Angeles Link – Phase 1
Quarterly Report (Q3 2024)

For the period of July 1, 2024 through September 30, 2024

Appendix 3 - SoCalGas Response to Comments

TABLE OF CONTENTS

1 Acronyms and Abbreviations

Acronym/Abbreviation	Definition
Alternatives Study	Project Options & Alternatives Study
AMM	Avoidance and Minimization Measure
ARCHES	Alliance for Clean Renewable Hydrogen Energy System
ASME	American Society of Mechanical Engineers
CARB	California Air Resources Board
CBO	Community Based Organization
CBOSG	Community Based Organization Stakeholder Group
CCS	Carbon Capture and Sequestration
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
Cost Effectiveness Study	High-level Economic Analysis and Cost Effectiveness Draft Report
CO2e	Carbon Dioxide Equivalent
CPUC	California Public Utilities Commission
D.	Decision
DAC	Disadvantaged Communities
Demand Study	Angeles Link Demand Report
Design Study	Pipeline Sizing & Design Criteria Report
DOE	Department of Energy
EDI	Electrodeionization
ELP	Event Learning Process
EPA	Environmental Protection Agency
ESJ	Environmental Social Justice
FN	Footnote
GHG	Greenhouse Gas
G.O.	General Order
GWP	Global Warming Potential
H2	Hydrogen
KG	Kilogram
LBNL	Lawrence Berkeley National Laboratory
LCOH	Levelized Cost of Hydrogen
M&I	Municipal and Industrial
MAOP	Maximum Allowable Operating Pressure
MMBTU	Million British Thermal Units
MMTPY	Million Metric Tons (tonnes) Per Year

Acronym/Abbreviation	Definition
MW	Megawatt
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NOx	Nitrogen Oxide
NREL	National Renewable Energy Lab
O.P.	Ordering Paragraph
PAG	Planning Advisory Group
Permitting Analysis	High-level Feasibility & Permitting Analysis Report
PHMSA	Pipeline and Hazardous Materials Safety and Administration
PIR	Potential Impact Radius
PPE	Personal Protective Equipment
RNG	Renewable Natural Gas
RO	Reverse Osmosis
ROW	Right-of-Way
Safety Study	Evaluation of Applicable Safety Requirements
SCAQMD	South Coast Air Quality Management District
SGMA	Sustainable Groundwater Management Act
SMS	Safety Management System
SSPs	Specifications, Standards, and Procedures
SWP	State Water Project
TCO	Total Cost of Ownership
UC Davis	University of California, Davis
UC Irvine	University of California, Irvine
UCLA	University of California, Los Angeles
UF	Ultrafiltration
UWMP	Urban Water Management Plans
VOC	Volatile Organic Compound

2 Overview

Appendix 3 to the Quarterly Report includes the written comment letters received from the Planning Advisory Group (PAG) and Community Based Stakeholder Group (CBOSG) during the third quarter (July to September) of 2024 on various Phase 1 feasibility studies, and SoCalGas's responses to the comment letters. SoCalGas's responses below address stakeholder feedback based on available information as of the submittal date of this quarterly report, unless otherwise noted. The categories of comments were provided on the following SoCalGas draft reports (1) Evaluation of Applicable Safety Requirements (Safety Study); (2) Water Resources Evaluation (Water Evaluation); (3) Workforce Planning & Training Evaluation (Workforce Study); (4) Greenhouse Gas (GHG) Emissions Evaluation (GHG Study); (5) Nitrogen Oxide (NOx) and other Air Emissions Assessment (NOx Study); (6) Environmental Social Justice (ESJ) Plan and Screening (ESJ Screening); (7) Production Planning & Assessment (Production Study); (8) Pipeline Sizing & Design Criteria Study (Design Study); (9) Preliminary Routing/Configuration Analysis (Routing Analysis); (10) High-Level Feasibility Assessment and Permitting Analysis (Permitting Analysis); (11) Project Options and Alternatives (Alternatives Study); (12) High-Level Economic Analysis & Cost Effectiveness Study (Cost Effectiveness Study); (13) Environmental Analysis; and (14) Framework for Affordability Considerations (Affordability Framework).

Table 1: Index of Comment Letters Received During Q3 2024

Comment Letter	Received Date	Commenter	Response No.
Draft Study (Safety Study) (Comment Period June 21 – July 19, 2024)			
1	July 19	Air Products	1-1 to 1-4
2	July 19	Physicians for Social Responsibility – Los Angeles	2-1 to 2-4
3	July 19	Communities for a Better Environment	3-1 to 3-11
4	July 24	Cal Advocates	4-1 to 4-4
Draft Study (Water Evaluation and Workforce Study) (Comment Period July 5 – August 2, 2024)			
5	August 2	Communities for a Better Environment	5-1 to 5-9
6	August 2	Air Products	6-1 to 6-4
7	August 2	Communities for a Better Environment	7-1 to 7-8
40	September 1	Reimagine LA	40-1
Draft Study (GHG Study) (Comment Period July 10 – August 7, 2024)			
8	August 7	Environmental Defense Fund	8-1 to 8-2
9	August 7	Air Products	9-1 to 9-5
10	August 13	Natural Resources Defense Council	10-1 to 10-5
11	August 14	Communities for a Better Environment	11-1 to 11-7
Draft Study (NOx Study) (Comment Period July 17 – August 14, 2024)			
12	August 14	Communities for a Better Environment	12-1 to 12-6
37	September 1	Reimagine LA	37-1

Comment Letter	Received Date	Commenter	Response No.
Draft Study (ESJ Plan and Screening, Production Study, Design Study, Routing Analysis, and Permitting Analysis) (Comment Period July 19 – August 30, 2024)			
13	August 16	Cal Advocates	13-1 to 13-6
14	August 16	California Greenworks	14-1 to 14-10
15	August 20	Green Hydrogen Coalition	15-1 to 15-9
16	August 21	Southern California Generation Coalition	16-1 to 16-6
17	August 21	Southern California Generation Coalition	17-1
18	August 21	Southern California Generation Coalition	18-1 to 18-2
19	August 27	Utility Workers Union of America	19-1
20	August 27	United Association Local Union 250	20-1 to 20-2
21	August 27	Soledad Enrichment Action	21-1
22	September 5	California Greenworks	22-1
23	August 30	Environmental Defense Fund	23-1 to 23-5
24	August 29	Coalition for Responsible Community Development	24-1 to 24-2
25	August 29	Protect Playa Now	25-1 to 25-3
26	August 29	Protect Playa Now	26-1
27	August 29	Protect Playa Now	27-1
28	August 29	Protect Playa Now	28-1 to 28-5
29	August 29	Protect Playa Now	29-1
34	August 30	Communities for a Better Environment	34-1 to 34-7
35	August 30	Communities for a Better Environment	35-1 to 35-3
36	August 30	California Hydrogen Business Council	36-1 to 36-8
38	September 1	Reimagine LA	38-1
39	September 1	Reimagine LA	39-1
42	September 4	UC Davis	42-1 to 42-10
43	September 5	Southern California Generation Coalition	43-1 to 43-2
Draft Study (Alternatives Study, Cost Effectiveness Study, and Environmental Analysis) (Comment Period July 26 – September 6, 2024)			
30	August 29	Protect Playa Now	30-1 to 30-6
31	August 29	Protect Playa Now	31-1 to 31-5
32	August 29	Protect Playa Now	32-1 to 32-5
33	August 30	Air Products	33-1 to 33-16
44	September 6	California Hydrogen Business Council	44-1 to 44-3
45	September 6	Cal Advocates	45-1
46	September 6	Environmental Defense Fund	46-1 to 46-4
47	September 6	Communities for a Better Environment	47-1 to 47-7
48	September 9	Food & Water Watch	48-1 to 48-4
Draft Study (Affordability Framework) (Comment Period September 20 – October 4, 2024)			

Comment Letter	Received Date	Commenter	Response No.
49	October 4	California Hydrogen Business Council	49-1
50	October 4	Environmental Defense Fund	50-1 to 50-2
51	October 4	Green Hydrogen Coalition	51-1 to 51-5
Miscellaneous Comments			
41	September 1	Reimagine LA	41-1

Since the CPUC approved D.22-12-055 in December 2022, SoCalGas has been working diligently to complete the feasibility analyses within this timeframe, and the windows for comment on the studies supported that timeframe. Comments received after the close of the comment period for each respective report could not be incorporated into the final study reports. However, SoCalGas is providing full responses to all comments received in this Quarterly Report.

Written comment letters from PAG and CBOSG members have been coded with a number to facilitate identification and tracking (see Table 1 above). These comment letters were reviewed and divided into individual comments, based on themes, issues, or concerns. Individual comments and the responses to them were assigned corresponding numbers (e.g., 1-1, 1-2, etc.). To aid readers and commenters, electronically bracketed comments have been applied to this document, with the corresponding responses provided immediately following the comments.

Global responses were prepared to address similar issues that were raised in multiple comment letters. These responses are provided below. These include:

Global Response 1 – Water Availability and Geographic Considerations for Third-Party Production

Global Response 2 – Timeline for PAG and CBOSG Responses

Global Response 3 – Stakeholder Letters of Support

Global Response 4 – Safety

Global Response 5 – Routing, Route Variation, and ESJ

Global Response 6 – Biomass Gasification and Emissions

Global Response 7 – ESJ Plan & Analysis Purpose and Limitations

Global Response 8 – ESJ Screening Purpose

Global Response 9 – Hydrogen Equity Principles and ESJ Plan

Global Response 10 – Affordability Framework Comment Letters

All references to SoCalGas reports and studies mentioned in the Global Responses and Responses to Comments can be found at the SoCalGas Angeles Link website: Angeles Link | SoCalGas.

Global Response 1 – Water Availability and Geographic Considerations for Third-Party Production

Various stakeholders stated that the Water Resources Evaluation (Water Evaluation) does not adequately evaluate the availability of water for specific potential hydrogen third-party production areas given potential geographic challenges, cost considerations, and supply constraints that may apply to water supply availability at specific production locations.

The primary purpose of the Water Evaluation is to: (i) identify potential sources of water for clean renewable hydrogen generation and (ii) provide estimates of the cost of water for hydrogen production.[1] The Water Evaluation fulfills that purpose by identifying the potential sources of water for third-party clean renewable hydrogen production (see Chapter 1: Water Availability Study) and estimating costs associated with water for that production based on various reasonable assumptions (see Chapter 3: Water Acquisition and Purification Costs). The Water Evaluation provides an initial feasibility-level analysis of potential water sources that third-party producers may pursue without more granular analysis of water availability in specific production areas, as clean renewable hydrogen[2] production is not part of Angeles Link.

While the Phase 1 Production Planning & Assessment (Production Study) identifies potential clean renewable hydrogen production areas considering conceptual Angeles Link routing options and the production projects being considered in the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES)[3] California hydrogen hub (see Production Study, Chapter 10 – Production Land Assessment), further evaluating the water availability for specific third-party production projects in specific geographic locations would be speculative at this time. Third parties will ultimately produce clean renewable hydrogen in locations that meet the needs and project specifications of those particular entities and would evaluate specific water supply sources on a case-by-case basis when specific production projects are proposed.

The challenge in evaluating water availability in specific geographic regions without proposed production projects is illustrated through a letter provided by Metropolitan Water District (Metropolitan) to SoCalGas in response to SoCalGas's outreach efforts concerning water availability for hydrogen production. As summarized in Chapter 1: Water Availability Study (Section 1.3.4 – Agency Outreach), Metropolitan stated it is willing to work with SoCalGas[4] on water exchanges either on the Colorado River or through the State Water Project to provide water to support potential hydrogen production projects.

[1] D.22-12-055 at 76, Ordering Paragraph (OP) 6(b).

[2] Per D.22-12-055, "clean renewable hydrogen" is defined as hydrogen produced with a carbon intensity equal to or less than four kilograms of carbon dioxide-equivalent produced on a lifecycle basis per kilogram and does not use any fossil fuel in its production process.

[3] ARCHES is co-founded by the Governor's Office of Business and Economic Development, the University of California, a statewide labor coalition organized by the State Building and Construction Trades Council of California, and the Renewables 100 Policy Institute. ARCHES identified potential hydrogen production locations and offtake sites. See https://archesh2.org/wp-content/uploads/2024/03/ARCHES-FAQ-Basic-1.pdf

[4] The letter from Metropolitan refers to SoCalGas as the party potentially pursuing water supply development. As noted, SoCalGas would not be developing water supplies for Angeles Link, as third-party producers would produce the clean renewable hydrogen that Angeles Link would transport. SoCalGas conducted agency outreach for informational purposes to support the Water Evaluation.

However, Metropolitan stated water exchanges are “difficult to quantify and must be evaluated on a case-by-case basis for their benefit to the Southern California region’s well-being and water supply security.” This statement from Metropolitan illustrates the need to evaluate potential water availability on a case-by-case basis as details of potential production projects develop over time.

As highlighted in the Water Evaluation (Chapters 3 and 4), SoCalGas recognizes the potential costs and challenges in acquiring, treating, and conveying the water needed to produce the clean renewable hydrogen that Angeles Link would transport. At the time those production projects are proposed, each production project would complete water supply assessments that account for costs and other challenges. In addition, such projects would undergo extensive environmental review under the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA), as applicable.

More generally, in response to stakeholder comments concerning water availability in specific production areas, water supply management throughout California is conducted on state, regional, and local levels, as discussed in the Q1 2024 Angeles Link Quarterly Report Global Response 5 - Water Availability, Local Community Impacts and Affordability and within Chapter 1 of the Water Evaluation. The availability of water sources varies by location, climatic conditions, and existing and anticipated demands. Agencies must manage their respective supply sources throughout seasonal and annual fluctuations to accommodate existing demands and obligations in key sectors including municipal and industrial (M&I) or urban, agricultural, and environmental sectors. Regulatory requirements are in place for agencies to manage water resources sustainably.

Global Response 2 – Timeline for PAG and CBOSG Review and Feedback

Some stakeholders commented that the timeline to provide feedback on the draft feasibility Phase 1 reports was too short. SoCalGas acknowledges this comment and recognizes the large volume of materials SoCalGas has presented to the PAG and CBOSG members for the Phase 1 feasibility analyses and, as a result, extended several feedback windows as requested.

As SoCalGas stated in its application for the Angeles Link Memorandum Account, the Phase 1 process was intended to be completed in a 12 to 18-month timeframe. Since the CPUC approved Decision (D.) 22-12-055 in December 2022, SoCalGas has been working diligently to complete the feasibility analyses within this timeframe. Recognizing the volume of feasibility analyses and the timeframe to complete the studies, SoCalGas established four milestones to provide PAG and CBOSG members with opportunities to provide feedback as the studies were being developed throughout the entirety of Phase One. These milestones provided opportunities for stakeholders to help shape the studies and have insight into the scope of the studies as they were developed. These key milestones included 1) scope of work; 2) technical approach; 3) preliminary findings; and 4) draft reports. PAG and CBOSG members had opportunities to provide feedback at each of those milestones as the studies developed. When stakeholders requested additional time to provide feedback at certain milestones, SoCalGas provided extensions on the feedback windows. For the largest batch of draft reports, SoCalGas extended, at stakeholder request, that feedback window two weeks from a four-week period to a six-week period for all stakeholders on the requested studies. These time extensions resulted in the anticipated completion of Phase 1 activities extending to approximately 20 months.

In addition to the milestones, SoCalGas met with its PAG and CBOSG at least once a quarter and added supplemental workshops on certain topics in response to PAG and CBOSG requests for more information on the development of the studies throughout Phase 1. SoCalGas also met with stakeholders on a one-on-one basis as requested, to discuss certain feasibility study topics in more detail.

Global Response 3 – Stakeholder Letters of Support

Various stakeholders submitted comments expressing their support for Angeles Link, including support of the ESJ Plan, the Routing Analysis, and the Design Study. Several themes are expressed across letters addressing various studies. For example, commenters:

- Support Angeles Link as critical infrastructure that would help create a clean, renewable hydrogen economy as part of the state's energy transition.
- Commend the analysis and integration of various data sources and consideration of NOx, GHG and other emission reductions presented in the air-related studies.
- State that Angeles Link will create and sustain jobs during construction and operation using an existing local workforce.
- Appreciate the use of economic and employment tools, and specifically IMPLAN (input-output modeling program that performs economic impact analysis), to address workforce considerations.
- Recognize SoCalGas's efforts to engage historically disenfranchised communities of color, especially in Los Angeles, through the development of the ESJ Plan.
- Appreciate incorporating a route variation (Route Variation 1) to minimize impacts to disadvantaged communities in response to stakeholder input.

Similar to comments from the PAG and CBOSG suggesting potential ways to improve Angeles Link, SoCalGas values the support expressed for the work already completed. This feedback is important as we continue to advance Angeles Link.

Global Response 4 – Safety

Several stakeholders commented about overarching safety concerns of a new hydrogen pipeline and local community impacts.

As the nation's largest gas distribution utility[5], with decades of experience transporting gases, SoCalGas prioritizes safety across its operations. The engineering and design of Angeles Link will prioritize infrastructure and public safety, and the well-being of our workforce, including employees and contractors.

Safety is embedded throughout Angeles Link's planning, engineering, and design process, and will be incorporated into, as well as through, the execution of construction and long-term operation and maintenance. As described in the Evaluation of Applicable Safety Requirements (Safety Study), SoCalGas evaluated federal, state, and industry codes, standards, and best practices for pipeline transmission, storage, and transportation of clean renewable hydrogen as applicable to Angeles Link. The Safety Study provides an assessment of applicable safety requirements and potential updates or modifications to SoCalGas's standards, specifications, and procedures (covering construction, operations, and maintenance) to address hydrogen-specific considerations. Additionally, as further described in the Safety Study, leveraging the SoCalGas existing public awareness program will lay the groundwork to make the necessary adjustments required to reflect the operations of a dedicated clean renewable hydrogen pipeline. The public awareness program communicates safety and other relevant information to all stakeholders, emergency response agencies, and local government officials, and excavators. SoCalGas also meets with each local fire department to review plans for emergency response. As described in the Design Study, the sizing of pipelines is a key engineering decision that influences efficiency, safety, and operational viability. Pipeline sizing is the process of determining the optimal diameter and wall thickness of a pipeline so that it can safely and efficiently transport the required volume of gas under given operating conditions. SoCalGas's Phase 1 feasibility studies serve as a precursor to more detailed analysis and refinement that underpin the subsequent stages of preliminary and Front End-Engineering Design (FEED) activities. In future phases, SoCalGas will continue to perform modeling and other engineering activities to advance developing a more detailed engineering design; identify specific project safety requirements and design factors; and support safe and efficient project execution.

As described in the Routing Study, gaseous hydrogen can be transported safely by pipeline much in the same way natural gas is transported today. As noted above, the Safety Study provides an assessment of applicable safety requirements and potential updates or modifications to SoCalGas's standards, specifications, and procedures (covering construction, operations, and maintenance) to address hydrogen-specific considerations. Approximately 1,600 miles of pure hydrogen pipeline are currently operating in the United States.[6] SoCalGas identified four preliminary preferred routes —A, B, C, and D, as well as a route variation (Route 1 Variation) —in the Routing Study. A street-level alignment evaluation of each of these four identified preferred pipeline routes was not conducted in Phase 1 and is expected to occur in subsequent phases of Angeles Link once a preferred route is selected. This future street-level evaluation will enable potential site-specific safety risks to be addressed through various mechanisms,

[5] Based on total customers and sales revenues reported in American Gas Association's (AGA) Utility Rankings by Volumes, Revenues and Customers 2022 Report.

[6] Hydrogen pipelines | Department of Energy. (n.d.-b). https://www.energy.gov/eere/fuelcells/hydrogen-pipelines.

such as pipeline design (e.g., increased pipeline wall thickness), installation of automatic shutoff valves, or route modifications.

Global Response 5 – Routing, Route Variation, Environmental Justice Considerations and Cost Estimate

As described in the Routing Analysis, SoCalGas's route selection process evaluates directional pathways that account for engineering, environmental, social, and environmental justice features along the four potential preferred routes. SoCalGas identified four preliminary preferred routes — A, B, C, and D, and a route variation (Route Variation 1) — in the Routing Analysis that meet the stated routing criteria, including environmental justice considerations (see Routing Analysis, Section 4 Disadvantaged Communities and Environmental Social Justice, for additional information).

SoCalGas proposed Route Variation 1 in response to stakeholder feedback about environmental justice. Several stakeholders commented on proposed Route Variation 1 and Preferred Route D (Route D) either in support of the potential alignment or in opposition to the potential alignment. In general, commenters in support of Route Variation 1 and Route D acknowledged the reduced pipeline mileage in designated disadvantaged communities. In general, commenters in opposition to Route Variation 1 and Route D stress the importance of interconnecting production with municipal load centers and electric generation facilities and providing access to hydrogen fueling along major transportation corridors and mobility hubs in the LA Basin.

Route Variation 1 is an example of potential modifications to Preferred Routes A, B, and C which would be studied further in Phase 2 when evaluation at the street level is conducted to determine how disadvantaged communities' impacts may be reduced and benefits maximized. Given the high concentration of disadvantaged communities in the LA Basin, it may be difficult to completely avoid these areas. However, it is the intention of Angeles Link to serve customers that are hardest to decarbonize and delivering clean renewable hydrogen via Angeles Link, as designed, would result in cleaner air for these communities.

A final preferred route will be selected in Phase 2 of Angeles Link with stakeholder feedback incorporated and key elements of route optimization considered which include, but are not limited to, safety, engineering, environmental, social, and environmental justice.

Several stakeholders commented that SoCalGas should incorporate the recommendations contained in the Equity Principles for Hydrogen regarding the environmental justice considerations of routing. SoCalGas's response to the Equity Principles is provided in its Q4 2023 Angeles Link Quarterly Report (see Appendix 3A). While SoCalGas will not produce hydrogen as part of Angeles Link, SoCalGas supports sustainable upstream production pathways as well as hydrogen usage that minimizes adverse environmental impacts. SoCalGas also sees alignment with the Equity Principles around prioritizing community engagement, tribal consultation, minimizing and mitigating environmental impacts and reducing energy pollution, cost transparency, and safety as a foundational value. Please see Global Response 9 for additional information on the Equity Principles as they relate to SoCalGas's ESJ Plan. As noted above, Angeles Link will incorporate environmental justice considerations in selecting a single preferred route in a future phase.

SoCalGas is in the early stages of developing preliminary cost estimates for Angeles Link and as part of future phases, SoCalGas will use more refined cost estimates to assess the potential costs of Angeles Link. A Class 5 Estimate, which is a high-level, budgetary cost estimate for constructing Angeles Link, was conducted in Phase 1. The cost estimates were developed based on feasibility level information, and have wide accuracy ranges appropriate for initial project screening purposes. In Phase 2, SoCalGas will

identify a single preferred route, and conduct detailed engineering, design, environmental analysis and other associated evaluations for the preferred route, which will narrow the accuracy range of the cost estimate following Association for the Advancement of Cost Engineering International guidelines for estimate development.

Global Response 6 – Biomass Gasification and Emissions

Various stakeholders addressed SoCalGas's GHG Study and NOx Study (Studies) assumption that biomass gasification[7] would not produce GHG and NOx emissions, and as a result, various stakeholders state the conclusions of the studies overstate potential GHG and NOx reductions.

SoCalGas developed assumptions to inform the Studies based on a reasonable range of reputable data sources and research studies available at this time.[8] The assumptions note that estimates were developed based on hypothetical scenarios related to percentages of total third-party production provided by the following options: 1) electrolysis, 2) biomass gasification, and 3) biogas steam methane reforming with the combustion equipment fueled by hydrogen.

Biomass gasification[9] is a process that involves heat, steam, and oxygen to convert biomass to hydrogen without combustion. Since this process does not use combustion, there is no potential for NOx emissions from biomass gasification. It was assumed that only renewable electricity would be used and therefore the GHG emissions would be zero. Based on literature reviewed, it was assumed that the process would be "carbon neutral" process even though it may actually have negative life cycle greenhouse gas emissions,[10] because growing biomass removes carbon dioxide from the atmosphere.

The GHG/NOx studies also assumed that biomass would be procured ready for combustion and removal of moisture would not be required on-site. The studies also indicated that emissions associated with transportation of other materials such as biomass to production sites or biomass feed preparation are not included as these details are beyond the scope of the feasibility studies. Uncertainty around the assumptions related are captured in the "Uncertainty" section of the GHG Study and NOx Study (see GHG Study Section 10.1.1 and NOx Study Section 11.2.1, respectively).

More accurate emissions estimates can be made for hydrogen production once designs for those production facilities are further along and the data made available to SoCalGas. Notwithstanding, third parties will ultimately produce clean renewable hydrogen in locations that meet the needs and project specifications of those particular entities. In the event that production of hydrogen does not meet the

[7] Gasification is a process that converts organic or fossil-based carbonaceous materials at high temperatures (>700°C), without combustion, with a controlled amount of oxygen and/or steam into carbon monoxide, hydrogen, and carbon dioxide. The carbon monoxide then reacts with water to form carbon dioxide and more hydrogen via a water-gas shift reaction. Adsorbers or special membranes can separate the hydrogen from this gas stream. Hydrogen Production: Biomass Gasification | Department of Energy.

[8] The Production Study acknowledges that GHG emissions are generated during harvesting, transporting, and conversion of biomass to hydrogen. The study also mentions that since growing biomass removes carbon dioxide from the atmosphere, the net carbon emissions may be neutral or low.

