	Laboratory Equipment	10,731,669	(2,767,447)	7,964,222
396	Construction Equipment	-	-	-
397	Communication Equipments	301,799,919	(128,387,055)	173,412,864
398	Miscellaneous Equipment	10,705,853	(885,650)	9,820,203
	Total General Plant	3,084,140,908	(2,070,929,571)	1,013,211,337
	Subtotal	**24,841,345,154**	**(10,221,715,131)**	**14,619,630,023**
121	Non-Utility Plant	32,335,315	(14,522,477)	17,812,838
117GSUNC	Gas Stored Underground - NonCurrent	61,422,045	-	61,422,045
GCL	GCT - Capital Lease	-	-	-
	Total Other - Non-Utility Plant	93,757,360	(14,522,477)	79,234,883
	Total-Reconciliation to Asset History Totals	24,935,102,514	(10,236,237,608)	14,698,864,906
	Sept 2024 Asset 1020 Report	24,935,102,514	(10,236,237,608)	14,698,864,906
	Difference	(0)	(0)	(0)