[9] DOE, 2024b, Hydrogen Production: Biomass Gasification, https://www.energy.gov/eere/fuelcells/hydrogen-production-biomass-gasification

[10] Yaser Khojasteh Salkuyeh, Bradley A. Saville, Heather L. MacLean, International Journal of Hydrogen Energy Volume 43, Issue 20, 17 May 2018, Pages 9514-9528, Techno-economic analysis and life cycle assessment of hydrogen production from different biomass gasification processes. https://www.sciencedirect.com/science/article/abs/pii/S0360319918311182

applicable CPUC requirements set forth for clean renewable hydrogen[11] then the hydrogen could not be transported by Angeles Link.

[11] D.22-12-055 at 42 and Findings of Fact 34-35, clean renewable hydrogen refers to hydrogen that does not exceed 4 kilograms of CO2e produced on a lifecycle basis per kilogram of hydrogen produced and does not use fossil fuels in the hydrogen production process, where fossil fuels are defined as a mixture of hydrocarbons including coal, petroleum, or natural gas, occurring in and extracted from underground deposits.

Global Response 7 – Intent of Environmental and Social Justice (ESJ Plan)

Various stakeholders expressed concern about the lack of direct community engagement with environmental justice communities as details on Angeles Link develop further.

SoCalGas prepared the ESJ Plan in response to CBOSG feedback received to engage communities living near potential preferred routes and create an opportunity to hear from the community. The ESJ Plan aligns with SoCalGas's commitment to address the needs of our community stakeholders and maintain a robust and transparent stakeholder engagement process.

The ESJ Plan includes an ESJ community screening assessment (ESJ Screening), which provides baseline disadvantaged community (DAC) designation information and other demographic information for the potential preferred routes identified in Phase 1. SoCalGas intends to leverage this information in Phase 2 to enhance future stakeholder engagement efforts and tailor outreach strategies in DAC and ESJ communities.

The aim of the ESJ Plan is "to enable the active involvement of ESJ Communities and other stakeholders that have been historically overlooked in a typical project development process. The ESJ Plan is designed to provide these communities with a seat at the table, creating a feedback loop that allows SoCalGas to listen to and learn from ESJ Community stakeholders directly."[12] Further, the ESJ Plan at this stage is primarily a framework for engaging ESJ Communities during Phase 2 of Angeles Link. The ESJ Plan is intended to be dynamic and is expected to evolve as project details develop and the needs of the community change. Additionally, the implementation of the ESJ Plan is not the entirety of the stakeholder engagement process for future phases of Angeles Link. SoCalGas intends to conduct a robust stakeholder engagement process, with the ESJ Plan being just one component.

Further, robust or expanded community or public outreach could not be conducted during Phase 1 as prescribed in D. 22-12-055: "[b]ecause the main objective of Phase One is to conduct a feasibility study of the Angeles Link Project, SoCalGas will not need to conduct public outreach in Phase one beyond the planned stakeholder engagement activities."[13]

SoCalGas summarizes the applicable goals from the CPUC's ESJ Action Plan in the Phase 1 Angeles Link ESJ Plan to show alignment with the Commission's commitment to furthering ESJ principles. SoCalGas supports the nine overarching goals included in the CPUC's ESJ Action Plan. However, it is important to note that not all of these goals directly apply to investor-owned utility operations, programming, or projects. The CPUC's ESJ Action Plan goals were developed with the CPUC's operating framework in mind, and therefore, they are not something that investor-owned utilities can implement directly but rather align with.

[12] ESJ Plan, Section 3 – Goals of this Plan.

[13] D. 22-12-055 at 67.

Global Response 8 – Intent of ESJ Screening

Various stakeholders expressed concern about the level of detail and analysis in the ESJ Screening.

The ESJ Screening was prepared to support SoCalGas's development of strategies to address and mitigate potential impacts to disadvantaged communities and other environmental justice (EJ) concerns, in accordance with OP(6)(l)) of D.22-12-055. The purpose of this Phase 1 ESJ Screening was to identify DACs and preliminarily identify potential impacts to DACs. The ESJ Screening work is not intended to define actual impacts, but rather provides a desktop analysis of the potential Angeles Link pipeline corridors that have the highest concentration of DACs, as well as a list of indicators for each area that could help SoCalGas prioritize future stakeholder engagement and routing efforts.

SoCalGas recognizes the limitations of the information presented in the ESJ Screening given the preliminary nature of Angeles Link. The conceptual routes do not illustrate the specific routes where Angeles Link may be constructed, as specific routes and street-level alignments will be further studied and refined in future phases of Angeles Link. As pipeline routes and alignments are further developed in future phases, SoCalGas can assess potential impacts to DACs in more detail.

Global Response 9 – Hydrogen Equity Principles and ESJ Plan

Several stakeholders commented that SoCalGas did not adequately consider the Equity Principles for Hydrogen in the Environmental Social Justice Plan. SoCalGas believes the plan is a first step in meaningfully engaging communities that have been historically overlooked in a typical project development process. SoCalGas is not intending to mischaracterize the Equity Principles for Hydrogen but rather aims to integrate them in a manner that is both practical and impactful. The company remains committed to ongoing dialogue and collaboration with all stakeholders to effectively implement the principles. SoCalGas sees alignment with the Equity Principles around prioritizing community engagement, tribal consultation, minimizing and mitigating environmental impacts, reducing energy pollution, cost transparency, and safety as a foundational value. For additional response related to the Equity Principles for the specific development of Angeles Link, please refer to Appendix 3A in SoCalGas's Q4 2023 Quarterly Report.

Global Response 10 – Affordability Framework Comment Letters

Several stakeholders commented that the Affordability Framework appropriately outlines a process and options to analyze affordability, rate design, and cost allocation when Angeles Link specifics are more certain, and these considerations should serve as the basis for any future discussions around affordability. Some commenters also identified or proposed additional affordability considerations that could be taken into account in such future discussions, or by the CPUC.

As noted in the Affordability Framework, there is growing consensus that fully decarbonizing the State's economy will require increasing electrification and, for some end users, clean alternative fuels, such as clean renewable hydrogen. SoCalGas acknowledges comments from stakeholders regarding efforts to manage the costs of Angeles Link and to consider creative ratepayer and non-ratepayer options to fund Angeles Link. With regard to non-ratepayer funding opportunities, these opportunities would require legislative action, CPUC approval, and/or a long-term funding source—all of which are beyond SoCalGas's control. SoCalGas looks forward to working with the CPUC and other stakeholders to identify and leverage such opportunities. SoCalGas plans to assess information developed in Phase 1 and Phase 2 about hydrogen demand, end users, hydrogen offtake contract terms, throughput, and system operations.

3 Comment Letters and Responses

Comment Letter 1 – Air Products

Comment Letter 1

July 19, 2024

VIA EMAIL TO
ALP1_PAG_FEEDBACK@INSIGNIAENV.COM

Emily Grant
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Southern California Gas Company
555 West Fifth Street
Los Angeles, CA 90013

Re: Angeles Link Planning Advisory Group (PAG) Feedback of Air Products and Chemicals Inc. on Plan for Applicable Safety Requirements (June 2024 Draft)

Air Products and Chemicals, Inc. ("Air Products") submits the following feedback concerning the June 2024 draft Plan for Applicable Safety Requirements ("Draft Safety Plan").

Air Products expects that the below feedback will be addressed in the final Studies and in Southern California Gas Company's (SoCalGas) quarterly reporting. Air Products also welcomes any response that SoCalGas may wish to provide to the comments below.

Experience with Natural Gas Systems Does Not Necessarily Translate to Hydrogen

Air Products safely operates 10 hydrogen production facilities and about 30 miles of hydrogen pipelines within California and has been doing so for over 40 years. Worldwide, Air Products operates over 1,800 miles of industrial-gas pipelines. In light of this experience, Air Products has concerns about the Draft Safety Plan's blithe assertions throughout the report that Southern California Gas Company's ("SoCalGas") experience with natural gas systems will inevitably translate to a hydrogen pipeline system. For example, the Draft Plan asserts that:

> A clean renewable hydrogen system (gaseous hydrogen) can leverage many of the existing requirements of an analogous natural gas system. Where hydrogen's physical and chemical properties differ from natural gas, influence from SoCalGas's existing natural gas system plans including safety system, specifications, procedures and training will provide a basis for designing, constructing and operating Angeles Link.[1]

The Draft Plan also asserts that "SoCalGas is well positioned to build, operate and maintain a clean renewable hydrogen pipeline system due to its long-standing experience operating and

Comment 01-01

[1] Draft Plan at 7.

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maintaining a highly developed gas transmission and distribution system, existing highly trained and qualified workforce, and a comprehensive established integrity management and emergency response procedures."[2] The Draft Plan goes on to contend that "there are many similarities between hydrogen and natural gas operations and gas handling. *While there are some differences in their properties and characteristics*, a variety of existing practices can be modified to manage these differences."[3]

While it is understandable that SoCalGas might wish to claim that its experience with natural gas somehow qualifies it to operate a hydrogen system, Air Products cautions that experience with natural gas does not necessarily translate to the operation of pipeline systems for other industrial gases such as hydrogen. Assuming that existing practices regarding natural gas will apply to hydrogen pipelines can lead to the adoption of practices and procedures that are not appropriately adapted to hydrogen. The Safety Plan should specially address why the contemplated practices and procedures appropriately apply to hydrogen systems. In addition, the Safety Plan must include some type of hazop interface review with all the end-use markets/customers to ensure that they understand the safe handling of hydrogen the project intends to deliver. While the Safety Plan describes public outreach generally, more detail is needed on the interface with the intended industrial, power generation, and transportation fuel supply customers.

Comment 01-01

The same applies to the applicability, if any, of existing Commission pipeline regulations. The Draft Safety Plan cites to Commission General Order ("GO") 112 F, Subpart E, which supplements Federal Pipeline Safety Regulations. As Air Products has pointed out previously,[4] Commission has yet to determine that the Angeles Link, or hydrogen transportation generally, would be subject to Commission jurisdiction.[5] It therefore is at best unclear whether GO 112 will be applicable to Angeles Link; furthermore, it is unclear whether the Commission, if it did assert jurisdiction, would apply GO 112 as currently drafted to hydrogen pipelines. In its response to Air Products' October 13, 2023 Feedback, SoCalGas stated that "potential safety considerations *may* be derived from GO 112-F and should be appropriately evaluated as it *may* apply to a clean renewable hydrogen transportation system."[6] Yet the Draft Safety Plan lists GO 112 F as part of the "hydrogen-specific industry standards that provide best practices that should be considered for hydrogen pipelines."[7] As SoCalGas conceded in its Q4 Quarterly Report, GO 112 F does not directly apply, and must be appropriately evaluated, like other natural gas practices and procedures, to determine the extent to which such requirements can and should apply to hydrogen pipelines.

Comment 01-02

Odorization Issues

[2] *Id.* at 11.
[3] *Id.* at 21 (emphasis added).
[4] *See* Air Products' October 13, 2023 Feedback Letter at 4-5.
[5] D.22-12-055 at 8; D.24-07-009 at 30. (TCAP decision).
[6] SoCalGas Angeles Link Q4 Quarterly Report Appendices (Phase One), Appendix 3 at p. 5.
[7] Draft Safety Plan at 24.

The Draft Safety Plan notes that "an odorant *may* be required under 49 CFR §192.625," and the Plan's initial review of several studies on the feasibility of odorizing hydrogen and the options for doing so.[8] However, there is a significant amount of additional work that should be performed to determine whether odorization is appropriate, and the appropriate odorant for a hydrogen system, and the Draft Safety Plan fails to fully address this issue.

Comment 01-03

The Draft Safety Plan notes that due to the disadvantages of using tetrahydrothiophene (THT) such as for fuel cell systems, alternative sulfur-free odorants were investigated for hydrogen distribution. The Draft Safety Plan selectively states that the odorant 2-hexyne was found not to have an adverse effect on the performance of fuel cells and "was able to maintain stability in hydrogen, therefore appeared suitable for use as a sulfur-free odorant in hydrogen."[9] However, as the cited report shows, sulfur-free odorants, including 2-hexyne, can be vulnerable to hydrogenation when in contact with uncoated steel cylinder surfaces. For example, 2-hexyne in uncoated steel cylinders can be hydrogenated to hexane, which has a very different odor profile which is likely not suitable as a hydrogen odorant. The same is true of another odorant mentioned in the report, Gasodor S-Free, which is comprised of ethyl acrylate, methyl acrylate and 2-ethyl-3-methylpyrazine, as it is also vulnerable to hydrogenation, resulting in odor changes that would likely render it ineffective as a gas odorant.

Comment 01-04

Conclusion

Air Products appreciates the opportunity to provide this feedback concerning the June 2024 Draft Safety Plan.

Respectfully,

Miles Heller Director, Global Greenhouse Gas,
Hydrogen, and Utility Regulatory Policy

[8] *Id.* at 28-29.
[9] *Id.* at 29.

AIR PRODUCTS COMMENT 1-1

Air Products and Chemicals, Inc. ("Air Products") submits the following feedback concerning the June 2024 draft Plan for Applicable Safety Requirements ("Draft Safety Plan").

Air Products expects that the below feedback will be addressed in the final Studies and in Southern California Gas Company's (SoCalGas) quarterly reporting. Air Products also welcomes any response that SoCalGas may wish to provide to the comments below.

Experience with Natural Gas Systems Does Not Necessarily Translate to Hydrogen

Air Products safely operates 10 hydrogen production facilities and about 30 miles of hydrogen pipelines within California and has been doing so for over 40 years. Worldwide, Air Products operates over 1,800 miles of industrial-gas pipelines. In light of this experience, Air Products has concerns about the Draft Safety Plan's blithe assertions throughout the report that Southern California Gas Company's ("SoCalGas") experience with natural gas systems will inevitably translate to a hydrogen pipeline system. For example, the Draft Plan asserts that:

A clean renewable hydrogen system (gaseous hydrogen) can leverage many of the existing requirements of an analogous natural gas system. Where hydrogen's physical and chemical properties differ from natural gas, influence from SoCalGas's existing natural gas system plans including safety system, specifications, procedures and training will provide a basis for designing, constructing and operating Angeles Link. FN1 The Draft Plan also asserts that "SoCalGas is well positioned to build, operate and maintain a clean renewable hydrogen pipeline system due to its long-standing experience operating and maintaining a highly developed gas transmission and distribution system, existing highly trained and qualified workforce, and a comprehensive established integrity management and emergency response procedures." FN2 The Draft Plan goes on to contend that "there are many similarities between hydrogen and natural gas operations and gas handling. While there are some differences in their properties and characteristics, a variety of existing practices can be modified to manage these differences." FN3

While it is understandable that SoCalGas might wish to claim that its experience with natural gas somehow qualifies it to operate a hydrogen system, Air Products cautions that experience with natural gas does not necessarily translate to the operation of pipeline systems for other industrial gases such as hydrogen. Assuming that existing practices regarding natural gas will apply to hydrogen pipelines can lead to the adoption of practices and procedures that are not appropriately adapted to hydrogen. The Safety Plan should specially address why the contemplated practices and procedures appropriately apply to hydrogen systems. In addition, the Safety Plan must include some type of hazop interface review with all the end-use markets/customers to ensure that they understand the safe handling of hydrogen the project intends to deliver. While the Safety Plan describes public outreach generally, more detail is needed on the interface with the intended industrial, power generation, and transportation fuel supply customers.

FN1 – Draft Plan at 7.
FN2 – Id. at 11.
FN3 – Id. at 21 (emphasis added).

SOCALGAS RESPONSE TO COMMENT 1-1

SoCalGas acknowledges the request for additional information on the practices and procedures that would apply to hydrogen systems and on the interface with the intended end-use markets and customers. While the Safety Study summarizes SoCalGas's decades-long experience in constructing and operating natural gas pipeline systems, SoCalGas recognizes certain different safety considerations would apply to the design and operation of a hydrogen pipeline system. SoCalGas's experience in the natural gas system is provided as a foundation from which SoCalGas would build and apply hydrogen-specific safety considerations. Specific natural gas codes and standards, such as from the ASME, provided a basis for hydrogen codes and standards that have been developed and continue to support the evolution of gas standards. Likewise, many pipeline safety regulations contained in 49 CFR Part 192 apply both to natural gas and hydrogen pipelines. The Safety Study provides an evaluation of safety concerns specifically related to the pipeline transmission, storage, and transportation of hydrogen.

The Safety Study is not intended to be a project-level safety plan at this feasibility stage, but rather provides an evaluation of safety considerations specific to hydrogen. Given that Angeles Link is currently in the feasibility stage, the additional assessments for a safety plan as recommended by this comment are outside the scope of the Phase 1 Study. A more detailed project-specific safety plan will be completed as more details about the project design and locations are developed in subsequent phases of Angeles Link. The Safety Study's Section 14.0 (Future Considerations) provides a summary of the topics that will be considered at appropriate stages of Angeles Link's development to safely advance the engineering and design of the system and identify specific project requirements. Consistent with the recommended assessment in this comment, the future considerations summary highlights the intended future hazard analysis process that would be implemented as more project details develop, including analysis of hazard interface management with third parties.

AIR PRODUCTS COMMENT 1-2

The same applies to the applicability, if any, of existing Commission pipeline regulations. The Draft Safety Plan cites to Commission General Order ("GO") 112 F, Subpart E, which supplements Federal Pipeline Safety Regulations. As Air Products has pointed out previously, FN4 Commission has yet to determine that the Angeles Link, or hydrogen transportation generally, would be subject to Commission jurisdiction. FN5 It therefore is at best unclear whether GO 112 will be applicable to Angeles Link; furthermore, it is unclear whether the Commission, if it did assert jurisdiction, would apply GO 112 as currently drafted to hydrogen pipelines. In its response to Air Products' October 13, 2023 Feedback, SoCalGas stated that "potential safety considerations may be derived from GO 112-F and should be appropriately evaluated as it may apply to a clean renewable hydrogen transportation system." FN6 Yet the Draft Safety Plan lists GO 112 F as part of the "hydrogen-specific industry standards that provide best practices that should be considered for hydrogen pipelines." FN7 As SoCalGas conceded in its Q4 Quarterly Report, GO 112 F does not directly apply, and must be appropriately evaluated, like other natural gas practices and procedures, to determine the extent to which such requirements can and should apply to hydrogen pipelines.

FN4 – See Air Products' October 13, 2023 Feedback Letter at 4-5.
FN5 – D.22-12-055 at 8; D.24-07-009 at 30. (TCAP decision).
FN6 – SoCalGas Angeles Link Q4 Quarterly Report Appendices (Phase One), Appendix 3 at p. 5.
FN7 – Draft Safety Plan at 24.

SOCALGAS RESPONSE TO COMMENT 1-2

General Order No. 112-F, "State of California Rules Governing Design, Construction, Testing, Operation, and Maintenance of Gas Gathering, Transmission, and Distribution Piping Systems," provides safety requirements for gas pipelines. SoCalGas notes that General Order 112-F has been referenced in analyses of other hydrogen pipelines in California, including the Air Products Hydrogen Pipeline Project in the City of Carson. (Refer to Draft EIR, State Clearinghouse No. SCH 2020059038 (Sept. 2020), p. 4.3-10.) Accordingly, SoCalGas believes it is prudent to consider General Order 112-F when assessing potentially applicable codes and standards that may apply to hydrogen pipeline projects. Refer to Section 7.0 (Key Safety Codes) of the Safety Study for additional information on regulatory requirements and industry-standard codes.

AIR PRODUCTS COMMENT 1-3

The Draft Safety Plan notes that "an odorant may be required under 49 CFR §192.625," and the Plan's initial review of several studies on the feasibility of odorizing hydrogen and the options for doing so. FN8 However, there is a significant amount of additional work that should be performed to determine whether odorization is appropriate, and the appropriate odorant for a hydrogen system, and the Draft Safety Plan fails to fully address this issue.

FN8 – Id. at 28-29.

SOCALGAS RESPONSE TO COMMENT 1-3

Odorant could be one potential mechanism for managing safe hydrogen operations. Odorization of gas is a practice common in the natural gas industry but is not currently used in the transportation of hydrogen. The hydrogen industry recognizes current challenges to odorizing hydrogen such as the potentially negative effects of contaminants in various end-use processes (i.e., hydrogen fuel cells). However, there continues to be research testing and identifying potential odorants that could be used in various applications and technology to scrub odorant from hydrogen before it is used in end- use applications. A summary of existing research on the feasibility of odorizing hydrogen and options for doing so is included in the Safety Study (Section 8.0). The summary highlights where studies have identified potential areas for further study. SoCalGas will continue to evaluate options for odorant as Angeles Link progresses. The Safety Study will include Section 14.0 (Future Considerations) to provide a summary of the topics that will be considered at appropriate stages of Angeles Link's development to safely advance the engineering and design of the system and identify specific project requirements. As highlighted in that section, the future considerations include monitoring odorization research.

In addition to the potential use of odorant, other safety mechanisms and methods would be implemented during design and operation of Angeles Link to incorporate safety considerations, such as installing hydrogen compatible materials, application of leak detection technologies, and increased survey frequency and monitoring, among others.

AIR PRODUCTS COMMENT 1-4

The Draft Safety Plan notes that due to the disadvantages of using tetrahydrothiophene (THT) such as for fuel cell systems, alternative sulfur-free odorants were investigated for hydrogen distribution. The Draft Safety Plan selectively states that the odorant 2-hexyne was found not to have an adverse effect on the performance of fuel cells and "was able to maintain stability in hydrogen, therefore appeared suitable for use as a sulfur-free odorant in hydrogen." FN9 However, as the cited report shows, sulfur-free odorants, including 2-hexyne, can be vulnerable to hydrogenation when in contact with uncoated steel cylinder surfaces. For example, 2-hexyne in uncoated steel cylinders can be hydrogenated to hexane, which has a very different odor profile which is likely not suitable as a hydrogen odorant. The same is true of another odorant mentioned in the report, Gasodor S-Free, which is comprised of ethyl acrylate, methyl acrylate and 2-ethyl-3-methylpyrazine, as it is also vulnerable to hydrogenation, resulting in odor changes that would likely render it ineffective as a gas odorant.

Conclusion

Air Products appreciates the opportunity to provide this feedback concerning the June 2024 Draft Safety Plan.

FN9 – Id. at 29.

SOCALGAS RESPONSE TO COMMENT 1-4

Please refer to Response to Comment 1-3.

Comment Letter 2 – Physicians for Social Responsibility

Comment Letter 2

Comments Regarding SoCalGas' Phase 1 Plan for Applicable Safety Requirements for the Angeles Link Project

Submitted via email to alp1_study_cbo_feedback@insigniaenv.com

Physicians for Social Responsibility - Los Angeles submits the following feedback letter in regards to the Phase 1 Plan for Applicable Safety Requirements for the Angeles Link project. Given the speed and intensity of the feedback process, all feedback should be considered partial, as there is not enough time to adequately address all of the issues with these reports.

That being said, our main concerns with the report are the following:

1. **That the report ignores SoCalGas' own history with mismanaging leaks, indicating that lessons have not been learned**

Given that SoCalGas is responsible for the Aliso Canyon methane leak that lasted over 100 days and resulted in 100,000 metric tons of methane into the atmosphere, as well as other issues in Pacoima and Wilmington, we believe that it is necessary to be critical of the existing policies and procedures that allowed for these issues to happen in the first place, and to be skeptical that they will adequately prepare for other potential disasters. Instead of an introspective and self-critical analysis of how SoCalGas can learn from their mistakes and thoughtfully tackle the complicated and specific challenges that hydrogen poses, the report painted a rosy picture of SoCalGas' methane infrastructure, and glossed over the differences between managing hydrogen and methane.

Comment 02-01

2. **The assessment of potential risks is overly simplified and fails to address several key risks**

The assessment of risks is simplified and fails to account for potential losses if the system fails, including disrupting critical infrastructure like power plants. Additionally, given the collocation of hydrogen and methane pipelines proposed by SoCalGas in the Routing Analysis, there is shockingly little information about what risks exist from the combination of these fuels in close proximity. While the report occasionally mentions a persisting challenge or unknown, the report concludes that the problem is solvable without demonstrating how (for example stating the issues with odorants and mentioning that research is ongoing). Additionally, given SoCalGas' own estimation of a leakage rate of .02-1% (which in our estimation is optimistic), there should have been mention of how these leaks could potentially lead to health or safety risks. The report also fails to mention that the project itself will contribute to climate change by way of hydrogen leakage.

Comment 02-02

3. **The report defaults to recommending existing guidelines for methane whenever possible, thereby ignoring potential issues that could arise for hydrogen**

The report claims that much insight can be drawn from SoCalGas' experience with managing methane infrastructure, and seems to default to assuming hydrogen and methane will operate similarly, and therefore only slight modifications are needed to existing practices. Instead, SoCalGas should thoroughly consider hydrogen implications on their own, rather than through the lens of methane, and additionally do research on the risks of transporting two fuels side by side. Hydrogen's flammability and volatility are big considerations that require much more robust planning and community education if hydrogen is ever to be considered safe.

Comment 02-03

4. **The report mentions that there are unknowns about hydrogen and that harmful incidents are possible and have happened, then concludes that it is possible to safely deliver 100% hydrogen**

It is surprising to see that after listing some of the many hydrogen incidents that have occurred, and outlining some of the many unknown issues concerning hydrogen, and after glossing over their own shortcomings in managing methane infrastructure that SoCalGas could confidently conclude that "as illustrated above, the safe transportation of 100% clean renewable hydrogen by pipeline is feasible."

Comment 02-04

Feedback submitted by:

Alex Jasset
Energy Justice Director
Physicians for Social Responsibility - Los Angeles

PHYSICIANS FOR SOCIAL RESPONSIBILITY COMMENT 2-1

Physicians for Social Responsibility - Los Angeles submits the following feedback letter in regards to the Phase 1 Plan for Applicable Safety Requirements for the Angeles Link project. Given the speed and intensity of the feedback process, all feedback should be considered partial, as there is not enough time to adequately address all of the issues with these reports. That being said, our main concerns with the report are the following:

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SOCALGAS RESPONSE TO COMMENT 2-1

SoCalGas appreciates this comment concerning learning from previous third-party incidents. As summarized in the Safety Study, Section 11.0 (Lessons Learned), depending on the nature of the incident, SoCalGas implements a detailed learning process referred to as the Event Learning Process (ELP) following incidents both internal and external to SoCalGas to assess company policies and processes, identify areas for improvement, and to prioritize enhancements to prevent similar incidents. This process provides guidance for performing and determining a root cause analysis for events that may have enterprise-wide impacts on the safety of employees, the public, the environment, or the integrity or reliability of the natural gas pipeline system. As highlighted in the Safety Study, SoCalGas also routinely analyzes National Transportation Safety Board (NTSB) reports to identify corrective actions or enhancements that could lead to enterprise-wide process improvements.

In addition, to learn from previous third-party incidents specifically related to hydrogen, Section 11.0 (Lessons Learned) of the Safety Study also summarizes incidents involving various hydrogen infrastructure as documented by the Hydrogen Safety Panel. While these incidents do not involve SoCalGas, the lessons learned from these incidents are valuable for SoCalGas's continued hydrogen safety planning. SoCalGas's internal procedures to learn from past incidents and the continued monitoring of incidents specifically related to hydrogen will inform SoCalGas's hydrogen safety planning in future phases.

Finally, SoCalGas assesses hydrogen leakage in the Leakage Study. Please also refer to the Q2 2024 Angeles Link Quarterly Report Global Response 2 – Hydrogen Leakage.

PHYSICIANS FOR SOCIAL RESPONSIBILITY COMMENT 2-2

2. The assessment of potential risks is overly simplified and fails to address several key risks.

The assessment of risks is simplified and fails to account for potential losses if the system fails, including disrupting critical infrastructure like power plants. Additionally, given the collocation of hydrogen and methane pipelines proposed by SoCalGas in the Routing Analysis, there is shockingly little information about what risks exist from the combination of these fuels in close proximity. While the report occasionally mentions a persisting challenge or unknown, the report concludes that the problem is solvable without demonstrating how (for example stating the issues with odorants and mentioning that research is ongoing). Additionally, given SoCalGas' own estimation of a leakage rate of .02-1% (which in our estimation is optimistic), there should have been mention of how these leaks could potentially lead to health or safety risks. The report also fails to mention that the project itself will contribute to climate change by way of hydrogen leakage.

SOCALGAS RESPONSE TO COMMENT 2-2

In response to the comment concerning potential losses from a system failure, such as disruption of a power plant, electric system reliability concepts are discussed in Appendix B of the Design Study with the intent to inform the technical feasibility of Angeles Link as clean firm power in support of electrification and electric reliability.

In response to the comment concerning the potential colocation of hydrogen and natural gas pipelines, at this feasibility stage, no determination has been made with regard to co-locating hydrogen and natural gas pipelines. SoCalGas summarizes the methodology used for the routing analysis at this feasibility stage in Section 1.3 of the Routing Analysis. Land rights will be a basis for further exploration in subsequent phases as preferred routes are evaluated from a more granular perspective and new alignments options are determined. Furthermore, construction and installation of pipelines will be in compliance with applicable federal, state, and local requirements.

In response to the comment concerning the ongoing research related to odorants, please refer to Response to Comment 1-3.

In response to the comment concerning the leakage rate of hydrogen and the potential GHG emissions associated with leakage, the Leakage Study, through a literature review, evaluates a range of values for potential hydrogen leakage, as well as opportunities to minimize the potential for leakage. This range of values is presented as percentages for each component of new proposed infrastructure and as percentages for each minimization opportunity. In addition, Section 9 of the GHG Study addresses potential GHG emissions related to hydrogen leakage and potential impact to overall GHG reductions for both general hydrogen infrastructure and infrastructure related to Angeles Link. The draft Leakage Study was released to the PAG and CBOSG in May 2024 and the draft GHG Study was released to the PAG and CBOSG in July 2024.

Angeles Link infrastructure is planned to be an entirely new system constructed with hydrogen-compatible material, compatible welding specifications, and the latest industry best practice construction techniques, helping to minimize leak events. Furthermore, regular maintenance and compliance with applicable safety regulations, as summarized in Safety Study Section 8.0 (Specifications,

Standards, & Procedures Evaluation), including implementing leak detection procedures, monitoring, and conducting regularly scheduled leakage surveys, will support mitigation of potential safety risks associated with hydrogen leakage.

PHYSICIANS FOR SOCIAL RESPONSIBILITY COMMENT 2-3

3. The report defaults to recommending existing guidelines for methane whenever possible, thereby ignoring potential issues that could arise for hydrogen.

The report claims that much insight can be drawn from SoCalGas' experience with managing methane

infrastructure, and seems to default to assuming hydrogen and methane will operate similarly, and therefore only slight modifications are needed to existing practices. Instead, SoCalGas should thoroughly consider hydrogen implications on their own, rather than through the lens of methane, and additionally do research on the risks of transporting two fuels side by side. Hydrogen's flammability and volatility are big considerations that require much more robust planning and community education if hydrogen is ever to be considered safe.

SOCALGAS RESPONSE TO COMMENT 2-3

SoCalGas recognizes certain different safety considerations would apply to certain aspects of the design and operation of a hydrogen pipeline system compared to a natural gas system. SoCalGas's decades-long experience in the natural gas system is provided as a foundation from which SoCalGas would build upon and apply hydrogen-specific safety considerations. As noted in Response to Comment 1-1, specific natural gas codes and standards, such as from the ASME, provided a basis for hydrogen codes and standards that have been developed and continue to support the evolution of gas standards. Likewise, many pipeline safety regulations contained in 49 CFR Part 192 apply both to natural gas and hydrogen pipelines. The Safety Study provides an evaluation of safety concerns specifically related to the pipeline transmission, storage, and transportation of hydrogen.

In addition, SoCalGas evaluated and considered the requirements for the design, construction, operation, and maintenance that apply to hydrogen pipelines for the preliminary design of Angeles Link, as described in Section 3.1 of the Design Study. These guidelines and regulations were created to confirm that hydrogen pipelines are built and operated safely, efficiently, and sustainably, aligning with the broader goals of federal energy policies and environmental protection standards. Section 7.0 of the Safety Study provides additional details on existing federal and state codes, specifications, standards, and regulatory requirements applicable to transporting gas by pipeline, including codes and standards that apply to the transportation of hydrogen. Section 7.0 also summarizes hydrogen-specific industry standards that provide best practices that should be considered for hydrogen pipelines. In addition, international codes can be used as a reference or basis for development of additional standards in the U.S. As the hydrogen economy further develops, additional industry best practices and technical specifications will likely emerge. SoCalGas will perform detailed engineering and design in accordance with designated hydrogen design codes and standards in subsequent phases of Angeles Link and will apply the most updated codes and standards as information becomes available.

As discussed in Response to Comment 2-2, a determination has not been made with regard to co-locating hydrogen and natural gas pipelines in this feasibility phase.

PHYSICIANS FOR SOCIAL RESPONSIBILITY COMMENT 2-4

4. The report mentions that there are unknowns about hydrogen and that harmful incidents are possible and have happened, then concludes that it is possible to safely deliver 100% hydrogen.

It is surprising to see that after listing some of the many hydrogen incidents that have occurred, and outlining some of the many unknown issues concerning hydrogen, and after glossing over their own shortcomings in managing methane infrastructure that SoCalGas could confidently conclude that "as illustrated above, the safe transportation of 100% clean renewable hydrogen by pipeline is feasible."

SOCALGAS RESPONSE TO COMMENT 2-4

As expanded upon in Section 6.0 Risk Management of the Safety Study, there are inherent risks with transporting any fuel. SoCalGas intends to apply an enterprise risk management process to Angeles Link, which would include conducting a process hazard analysis to identify and analyze potential hazards associated with hydrogen operations.

Comment Letter 3 – Communities for a Better Environment

Comment Letter 3

COMMUNITIES FOR A BETTER ENVIRONMENT
established 1978

July 19, 2024

Southern California Gas Company
555 West Fifth Street
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback for Southern California Gas Company on the Plan for Applicable Safety Requirements Draft Report

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Plan for Applicable Safety Requirements Draft Report (the "Report") provided on June 21, 2024. This letter discusses serious oversights and omissions that the final report must remedy. Although SoCalGas has repeatedly assured PAG and CBOSG stakeholders that draft reports would address shortcomings and gaps in earlier "preliminary data and findings" slide decks, this report still lacks fair discussion of several important issues surrounding hydrogen safety. California Public Utilities Commission (CPUC) Decision 22-12-055 emphasizes the importance of stakeholder engagement. Meaningful engagement is impeded where key information is either omitted or presented in a misleading manner. Particularly, the Report:

I. Glosses Over Unknowns about Hydrogen
II. Draws Faulty Conclusions about Angeles Link's Safety
III. Overly Relies on Safety Measures for Existing Natural Gas Infrastructure as a Proxy for Safety of New Hydrogen Pipeline Infrastructure
IV. Omits Key Details of Hydrogen Related Accidents
V. Mischaracterizes SoCalGas's Safety Management System

Comment 03-01

I. The Report Glosses Over Unknowns about Hydrogen and Fails to Discuss International Hydrogen Safety Standards Apart from Vaguely Referencing Them

The Report is characterized by an absence of clear hydrogen safety data and an insistence by the SoCalGas team that safety concerns are well in hand. Nowhere does the Report adequately address that the Angeles Link Project (ALP) is a first of its kind project without real world study to inform assumptions. The serious safety concerns associated with carrying unprecedented volumes of hydrogen gas along key infrastructure corridors and past sensitive receptors require substantially more precaution than the Report suggests. Furthermore, the ALP would bring hydrogen into communities like Wilmington and Pacoima, long plagued by

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hydrogen and methane system failures. The explosions, flares, and leaks those and many other communities experience are a strong reminder that the status quo does not provide adequate safety for many polluted neighborhoods. Hydrogen unknowns cannot be brushed aside.

Comment 03-01

The Report glosses over unknowns about hydrogen, including identification of a specific odorant for hydrogen gas to be used in Angeles Link. The Report notes that like natural gas, hydrogen is odorless and that mercaptans are used to odorize natural gas. The Report states that assessing and finding an appropriate odorant for hydrogen "to indicate the presence of hydrogen is an important consideration in the development of applicable safety protocols." We agree that odorizing agents are important for the public and emergency responders to detect the presence of a hydrogen gas leak that could threaten peoples' lives. But the Report also concedes: "Industry research on the implications of odorant in a pure hydrogen system is ongoing and should be monitored during the development of Angeles Link to identify industry best practices." CBE finds it alarming that SoCalGas has not identified or included in the Report even one specific odorant appropriate for the safe transportation of hydrogen gas. To ensure the safety of our community members, it is vital that SoCalGas address this major unknown about hydrogen.

Comment 03-02

Further, the Report fails to discuss important international safety standards for hydrogen in any detail. The Report mentions organizations with experience in hydrogen safety education and training, such as the American Institute of Chemical Engineers (AICHE) and the International Association for Hydrogen Safety (HySafe). It also notes: "Various resources for education and training are available for both pipeline operators, emergency and first responders, and the public." But rather than provide specific examples of safety standards or in-depth discussion of them, the Report only describes what these organizations do in very general terms and provides URLs for them. CBE thus believes the Report lacks necessary discussion of existing hydrogen safety standards.

Comment 03-03

II. The Report Fails to Commit to Maintaining Safety Teams for Hydrogen Distinct from Those for Natural Gas, Draws Faulty Conclusions about Angeles Link's Safety Despite the Lack of Hydrogen-Specific Federal and State Laws and Regulations, and Fails to Examine Safety Measures of Any Specific, Existing Hydrogen Pipelines in the United States

In both the Report's Executive Summary and Conclusion sections, SoCalGas states it might consider implementing separate safety teams for the Angeles Link hydrogen system and existing natural gas network. Due to the differences between hydrogen and natural gas and heightened risk of hydrogen accidents, CBE contends that SoCalGas should definitively commit to maintaining distinct gas controllers and emergency response teams for the Angeles Link pipeline system.

Comment 03-04

The Report acknowledges that federal minimum safety standards for gas pipelines "do not specify differences and considerations for hydrogen specifically versus natural gas (and other gases)." Given this lack of differentiation in federal law for hydrogen despite its numerous differences from natural gas, CBE finds it troubling that SoCalGas makes a "Key Finding" promising that some combination of existing regulations and industry standards (only some of which may be hydrogen-specific) "will help promote safety." To its credit, the Report discusses hydrogen-specific standards like American Society of Mechanical Engineers (ASME) B31.12 and National Fire Protection Association (NFPA) 2. Yet, the Report admits these standards "are not specifically incorporated into" Title 49 Code of Federal Regulations (CFR) Part 192 or CPUC General Order (GO) 112-F" by direct reference." CBE's communities have not been adequately protected by industry best practices for decades, even when federal and state laws and regulations directly apply them. Because these hydrogen-specific standards (CFR Part 192 and CPUC GO 112-F) are not directly incorporated into federal and state laws or regulations, only best practices provide for this necessary, but insufficient layer of protection.

Comment 03-05

Furthermore, SoCalGas makes multiple references in the Report to the roughly 1,600 miles of hydrogen pipelines that already exist and currently operate in the U.S. The Report claims the "industry experience" derived from operation of these pipelines "makes the properties and risks associated with hydrogen well known." Even if self-regulation by "industry standards" were sufficient to ensure safety, the Report completely fails to examine the supposed safety standards of the existing 1,600 miles of hydrogen pipelines because it does not discuss *any* specific, existing hydrogen pipeline anywhere in the country. With the sparse level of detail provided in the Report, SoCalGas's conclusions about hydrogen safety are not substantiated.

Comment 03-06

III. The Report Overly Relies on Safety Measures for Existing Natural Gas Infrastructure as a Proxy for Safety of New Hydrogen Pipeline Infrastructure

CBE appreciates the inclusion of the table comparing the properties of hydrogen and natural gas. It is important that the Report describes hydrogen's wider range of flammability and 500 °F higher flame temperature than natural gas, "which requires considerations for proper materials and mitigating potential increases in oxides of nitrogen (NO_x) emissions." However, we disagree with SoCalGas's statements minimizing the differences of hydrogen and natural gas and concluding that simply modifying existing safety practices for natural gas will be sufficient to address the safety risks associated with hydrogen.[1] After all, SoCalGas's review of approximately 1,600 of its own existing specifications, standards, and procedures (SSPs) revealed that roughly 21% of SoCalGas's existing SSPs do not apply to hydrogen, 34% of current SSPs apply to hydrogen but may require modifications, and 15% of existing SSPs "may

Comment 03-07

[1] Report at 21 ("In summary, there are many similarities between hydrogen and natural gas operations and gas handling. While there are some differences in their properties and characteristics, a variety of existing practices can be modified to manage these differences.").

require a new SSP specific to hydrogen service." Therefore, by SoCalGas' own count, 70% of current SSPs either do not apply or need to be updated for hydrogen, and only 30% are applicable to hydrogen service but would not require changes. CBE believes it is deceptive for SoCalGas to gloss over these significant differences between hydrogen and natural gas services by relying on its existing natural gas network infrastructure and current SSPs.

Comment 03-07

IV. The Report Fails to Include Examples of Hydrogen Related Accidents Involving Serious Injuries or Fatalities and Includes Misleading Descriptions that Omit Key Details

The Report's Lessons Learned cherry-picks less severe hydrogen incidents from the H2Tools.org database and excludes key details about more severe accidents, thereby failing to include accurate descriptions involving serious bodily injury or death. Although this section of the Report describes 11 hydrogen-related accidents between 1969 and 2019, none of them involved serious injuries or fatalities. Yet the Report contemplates the potential for serious bodily injuries and death since the term "Serious Injuries and Fatalities" and the corresponding abbreviation ("SIF") are included in section 1.0 List of Abbreviations and Acronyms. In fact, only one incident description about an explosion in 1980 at a National Aeronautics and Space Administration (NASA) facility even mentions the word "injured."[2] Although it is fortunate no one was injured by that explosion, that outcome was only possible because, as the Report itself acknowledges, nobody was present at the NASA facility when the explosion occurred. Further emphasizing the need for greater study, NASA facilities are regulated by the Federal Aviation Administration's much stricter safety standards, in particular requiring physical separation requirements not mandated for standard gas transmission pipelines.[3]

Comment 03-08

To portray the risks of hydrogen more fairly, the Report should have included the following incident whose description is readily available in the H2Tools database. In a 1992 incident titled "Technician Fatally Burned When Leaking Hydrogen Ignites" in that database, experiments with hydrogen gas resulted in the death of a laboratory technician and serious injuries to three other individuals.[4] Leaked hydrogen gas interacted with liquefied petroleum gas to ignite a flash fire that "engulfed the people in the room."[5] It appears that the hydrogen gas leaked into the laboratory via "a pump seal or pipe union."[6] This is an extremely serious hydrogen-related incident, which should have been included in the Report.

Comment 03-09

[2] Report at 52-53 ("Firefighters and emergency medical personnel were sent to the area to verify that no one was injured and to extinguish small residual fires.").
[3] 14 CFR § 420.
[4] Hydrogen Tools, Laboratory Technician Fatally Burned When Leaking Hydrogen Ignites, https://h2tools.org/lessons/laboratory-technician-fatally-burned-when-leaking-hydrogen-ignites (last accessed July 19, 2024).
[5] *Id.*
[6] *Id.*

4

The Report also omits key details about some of the incidents it does partially describe. For example, regarding an accident from January 8, 2007, the Report by SoCalGas states (in its entirety) the following: "On Jan[.] 8, 2007, an explosion occurred during a delivery of compressed hydrogen gas at a coal fired power plant. Evidence pointed to the premature failure of a pressure relief device rupture disk, which had been repaired by the vendor six months before the explosion." However, according to the H2Tools database incident description, the explosion "killed one person and injured 10 others."[7] The database adds further detail about the fatality: "The blast killed the delivery truck driver who was unloading compressed hydrogen gas."[8] Given that SoCalGas chose to include the January 2007 explosion event in the "Pressure Relief Device Incidents" section of the report, CBE finds it very troubling that SoCalGas either intentionally or negligently chose not to include any details about the fatality and serious injuries that occurred due to this incident. If the Report cannot directly confront the sort of incidents which impact CBE's communities and many communities like them, it will struggle to identify solutions to such catastrophes.

Comment 03-10

V. The Report Misleadingly Characterizes SoCalGas's Safety Management System as Strong Without Adequate Context

SoCalGas makes misleading statements about the maturity of its safety management system (SMS). The Report states that in 2021:

> SoCalGas engaged the American Petroleum Institute to perform a maturity assessment of SoCalGas's SMS. At that time, SoCalGas's SMS scored a 3.06, which indicates SoCalGas's SMS is "Implemented: Organizational structures are in place, processes are fully developed, and procedures and programs documented and functional." Since that assessment, SoCalGas has and is implementing improvements to continue maturing its SMS.

And that:

> SoCalGas is well positioned to build, operate, and maintain a clean renewable hydrogen pipeline system due to its long-standing experience operating and maintaining a highly developed gas transmission and distribution system, existing highly trained and qualified workforce, and comprehensive established integrity management and emergency response procedures.

Comment 03-11

[7] Hydrogen Tools, Hydrogen Explosion at Coal-Fired Power Plant, https://h2tools.org/lessons/hydrogen-explosion-coal-fired-power-plant (last accessed July 19, 2024).
[8] *Id.*

There is no question that the personnel and expertise devoted to maintaining the safety of SoCalGas' transmission pipelines are an integral part of any hydrogen safety system. The company itself, however, has many long strides to make with respect to safety and basic hydrogen learning before making such claims in its report. SoCalGas's score of 3.06 (on a 1 to 5 scale) net's it a "Conformance" ranking while scores of 4 to 5 indicate "Effectiveness."[9] Adding the volatility of hydrogen along with the unknowns of untested safety equipment, the need for new safety procedures, and an outdated regulatory structure raises severe doubts about SoCalGas' ability to safely "build, operate, and maintain" the ALP.

Comment 03-11

VI. Conclusion

Due to the Report's omissions and misleading discussion outlined above, CBE strongly objects to SoCalGas's magical determination in the Report's conclusion section that: "[P]ipeline transportation of clean renewable hydrogen is feasible and can be safely achieved through compliance with Federal and State codes, standards, regulations, and procedures identified within this document."

Sincerely,

Jay Parepally
Theo Caretto

Communities for a Better Environment

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group
Angeles Link service list

[9] Pipeline SMS, Resources: Pipeline SMS Maturity Model, April 15, 2018, https://pipelinesms.org/pipeline-sms-maturity-model/ (last accessed July 19, 2024).

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-1

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Plan for Applicable Safety Requirements Draft Report (the "Report") provided on June 21, 2024. This letter discusses serious oversights and omissions that the final report must remedy. Although SoCalGas has repeatedly assured PAG and CBOSG stakeholders that draft reports would address shortcomings and gaps in earlier "preliminary data and findings" slide decks, this report still lacks fair discussion of several important issues surrounding hydrogen safety. California Public Utilities Commission (CPUC) Decision 22-12-055 emphasizes the importance of stakeholder engagement. Meaningful engagement is impeded where key information is either omitted or presented in a misleading manner. Particularly, the Report:

I. Glosses Over Unknowns about Hydrogen
II. Draws Faulty Conclusions about Angeles Link's Safety
III. Overly Relies on Safety Measures for Existing Natural Gas Infrastructure as a Proxy for Safety of New Hydrogen Pipeline Infrastructure
IV. Omits Key Details of Hydrogen Related Accidents
V. Mischaracterizes SoCalGas's Safety Management System

I. The Report Glosses Over Unknowns about Hydrogen and Fails to Discuss International Hydrogen Safety Standards Apart from Vaguely Referencing Them.

The Report is characterized by an absence of clear hydrogen safety data and an insistence by the SoCalGas team that safety concerns are well in hand. Nowhere does the Report adequately address that the Angeles Link Project (ALP) is a first of its kind project without real world study to inform assumptions. The serious safety concerns associated with carrying unprecedented volumes of hydrogen gas along key infrastructure corridors and past sensitive receptors require substantially more precaution than the Report suggests. Furthermore, the ALP would bring hydrogen into communities like Wilmington and Pacoima, long plagued by hydrogen and methane system failures. The explosions, flares, and leaks those and many other communities experience are a strong reminder that the status quo does not provide adequate safety for many polluted neighborhoods. Hydrogen unknowns cannot be brushed aside.

SOCALGAS RESPONSE TO COMMENT 3-1

As summarized in the Safety Study, SoCalGas will continue to monitor ongoing research related to hydrogen pipelines and will incorporate applicable best practices and codes and standards into the design of Angeles Link in future phases. For additional information on the applicable codes and standards SoCalGas has identified to date please refer to Response to Comment 2-3.

As stated in the Safety Study, Section 7.0 (Key Safety Codes) provides a summary of existing codes, specifications, standards, and regulatory requirements appliable at the federal and state levels, in addition to practices appliable industry-wide. As explained further in the Safety Study, international codes can be used as a reference point or basis for development of standards in the United States. In response to this feedback concerning more information on international standards, a new table will be added to the final Safety Study that includes high-level descriptions of the current and existing key international codes outside of the U.S. SoCalGas may reference these international codes in future phases of Angeles Link as applicable as they may provide value in understanding certain best practices

for similar systems as well as potential application(s) to enhance safety. SoCalGas will continue to integrate safety features into Angeles Link planning and development as information becomes available.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-2

The Report glosses over unknowns about hydrogen, including identification of a specific odorant for hydrogen gas to be used in Angeles Link. The Report notes that like natural gas, hydrogen is odorless and that mercaptans are used to odorize natural gas. The Report states that assessing and finding an appropriate odorant for hydrogen "to indicate the presence of hydrogen is an important consideration in the development of applicable safety protocols." We agree that odorizing agents are important for the public and emergency responders to detect the presence of a hydrogen gas leak that could threaten peoples' lives. But the Report also concedes: "Industry research on the implications of odorant in a pure hydrogen system is ongoing and should be monitored during the development of Angeles Link to identify industry best practices." CBE finds it alarming that SoCalGas has not identified or included in the Report even one specific odorant appropriate for the safe transportation of hydrogen gas. To ensure the safety of our community members, it is vital that SoCalGas address this major unknown about hydrogen.

SOCALGAS RESPONSE TO COMMENT 3-2

Please refer to Response to Comment 1-3.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-3

Further, the Report fails to discuss important international safety standards for hydrogen in any detail. The Report mentions organizations with experience in hydrogen safety education and training, such as the American Institute of Chemical Engineers (AICHE) and the International Association for Hydrogen Safety (HySafe). It also notes: "Various resources for education and training are available for both pipeline operators, emergency and first responders, and the public." But rather than provide specific examples of safety standards or in-depth discussion of them, the Report only describes what these organizations do in very general terms and provides URLs for them. CBE thus believes the Report lacks necessary discussion of existing hydrogen safety standards.

SOCALGAS RESPONSE TO COMMENT 3-3

As summarized in the Safety Study, applicable federal and state codes and standards and industry best practices will be incorporated into the design and operations of Angeles Link. Refer to Response 2-3 for further details. Additionally, the Safety Study, Section 10.0 (Awareness, Education, and Training), describes several accredited organizations that provide hydrogen safety training and operator training, including the American Institute of Chemical Engineers' (AIChE) Center for Hydrogen Safety and the International Association for Hydrogen. The Safety Study provides this summary to highlight the organizations SoCalGas could learn from in future phases of Angeles Link. Section 7.0 of the Safety Study provides additional details on existing federal and state codes, specifications, standards, and regulatory requirements applicable to transporting gas by pipeline, including codes and standards that apply to the transportation of hydrogen. Section 7.0 states that international codes can be used as a reference or basis for development of additional standards in the U.S. SoCalGas believes international codes can be beneficial as industry best practices in the development of hydrogen infrastructure, therefore a table listing available international codes has been incorporated into Section 7 in response to this comment. As the hydrogen economy further develops, additional industry best practices and technical specifications will likely emerge. SoCalGas will continue to integrate safety features into Angeles Link planning and development as information becomes available.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-4

II. The Report Fails to Commit to Maintaining Safety Teams for Hydrogen Distinct from Those for Natural Gas, Draws Faulty Conclusions about Angeles Link's Safety Despite the Lack of Hydrogen-Specific Federal and State Laws and Regulations, and Fails to Examine Safety Measures of Any Specific, Existing Hydrogen Pipelines in the United States.

In both the Report's Executive Summary and Conclusion sections, SoCalGas states it might consider implementing separate safety teams for the Angeles Link hydrogen system and existing natural gas network. Due to the differences between hydrogen and natural gas and heightened risk of hydrogen accidents, CBE contends that SoCalGas should definitively commit to maintaining distinct gas controllers and emergency response teams for the Angeles Link pipeline system.

SOCALGAS RESPONSE TO COMMENT 3-4

The Safety Study will include Section 14.0 (Future Considerations) to address the recommended assessment to determine utilizing existing and/or separate operations teams for Angeles Link. This assessment will be conducted as more details about Angeles Link design and locations are developed in subsequent phases.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-5

The Report acknowledges that federal minimum safety standards for gas pipelines "do not specify differences and considerations for hydrogen specifically versus natural gas (and other gases)." Given this lack of differentiation in federal law for hydrogen despite its numerous differences from natural gas, CBE finds it troubling that SoCalGas makes a "Key Finding" promising that some combination of existing regulations and industry standards (only some of which may be hydrogen-specific) "will help promote safety." To its credit, the Report discusses hydrogen-specific standards like American Society of Mechanical Engineers (ASME) B31.12 and National Fire Protection Association (NFPA) 2. Yet, the Report admits these standards "are not specifically incorporated into" Title 49 Code of Federal Regulations (CFR) Part 192 or CPUC General Order (GO) 112-F" by direct reference." CBE's communities have not been adequately protected by industry best practices for decades, even when federal and state laws and regulations directly apply them. Because these hydrogen-specific standards (CFR Part 192 and CPUC GO 112-F) are not directly incorporated into federal and state laws or regulations, only best practices provide for this necessary, but insufficient layer of protection.

SOCALGAS RESPONSE TO COMMENT 3-5

Although certain best practices may not be incorporated into regulations by direct references, SoCalGas intends to consider, and as appropriate, apply and implement applicable hydrogen specific standards and codes such as ASME B31.12 and National Fire Protection Association (NFPA) 2 as explained in the Safety Study, Section 7.0 - Key Safety Codes.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-6

Furthermore, SoCalGas makes multiple references in the Report to the roughly 1,600 miles of hydrogen pipelines that already exist and currently operate in the U.S. The Report claims the "industry experience" derived from operation of these pipelines "makes the properties and risks associated with hydrogen well known." Even if self-regulation by "industry standards" were sufficient to ensure safety, the Report completely fails to examine the supposed safety standards of the existing 1,600 miles of hydrogen pipelines because it does not discuss any specific, existing hydrogen pipeline anywhere in the country. With the sparse level of detail provided in the Report, SoCalGas's conclusions about hydrogen safety are not substantiated.

SOCALGAS RESPONSE TO COMMENT 3-6

Information provided in the Safety Study is based on existing hydrogen-specific requirements, codes, and industry standards, which apply to the existing hydrogen pipeline infrastructure in the US, subject to applicable state-specific requirements. In addition, the Safety Study addresses existing requirements and internal standards applicable to SoCalGas's operation of a natural gas system. The evaluation of hydrogen-specific requirements and industry standards is based on publicly-available information. To learn as much as possible from publicly-available information at this time, the Safety Study, Section 11.0 (Lessons Learned), also includes a summary of hydrogen safety lessons learned from third-party operations of existing hydrogen systems. SoCalGas will continue to integrate safety features into Angeles Link planning and development as more information becomes available.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-7

III. The Report Overly Relies on Safety Measures for Existing Natural Gas Infrastructure as a Proxy for Safety of New Hydrogen Pipeline Infrastructure.

CBE appreciates the inclusion of the table comparing the properties of hydrogen and natural gas. It is important that the Report describes hydrogen's wider range of flammability and 500 °F higher flame temperature than natural gas, "which requires considerations for proper materials and mitigating potential increases in oxides of nitrogen (NOx) emissions." However, we disagree with SoCalGas's statements minimizing the differences of hydrogen and natural gas and concluding that simply modifying existing safety practices for natural gas will be sufficient to address the safety risks associated with hydrogen. FN1 After all, SoCalGas's review of approximately 1,600 of its own existing specifications, standards, and procedures (SSPs) revealed that roughly 21% of SoCalGas's existing SSPs do not apply to hydrogen, 34% of current SSPs apply to hydrogen but may require modifications, and 15% of existing SSPs "may require a new SSP specific to hydrogen service." Therefore, by SoCalGas' own count, 70% of current SSPs either do not apply or need to be updated for hydrogen, and only 30% are applicable to hydrogen service but would not require changes. CBE believes it is deceptive for SoCalGas to gloss over these significant differences between hydrogen and natural gas services by relying on its existing natural gas network infrastructure and current SSPs.

FN1 – Report at 21 ("In summary, there are many similarities between hydrogen and natural gas operations and gas handling. While there are some differences in their properties and characteristics, a variety of existing practices can be modified to manage these differences.").

SOCALGAS RESPONSE TO COMMENT 3-7

SoCalGas identifies and describes the unique differences between natural gas and hydrogen and intends to incorporate consideration of the distinct chemical and physical properties in planning, designing, constructing, and operating and maintaining hydrogen infrastructure. As summarized in the Safety Study Section 4.0 (SoCalGas Safety Management System), SoCalGas recognizes that existing practice and procedures that apply to its operation and maintenance of a natural gas system will need to be evaluated and some may need to evolve to apply to a system that transports hydrogen. A review of SoCalGas's existing specifications, standards, and procedures (SSPs) in the Safety Study, Appendix A, provides a starting point for the initial review of SSPs that will continue to evolve as more information on the operation of hydrogen pipelines becomes available. As SoCalGas recognizes existing SSPs will need to be modified or new SSPs will need to be created for the operation of a hydrogen pipeline system, Appendix A highlights the key specifications and standard topics that should be considered for modifications or new specifications development to implement the hydrogen transport system.

In response to this feedback, the summary of the review of SoCalGas's current SSPs in Appendix A of the Safety Study will be updated to clarify the following:

SoCalGas clarifies that the category for existing specifications, standards, and procedures (SSPs) that do not apply to hydrogen means there are no differences identified in the standard that would warrant a change or creation of a new standard.

Consequently, 34% of current SSPs identified that apply to hydrogen but may require modifications, and 15% of existing SSPs that may require a new SSP specific to hydrogen service account for approximately 49% of SoCalGas's SSPs that are potentially impacted by Angeles Link.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-8

IV. The Report Fails to Include Examples of Hydrogen Related Accidents Involving Serious Injuries or Fatalities and Includes Misleading Descriptions that Omit Key Details.

The Report's Lessons Learned cherry-picks less severe hydrogen incidents from the H2Tools.org database and excludes key details about more severe accidents, thereby failing to include accurate descriptions involving serious bodily injury or death. Although this section of the Report describes 11 hydrogen-related accidents between 1969 and 2019, none of them involved serious injuries or fatalities. Yet the Report contemplates the potential for serious bodily injuries and death since the term "Serious Injuries and Fatalities" and the corresponding abbreviation ("SIF") are included in section 1.0 List of Abbreviations and Acronyms. In fact, only one incident description about an explosion in 1980 at a National Aeronautics and Space Administration (NASA) facility even mentions the word "injured." FN2 Although it is fortunate no one was injured by that explosion, that outcome was only possible because, as the Report itself acknowledges, nobody was present at the NASA facility when the explosion occurred. Further emphasizing the need for greater study, NASA facilities are regulated by the Federal Aviation Administration's much stricter safety standards, in particular requiring physical separation requirements not mandated for standard gas transmission pipelines. FN3

FN2 – Report at 52-53 ("Firefighters and emergency medical personnel were sent to the area to verify that no one was injured and to extinguish small residual fires.").

FN3 – 14 CFR § 420.

SOCALGAS RESPONSE TO COMMENT 3-8

SoCalGas summarized the failure process of several industry-related incidents with specific emphasis on the facts and lessons relevant to a hydrogen pipeline system from the H2Tools.org database and focused on the root cause analysis. In response to this feedback, SoCalGas will add a reference in the final Safety Study that there are injuries/deaths associated with some of these incidents, however the intent of Section 11.0 (Lessons Learned) of the Safety Study is to focus on the design and safety root cause of each industry-related incident and the lessons learned.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-9

To portray the risks of hydrogen more fairly, the Report should have included the following incident whose description is readily available in the H2Tools database. In a 1992 incident titled "Technician Fatally Burned When Leaking Hydrogen Ignites" in that database, experiments with hydrogen gas resulted in the death of a laboratory technician and serious injuries to three other individuals. FN4 Leaked hydrogen gas interacted with liquefied petroleum gas to ignite a flash fire that "engulfed the people in the room." FN5 It appears that the hydrogen gas leaked into the laboratory via "a pump seal or pipe union." FN6 This is an extremely serious hydrogen-related incident, which should have been included in the Report.

FN4 – Hydrogen Tools, Laboratory Technician Fatally Burned When Leaking Hydrogen Ignites, https://h2tools.org/lessons/laboratory-technician-fatally-burned-when-leaking-hydrogen-ignites (last accessed July 19, 2024).

FN5 – Id.
FN6 – Id.

SOCALGAS RESPONSE TO COMMENT 3-9

Please refer to Response to Comment 3-8. SoCalGas notes that this incident occurred in a laboratory setting using hydrogen to conduct experiments and did not concern a hydrogen pipeline system. H2Tools identifies the Lessons Learned from the incident as: "This incident emphasizes the need for proper gas detection and ventilation systems, as well as fire suppression systems, in laboratories using and storing hydrogen. This is especially true when open flame burners are in close proximity. Experienced consultants/engineers should be involved in the design of gas detection and ventilation systems before hydrogen cylinders are employed in any laboratory. Laboratories also need to develop a Standard Operating Procedure, requiring periodic maintenance on hydrogen systems to check fittings, valves, and all critical components to ensure proper functionality at all times." While, as noted previously, this incident did not involve a hydrogen pipeline system, SoCalGas acknowledges that this incident serves as a reminder of the importance of gas detection and ventilation systems, and continued maintenance of hydrogen systems. These considerations will be reflected in the planning and design of Angeles Link.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-10

The Report also omits key details about some of the incidents it does partially describe. For example, regarding an accident from January 8, 2007, the Report by SoCalGas states (in its entirety) the following: "On Jan[.] 8, 2007, an explosion occurred during a delivery of compressed hydrogen gas at a coal fired power plant. Evidence pointed to the premature failure of a pressure relief device rupture disk, which had been repaired by the vendor six months before the explosion." However, according to the H2Tools database incident description, the explosion "killed one person and injured 10 others." FN7 The database adds further detail about the fatality: "The blast killed the delivery truck driver who was unloading compressed hydrogen gas." FN8 Given that SoCalGas chose to include the January 2007 explosion event in the "Pressure Relief Device Incidents" section of the report, CBE finds it very troubling that SoCalGas either intentionally or negligently chose not to include any details about the fatality and serious injuries that occurred due to this incident. If the Report cannot directly confront the sort of incidents which impact CBE's communities and many communities like them, it will struggle to identify solutions to such catastrophes.

FN7 – Hydrogen Tools, Hydrogen Explosion at Coal-Fired Power Plant, https://h2tools.org/lessons/hydrogen-explosion-coal-fired-power-plant (last accessed July 19, 2024).

FN8 – Id.

SOCALGAS RESPONSE TO COMMENT 3-10

Please refer to Response to Comment 3-8.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 3-11

V. The Report Misleadingly Characterizes SoCalGas's Safety Management System as Strong Without Adequate Context.

SoCalGas makes misleading statements about the maturity of its safety management system (SMS). The Report states that in 2021:

SoCalGas engaged the American Petroleum Institute to perform a maturity assessment of SoCalGas's SMS. At that time, SoCalGas's SMS scored a 3.06, which indicates SoCalGas's SMS is "Implemented: Organizational structures are in place, processes are fully developed, and procedures and programs documented and functional." Since that assessment, SoCalGas has and is implementing improvements to continue maturing its SMS.

And that:

SoCalGas is well positioned to build, operate, and maintain a clean renewable hydrogen pipeline system due to its long-standing experience operating and maintaining a highly developed gas transmission and distribution system, existing highly trained and qualified workforce, and comprehensive established integrity management and emergency response procedures.

There is no question that the personnel and expertise devoted to maintaining the safety of SoCalGas' transmission pipelines are an integral part of any hydrogen safety system. The company itself, however, has many long strides to make with respect to safety and basic hydrogen learning before making such claims in its report. SoCalGas's score of 3.06 (on a 1 to 5 scale) net's it a "Conformance" ranking while scores of 4 to 5 indicate "Effectiveness." FN9 Adding the volatility of hydrogen along with the unknowns of untested safety equipment, the need for new safety procedures, and an outdated regulatory structure raises severe doubts about SoCalGas' ability to safely "build, operate, and maintain" the ALP.

VI. Conclusion

Due to the Report's omissions and misleading discussion outlined above, CBE strongly objects to SoCalGas's magical determination in the Report's conclusion section that: "[P]ipeline transportation of clean renewable hydrogen is feasible and can be safely achieved through compliance with Federal and State codes, standards, regulations, and procedures identified within this document."

FN9 – Pipeline SMS, Resources: Pipeline SMS Maturity Model, April 15, 2018, https://pipelinesms.org/pipeline-sms-maturity-model/ (last accessed July 19, 2024).

SOCALGAS RESPONSE TO COMMENT 3-11

SoCalGas continues to enhance its safety culture and advance employee, public, infrastructure, and contractor safety through the implementation of various safety activities, including its integrity management programs and comprehensive Safety Management System (SMS). These programs, skills, and capabilities are transferable to building, operating, and maintaining a clean renewable hydrogen pipeline system. SoCalGas continues to work with industry leaders, including the Center for Hydrogen Safety, to identify continuous improvement opportunities and enhance safety beyond current regulatory

requirements to address emerging issues. SoCalGas will continue to integrate and evolve hydrogen safety into its safety programs and policies, including its SMS framework.

Comment Letter 4 – Cal Advocates

Comment Letter 4

The Public ADVOCATES OFFICE

July 24, 2024

Informal Comments of the Public Advocates Office on Southern California Gas Company's Angeles Link Draft Report for Plan for Applicable Safety Requirements

The Public Advocates Office at the California Public Utilities Commission (Cal Advocates) provides these comments on Southern California Gas Company's (SoCalGas) *Angeles Link Draft Report for Plan for Applicable Safety Requirements* (Safety Requirements), which was issued on June 21, 2024. The Safety Requirements report discusses the safety regulations and industry standards with which SoCalGas must comply regarding hydrogen transmission, storage, and transportation as required by the Commission's Phase 1 Decision.[1] Cal Advocates comments on two issues regarding the Safety Requirements:

1. SoCalGas should clarify whether the Class Location of its hydrogen pipelines will be different from the existing Class Location of its natural gas pipelines due to differences in the two gases potential impact radius (PIR) calculations, and if so, cite to supporting regulations;
2. SoCalGas should design the Angeles Link pipeline to a more conservative, safety-oriented standard beyond the minimum requirements set by PHMSA's OPS TTO Number 13; given that:
   a. The consequence of pipeline rupture zone with the currently adopted Heat Intensity Threshold has come under scrutiny;
   b. New scholarship and real-world rupture data questions the simplified point-source rupture assumption and promotes a new standard for calculating the PIR which includes jet ruptures; and,
   c. PHMSA, the NTSB, and other safety advisor and regulatory bodies who are publicly addressing the seeming inadequacies of the current TTO Number 13 standard for calculating PIR may soon look to update the calculation.

Comment 04-01

Class Location Definitions are Based on Population Density and Do Not Change with the Potential Impact Radius

49 Code of Federal Regulations (CFR) 192.903, defines the PIR as "the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property."[2] The PIR is based on the

Comment 04-02

[1] *SoCalGas Angeles Link Draft Report for Plan for Applicable Safety Requirements* (Safety Requirements) at 7.
[2] In 49 CFR 192.903, the potential impact radius is fully defined as "the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property. PIR is determined by the formula r = 0.69* (square root of (p*d2)), where 'r' is the radius of a circular area in feet surrounding the point of failure, 'p' is the maximum allowable

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1

calculated threshold where fatality due to the rupture is likely.[3] The Pipeline Hazardous Materials Safety Administration (PHMSA) has included as reference in 49 CFR 192.7 the 2004 American Society of Mechanical Engineers (ASME) B31.8S standard for calculating PIR for natural gas and other gases.[4] Section 3.2 in ASME B31.8S describes the relationship as follows:[5]

$$r = 00.6666 * d\sqrt{p}$$

where **r** is the pipeline impact radius in feet, **d** is the pipe diameter in inches, and **p** is the operating pressure of the pipeline in pounds per square inch. The coefficient **"0.69"** is a gas factor for natural gas.[6]

Comment 04-02

SoCalGas states in its Integrity Management section that it plans to utilize PHMSA's Technical Task Order (TTO) Number 13 to inform its PIR calculations.[7] PHMSA's Office of Pipeline Safety (OPS) commissioned TTO Number 13 in part to determine the gas factor for other fuels, and established that the appropriate gas factor for hydrogen gas would be **"0.47"**.[8] SoCalGas states that once it has finished its PIR calculation, its definitions around its class locations, high consequence areas (HCAs) and moderate consequence areas (MCAs) will vary between its natural gas and hydrogen pipelines:

> Once the PIR is calculated, the HCAs and MCAs can be determined for the hydrogen pipeline using the same methodology as for a natural gas pipeline.
>
> To note, the factor for hydrogen (0.47) is lower than the factor for natural gas (0.69), which results in lower PIR than a similar pipeline carrying natural gas. This could result in fewer HCAs and MCAs identified for a hydrogen pipeline versus a natural gas pipeline, and potentially differing class locations along the pipeline route.[9]

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operating pressure (MAOP) in the pipeline segment in pounds per square inch and 'd' is the nominal diameter of the pipeline in inches.

Note:
0.69 is the factor for natural gas. This number will vary for other gases depending upon their heat of combustion. An operator transporting gas other than natural gas must use section 3.2 of ASME B31.8S (incorporated by reference, see § 192.7) to calculate the impact radius formula."

[3] C-FER October 27, 2022 Presentation titled "The Potential Impact Radius Formula Background to Development and Validation" to the Transportation Research Board at 11.

[4] The original derivation of the PIR calculation can be found in a Gas Research Institute (GRI) report by C-FER Technologies (C-FER), "A Model for Sizing High Consequence Areas Associated with Natural Gas Pipelines".

[5] ASME B31.8S shows a formula with fifteen variables, many of which differ depending on the gas being transported in the pipeline.

[6] *See* Reference 2 for full definition of PIR from 49 CFR 192.903.

[7] Safety Requirements at 36-37.

[8] Office of Pipeline Safety (OPS) Technical Task Order (TTO) Number 13 "Potential Impact Radius Formulae for Flammable Gases Other Than Natural Gas" - Equation 4.30 at 37.

[9] Safety Requirements at 36-37.

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Cal Advocates agrees that the change in PIR between natural gas and hydrogen pipelines will affect the size of HCAs and MCAs as these are both in part defined by PIR calculations.[10,11] However, PHMSA does not define class location in terms of PIR. Instead, class location is solely defined by the density of a region given the number of buildings intended to be used for human occupancy per class location unit based on a radius of 660 feet from the pipeline, which means that class location will not change with changes in PIR.[12] SoCalGas should clarify if it intends to use a different definition of class location for its hydrogen pipelines than natural gas pipelines due to a different potential impact radius or other regulations and, if so, it should provide its rationale and cite to supporting regulations.

Comment 04-02

Fatalities Outside of the Potential Impact Radius Mean that Assumptions in Technical Task Order Number 13 are Inadequate to Capture Real World Conditions and Raise Equity Concerns

Cal Advocates agrees with SoCalGas that PHMSA's OPS TTO Number 13 establishes the hydrogen gas factor at 0.47 based many variables including the "Heat Intensity Threshold". TTO Number 13 details how the Heat Intensity Threshold value was chosen and states:

> The exposure time adopted as the reference was 30 seconds based on the premise that an exposed person would stay in place for 1 to 5 seconds to evaluate the situation and then run at 5 miles per hour (7.3 feet per second) to some type of shelter within approximately 200 feet of their initial position... The heat intensity threshold of 5000 Btu/hr-ft^2 used in the original derivation was chosen by defining a significant chance of fatal injury as a 1% chance of mortality.[13]

For its input on whether the 30 second escape period was appropriate, C-FER, the co-author of TTO Number 13, has since defended this decision as they indicate there is international precedent for such travel speed.[14]

Following a 2019 pipeline rupture in Danville, Kentucky where there were several injuries and one fatality, the National Transportation Safety Board (NTSB) issued Pipeline Investigation Report NTSB/PIR-22/02

Comment 04-03

[10] In 49 CFR 192.903, the High Consequence Area is defined by the size of the PIR in several instances, including the instance when an otherwise Class 1 or Class 2 location has a pipeline with a PIR greater than 200 meters and a circle of radius equal to the PIR contains 20 or more buildings intended for human occupancy.
[11] In 49 CFR 192.3, the Moderate Consequence Area is defined by the size of the PIR in several instances.
[12] In 49 CFR 192.5, the definitions of Class location 1, 2, 3, and 4 are all defined in terms of number and distance between buildings intended for human occupancy, not by PIR.
[13] OPS TTO Number 13 at 15.
[14] "International precedent (BS PD 8010-3:2009) for 2.5 m/s travel speed and sheltered within 50 to 75 m." C-FER October 27, 2022 Presentation titled "The Potential Impact Radius Formula Background to Development and Validation" to the Transportation Research Board at 10.

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with recommendations that PHMSA implement changes to its PIR calculations due to concerns around the feasibility of human response in the event of pipe rupture.[15] The NTSB notes:

> We also found that the Pipeline and Hazardous Materials Safety Administration's (PHMSA's) equation for determining the potential impact radius of a pipeline rupture is based on assumptions that are inconsistent with findings from recent natural gas ruptures and human response data; thus, high consequence areas determined using the equation do not include the full area at risk.[16]

PHMSA has since acknowledged the NTSB's recommendation, suggesting that it was something the agency would consider addressing. On December 14, 2022 as part of its Public Meeting, Director of Program Development at PHMSA, Max Kieba, acknowledged the NTSB's recommendation. Mr. Kieba stated:

> There are a lot of aspects and questions we will come up in this panel are the baseline of the PIR is it reasonable for some of the timing aspects… the ability for a member of the public to respond following a gas pipeline rupture may be complicated by, for example, sleeping, being in interior room where one may not be immediately aware of a pipeline emergency or evacuation or evacuating other household members who cannot self-evacuate the speed with which the member is assumed to run is not general population including very young elderly, mobility impaired or those with preexisting medical condition. Two of the evacuees rescued during the incident by sheriff were both elderly mobility impaired I would say this part of the recommendation does also align with if it hasn't been mentioned yet among DOT strategic goals is looking at areas of equity… But we hope to go into a lengthy discussion about do we need to reconsider particularly align with the NTSB recommendation but also expand from there.[17]

Comment 04-03

PHMSA is interested in mitigating the risk to the mobility-impaired and people with pre-existing medical conditions posed by the adopted Heat Intensity Threshold, which underpins both the currently designated natural gas and hydrogen gas factors of "0.69" and "0.47", respectively. Adopting a new Heat Intensity Threshold standard to address these concerns would impact both gas factors.

There are also real-world events where fatalities have occurred outside of the calculated pipeline impact radius. In addition to PHMSA's equity concerns around the current PIR calculation, analysis of pipe ruptures in the twenty years since the PIR was first described has found damage outside a circle of radius equal to the potential impact radius (also known as a potential impact circle, or PIC).[18] Investigations of recent rupture

[15] "As a result of this investigation, we made a recommendation to PHMSA to revise the regulations regarding potential impact radius methodology based on data from recent natural gas pipeline ruptures and human response considerations." NTSB/PIR-22/02 at 9.
[16] NTSB/PIR-22/02 at vii.
[17] PHMSA Director of Program Development Max Kieba at PHMSA's Day 2, December 14, 2022 Public Meeting Transcript. day2 (onlinevideoservice.com). (Last accessed 7/16/2024)
[18] The potential impact circle (PIC) is defined in 49 CFR § 192.903.

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events, including Danville, Kentucky in 2019[19] and Sissonville, West Virginia in 2012[20] have shown evidence of blast damage exceeding the PIC for how the pipeline was being operated. In its Pipeline Investigation Report, the NTSB noted several high-profile cases of rupture damage exceeding the calculated PIR:

> Past accidents have also demonstrated the insufficiency of the PIR calculation. In 2000, a pipeline rupture in Carlsbad, New Mexico, killed 12 people camped about 675 feet from the rupture crater; the PIR would have been calculated at 598 feet by current federal regulations (NTSB 2003). A pipeline that ruptured in San Bruno, California, in 2010 had a PIR of 414 feet, but homes were damaged up to 600 feet from the rupture origin (NTSB 2011). A rupture in Sissonville, West Virginia, in 2012 displayed evidence of thermal damage up to 610 feet from the rupture origin, but the PIR was calculated as 567 feet (NTSB 2014).

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One reason for the discrepancy in finding damage outside of the pipe's PIC is the manner in which the pipe ruptures. C-FER noted in an October 2022 presentation on the matter that the original PIR calculation was designed by modeling the fire as "…a time-varying large-scale fire as a steady-state, ground-level, *point-source heat emitter* for the purpose of hazard zone estimation"[21] (emphasis added). This means that the PIR currently assumes that everywhere in a given distance of the rupture will be affected equally. Recent evidence shows that instead of point-source cratering at the rupture location, in certain circumstances pipeline ruptures have the tendency to create *directed jets*. For a directed jet rupture, such as is anticipated if a hydrogen pipeline ruptures,[22] C-FER explains that the "hazard area is comparable to that of crater fire, but generally width is reduced and length is increased."[23] This means that for a directed jet rupture, the heat and damage experienced in the direction of the jet exceeds the PIR circle as currently calculated. This is further evidence that the current PIR calculation fails to accurately define a threshold for the consequence of a pipeline rupture. Newly published research in January 2024 attempts to develop a new PIR calculation formula, validated against real pipeline rupture data including jet ruptures, to more accurately capture a threshold where damage is experienced during a pipeline rupture.[24]

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[19] "The PIR at the rupture site calculated under PHMSA regulations was 633 feet. Physical evidence at the accident site and from the Lincoln County Coroner's report showed that the PIR of the accident site was larger than what was calculated. The deceased individual was found 640 feet south of the pipeline failure and natural gas fire, and damage to homes was found up to 1,100 feet from the rupture crater." NTSB/PIR-22/02 at 37.
[20] C-FER October 27, 2022 Presentation titled "The Potential Impact Radius Formula Background to Development and Validation" to the Transportation Research Board at 18.
[21] C-FER October 27, 2022 Presentation titled "The Potential Impact Radius Formula Background to Development and Validation" to the Transportation Research Board at 2.
[22] "The existing methodologies employ a single point source model to estimate radiation and the potential impact radius. However, these approaches overlook the jet fire shape resulting from high-pressure leaks, leading to discrepancies between the calculated values and real-world incidents." "A Model for Assessing the Potential Impact Radius of Hydrogen Pipelines Based on Jet Fire Radiation" at 1.
[23] C-FER October 27, 2022 Presentation titled "The Potential Impact Radius Formula Background to Development and Validation" to the Transportation Research Board at 8.
[24] "A Model for Assessing the Potential Impact Radius of Hydrogen Pipelines Based on Jet Fire Radiation" Equation 10 at 7.

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There are potential safety implications of designing the Angeles Link pipeline in accordance with PHMSA's TTO Number 13. Given the uncertainty around the future of the PIR calculation and the "0.47" gas factor for hydrogen calculated in TTO Number 13, SoCalGas should prioritize safety and adopt a more conservative value for the design of its proposed Angeles Link pipeline. In previous PAG meetings, Cal Advocates has advised that the hydrogen pipeline be designed to natural gas standards, to a gas factor of "0.69". To demonstrate that SoCal Gas can safely construct its first hydrogen transmission line, the safety requirements report should also explicitly discuss who and how SoCalGas consulted with in determining the engineering and design parameters for a hydrogen transmission pipeline. At a minimum, SoCalGas should consult with PHMSA and the NTSB given the concerns around the PIR calculation as currently described by TTO Number 13. SoCalGas should then explicitly describe how and where it included the advice and recommendations of these other safety advisory and regulatory bodies.

Comment 04-03

Conclusion

In summary, SoCalGas' decision to adopt PHMSA's TTO Number 13 should be tempered by broader consideration of the PIR that exceeds the minimum safety standards established by PHMSA. Cal Advocates recommends that SoCalGas:

1. Should clarify whether the Class Location of its hydrogen pipelines will be different from the existing Class Location of its natural gas pipelines due to differences in the two gases potential impact radius (PIR) calculations, and if so, cite to supporting regulations;
2. Should design the Angeles Link pipeline to a more conservative, safety-oriented standard beyond the minimum requirements set by PHMSA's OPS TTO Number 13; given that:
    a. The consequence of pipeline rupture zone with the currently adopted Heat Intensity Threshold has come under scrutiny;
    b. New scholarship and real-world rupture data questions the simplified point-source rupture assumption and promotes a new standard for calculating the PIR which includes jet ruptures; and,
    c. PHMSA, the NTSB, and other safety advisor and regulatory bodies who are publicly addressing the seeming inadequacies of the current TTO Number 13 standard for calculating PIR may soon look to update the calculation.

Comment 04-04

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CAL ADVOCATES COMMENT 4-1

The Public Advocates Office at the California Public Utilities Commission (Cal Advocates) provides these comments on Southern California Gas Company's (SoCalGas) Angeles Link Draft Report for Plan for Applicable Safety Requirements (Safety Requirements), which was issued on June 21, 2024. The Safety Requirements report discusses the safety regulations and industry standards with which SoCalGas must comply regarding hydrogen transmission, storage, and transportation as required by the Commission's Phase 1 Decision.FN1 Cal Advocates comments on two issues regarding the Safety Requirements:

1. SoCalGas should clarify whether the Class Location of its hydrogen pipelines will be different from the existing Class Location of its natural gas pipelines due to differences in the two gases potential impact radius (PIR) calculations, and if so, cite to supporting regulations;

2. SoCalGas should design the Angeles Link pipeline to a more conservative, safety-oriented standard beyond the minimum requirements set by PHMSA's OPS TTO Number 13; given that:

a. The consequence of pipeline rupture zone with the currently adopted Heat Intensity Threshold has come under scrutiny;

b. New scholarship and real-world rupture data questions the simplified point-source rupture assumption and promotes a new standard for calculating the PIR which includes jet ruptures; and,

c. PHMSA, the NTSB, and other safety advisor and regulatory bodies who are publicly addressing the seeming inadequacies of the current TTO Number 13 standard for calculating PIR may soon look to update the calculation.

FN1 – SoCalGas Angeles Link Draft Report for Plan for Applicable Safety Requirements (Safety Requirements) at 7.

SOCALGAS RESPONSE TO COMMENT 4-1

Please refer to Responses to Comments 4-2 and 4-3 pertaining to class locations and design standards.

CAL ADVOCATES COMMENT 4-2

Class Location Definitions are Based on Population Density and Do Not Change with the Potential Impact Radius

49 Code of Federal Regulations (CFR) 192.903, defines the PIR as "the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property." FN2 The PIR is based on the calculated threshold where fatality due to the rupture is likely. FN3 The Pipeline Hazardous Materials Safety Administration (PHMSA) has included as reference in 49 CFR 192.7 the 2004 American Society of Mechanical Engineers (ASME) B31.8S standard for calculating PIR for natural gas and other gases. FN4 Section 3.2 in ASME B31.8S describes the relationship as follows: FN5

$r = 0.69 * d\sqrt{p}$

where **r** is the pipeline impact radius in feet, **d** is the pipe diameter in inches, and **p** is the operating pressure of the pipeline in pounds per square inch. The coefficient **"0.69"** is a gas factor for natural gas. FN6

SoCalGas states in its Integrity Management section that it plans to utilize PHMSA's Technical Task Order (TTO) Number 13 to inform its PIR calculations. FN7 PHMSA's Office of Pipeline Safety (OPS) commissioned TTO Number 13 in part to determine the gas factor for other fuels, and established that the appropriate gas factor for hydrogen gas would be "0.47". FN8 SoCalGas states that once it has finished its PIR calculation, its definitions around its class locations, high consequence areas (HCAs) and moderate consequence areas (MCAs) will vary between its natural gas and hydrogen pipelines:

Once the PIR is calculated, the HCAs and MCAs can be determined for the hydrogen pipeline using the same methodology as for a natural gas pipeline.

To note, the factor for hydrogen (0.47) is lower than the factor for natural gas (0.69), which results in lower PIR than a similar pipeline carrying natural gas. This could result in fewer HCAs and MCAs identified for a hydrogen pipeline versus a natural gas pipeline, and potentially differing class locations along the pipeline route. FN9

Cal Advocates agrees that the change in PIR between natural gas and hydrogen pipelines will affect the size of HCAs and MCAs as these are both in part defined by PIR calculations. FN10, FN11 However, PHMSA does not define class location in terms of PIR. Instead, class location is solely defined by the density of a region given the number of buildings intended to be used for human occupancy per class location unit based on a radius of 660 feet from the pipeline, which means that class location will not change with changes in PIR. FN12 SoCalGas should clarify if it intends to use a different definition of class location for its hydrogen pipelines than natural gas pipelines due to a different potential impact radius or other regulations and, if so, it should provide its rationale and cite to supporting regulations.

Note: 0.69 is the factor for natural gas. This number will vary for other gases depending upon their heat of combustion. An operator transporting gas other than natural gas must use section 3.2 of ASME B31.8S (incorporated by reference, see §192.7) to calculate the impact radius formula."

FN2 – In 49 CFR 192.903, the potential impact radius is fully defined as "the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property. PIR is determined by the formula r = 0.69* (square root of (p*d2)), where 'r' is the radius of a circular area in

feet surrounding the point of failure, 'p' is the maximum allowable operating pressure (MAOP) in the pipeline segment in pounds per square inch and 'd' is the nominal diameter of the pipeline in inches.

FN3 – C-FER October 27, 2022 Presentation titled "The Potential Impact Radius Formula Background to Development and Validation" to the Transportation Research Board at 11.

FN4 – The original derivation of the PIR calculation can be found in a Gas Research Institute (GRI) report by C-FERTechnologies (C-FER), "A Model for Sizing High Consequence Areas Associated with Natural Gas Pipelines".

FN5 – ASME B31.8S shows a formula with fifteen variables, many of which differ depending on the gas being transported in the pipeline.

FN6 – *See* Reference 2 for full definition of PIR from 49 CFR 192.903.

FN7 – Safety Requirements at 36-37.

FN8 – Office of Pipeline Safety (OPS) Technical Task Order (TTO) Number 13 "Potential Impact Radius Formulae for Flammable Gases Other Than Natural Gas" - Equation 4.30 at 37.

FN9 – Safety Requirements at 36-37.

FN10 – In 49 CFR 192.903, the High Consequence Area is defined by the size of the PIR in several instances, including the instance when an otherwise Class 1 or Class 2 location has a pipeline with a PIR greater than 200 meters and a circle of radius equal to the PIR contains 20 or more buildings intended for human occupancy.

FN11 – In 49 CFR 192.3, the Moderate Consequence Area is defined by the size of the PIR in several instances.

FN12 – In 49 CFR 192.5, the definitions of Class location 1, 2, 3, and 4 are all defined in terms of number and distance between buildings intended for human occupancy, not by PIR.

SOCALGAS RESPONSE TO COMMENT 4-2

Potential Impact Radius (PIR) was not calculated in Angeles Link Phase 1 as the pipeline diameters, maximum allowable operating pressure, and pipeline routing were not selected nor finalized in this feasibility level analysis. In response to this feedback, PIR will be added to Section 8.2.2 of the Design Study as part of the future considerations to inform the design development of Angeles Link. In future phases, the PIR will be determined to identify high and medium consequence areas, inform integrity management program development, and compliance with industry standards such as ASME B31.12, and federal regulations such as the Gas Transmission Pipeline Integrity Management, 49 CFR 192, Subpart O. The PIR will be calculated after a preferred route is selected and the pipeline nominal diameter and maximum allowable operating pressure (MAOP) are finalized.

SoCalGas will follow the Class Location definition outlined in 49 CFR 192, Subpart A, 192.5 for hydrogen pipelines and will not determine Class Location based on PIR.

CAL ADVOCATES COMMENT 4-3

Fatalities Outside of the Potential Impact Radius Mean that Assumptions in Technical Task Order Number 13 are Inadequate to Capture Real World Conditions and Raise Equity Concerns

Cal Advocates agrees with SoCalGas that PHMSA's OPS TTO Number 13 establishes the hydrogen gas factor at 0.47 based many variables including the "Heat Intensity Threshold". TTO Number 13 details how the Heat Intensity Threshold value was chosen and states:

The exposure time adopted as the reference was 30 seconds based on the premise that an exposed person would stay in place for 1 to 5 seconds to evaluate the situation and then run at 5 miles per hour (7.3 feet per second) to some type of shelter within approximately 200 feet of their initial position... The heat intensity threshold of 5000 Btu/hr-ft2 used in the original derivation was chosen by defining a significant chance of fatal injury as a 1% chance of mortality. FN13

For its input on whether the 30 second escape period was appropriate, C-FER, the co-author of TTO Number 13, has since defended this decision as they indicate there is international precedent for such travel speed. FN14

Following a 2019 pipeline rupture in Danville, Kentucky where there were several injuries and one fatality, the National Transportation Safety Board (NTSB) issued Pipeline Investigation Report NTSB/PIR-22/02 with recommendations that PHMSA implement changes to its PIR calculations due to concerns around the feasibility of human response in the event of pipe rupture. FN15 The NTSB notes:

We also found that the Pipeline and Hazardous Materials Safety Administration's (PHMSA's) equation for determining the potential impact radius of a pipeline rupture is based on assumptions that are inconsistent with findings from recent natural gas ruptures and human response data; thus, high consequence areas determined using the equation do not include the full area at risk. FN16

PHMSA has since acknowledged the NTSB's recommendation, suggesting that it was something the agency would consider addressing. On December 14, 2022 as part of its Public Meeting, Director of Program Development at PHMSA, Max Kieba, acknowledged the NTSB's recommendation. Mr. Kieba stated:

There are a lot of aspects and questions we will come up in this panel are the baseline of the PIR is it reasonable for some of the timing aspects… the ability for a member of the public to respond following a gas pipeline rupture may be complicated by, for example, sleeping, being in interior room where one may not be immediately aware of a pipeline emergency or evacuation or evacuating other household members who cannot self-evacuate the speed with which the member is assumed to run is not general population including very young elderly, mobility impaired or those with preexisting medical condition. Two of the evacuees rescued during the incident by sheriff were both elderly mobility impaired I would say this part of the recommendation does also align with if it hasn't been mentioned yet among DOT strategic goals is looking at areas of equity… But we hope to go into a lengthy discussion about do we need to reconsider particularly align with the NTSB recommendation but also expand from there. FN17

PHMSA is interested in mitigating the risk to the mobility-impaired and people with pre-existing medical conditions posed by the adopted Heat Intensity Threshold, which underpins both the currently designated natural gas and hydrogen gas factors of "0.69" and "0.47", respectively. Adopting a new Heat Intensity Threshold standard to address these concerns would impact both gas factors.

There are also real-world events where fatalities have occurred outside of the calculated pipeline impact radius. In addition to PHMSA's equity concerns around the current PIR calculation, analysis of pipe ruptures in the twenty years since the PIR was first described has found damage outside a circle of radius equal to the potential impact radius (also known as a potential impact circle, or PIC). FN18 Investigations of recent rupture events, including Danville, Kentucky in 2019 FN19 and Sissonville, West Virginia in 2012 FN20 have shown evidence of blast damage exceeding the PIC for how the pipeline was being operated. In its Pipeline Investigation Report, the NTSB noted several high-profile cases of rupture damage exceeding the calculated PIR:

Past accidents have also demonstrated the insufficiency of the PIR calculation. In 2000, a pipeline rupture in Carlsbad, New Mexico, killed 12 people camped about 675 feet from the rupture crater; the PIR would have been calculated at 598 feet by current federal regulations (NTSB 2003). A pipeline that ruptured in San Bruno, California, in 2010 had a PIR of 414 feet, but homes were damaged up to 600 feet from the rupture origin (NTSB 2011). A rupture in Sissonville, West Virginia, in 2012 displayed evidence of thermal damage up to 610 feet from the rupture origin, but the PIR was calculated as 567 feet (NTSB 2014).

One reason for the discrepancy in finding damage outside of the pipe's PIC is the manner in which the pipe ruptures. C-FER noted in an October 2022 presentation on the matter that the original PIR calculation was designed by modeling the fire as "…a time-varying large-scale fire as a steady-state, ground-level, point-source heat emitter for the purpose of hazard zone estimation" FN21 (emphasis added). This means that the PIR currently assumes that everywhere in a given distance of the rupture will be affected equally. Recent evidence shows that instead of point-source cratering at the rupture location, in certain circumstances pipeline ruptures have the tendency to create directed jets. For a directed jet rupture, such as is anticipated if a hydrogen pipeline ruptures, FN22 C-FER explains that the "hazard area is comparable to that of crater fire, but generally width is reduced and length is increased." FN23 This means that for a directed jet rupture, the heat and damage experienced in the direction of the jet exceeds the PIR circle as currently calculated. This is further evidence that the current PIR calculation fails to accurately define a threshold for the consequence of a pipeline rupture. Newly published research in January 2024 attempts to develop a new PIR calculation formula, validated against real pipeline rupture data including jet ruptures, to more accurately capture a threshold where damage is experienced during a pipeline rupture. FN24

There are potential safety implications of designing the Angeles Link pipeline in accordance with PHMSA's TTO Number 13. Given the uncertainty around the future of the PIR calculation and the "0.47" gas factor for hydrogen calculated in TTO Number 13, SoCalGas should prioritize safety and adopt a more conservative value for the design of its proposed Angeles Link pipeline. In previous PAG meetings, Cal Advocates has advised that the hydrogen pipeline be designed to natural gas standards, to a gas factor of "0.69". To demonstrate that SoCal Gas can safely construct its first hydrogen transmission line, the safety requirements report should also explicitly discuss who and how SoCalGas consulted with in determining the engineering and design parameters for a hydrogen transmission pipeline. At a minimum, SoCalGas should consult with PHMSA and the NTSB given the concerns around the PIR calculation as currently described by TTO Number 13. SoCalGas should then explicitly describe how and where it included the advice and recommendations of these other safety advisory and regulatory bodies.

FN13 – OPS TTO Number 13 at 15.

FN14 – "International precedent (BS PD 8010-3:2009) for 2.5 m/s travel speed and sheltered within 50 to 75 m." C-FER October 27, 2022 Presentation titled "The Potential Impact Radius Formula Background to Development and Validation" to the Transportation Research Board at 10.

FN15 – "As a result of this investigation, we made a recommendation to PHMSA to revise the regulations regarding potential impact radius methodology based on data from recent natural gas pipeline ruptures and human response considerations." NTSB/PIR-22/02 at 9.

FN16 – NTSB/PIR-22/02 at vii.

FN17 – PHMSA Director of Program Development Max Kieba at PHMSA's Day 2, December 14, 2022 Public Meeting Transcript. day2 (onlinevideoservice.com). (Last accessed 7/16/2024)

FN18 – The potential impact circle (PIC) is defined in 49 CFR § 192.903.

FN19 – "The PIR at the rupture site calculated under PHMSA regulations was 633 feet. Physical evidence at the accident site and from the Lincoln County Coroner's report showed that the PIR of the accident site was larger than what was calculated. The deceased individual was found 640 feet south of the pipeline failure and natural gas fire, and damage to homes was found up to 1,100 feet from the rupture crater." NTSB/PIR-22/02 at 37.

FN20 – C-FER October 27, 2022 Presentation titled "The Potential Impact Radius Formula Background to Development and Validation" to the Transportation Research Board at 18.

FN21 – C-FER October 27, 2022 Presentation titled "The Potential Impact Radius Formula Background to Development and Validation" to the Transportation Research Board at 2.

FN22 – "The existing methodologies employ a single point source model to estimate radiation and the potential impact radius. However, these approaches overlook the jet fire shape resulting from high-pressure leaks, leading to discrepancies between the calculated values and real-world incidents." "A Model for Assessing the Potential Impact Radius of Hydrogen Pipelines Based on Jet Fire Radiation" at 1.

FN23 – C-FER October 27, 2022 Presentation titled "The Potential Impact Radius Formula Background to Development and Validation" to the Transportation Research Board at 8.

FN24 – "A Model for Assessing the Potential Impact Radius of Hydrogen Pipelines Based on Jet Fire Radiation" Equation 10 at 7.

SOCALGAS RESPONSE TO COMMENT 4-3

As discussed in Response to Comment 4-2, SoCalGas will comply with codes, regulations and standards applicable to hydrogen pipelines, including the potential impact radius (PIR), should Angeles Link be authorized by the CPUC (and other agencies as applicable).

SoCalGas will determine the PIR for hydrogen transmission pipelines using the hydrogen gas factor of 0.47, as instructed by ASME B31.12 and Pipeline Hazardous Materials Safety Administration (PHMSA)'s Technical Task Order (TTO) Number 13. Furthermore, SoCalGas will follow requirements set forth in ASME B31.12, PL-3.5 which indicates that "if one of more buildings intended for human occupancy are found to be within the potential impact area of a proposed hydrogen pipeline, a full risk assessment shall be carried out." If applicable and required, this risk assessment will provide additional findings to be considered in future safety plan development. SoCalGas will continue to monitor CFR requirements and

design codes for updates to PIR calculation methodology and implement applicable updates to determine PIR in Phase 2.

As a result of feedback received after distributing the draft scope of work in third quarter 2023, the Center for Hydrogen Safety (CHS) was recommended as a resource to SoCalGas. In response to this feedback, SoCalGas engaged the Hydrogen Safety Panel (HSP) in fourth quarter 2023. The Hydrogen Safety Panel reviewed the draft Safety Study and identified additional key hydrogen safety codes and safety best practices and made other recommendations for information to consider in the planning of Angeles Link. Changes will be made to the final Safety Study to address their feedback. Their comments are included in Appendix 10 of this Q3 2024 report. HSP's extensive hydrogen safety experience has been a valuable resource during the drafting of the Safety Study. HSP's feedback has not only helped SoCalGas confirm relevant hydrogen standards and best practices, but it also provided valuable insights into areas where SoCalGas can supplement its internal procedures and policies. HSP's comments and recommendations will help refine SoCalGas's safety planning for the subsequent phases of Angeles Link that include design, construction, and operational efficiency.

CAL ADVOCATES COMMENT 4-4

Conclusion

In summary, SoCalGas' decision to adopt PHMSA's TTO Number 13 should be tempered by broader consideration of the PIR that exceeds the minimum safety standards established by PHMSA. Cal Advocates recommends that SoCalGas:

1. Should clarify whether the Class Location of its hydrogen pipelines will be different from the existing Class Location of its natural gas pipelines due to differences in the two gases potential impact radius (PIR) calculations, and if so, cite to supporting regulations;

2. Should design the Angeles Link pipeline to a more conservative, safety-oriented standard beyond the minimum requirements set by PHMSA's OPS TTO Number 13; given that:

    a. The consequence of pipeline rupture zone with the currently adopted Heat Intensity Threshold has come under scrutiny;

    b. New scholarship and real-world rupture data questions the simplified point-source rupture assumption and promotes a new standard for calculating the PIR which includes jet ruptures; and,

    c. PHMSA, the NTSB, and other safety advisor and regulatory bodies who are publicly addressing the seeming inadequacies of the current TTO Number 13 standard for calculating PIR may soon look to update the calculation.

SOCALGAS RESPONSE TO COMMENT 4-4

Please refer to Responses to Comments 4-2 and 4-3 above.

Comment Letter 5 – Communities for a Better Environment

Comment Letter 5

COMMUNITIES FOR A BETTER ENVIRONMENT
established 1978

August 2, 2024

Southern California Gas Company
555 West Fifth Street
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback for Southern California Gas Company on the Workforce Planning & Training Evaluation Draft Report

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Workforce Planning & Training Evaluation Draft Report (the "Report") provided on July 5, 2024. This report still lacks fair discussion of several important issues surrounding workforce planning, largely because it relies on the Plan for Applicable Safety Requirements ("Safety Study"). As we explained in our feedback letter regarding the Safety Study (from July 19, 2024), that safety draft report has major flaws and omissions. Thus, SoCalGas's reliance on the Safety Study in this workforce report is misplaced. California Public Utilities Commission (CPUC) Decision 22-12-055 emphasizes the importance of stakeholder engagement. Meaningful engagement is impeded where key information is either omitted or presented in a misleading manner. Particularly, the Report:

I. Does Not Adequately Addresses Prior Concerns Raised by CBE about Worker Safety Because It Relies on the Flawed Safety Study
II. Fails to Go Far Enough in Committing to More Local Hiring and Greater Numbers of Union Represented Employees
III. Has Shortcomings in its Discussion of Gas Control and Emergency Response Personnel for Hydrogen and Natural Gas Systems
IV. Glosses Over Key Differences Between Hydrogen and Natural Gas

Comment 05-01

I. The Report Does Not Adequately Addresses Prior Concerns Raised by CBE About Worker Safety Because It Relies on the Flawed Safety Study

In the Report's Stakeholder Comments section, SoCalGas states it has addressed concerns voiced by CBE to expand on worker safety concerns related to pipeline transportation of 100% hydrogen.[1] The Report claims: "Employee safety is addressed throughout the study and is specifically evaluated in the *Plan for Applicable Safety Requirements* Study (Safety Study)."[2]

[1] Report at 34.
[2] *Id.* at 34.

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However, the Safety Study lacked meaningful details on numerous important topics. For example, in the Safety Study, SoCalGas made multiple references to the roughly 1,600 miles of hydrogen pipelines that already exist and operate in the United States. As we pointed out in our feedback letter for the Safety Study, SoCalGas failed to examine the supposed safety standards of the existing 1,600 miles of hydrogen pipelines because it did not discuss any specific hydrogen pipeline nationwide.[3] In addition, the Safety Study failed to examine international hydrogen safety standards beyond merely naming organizations like HySafe, providing brief general descriptions of the organizations, and providing URLs for them.[4] The Safety Study also minimized the risks of serious bodily injury and death that can result from hydrogen leaks and explosions because it cherry-picked relatively less serious hydrogen accidents and excluded key details in some of the incidents SoCalGas described.[5] This Report repeatedly refers to the Safety Study[6] as if the safety report sufficiently resolved CBE's safety concerns. As CBE has raised, the Safety Study was flawed in several ways. SoCalGas's reliance on it in this Report is misplaced, and the comments made around worker safety at the Preliminary Data and Findings stage have still not been adequately addressed.

Comment 05-02

II. The Report Fails to Go Far Enough in Committing to More Local Hiring and Greater Numbers of Union Represented Employees

The report does not adequately discuss steps to providing stable, well-paying jobs to union workers and investing in new members of the workforce. A project's safety and integrity are only as good as the workers that construct and operate it. It is critical that any pipeline that is in fact constructed builds up the opportunities and skilled workforce of the community it is located in. Projects should work in concert with California's professional trade unions to provide well-paid, stable jobs to existing workers and invest resources in recruiting and training the next generation of workers from the project community.

Comment 05-03

The Report's Employment Impact Analysis appendix includes discussion of projected economic benefits for Diverse Business Enterprises (DBEs) during the construction phase of Angeles Link.[7] This section also includes an estimate of more than 23,000 direct DBE jobs during the project construction period.[8] However, these DBE projections only refer to SoCalGas contracts for "goods and services from diverse suppliers[.]"[9] Neither the Report nor its appendix say more statements like "workforce planning includes managing the recruitment and selection

Comment 05-04

[3] CBE Feedback for Southern California Gas Company on the Plan for Applicable Safety Requirements Draft Report (July 19, 2024), at 3.
[4] *Id.* at 2.
[5] *Id.* at 4-5.
[6] Report at 11, 12, 22, 34.
[7] Appendix A at 14.
[8] *Id.*
[9] *Id.* at 14.

of a qualified and diverse workforce, while complying with legal requirements throughout the staffing process."[10] Further, "[a]pproximately one-half of the SoCalGas workforce is union represented[.]"[11]The Report should aim to boost the percentage share of full-time, union represented employees (not just independent contractors that usually lack the benefits afforded to full-time, union represented employees) and explore in greater detail what investments and training must be made to mobilize local workforces and bring adequate hydrogen specific training to union workers.

Comment 05-04

III. The Report Has Shortcomings in its Discussion of Gas Control and Emergency Response Personnel for Hydrogen and Natural Gas Systems

After reviewing the Report's discussion of workforce personnel for SoCalGas's existing natural gas network and proposed Angeles Link hydrogen pipeline, CBE believes that SoCalGas needs to strike a better balance between proposing cross-training[12] for both systems while maintaining distinct gas control and emergency response personnel. Such balance is essential to promote safety for natural gas and hydrogen systems. The Report repeatedly hedges about separate teams for the natural gas and hydrogen systems: "may have designated responsibilities for the control of both natural gas and hydrogen systems;"[13] operator qualifications "may be different due to the physical and chemical properties of hydrogen;"[14] "[s]eparate control room management plans may be implemented for natural gas and hydrogen."[15] This hedging is also present when discussing field personnel, not just control room staff: "SoCalGas will determine if field personnel can carry OQs [Operator Qualifications] for both natural gas pipeline O&M [Operations & Maintenance] and Angeles Link hydrogen pipeline O&M, or if they must be carried by separate personnel."[16] SoCalGas should make these determinations and issue associated explanations for them as soon as feasible so that parties can review their decisions. Given the differing chemical properties of hydrogen and natural gas and the novelty of this projects proposed scale, it is vital that adequate safety teams are trained and on call at all times.

Comment 05-05

IV. The Report Again Glosses Over Key Differences Between Hydrogen and Natural Gas

The Report continues the error made in the Safety Study concerning the lack of differentiation in federal safety regulations for natural gas pipelines and hydrogen pipelines. As

Comment 05-06

[10] Report at 32.
[11] *Id.* at 32.
[12] *Id.* at 23 ("An alternate approach to consider for staffing gas control and emergency response functions would be to rotate gas control personnel and emergency response personnel between natural gas and hydrogen infrastructure, thereby providing cross-training of personnel.")
[13] *Id.*
[14] *Id.*
[15] *Id.*
[16] *Id.* at 18.

we explained in our feedback to the Safety Study,[17] CBE's communities have not been sufficiently protected by industry best practices, even when federal and state laws and regulations directly apply these practices. Chemical leaks, flaring, explosions, and spills are commonplace in communities like Wilmington despite safety regulations. These exposures impact workers, first responders, community members' health and well-being. Unnecessary risks which can be eliminated by new training, research, and updated operating practices must be to priority. Because hydrogen-specific standards are not directly incorporated into federal and state laws or regulations in all circumstances, only industry best practices provide for some, albeit insufficient, level of protection.

Comment 05-06

In the Report, SoCalGas states: "Angeles Link and the natural gas infrastructure would both be governed by 49 CFR Part 192 with the same regulatory requirements." But the Report fails to mention the lack of differentiation in federal safety regulations for natural gas pipelines and hydrogen pipelines. SoCalGas then presents Table 5 (Pipeline and Compressor Station Requirements) to show that many subsections of 49 Code of Federal Regulations (CFR) 192 apply to both natural gas and hydrogen infrastructure.[18] The table has 19 rows of CFR sections, and they all say "Yes" for applicability for natural gas and for hydrogen. Accordingly, the Report asserts that corrosion control, operating, and maintenance requirements for "natural gas infrastructure and Angeles Link may be similar."[19] Even though the sentence before Table 5 is presented includes the caveat that "this is not an exhaustive list)," this table masks the potential need for differing regulatory standards for hydrogen versus natural gas because it draws support from existing federal standards that also fail to distinguish between the risks associated with hydrogen and natural gas. Thus, Table 5 presents information in a misleading manner.

Comment 05-07

A fairer version of Table 5 would include at least one, and preferably more, differences between hydrogen and natural gas. And if there truly are no applicability differences because current federal regulations do not specify differences between natural gas, hydrogen, or other gases, then SoCalGas should identify updated requirements which would more effectively protect the ALP workforce and the communities bearing impacts from the project.

V. Conclusion

CBE appreciates the opportunity to provide feedback and urges SoCalGas to incorporate, in greater depth, workforce development and training needs, opportunities to partner more closely with unionize workers, and investigate worker and community safety response plans more expansively. The Report's conclusion section asserts: "SoCalGas is uniquely well-positioned to operate and maintain a clean renewable hydrogen pipeline system due to its vast

Comment 05-08

[17] CBE Feedback for Southern California Gas Company on the Plan for Applicable Safety Requirements Draft Report (July 19, 2024), at 3.
[18] Report at 28.
[19] *Id.*

experience operating and maintaining a highly developed gas transmission and distribution system, existing highly trained and qualified workforce, and comprehensive programs and procedures."[20] CBE reiterates that the company has many long strides to make with respect to safety and basic hydrogen learning before making such claims in its report.

Comment 05-08

CBE emphasizes, and echoes comments made in prior letters as well as in person at CBOSG and PAG meetings that the volume and speed at which report feedback is requested is vastly inappropriate for meaningful engagement and feedback on Phase 1 reports as is repeatedly emphasized in CPUC Decision 22-02-007.

Comment 05-09

Sincerely,

Jay Parepally
Theo Caretto
Communities for a Better Environment

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group
Angeles Link service list

[20] *Id.* at 35.

5

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 5-1

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Workforce Planning & Training Evaluation Draft Report (the "Report") provided on July 5, 2024. This report still lacks fair discussion of several important issues surrounding workforce planning, largely because it relies on the Plan for Applicable Safety Requirements ("Safety Study"). As we explained in our feedback letter regarding the Safety Study (from July 19, 2024), that safety draft report has major flaws and omissions. Thus, SoCalGas's reliance on the Safety Study in this workforce report is misplaced. California Public Utilities Commission (CPUC) Decision 22-12-055 emphasizes the importance of stakeholder engagement. Meaningful engagement is impeded where key information is either omitted or presented in a misleading manner. Particularly, the Report:

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I. The Report Does Not Adequately Addresses Prior Concerns Raised by CBE About Worker Safety Because It Relies on the Flawed Safety Study

In the Report's Stakeholder Comments section, SoCalGas states it has addressed concerns voiced by CBE to expand on worker safety concerns related to pipeline transportation of 100% hydrogen. FN1 The Report claims: "Employee safety is addressed throughout the study and is specifically evaluated in the Plan for Applicable Safety Requirements Study (Safety Study)." FN2

FN1 – Report at 34.
FN2 – Id. at 34.

SOCALGAS RESPONSE TO COMMENT 5-1

Employee safety is addressed in the Workforce Study Section 3.2 (Education, Operator Qualifications, and Training) and specifically in Section 3.2.4 (Environmental and Safety Compliance Management Program). As explained further in Section 3.2.4 of the Workforce Study, SoCalGas implements an Environmental and Safety Compliance Management Program (ESCMP) that applies to all employees and provides the training and compliance framework, so all employees understand their roles and responsibilities. The specific requirements related to hydrogen infrastructure would be incorporated into the ESCMP so employees receive the necessary training and implement the appropriate compliance measures specific to hydrogen.

In addition, SoCalGas implements a Gas Safety Plan that provides references to existing safety programs, plans, and procedures in place for specified infrastructure or areas of company activities. As explained further in the Workforce Study, the Gas Safety Plan will be updated to account for any changes to SoCalGas's specifications, standards, and procedures (SSPs) required for the operation and maintenance of a hydrogen pipeline system.

The separate Safety Study, Section 8.0 (Specifications, Standards, & Procedures Evaluation), provides additional information related to how SoCalGas's SSPs are being reviewed and will be updated to address hydrogen-specific requirements. The SSPs address essential employee safety concerns such as purging procedures, leak detection, hydrogen Personal Protective Equipment (PPE) and drug and alcohol testing.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 5-2

However, the Safety Study lacked meaningful details on numerous important topics. For example, in the Safety Study, SoCalGas made multiple references to the roughly 1,600 miles of hydrogen pipelines that already exist and operate in the United States. As we pointed out in our feedback letter for the Safety Study, SoCalGas failed to examine the supposed safety standards of the existing 1,600 miles of hydrogen pipelines because it did not discuss any specific hydrogen pipeline nationwide. FN3 In addition, the Safety Study failed to examine international hydrogen safety standards beyond merely naming organizations like HySafe, providing brief general descriptions of the organizations, and providing URLs for them. FN4 The Safety Study also minimized the risks of serious bodily injury and death that can result from hydrogen leaks and explosions because it cherry-picked relatively less serious hydrogen accidents and excluded key details in some of the incidents SoCalGas described. FN5 This Report repeatedly refers to the Safety Study FN6 as if the safety report sufficiently resolved CBE's safety concerns. As CBE has raised, the Safety Study was flawed in several ways. SoCalGas's reliance on it in this Report is misplaced, and the comments made around worker safety at the Preliminary Data and Findings stage have still not been adequately addressed.

FN3 – CBE Feedback for Southern California Gas Company on the Plan for Applicable Safety Requirements Draft Report (July 19, 2024), at 3.

FN4 – Id. at 2.
FN5 – Id. at 4-5.
FN6 – Report at 11, 12, 22, 34.

SOCALGAS RESPONSE TO COMMENT 5-2

The Workforce Study is intended to provide recommendations for SoCalGas to develop a workforce that is trained and qualified with the appropriate skills to safely design, construct, operate, and maintain hydrogen infrastructure. The Workforce Study refers to the separate Evaluation of Applicable Safety Requirements (Safety Study) where information from the Safety Study can inform the development of that workforce.

SoCalGas acknowledges CBE's concerns related to the separate Safety Study and provides responses to those concerns in the responses to Comment Letter No. 3 in this Quarterly Report. Specifically, in response to the comment concerning the description of the 1,600 miles of existing hydrogen pipelines in the Safety Study, please refer to Response to Comment 3-6.

In response to the comment concerning further review of the international hydrogen safety standards in the Safety Study, please refer to Response to Comment 3-1.

In response to the comment concerning the summary of the third-party hydrogen incidents highlighted in the Safety Study, please refer to Response to Comment 3-8.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 5-3

II. The Report Fails to Go Far Enough in Committing to More Local Hiring and Greater Numbers of Union Represented Employees

The report does not adequately discuss steps to providing stable, well-paying jobs to union workers and investing in new members of the workforce. A project's safety and integrity are only as good as the workers that construct and operate it. It is critical that any pipeline that is in fact constructed builds up the opportunities and skilled workforce of the community it is located in. Projects should work in concert with California's professional trade unions to provide well-paid, stable jobs to existing workers and invest resources in recruiting and training the nex generation of workers from the project community.

SOCALGAS RESPONSE TO COMMENT 5-3

In response to the comment concerning union jobs, SoCalGas recognizes the importance of providing stable, well-compensating jobs to union workers and the importance of investing in new members of the workforce. During early stages of the Workforce Study, an employment impact analysis was conducted in direct response to stakeholder feedback to estimate the number of potential jobs that could be created during construction and operation of Angeles Link. This content is summarized in Section 2.0 and provided in Appendix A of the Workforce Study. The analysis does not identify the number of union jobs created; however, approximately 88% of the current SoCalGas gas transmission organization is union represented. Approximately half of SoCalGas's overall workforce is union represented.

In addition, as summarized in the Key Findings in the Workforce Study's Executive Summary, for the construction resources, based on SoCalGas's experience, field personnel with transferrable construction skill sets could be from labor unions. Multiple trade unions, including pipe trades representatives, carpenters, operating engineers, laborers, and electrical workers, that could support construction of the pipeline and/or compressor stations will be essential to the contracted workforce needed for Angeles Link. In addition, the workforce for Angeles Link will include field personnel that are union represented SoCalGas employees that would be responsible for operating and maintaining the hydrogen infrastructure. Section 3.0 (Planning Considerations) in the Workforce Study further summarizes the workforce planning considerations to develop the workforce for Angeles Link, including evaluating potential the potential skills gap and where there might be a potential shortage of workers at different stages of Angeles Link.

Section 7.0 (Community Engagement and Employment) of the Workforce Study provides an overview of SoCalGas's current workforce planning related to community engagement and how that planning would apply to implementation of Angeles Link. As summarized, SoCalGas's workforce planning includes managing the recruitment and selection of a qualified and diverse workforce, while complying with legal requirements throughout the staffing process. Internal and external recruitment activities are conducted for all positions, and SoCalGas partners with colleges, veterans, disability support groups, and local communities to source qualified and diverse candidates to fill job vacancies. Specifically for Angeles Link, those recruitment efforts will be focused on communities along the potential Angeles Link route.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 5-4

The Report's Employment Impact Analysis appendix includes discussion of projected economic benefits for Diverse Business Enterprises (DBEs) during the construction phase of Angeles Link. FN7 This section also includes an estimate of more than 23,000 direct DBE jobs during the project construction period. FN8 However, these DBE projections only refer to SoCalGas contracts for "goods and services from diverse suppliers[.]" FN9 Neither the Report nor its appendix say more statements like "workforce planning includes managing the recruitment and selection of a qualified and diverse workforce, while complying with legal requirements throughout the staffing process." FN10 Further, "[a]pproximately one-half of the SoCalGas workforce is union represented[.]"FN11 The Report should aim to boost the percentage share of full-time, union represented employees (not just independent contractors that usually lack the benefits afforded to full-time, union represented employees) and explore in greater detail what investments and training must be made to mobilize local workforces and bring adequate hydrogen specific training to union workers.

FN7 – Appendix A at 14.
FN8 – Id.
FN9 – Id. at 14.
FN10 – Report at 32.
FN11 – Id. at 32.

SOCALGAS RESPONSE TO COMMENT 5-4

SoCalGas recognizes the importance of mobilizing and training a workforce with specific hydrogen training and knowledge, including union represented employees and employees from local communities. The Workforce Study recognizes the investment and trainings that will be necessary to develop a workforce specific for a hydrogen pipeline system. As summarized in in Section 9.0 (Conclusion), specific to the hydrogen industry, "SoCalGas is in partnership with a joint industry project to develop a conceptual hydrogen certification pathway to educate a range of personnel. Nationally, SoCalGas has joined the Hydrogen Education for a Decarbonized Global Economy (H2EDGE) initiative to advance emerging hydrogen workforce by developing newly trained personnel and enabling the existing workforce to migrate into the hydrogen field by way of enhanced industry coordination and workforce readiness initiatives, made possible by training, education, and recruitment of qualified people."

Consistent with this feedback, a statement will be added to Section 2.0 (Employment Impact Analysis) in the final Workforce Study stating that based off the current percentage of union represented employees at SoCalGas that could have a role in operating and maintaining similar infrastructure, there could be a significant increase in union-represented roles for Angeles Link. For additional response to the comment concerning development of union employees and recruitment in local communities for Angeles Link, please refer to Response to Comment 5-3.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 5-5

III. The Report Has Shortcomings in its Discussion of Gas Control and Emergency Response Personnel for Hydrogen and Natural Gas Systems

After reviewing the Report's discussion of workforce personnel for SoCalGas's existing natural gas network and proposed Angeles Link hydrogen pipeline, CBE believes that SoCalGas needs to strike a better balance between proposing cross-training FN12 for both systems while maintaining distinct gas control and emergency response personnel. Such balance is essential to promote safety for natural gas and hydrogen systems. The Report repeatedly hedges about separate teams for the natural gas and hydrogen systems: "may have designated responsibilities for the control of both natural gas and hydrogen systems;" FN13 operator qualifications "may be different due to the physical and chemical properties of hydrogen;" FN14 "[s]eparate control room management plans may be implemented for natural gas and hydrogen." FN15 This hedging is also present when discussing field personnel, not just control room staff: "SoCalGas will determine if field personnel can carry OQs [Operator Qualifications] for both natural gas pipeline O&M [Operations & Maintenance] and Angeles Link hydrogen pipeline O&M, or if they must be carried by separate personnel." FN16 SoCalGas should make these determinations and issue associated explanations for them as soon as feasible so that parties can review their decisions. Given the differing chemical properties of hydrogen and natural gas and the novelty of this projects proposed scale, it is vital that adequate safety teams are trained and on call at all times.

FN12 – *Id.* at 23 ("An alternate approach to consider for staffing gas control and emergency response functions would be to rotate gas control personnel and emergency response personnel between natural gas and hydrogen infrastructure, thereby providing cross-training of personnel.")

FN13 – Id.
FN14 – Id.
FN15 – Id.
FN16 – Id. at 18.

SOCALGAS RESPONSE TO COMMENT 5-5

In future phases of Angeles Link, SoCalGas will address how the workforce will carry out the tasks specific to hydrogen as compared to how the tasks are performed today with natural gas. As identified in the Workforce Study Section 3.0 (Planning Considerations), there are important considerations that require thoughtful planning to determine the appropriate workforce applicable to Angeles Link. Section 6.1 (Job Classifications) in the Workforce Study provides the potential workforce roles and outlines the possibility of separate job classifications for the natural gas and hydrogen gas systems. Certain tasks for hydrogen operations and natural gas operations may involve similar work and require similar training, skills, knowledge, and expertise. Additionally, as described in the Safety Study in Section (8.0 Specifications, Standards, & Procedures Evaluation), SoCalGas's Specifications, Standards, and Procedures (SSPs) are being reviewed and will be updated to incorporate requirements and procedures specific to tasks to operate and maintain a hydrogen pipeline system. In order to determine if the differences between the job functions would warrant separate job tasks, information will need to be collected on the knowledge and skills required for those tasks. As summarized in the Workforce and Safety Study, future assessments such as an operator qualifications gap analysis, a detailed procedures evaluation, systems/workflow

analysis and/or workforce capacity planning will support defining job duties and requirements in future phases of Angeles Link

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 5-6

IV. The Report Again Glosses Over Key Differences Between Hydrogen and Natural Gas

The Report continues the error made in the Safety Study concerning the lack of differentiation in federal safety regulations for natural gas pipelines and hydrogen pipelines. As we explained in our feedback to the Safety Study, FN17 CBE's communities have not been sufficiently protected by industry best practices, even when federal and state laws and regulations directly apply these practices. Chemical leaks, flaring, explosions, and spills are commonplace in communities like Wilmington despite safety regulations. These exposures impact workers, first responders, community members' health and well-being. Unnecessary risks which can be eliminated by new training, research, and updated operating practices must be to priority. Because hydrogen-specific standards are not directly incorporated into federal and state laws or regulations in all circumstances, only industry best practices provide for some, albeit insufficient, level of protection.

FN17 – CBE Feedback for Southern California Gas Company on the Plan for Applicable Safety

SOCALGAS RESPONSE TO COMMENT 5-6

SoCalGas recognizes the differences between operating a natural gas pipeline and hydrogen pipeline system and SoCalGas will continue to integrate safety features specific to hydrogen into Angeles Link planning and development as more information becomes available.

For additional response concerning SoCalGas's review of requirements, standards, and best practices applicable to hydrogen, please refer to Responses to Comments 3-1 and 3-7.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 5-7

In the Report, SoCalGas states: "Angeles Link and the natural gas infrastructure would both be governed by 49 CFR Part 192 with the same regulatory requirements." But the Report fails to mention the lack of differentiation in federal safety regulations for natural gas pipelines and hydrogen pipelines. SoCalGas then presents Table 5 (Pipeline and Compressor Station Requirements) to show that many subsections of 49 Code of Federal Regulations (CFR) 192 apply to both natural gas and hydrogen infrastructure. FN18 The table has 19 rows of CFR sections, and they all say "Yes" for applicability for natural gas and for hydrogen. Accordingly, the Report asserts that corrosion control, operating, and maintenance requirements for "natural gas infrastructure and Angeles Link may be similar." FN19 Even though the sentence before Table 5 is presented includes the caveat that "this is not an exhaustive list)," this table masks the potential need for differing regulatory standards for hydrogen versus natural gas because it draws support from existing federal standards that also fail to distinguish between the risks associated with hydrogen and natural gas. Thus, Table 5 presents information in a misleading manner.

A fairer version of Table 5 would include at least one, and preferably more, differences between hydrogen and natural gas. And if there truly are no applicability differences because current federal regulations do not specify differences between natural gas, hydrogen, or other gases, then SoCalGas should identify updated requirements which would more effectively protect the ALP workforce and the communities bearing impacts from the project.

FN18 – Report at 28.
FN19 – Id.

SOCALGAS RESPONSE TO COMMENT 5-7

As summarized in the Workforce Study, Section 5.2.2 (SoCalGas Pipeline Segment Example), Table 5 (Pipeline and Compressor Station Requirements) provides a summary of the applicable subparts of 49 CFR Part 192 related to corrosion control and operations and maintenance requirements that may be applicable to compressor stations and pipeline segments for hydrogen pipelines. Based on the requirements summarized in Table 5, the applicable provisions summarized from 49 CFR Part 192 provides an example of where the workforce skillsets for hydrogen pipeline operations and maintenance are not expected to differ significantly from natural gas pipelines and operations. However, SoCalGas recognizes several requirements and procedures that are specific to hydrogen will also apply to Angeles Link. Section 7.0 (Key Safety Codes) of the Safety Study provides further information on the federal, state requirements that may apply to Angeles Link, as well as a summary of industry standards that provide best practices that should be considered for hydrogen pipelines. In addition, Section 8.0 (Specifications, Standards, & Procedures Evaluation) of the Safety Study summarizes how SoCalGas is reviewing and will be updating its Specifications, Standards, and Procedures (SSPs) specifically for the operation and maintenance of a hydrogen pipeline system. SoCalGas will continue to integrate safety features specific to hydrogen into Angeles Link planning and development as more information becomes available.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 5-8

V. Conclusion

CBE appreciates the opportunity to provide feedback and urges SoCalGas to incorporate, in greater depth, workforce development and training needs, opportunities to partner more closely with unionize workers, and investigate worker and community safety response plans more expansively. The Report's conclusion section asserts: "SoCalGas is uniquely well-positioned to operate and maintain a clean renewable hydrogen pipeline system due to its vast experience operating and maintaining a highly developed gas transmission and distribution system, existing highly trained and qualified workforce, and comprehensive programs and procedures." FN20 CBE reiterates that the company has many long strides to make with respect to safety and basic hydrogen learning before making such claims in its report.

FN20 – *Id*. at 35.

SOCALGAS RESPONSE TO COMMENT 5-8

SoCalGas acknowledges this comment and the additional efforts that will take place in future phases of Angeles Link to develop a workforce that will safely operate and maintain a hydrogen pipeline system. For additional information related efforts to partner with industry groups to further develop a workforce trained in hydrogen pipelines, please refer to Response to Comment 5-4.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 5-9

CBE emphasizes, and echoes comments made in prior letters as well as in person at CBOSG and PAG meetings that the volume and speed at which report feedback is requested is vastly inappropriate for meaningful engagement and feedback on Phase 1 reports as is repeatedly emphasized in CPUC Decision 22-02-007.

SOCALGAS RESPONSE TO COMMENT 5-9

Please refer to Global Response 2.

Comment Letter 6 – Air Products

Comment Letter 6

August 2, 2024

VIA EMAIL TO
ALP1_PAG_FEEDBACK@INSIGNIAENV.COM

Emily Grant
Angeles Link Senior Public Affairs Manager
Southern California Gas Company
555 West Fifth Street
Los Angeles, CA 90013

Re: Angeles Link Planning Advisory Group (PAG) Feedback of Air Products and Chemicals Inc. on Water Resources Evaluation (July 2024 Draft)

Air Products and Chemicals, Inc. ("Air Products") submits the following feedback concerning the July 2024 draft Water Resources Evaluation ("Draft Water Evaluation").

Air Products expects that the below feedback will be addressed in the final Studies and in Southern California Gas Company's ("SoCalGas") quarterly reporting. Air Products also welcomes any response that SoCalGas may wish to provide to the comments below.

The Water Evaluation Fails to Focus on Relevant Production Areas

SoCalGas has identified the specific areas where it believes hydrogen production is likely to take place—primarily inland locations that are favorable for renewable energy, including Blythe, Lancaster and the San Joaquin Valley.[1] Yet the Draft Water Evaluation minimizes—indeed, effectively ignores—the challenges associated with water availability by focusing on water availability across the state, without any detailed evaluation of whether that water can economically be delivered to the production locations that it identified. The Draft Water Evaluation notes that the potential water sources identified are located far from the location of presumed production, including in coastal or urban areas throughout California.[2] And the Draft Water Evaluation acknowledges that "[l]ong pipelines may be needed to convey water from the coastal and urban areas to the production areas." There are a litany of challenges associated with construction of such pipelines, as the Draft Water Evaluation also acknowledges. The pipelines will be costly, will need to be permitted and sited through high population urban areas, and may have significant environmental impacts, including energy demand that may have impacts on greenhouse gas emissions, and energy costs that will further exacerbate the expense associated with delivering water to the production areas. Simply put, these challenges are likely to make access to a significant portion of the identified water sources uneconomic, unacceptable from an

Comment 06-01

[1] Production and Planning Assessment Study at ____; Water Evaluation at 4-12.
[2] Water Evaluation at 4-12.

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environmental impact perspective, or simply logistically infeasible. Yet the Draft Water Evaluation fails to comprehensively evaluate these challenges or make any determination as to whether identified water sources are actually viable water sources for hydrogen production, based on these factors.

The Draft Water Evaluation is therefore useless for determining whether water is actually economically available for hydrogen production in the areas where SoCalGas assumes hydrogen production would occur. The Draft Water Evaluation effectively acknowledges this issue when it states that "[p]rioritizing sources close the hydrogen production areas would mitigate construction and cost challenges associated with long conveyance requirements."[3] However, aside from the offhand comment, the Draft Water Evaluation fails to do exactly that—prioritize and analyze sources that can logistically and cost-effectively be transported to production areas.

The Draft Water Evaluation provides one other potential solution—stating that "[a]cquiring surface water through an exchange provides another opportunity to mitigate challenges associated with conveyance."[4] Yet, as with other conveyance approaches, the Draft Water Evaluation fails to provide any actual analysis of surface water exchange options that might be available. Factors impacting the availability of transfers and exchanges include the duration of the transfer or exchange, the type of water at issue, potential injury to other water rights holders, the anticipated environmental impacts, and whether State or Federal facilities are involved.

Comment 06-01

Finally, the Draft Water Evaluation identifies water supply challenges, including concentrate management, treatment issues, and supply reliability.[5] However, because the Draft Water Evaluation does not evaluate water availability as it relates to specific production areas, it is impossible to determine how and to what extent these water supply challenges will impact specific production areas. Again, a focus on production areas—rather than water supply statewide—is the appropriate approach. The Draft Water Evaluation's blithe assertion that the "[w]ater required for the portion of clean renewable hydrogen production that Angeles Link could transport is a small percentage… of California's total water usage each year"[6] misses the point. The issue is not what is used, or what might be available statewide. What the Draft Water Evaluation should actually evaluate is the extent to which sufficient water supply would be available for hydrogen production in SoCalGas's identified production areas.

The Draft Water Evaluation notes that "project-level analysis for specific proposed clean renewable hydrogen production projects would be speculative…, given the unknown variables associated with project-level analysis…"[7] However, that concern about the speculative nature of individual project should not preclude a more granular analysis of the specific production areas that SoCalGas has already identified. The Draft Water Evaluation's statewide approach, in

[3] *Id.*
[4] *Id.*
[5] *Id.* at 4-6.
[6] *Id.* at INTRO-i.
[7] *Id.* at 4-6.

contrast, makes it virtually useless for determining whether there is sufficient water to supply likely hydrogen production areas which the Angeles Link project proposes to serve.

Comment 06-01

Additional Data Issues with Draft Water Evaluation

Beyond its broad concern about the lack of granularity in the Draft Water Evaluation, Air Products has identified a number of concerns about the data provided in the Draft Water Evaluation, as explained in detail below.

Water Demand Figures

Air Products appreciates that that the Draft Water Evaluation, in response to Air Products' previous comments, attempts to distinguish between raw water demands and stoichiometric ultra pure water (UPW) needs.[8] However, there are still numerous instances throughout the Draft Water Evaluation where it is unclear whether water needs refer to UPW needs or raw water needs. Air Products suggests that the Draft Water Evaluation be revised to always default to raw water demand, where possible.

Comment 06-02

In Table 1.ES-1 at p. 1-2, the referenced annual water needs appear to be raw water demand. It appears that the Draft Water Evaluation is assuming approximately 65% recovery through water treatment systems to calculate raw water demand, but the assumption on recovery percentage through water treatment systems is not specified anywhere in the Draft Water Evaluation. Also, the annual water demand does not seem to account for cooling water needs for the electrolyzer and the hydrogen production facility. Air Products would expect cooling water needs to be roughly twice the UPW stochiometric flow demand.

Electrolyzer Feed Water Requirements

Table 3-4 purports to list the "Water Quality Requirements for Electrolyzer Supplier's Polishing Treatment System." It is unclear whether these are suggested requirements for RO or EDI. RO membrane manufacturers typically do not specify limits for TDS or total silica, and the listed figures appear low for RO membranes. However, the listed requirements appear higher than typical feedwater limits for an EDI system.

Table 3-4 is also inconsistent with the feedwater requirements cited in Chapter 2 at p. 2-2 (water conductivity of <0.2 µS/cm and <5 µS/cm for PEM and alkaline electrolyzers, respectively).

Chapter 3 also refers to RO and EDI treatment as polishing steps, while Chapter 2 (p. 2-3) refers to the polishing step as post-RO treatment. Feed water requirements at the post-RO stage are significantly tighter than the figures specified in Table 3-4.

Also, at p. 3-11, the Draft Water Evaluation states that "anticipated TDS and TOC concentrations for all potential supply types identified in Chapter 1: Water Availability Study

Comment 06-03

[8] *Id.* at INTRO-iii.

(Rincon 2024) exceed these limits [in Table 3-4], with the exception of surface water sources and urban stormwater capture and reuse (refer to Table 3-3). Consequently, pretreatment by RO will be required for those remaining eight supply sources." However, as referenced in note [a] to Table 3-3, surface water sources other than SWP Water-Lake Perris Outlet may have TDS levels higher than 350 mg/l, and therefore also require pretreatment by RO.

The Draft Water Evaluation also estimates a water recovery of 98% is achievable for treatment of SWP.[9] This seems unrealistic in Air Products' experience. The Draft Water Evaluation also claims that the water recovery rate for the UF would 98%, assuming that the clarified backwash water return will be transferred back to the UF feed.[10] It is Air Products' understanding that this is not possible given the high levels of coagulant and polymer in these waste streams. Please provide a further explanation as to why SoCalGas believes these water recovery rates are realistic.

Comment 06-03

Wastewater Treatment

Section 6 presents planning-level cost estimates for two options for concentrate management to provide a range of potential costs for potential third-party production projects. The two options presented are discharge to existing brine disposal facilities, or the construction of onsite evaporation ponds.[11] Regardless of feed water resource type, all treatment facilities are expected to produce continuous wastewater discharge. This section fails to provide a detailed analysis on approaches to comply with wastewater discharge limits and challenges associated with obtaining discharge permits in the regions where production is anticipated to occur. It will be critical for production to identify a workable wastewater discharge strategy.

Comment 06-04

Conclusion

Air Products appreciates the opportunity to provide this feedback concerning the July 2024 Draft Water Evaluation.

[9] *Id.* at Section 5.1.1 at p. 3-13.
[10] *Id.* at Section 5.2.1 at p. 3-14.
[11] *Id.* at Section 6 at p. 3-24.

Respectfully,

Miles Heller Director, Global Greenhouse Gas,
Hydrogen, and Utility Regulatory Policy

AIR PRODUCTS COMMENT 6-1

Air Products and Chemicals, Inc. ("Air Products") submits the following feedback concerning the July 2024 draft Water Resources Evaluation ("Draft Water Evaluation").

Air Products expects that the below feedback will be addressed in the final Studies and in Southern California Gas Company's ("SoCalGas") quarterly reporting. Air Products also welcomes any response that SoCalGas may wish to provide to the comments below.

The Water Evaluation Fails to Focus on Relevant Production Areas

SoCalGas has identified the specific areas where it believes hydrogen production is likely to take place—primarily inland locations that are favorable for renewable energy, including Blythe, Lancaster and the San Joaquin Valley. FN1 Yet the Draft Water Evaluation minimizes—indeed, effectively ignores—the challenges associated with water availability by focusing on water availability across the state, without any detailed evaluation of whether that water can economically be delivered to the production locations that it identified. The Draft Water Evaluation notes that the potential water sources identified are located far from the location of presumed production, including in coastal or urban areas throughout California. FN2 And the Draft Water Evaluation acknowledges that "[l]ong pipelines may be needed to convey water from the coastal and urban areas to the production areas." There are a litany of challenges associated with construction of such pipelines, as the Draft Water Evaluation also acknowledges. The pipelines will be costly, will need to be permitted and sited through high population urban areas, and may have significant environmental impacts, including energy demand that may have impacts on greenhouse gas emissions, and energy costs that will further exacerbate the expense associated with delivering water to the production areas. Simply put, these challenges are likely to make access to a significant portion of the identified water sources uneconomic, unacceptable from an environmental impact perspective, or simply logistically infeasible. Yet the Draft Water Evaluation fails to comprehensively evaluate these challenges or make any determination as to whether identified water sources are actually viable water sources for hydrogen production, based on these factors.

The Draft Water Evaluation is therefore useless for determining whether water is actually economically available for hydrogen production in the areas where SoCalGas assumes hydrogen production would occur. The Draft Water Evaluation effectively acknowledges this issue when it states that "[p]rioritizing sources close the hydrogen production areas would mitigate construction and cost challenges associated with long conveyance requirements." FN3 However, aside from the offhand comment, the Draft Water Evaluation fails to do exactly that—prioritize and analyze sources that can logistically and cost-effectively be transported to production areas.

The Draft Water Evaluation provides one other potential solution—stating that "[a]cquiring surface water through an exchange provides another opportunity to mitigate challenges associated with conveyance." FN4 Yet, as with other conveyance approaches, the Draft Water Evaluation fails to provide any actual analysis of surface water exchange options that might be available. Factors impacting the availability of transfers and exchanges include the duration of the transfer or exchange, the type of water at issue, potential injury to other water rights holders, the anticipated environmental impacts, and whether State or Federal facilities are involved.

Finally, the Draft Water Evaluation identifies water supply challenges, including concentrate management, treatment issues, and supply reliability. FN5 However, because the Draft Water Evaluation does not evaluate water availability as it relates to specific production areas, it is impossible to determine

how and to what extent these water supply challenges will impact specific production areas. Again, a focus on production areas—rather than water supply statewide—is the appropriate approach. The Draft Water Evaluation's blithe assertion that the "[w]ater required for the portion of clean renewable hydrogen production that Angeles Link could transport is a small percentage… of California's total water usage each year" FN6 misses the point. The issue is not what is used, or what might be available statewide. What the Draft Water Evaluation should actually evaluate is the extent to which sufficient water supply would be available for hydrogen production in SoCalGas's identified production areas.

The Draft Water Evaluation notes that "project-level analysis for specific proposed clean renewable hydrogen production projects would be speculative…, given the unknown variables associated with project-level analysis" FN7 However, that concern about the speculative nature of individual project should not preclude a more granular analysis of the specific production areas that SoCalGas has already identified. The Draft Water Evaluation's statewide approach, in contrast, makes it virtually useless for determining whether there is sufficient water to supply likely hydrogen production areas which the Angeles Link project proposes to serve.

FN1 – Production and Planning Assessment Study at ____; Water Evaluation at 4-12.
FN2 – Water Evaluation at 4-12.
FN3 – Id.
FN4 – Id.
FN5 – Id. At 4-6.
FN6 – Id. At INTRO-i.
FN7 – Id. At 4-6.

SOCALGAS RESPONSE TO COMMENT 6-1

Please refer to Global Response 1.

AIR PRODUCTS COMMENT 6-2

Additional Data Issues with Draft Water Evaluation

Beyond its broad concern about the lack of granularity in the Draft Water Evaluation, Air Products has identified a number of concerns about the data provided in the Draft Water Evaluation, as explained in detail below.

Water Demand Figures

Air Products appreciates that that the Draft Water Evaluation, in response to Air Products' previous comments, attempts to distinguish between raw water demands and stoichiometric ultra pure water (UPW) needs. FN8 However, there are still numerous instances throughout the Draft Water Evaluation where it is unclear whether water needs refer to UPW needs or raw water needs. Air Products suggests that the Draft Water Evaluation be revised to always default to raw water demand, where possible.

In Table 1.ES-1 at p. 1-2, the referenced annual water needs appear to be raw water demand. It appears that the Draft Water Evaluation is assuming approximately 65% recovery through water treatment systems to calculate raw water demand, but the assumption on recovery percentage through water treatment systems is not specified anywhere in the Draft Water Evaluation. Also, the annual water demand does not seem to account for cooling water needs for the electrolyzer and the hydrogen production facility. Air Products would expect cooling water needs to be roughly twice the UPW stochiometric flow demand.

FN8 – Id. at INTRO-iii.

SOCALGAS RESPONSE TO COMMENT 6-2

In response to the comment concerning clarification when estimated water demands refer to raw water needs as compared to ultra pure water needs, the water demands presented in Table 1 in the Executive Summary of the draft Water Evaluation are estimates of the water demands needed for (i) water pretreatment; (ii) electrolyzer production, and (iii) electrolyzer cooling. Two components of that water demand include a level of treatment—(i) the water pretreatment and (ii) the electrolyzer production. The water pretreatment demands encompass the average recovery rate through water pretreatment across the ten potential water sources identified in Chapter 1 of the Water Evaluation. The electrolyzer production demand component also encompasses a degree of treatment that occurs for treated water to be fed into the electrolyzer. The estimates in Table 1 in the Executive Summary therefore encompass the average amount of water needed across the ten potential water sources identified for third-party clean renewable hydrogen production, representing on average the volume of water that would be needed for the pretreatment, electrolyzer, and electrolyzer cooling stages of the production combined. For clarification, explanatory footnotes (FNs) will be added to the final Water Evaluation, where applicable, stating that the water demands encompass water demands for electrolyzers, electrolyzer cooling, and water pretreatment.

In response to the comment concerning the assumption of the 65% recovery through water treatment systems to calculate raw water demand, it is unclear where the Water Evaluation refers to a 65% recovery rate. Chapter 3 of the Water Evaluation – Water Acquisition and Purification Costs, Section 5

(Treatment Process and Costs) provides a summary of the treated water recovery rate for each of the ten potential water sources identified in the Water Evaluation. For example, Section 5.1 in Chapter 3 describes the treatment process for the source of imported surface water and states that a water recovery rate of 98% is estimated to be achievable using the treatment processes described therein. For the portfolio of sources and treatment processes considered for this study as summarized in Section 5 of Chapter 3, the average water recovery for pretreatment was estimated to be approximately 87 percent. (Refer to Chapter 3, Section 10.1.3.)

In response to the comment concerning whether the water demand estimates account for cooling needs of the electrolyzer, the demand estimates include the water demands for electrolyzer cooling. Please refer to Chapter 3 of the Water Evaluation, Section 10 - Estimates of Overall Water Demands and Water Supply Costs, for a summary of the water demand estimates, including the cooling water needs for the electrolyzers (refer to Section 10.1.2).

In response to the comment concerning water needs at the hydrogen production facility, the water estimates do not include potential water use at the production facility outside of the electrolyzer process. That analysis was outside of the scope of the Water Evaluation and would be conducted at a granular level by the third-party producers when details of such projects are further developed.

AIR PRODUCTS COMMENT 6-3

Electrolyzer Feed Water Requirements

Table 3-4 purports to list the "Water Quality Requirements for Electrolyzer Supplier's Polishing Treatment System." It is unclear whether these are suggested requirements for RO or EDI. RO membrane manufacturers typically do not specify limits for TDS or total silica, and the listed figures appear low for RO membranes. However, the listed requirements appear higher than typical feedwater limits for an EDI system.

Table 3-4 is also inconsistent with the feedwater requirements cited in Chapter 2 at p. 2-2 (water conductivity of <0.2 µS/cm and <5 µS/cm for PEM and alkaline electrolyzers, respectively).

Chapter 3 also refers to RO and EDI treatment as polishing steps, while Chapter 2 (p. 2-3) refers to the polishing step as post-RO treatment. Feed water requirements at the post-RO stage are significantly tighter than the figures specified in Table 3-4.

Also, at p. 3-11, the Draft Water Evaluation states that "anticipated TDS and TOC concentrations for all potential supply types identified in Chapter 1: Water Availability Study (Rincon 2024) exceed these limits [in Table 3-4], with the exception of surface water sources and urban stormwater capture and reuse (refer to Table 3-3). Consequently, pretreatment by RO will be required for those remaining eight supply sources." However, as referenced in note [a] to Table 3-3, surface water sources other than SWP Water-Lake Perris Outlet may have TDS levels higher than 350 mg/l, and therefore also require pretreatment by RO.

The Draft Water Evaluation also estimates a water recovery of 98% is achievable for treatment of SWP. FN9 This seems unrealistic in Air Products' experience. The Draft Water Evaluation also claims that the water recovery rate for the UF would 98%, assuming that the clarified backwash water return will be transferred back to the UF feed. FN10 It is Air Products' understanding that this is not possible given the high levels of coagulant and polymer in these waste streams. Please provide a further explanation as to why SoCalGas believes these water recovery rates are realistic.

FN9 – Id. at Section 5.1.1 at p. 3-13.
FN10 – Id. at Section 5.2.1 at p. 3-14.

SOCALGAS RESPONSE TO COMMENT 6-3

The first part of this comment states it is unclear whether Table 3-4 ("Water Quality Requirements for Electrolyzer Supplier's Polishing Treatment System") in Chapter 3 of the Water Evaluation provides requirements for reverse osmosis (RO) or electrodialysis (EDI) and states the listed requirements appear lower than limits for typical RO systems but higher than limits for typical EDI systems. Commercial electrolyzer systems typically incorporate manufacturer-specific, polishing treatment systems for feed water that consist of a combination of RO and EDI. In Chapter 3, the RO and EDI treatment steps that are components of commercial electrolyzer systems are referred to as "polishing" treatment steps. Table 3-4 does not summarize feed requirements for a separate RO treatment system or an EDI system. Rather, this table provides an example of the requirements for the polishing treatment systems that consist of a combination of RO and EDI that may be included with commercial electrolyzers.

Accordingly, the requirements in Table 3-4 do not represent requirements of either an RO or EDI system, but rather the requirements of the particular polishing system from a particular manufacturer that may consist of a combination of RO and EDI. As described in the draft Water Evaluation, Chapter 3, (Section 4.1 Requirements for Hydrogen Production Electrolyzers), Table 3-4 summarizes the specific water quality requirements for the polishing systems that are included with electrolyzers manufactured by Nel Hydrogen. The requirements provided in Table 3-4 are intended to provide a representative example of requirements that may be required to feed electrolyzers for clean renewable hydrogen production for the informational purposes of the feasibility study.

The second part of this comment states that Table 3-4 is inconsistent with the feedwater requirements cited in Chapter 2 (<0.2 µS/cm and <5 µS/cm for PEM and alkaline electrolyzers, respectively). The water quality limits described in Table 3-4 (Chapter 3, Section 4.1 Requirements for Hydrogen Production Electrolyzers) and Chapter 2 (Section 2 Electrolyzer Water Quality Specifications) summarize requirements for different stages of treatment. The information presented in Table 3-4 is an example of the requirements for the influent to the polishing treatment systems that are included with commercial electrolyzers. As discussed further in Chapter 3 of the Water Evaluation (Section 5), pretreatment of the raw water supply could achieve these limits to feed water into the electrolyzer polishing system. In contrast, the water quality requirements discussed in Chapter 2 (Section 2 Electrolyzer Water Quality Specifications) are the requirements for electrolyzer feed water, *after* polishing treatment, for several types of electrolyzers.

The third part of this comment states Chapter 3 refers to RO and EDI treatment as polishing steps, while Chapter 2 refers to the polishing step as a post-RO treatment and that feed requirements at the post-RO stage are tighter than the requirements presented in Table 3-4. As described further above, Chapter 3's references to the "polishing" system refers to the RO and EDI treatment steps that are components of electrolyzer systems. Chapter 2 provides the requirements for the electrolyzer feed water after the polishing treatment. This treatment after the polishing stage is referred to as a post-RO treatment and is an EDI step.

The fourth part of this comment states that surface water sources other than State Water Project Water-Lake Perris Outlet may have TDS concentrations greater than 350 mg/l and therefore may require pretreatment by RO, while other parts of the Chapter refer to surface water generally not exceeding the TDS concentrations. As highlighted in this comment and in note [a] to Table 3-3 in Chapter 3, the Water Evaluation acknowledges pretreatment would be required for surface water sources that have TDS concentrations greater than 350 mg/L. The cost estimates in Chapter 3 reflect a representative estimate if surface water used for clean renewable hydrogen did not require RO pretreatment. However, the Chapter states that RO pretreatment may be required, depending on the source of surface water. If pretreatment were required, the estimated costs for pretreatment and concentrate management for surface water would be larger than those presented in Chapter 3, using the same cost assumptions. Based on the cost ranges presented and assumptions applicable to that potential treatment, the overall project costs would likely be within the range of costs presented in Chapter 3 for the 10 source types if RO pretreatment were required.

The last part of this comment requests additional explanation as to why a water recovery rate of 98% for State Water Project (SWP) water may be achievable. Recognizing that water is a limited resource, when developing the conceptual treatment processes, the Water Evaluation assumed treatment strategies that would maximize water recovery and minimize liquid discharge. SoCalGas acknowledges that attaining 98% water recovery for ultrafiltration (UF) may be challenging. The Water Evaluation assumes a robust and optimized solid removal process would be used to treat the UF backwash in order

to achieve such high recovery. The optimization would involve evaluation to determine the optimal coagulant and/or polymer type and dosage based on the water characteristics as well as the solid separation technology used. The Water Evaluation assumes that plate settlers would be used along with optimization of coagulant and/or polymer selection and dosage to achieve that level of recovery for treating SWP water. The assumption of 98% water recovery for UF when treating SWP water is reasonable because such systems have been designed and are operational, such as a large-scale zero liquid discharge drinking water treatment plant in Southern California that treats surface water using UF with a recovery of approximately 99%.

AIR PRODUCTS COMMENT 6-4

Wastewater Treatment

Section 6 presents planning-level cost estimates for two options for concentrate management to provide a range of potential costs for potential third-party production projects. The two options presented are discharge to existing brine disposal facilities, or the construction of onsite evaporation ponds. FN11 Regardless of feed water resource type, all treatment facilities are expected to produce continuous wastewater discharge. This section fails to provide a detailed analysis on approaches to comply with wastewater discharge limits and challenges associated with obtaining discharge permits in the regions where production is anticipated to occur. It will be critical for production to identify a workable wastewater discharge strategy.

Conclusion

Air Products appreciates the opportunity to provide this feedback concerning the July 2024 Draft Water Evaluation.

FN11 – Id. at Section 6 at p. 3-24.

SOCALGAS RESPONSE TO COMMENT 6-4

Section 6 of Chapter 3 of the Water Evaluation presents estimated costs for the two concentrate management options described in the comment above. While SoCalGas recognizes that obtaining discharge permits from the appropriate Regional Water Quality Control Board may be a potential challenge for a third-party production facility, identifying wastewater discharge permitting strategies is beyond the scope of work for this feasibility study and would be pursued further by third-party producers of the clean renewable hydrogen.

Comment Letter 7 – Communities for a Better Environment

Comment Letter 7

COMMUNITIES FOR A BETTER ENVIRONMENT established 1978

August 2, 2024

Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com.

Feedback for Southern California Gas Company on Water Resources Evaluation Draft Report

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Water Resource Evaluation Draft Report (Water Report) provided on July 5, 2024. This letter raises concerns regarding the scope of the water report and significant omissions that the final report must remedy. The following sections, addressed at length below, outline CBE's concerns across the five chapters of the Water Report:

I. Water Source Feasibility Concerns
II. Geographic Scope, Acquisition, and Treatment Feasibility Concerns
III. Failure to Include Community Concerns in Feasibility Analysis
IV. Inadequate Greenhouse Gas Emissions Analysis

Echoing the Equity Principles for Hydrogen,[1] CBE emphasizes the importance of environmental justice protections related to water use and treatment to mitigate the negative impacts of hydrogen projects on California's already stretched water supply. Foundational environmental justice protections include requirements that water sources are surplus and not diverted from sources which serve jurisdictions that are struggling or failing to meet clean drinking water needs, nor can the water source be potable water when drinking water needs are not met.

Comment 07-01

I. Water Source Feasibility Concerns

Water Report chapter one on availability identifies ten sources of water as feasible for hydrogen production in service of the Angeles Link Project based on a flawed set of criteria that fail to account for water treatment, and acquisition. While treatment and acquisition are separately addressed in Chapters two and three respectively, their assessment does not affect the Report's presumption of feasibility based on availability alone. For example, some sources, such as imported surface water have been fully allocated and are only accessible via exchange agreements. Whereas other sources such as dry weather flows, urban stormwater capture and reuse, and oil and gas industry water are ephemeral, inconsistent sources that exist dependent on

[1] CBE et al., Environmental Justice Position on Green Hydrogen in California, Equity Principles for Hydrogen (2023).

1

specific weather or market conditions. Finally, sources such as agricultural industry water, brine line flows, advanced water treatment concentrate, and oil and gas industry water will require significant, costly treatment to reach the level of purity required to be used in electrolysis. While these topics are addressed elsewhere in the report, they are not adequately expressed in terms of feasibility.

Exploring this further, CBE raises the following concerns regarding the feasibility of the most alarming water sources:

- **Imported surface water is already allocated.** CBE is concerned with the lack of analysis regarding the feasibility of acquiring land rights to acquire water rights as well as the feasibility of coming to exchange agreements on already fully allocated State Water Project, Colorado River, and Central Valley Project.
- **There are significant groundwater management concerns across Southern California**. While the Water Report assumes that over drafted groundwater was unavailable, it fails to provide sufficient analysis on the extent of water management impacts on groundwater availability. For example, the State Water Resources Control Board is holding hearings regarding major concerns with local groundwater management plans and critical overdraft in Kern County of the San Joaquin Valley, where a potential production site is to be located.[2]
- **Oil and Gas Industry Water is not a viable source of water.** As the Water Report itself states, the oil and gas industry is expected to decline in coming years. However, this fact is not adequately addressed in the feasibility consideration of oil and gas industry water for hydrogen production. A concerning result of this relationship would be hydrogen producers scrambling to find higher cost, less conflict vetted water sources when oil refineries go offline and are no longer able to fulfill hydrogen producers' contracts for water supply.

Comment 07-01

II. Geographic Scope, Acquisition, and Treatment Feasibility Concerns

All the Water Report's chapters use a wide geographic boundary inspired by SoCalGas's service territory covering almost the entirety of Southern California. This far-reaching scope completely fails to contextualize availability, acquisition, and treatment of water sources in the areas SoCalGas has identified as potential production sites, the San Joaquin Valley, Lancaster, and Blythe – all notably water strapped communities. While Chapter four titled "Challenges and Opportunities" identifies geographic location and distance to hydrogen production as key topics of assessment, these concerns are not addressed in terms of feasibility. Concerningly, Chapter 3 cost calculations even assume that water will be transported only 25 miles on average to treatment facilities. The Report thereby fails to provide any analysis realistically rooted in how identified water sources from this entire region will arrive and be treated in the San Joaquin Valley, Lancaster, and Blythe. These challenges are generically described and should be better defined in relation to the three identified production facilities and included in feasibility analyses.

Comment 07-02

[2] State Water Resources Control Board, Kern County Subbasin Probationary Hearing Draft Staff Report (2024).

Chapters two and three of the Water Report provide insight into the specific demands of the ALP. SoCalGas' "moderate" demand scenario, places ALP hydrogen demand at 1 million metric tons of hydrogen per year, or 1 billion kilograms requiring 11,000 acre-feet of water per year[3] or 13,568,300,000 (13.57 billion) liters per year. In other words, the Report estimates a water consumption rate of 13.6 kg of water per kg of hydrogen. To purify this water, the report estimates an average cost of $8,124 per million gallons or between $436 million and $1.3 billion (including facilities over 30 years). This average estimate, while useful, leaves significant margins if any assumptions prove underestimates. Studies show that electrolysis can consume between 9 (the stoichiometric water demand) and 30kg of water per kg of hydrogen. In addition, the Report's cost estimates exclude permitting, engineering, water transportation costs beyond 25 miles, and land costs; and explain that water purification cost is *heavily* dependent on purification demands leaving significant (billion-dollar) wiggle room in the presented estimates.

Comment 07-03

CBE is also concerned about unanswered questions around wastewater concentrate. The Report outlines that electrolysis will produce approximately half a billion of gallons of concentrated wastewater each year that must be either treated at new or existing wastewater treatment facilities or disposed of via evaporation ponds that would be collocated, or near treatment and electrolysis facilities. Long-term storage of wastewater concentrate in evaporation ponds will introduce an additional source of pollution risk into any communities, or groundwater supplies located near the water treatment facility. While treatment at capable treatment facilities is both cheaper than evaporation and could potentially reduce the risk of groundwater contamination, the report does not delve into this solution or fully discuss water treatment facility options.

Comment 07-04

III. Community Needs and Concerns Were not Included in Feasibility Analysis

The Water Report' stated feasibility criteria imply that the authors determined whether the use of a specific water source "would conflict with existing or anticipated water needs." However, the details of this analysis are not provided. Information regarding conflicts with existing and anticipated water needs is essential for drought stricken and water strapped communities to be fully informed of the impact of hydrogen production. The volumes of water, and scale of new-built water infrastructure contemplated by the report would significantly alter the landscape of each proposed production community. However, they are not consistently provided in the report. Without this information affected communities cannot provide informed consent or meaningful feedback. To remedy this, the Water Report should be amended to include a comprehensive chart that delineates, for each source, the amount of untreated water available, the estimated throughput of water from treatment, and resulting amount of treated water available for electrolysis.

Comment 07-05

IV. Inadequate Greenhouse Gas Emissions Analysis

Comment 07-06

[3] A significant increase over current consumption in communities SoCalGas taps for possible production facilities. City of Blythe, General Plan Water Supply Assessment, at 3 August 31, 2006 https://www.cityofblythe.ca.gov/DocumentCenter/View/279/Water-Supply-Assessment---General-Plan-20061011?bidId=; City of Lancaster, General Plan 2030 Master Environmental Assessment, at10.1-11, April 2009, https://www.cityoflancasterca.org/home/showpublisheddocument/11352/635775792210230000.

CBE stresses the importance of gathering high quality greenhouse gas (GHG) emissions data as soon as possible. The Report states that a "detailed, quantified analysis of potential GHG emissions associated with water conveyance and treatment is outside the scope of the WRE."[4] While we recognize Phase One feasibility studies are preliminary in nature, detailed analysis is essential to determining whether Angeles Link will indeed transport the "clean renewable hydrogen" SoCalGas has repeatedly promised to support throughout this process. Regarding third-party hydrogen production, this chapter of the Report notes:

> SoCalGas anticipates clean renewable production projects would undergo a thorough environmental review under the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA), as applicable . . . That environmental review would likely include an analysis of potential GHG emissions associated with development of those projects.[5]

SoCalGas must carefully examine all environmental impacts of the ALP. The ALP has made many broad claims as to air quality and general environmental impacts of the project. Without a clear study of these impacts, it will not be possible to determine critical opportunities for mitigation, assess project alternatives, or analyze how the ALP will really impact environmental justice communities. In the absence of such analysis, SoCalGas statements about green hydrogen or "clean renewable hydrogen" are, at best, wishful thinking.

Finally, in addition to examining GHG emissions, SoCalGas should also evaluate other criteria pollutants associated with water treatment and conveyance.

Comment 07-06

V. Conclusion

CBE appreciates the opportunity to provide feedback. However, SoCalGas has chosen not to pursue representation of the communities along the ALP route and in areas they view as potential hydrogen production zones in Phase 1. To the extent that the Water Report speaks to environmental impacts in those communities, the voices of community members not represented in the ALP process at this time cannot be ignored. This feasibility study alone illustrates the significant challenges that water availability adds to the development of such extensive hydrogen infrastructure in Southern California. When looked at in the context of the released and forthcoming feasibility studies, it is essential that the significant challenges to hydrogen, and strategies to address these challenges need to be elucidated so that the communities this infrastructure will most impact can position themselves to be a meaningful part of the conversation. Both the report itself, and the ALP Phase 1 process fall short in this regard.

Comment 07-07

CBE emphasizes, and echoes comments made in prior letters as well as in person at CBOSG and PAG meetings that the volume and speed at which report feedback is requested is vastly inappropriate for meaningful engagement and feedback on Phase 1 reports as is repeatedly emphasized in CPUC Decision 22-02-007.

Comment 07-08

[4] Water Report at 5-1.
[5] Id.

Respectfully Submitted.

Lauren Gallagher
Jay Parepally
Theo Caretto
Communities for a Better Environment

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group
Angeles Link PAG Service List

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 7-1

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Water Resource Evaluation Draft Report (Water Report) provided on July 5, 2024. This letter raises concerns regarding the scope of the water report and significant omissions that the final report must remedy. The following sections, addressed at length below, outline CBE's concerns across the five chapters of the Water Report:

I. Water Source Feasibility Concerns
II. Geographic Scope, Acquisition, and Treatment Feasibility Concerns
III. Failure to Include Community Concerns in Feasibility Analysis
IV. Inadequate Greenhouse Gas Emissions Analysis

Echoing the Equity Principles for Hydrogen, FN1 CBE emphasizes the importance of environmental justice protections related to water use and treatment to mitigate the negative impacts of hydrogen projects on California's already stretched water supply. Foundational environmental justice protections include requirements that water sources are surplus and not diverted from sources which serve jurisdictions that are struggling or failing to meet clean drinking water needs, nor can the water source be potable water when drinking water needs are not met.

I. Water Source Feasibility Concerns

Water Report chapter one on availability identifies ten sources of water as feasible for hydrogen production in service of the Angeles Link Project based on a flawed set of criteria that fail to account for water treatment, and acquisition. While treatment and acquisition are separately addressed in Chapters two and three respectively, their assessment does not affect the Report's presumption of feasibility based on availability alone. For example, some sources, such as imported surface water have been fully allocated and are only accessible via exchange agreements. Whereas other sources such as dry weather flows, urban stormwater capture and reuse, and oil and gas industry water are ephemeral, inconsistent sources that exist dependent on specific weather or market conditions. Finally, sources such as agricultural industry water, brine line flows, advanced water treatment concentrate, and oil and gas industry water will require significant, costly treatment to reach the level of purity required to be used in electrolysis. While these topics are addressed elsewhere in the report, they are not adequately expressed in terms of feasibility.

Exploring this further, CBE raises the following concerns regarding the feasibility of the most alarming water sources:

- Imported surface water is already allocated. CBE is concerned with the lack of analysis regarding the feasibility of acquiring land rights to acquire water rights as well as the feasibility of coming to exchange agreements on already fully allocated State Water Project, Colorado River, and Central Valley Project.

- There are significant groundwater management concerns across Southern California. While the Water Report assumes that over drafted groundwater was unavailable, it fails to provide sufficient analysis on the extent of water management impacts on groundwater availability. For example, the State Water Resources Control Board is holding hearings regarding major concerns

with local groundwater management plans and critical overdraft in Kern County of the San Joaquin Valley, where a potential production site is to be located. FN2

- Oil and Gas Industry Water is not a viable source of water. As the Water Report itself states, the oil and gas industry is expected to decline in coming years. However, this fact is not adequately addressed in the feasibility consideration of oil and gas industry water for hydrogen production. A concerning result of this relationship would be hydrogen producers scrambling to find higher cost, less conflict vetted water sources when oil refineries go offline and are no longer able to fulfill hydrogen producers' contracts for water supply.

FN1 – CBE et al., Environmental Justice Position on Green Hydrogen in California, Equity Principles for Hydrogen (2023).

FN2 – State Water Resources Control Board, Kern County Subbasin Probationary Hearing Draft Staff Report (2024).

SOCALGAS RESPONSE TO COMMENT 7-1

SoCalGas recognizes the importance of environmental justice concerns related to water use and treatment. SoCalGas also acknowledges the concerns raised about the feasibility of water sources, including the need for significant treatment and the potential challenges associated with acquisition. However, SoCalGas will not be producing clean renewable hydrogen as part of Angeles Link. When specific production projects are proposed, it is anticipated that third-party clean renewable hydrogen production projects would undergo thorough environmental review, including a review of potential impacts associated with water supply development, pursuant to the CEQA and/or the NEPA, as appliable, at the time such projects are proposed. As a component of the CEQA/NEPA analysis, local community impacts would be evaluated through several resource areas, including, but not limited to, hydrology and water quality, land use and planning, and biological resources.

In response to the concerns about feasibility of water supplies for clean renewable hydrogen production, the potential water sources identified in Chapter 1 of the Water Evaluation and highlighted in this comment are intended to provide the potential menu of water sources third-party producers may pursue. Third-party producers would conduct assessments to acquire feasible water supplies for production projects on a case-by-case basis once details of those production projects develop further. Overall, the volume of water needed for third-party clean renewable hydrogen producers to produce the quantity of clean renewable hydrogen to meet 2045 demand across SoCalGas's service territory comprises a small percentage (0.02 to 0.10 percent) of total annual applied water in California for urban (M&I), agricultural, and environmental purposes. For additional information related to the assessments related to water resources third-party production projects would undertake and the general management of water resources in the state, please refer to Global Response 1.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 7-2

II. Geographic Scope, Acquisition, and Treatment Feasibility Concerns

All the Water Report's chapters use a wide geographic boundary inspired by SoCalGas's service territory covering almost the entirety of Southern California. This far-reaching scope completely fails to contextualize availability, acquisition, and treatment of water sources in the areas SoCalGas has identified as potential production sites, the San Joaquin Valley, Lancaster, and Blythe – all notably water strapped communities. While Chapter four titled "Challenges and Opportunities" identifies geographic location and distance to hydrogen production as key topics of assessment, these concerns are not addressed in terms of feasibility. Concerningly, Chapter 3 cost calculations even assume that water will be transported only 25 miles on average to treatment facilities. The Report thereby fails to provide any analysis realistically rooted in how identified water sources from this entire region will arrive and be treated in the San Joaquin Valley, Lancaster, and Blythe. These challenges are generically described and should be better defined in relation to the three identified production facilities and included in feasibility analyses.

SOCALGAS RESPONSE TO COMMENT 7-2

In response to the portions of this comment concerning the geographic scope of the potential water sources identified in Chapter 1 that third-party clean renewable hydrogen producers may pursue, please refer to Global Response 1 above. Local water supply availability is also addressed in Q1 2024 Quarterly Report Global Response 5 - Water Availability, Local Community Impacts and Affordability.

In response to the comment that the Chapter 3 cost calculations assume water will be transported only 25 miles on average to treatment facilities, the assumption of conveying water 25 miles was an assumption used to develop a unit cost for conveyance on a per mile basis. As described in Chapter 3, Section 7.1 (Key Assumptions) the distance of 25 miles was used only as a distance to develop the unit cost. Actual water conveyance costs for third-party producers would be based on the real distance between the water source and production facility once details of particular third-party production projects are proposed.

In response to the comment concerning the Water Evaluation further evaluating the challenges to convey water to and treat water in potential clean renewable hydrogen production areas, the Water Evaluation recognizes the associated potential challenges but also acknowledges these challenges would be evaluated further at a more granular level by the third parties proposing the particular production projects. SoCalGas recognizes the importance of third-party producers conducting feasibility analyses that are specific to the identified production sites. However, based on the level of detail known about third-party hydrogen production, the scope of the Water Evaluation aligns with the appropriate level of feasibility analysis.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 7-3

Chapters two and three of the Water Report provide insight into the specific demands of the ALP. SoCalGas' "moderate" demand scenario, places ALP hydrogen demand at 1 million metric tons of hydrogen per year, or 1 billion kilograms requiring 11,000 acre-feet of water per year FN3 or 13,568,300,000 (13.57 billion) liters per year. In other words, the Report estimates a water consumption rate of 13.6 kg of water per kg of hydrogen. To purify this water, the report estimates an average cost of $8,124 per million gallons or between $436 million and $1.3 billion (including facilities over 30 years). This average estimate, while useful, leaves significant margins if any assumptions prove underestimates. Studies show that electrolysis can consume between 9 (the stoichiometric water demand) and 30kg of water per kg of hydrogen. In addition, the Report's cost estimates exclude permitting, engineering, water transportation costs beyond 25 miles, and land costs; and explain that water purification cost is heavily dependent on purification demands leaving significant (billion-dollar) wiggle room in the presented estimates.

FN3 – A significant increase over current consumption in communities SoCalGas taps for possible production facilities. City of Blythe, General Plan Water Supply Assessment, at 3 August 31, 2006 https://www.cityofblythe.ca.gov/DocumentCenter/View/279/Water-Supply-Assessment---General-Plan20061011?bidId=; City of Lancaster, General Plan 2030 Master Environmental Assessment, at 10.1-11, April 2009, https://www.cityoflancasterca.org/home/showpublisheddocument/11352/635775792210230000.

SOCALGAS RESPONSE TO COMMENT 7-3

SoCalGas acknowledges cost estimates provided in Chapter 3 of the Water Evaluation are preliminary, high-level and based on available information as of the date of the study. The average estimates provide a baseline of potential costs associated with water supplies and clean renewable hydrogen production. More refined cost estimates will ultimately be developed by third-party hydrogen producers.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 7-4

CBE is also concerned about unanswered questions around wastewater concentrate. The Report outlines that electrolysis will produce approximately half a billion of gallons of concentrated wastewater each year that must be either treated at new or existing wastewater treatment facilities or disposed of via evaporation ponds that would be collocated, or near treatment and electrolysis facilities. Long-term storage of wastewater concentrate in evaporation ponds will introduce an additional source of pollution risk into any communities, or groundwater supplies located near the water treatment facility. While treatment at capable treatment facilities is both cheaper than evaporation and could potentially reduce the risk of groundwater contamination, the report does not delve into this solution or fully discuss water treatment facility options.

SOCALGAS RESPONSE TO COMMENT 7-4

SoCalGas acknowledges that the electrolysis process may produce wastewater concentrate that would need to be appropriately managed. Chapter 3 and Chapter 4 of the Water Evaluation address cost considerations and provide a high-level overview of potential challenges and opportunities related to treated wastewater and advanced water treatment concentrate, respectively. While the report provides a high-level overview of potential challenges and opportunities related to treated wastewater and advanced water treatment concentrate, it does not delve into specific water treatment facility options, as this is outside the scope of this feasibility analysis. As SoCalGas will not be producing hydrogen as part of Angeles Link, third-party producers would be responsible for obtaining the appropriate permits and agency authorizations (e.g., the Water Resources Control Board) to protect groundwater quality from any wastewater concentrate produced from the electrolysis process.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 7-5

III. Community Needs and Concerns Were not Included in Feasibility Analysis

The Water Report' stated feasibility criteria imply that the authors determined whether the use of a specific water source "would conflict with existing or anticipated water needs." However, the details of this analysis are not provided. Information regarding conflicts with existing and anticipated water needs is essential for drought stricken and water strapped communities to be fully informed of the impact of hydrogen production. The volumes of water, and scale of new-built water infrastructure contemplated by the report would significantly alter the landscape of each proposed production community. However, they are not consistently provided in the report. Without this information affected communities cannot provide informed consent or meaningful feedback. To remedy this, the Water Report should be amended to include a comprehensive chart that delineates, for each source, the amount of untreated water available, the estimated throughput of water from treatment, and resulting amount of treated water available for electrolysis.

SOCALGAS RESPONSE TO COMMENT 7-5

In response to the comment concerning the Water Evaluation's criteria to identify potential water supply sources that third parties may pursue for clean renewable hydrogen production, potential water supply sources were eliminated from consideration if they were (1) fully allocated or planned for use in meeting existing or anticipated water needs for a given area; (2) part of existing or planned water recycling or reuse projects; (3) part of the sustainable management of local groundwater resources for Sustainable Groundwater Management Act (SGMA) compliance; or (4) if use would conflict with existing or anticipated water needs. The last criterion refers to water needs accounted for in long-term planning through Urban Water Management Plans (UWMPs). Please refer to the Water Evaluation, Chapter 1, Section 2.4 (Urban Water Management Planning) for additional information on UWMPs. When certain identified water sources were accounted for in the anticipated water needs of current UWMPs, that water was considered unavailable for purposes of hydrogen production. For example, for the potential water supply source of treated wastewater, as explained further in Section 3.2 of Chapter 1, recycled water that is currently reused or is planned for reuse based on information in 2020 UWMPs was considered unavailable to future hydrogen development. For additional response to the comment concerning water needs of local communities, please refer to Global Response 1.

In response to the comment that the Water Evaluation should include additional information on the amount of treated water available for electrolysis, that information is highly dependent on the engineering design, size of facility, and other variables based on the specific production projects proposed by third parties. Therefore, a more granular analysis, including a chart, delineating the amount of untreated water available and water available after treatment for each identified potential water source is not feasible. For a high-level understanding of potential water losses from treatment of each potential source identified for third-party production, please refer to the Water Evaluation Chapter 3: Water Acquisition and Purification Costs, Section 5.0 (Treatment Processes and Costs). For additional information related to the water assessments third-party producers would undertake when specific production projects are proposed, please refer to Global Response 1.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 7-6

IV. Inadequate Greenhouse Gas Emissions Analysis

CBE stresses the importance of gathering high quality greenhouse gas (GHG) emissions data as soon as possible. The Report states that a "detailed, quantified analysis of potential GHG emissions associated with water conveyance and treatment is outside the scope of the WRE." FN4 While we recognize Phase One feasibility studies are preliminary in nature, detailed analysis is essential to determining whether Angeles Link will indeed transport the "clean renewable hydrogen" SoCalGas has repeatedly promised to support throughout this process. Regarding third-party hydrogen production, this chapter of the Report notes:

SoCalGas anticipates clean renewable production projects would undergo a thorough environmental review under the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA), as applicable . . . That environmental review would likely include an analysis of potential GHG emissions associated with development of those projects. FN5

SoCalGas must carefully examine all environmental impacts of the ALP. The ALP has made many broad claims as to air quality and general environmental impacts of the project. Without a clear study of these impacts, it will not be possible to determine critical opportunities for mitigation, assess project alternatives, or analyze how the ALP will really impact environmental justice communities. In the absence of such analysis, SoCalGas statements about green hydrogen or "clean renewable hydrogen" are, at best, wishful thinking.

Finally, in addition to examining GHG emissions, SoCalGas should also evaluate other criteria pollutants associated with water treatment and conveyance.

FN4 – Water Report at 5-1.
FN5 – Id.

SOCALGAS RESPONSE TO COMMENT 7-6

In response to the comment concerning more detailed analysis of potential greenhouse gas (GHG) emissions and criteria pollutants associated with conveyance and treatment, production of clean renewable hydrogen[14] would be performed by third-party producers. At such time as producers seek permits/agency authorizations for hydrogen production, these projects would undergo a thorough environmental review under the CEQA and/or NEPA, as applicable, and the environmental review would likely include an analysis of potential GHG emissions and criteria pollutants associated with development of those projects.

For purposes of the Angeles Link feasibility analyses, in response to stakeholder feedback after presenting the preliminary findings of the Water Evaluation, SoCalGas incorporated a new desktop analysis related to GHG emissions that was not within the initial scope of the Water Evaluation. The new

[14] Per D.22-12-055, "clean renewable hydrogen" is defined as hydrogen produced with a carbon intensity equal to or less than four kilograms of carbon dioxide-equivalent produced on a lifecycle basis per kilogram and does not use any fossil fuel in its production process.

analysis is included as Chapter 5 of the Water Evaluation and includes a desktop analysis of GHG emissions associated with water treatment and conveyance.

In response to the comment concerning the requirement for Angeles Link to transport clean renewable hydrogen, SoCalGas recognizes the importance of transporting hydrogen that meets the applicable clean renewable standards determined by the CPUC. The Phase 1 Production Study, Section 2.5 (Plans to Confirm Adherence to Clean Renewable Hydrogen Standards: Clean Renewable Hydrogen Certification and Other Measures), provides a summary of potential measures SoCalGas could take to confirm hydrogen transported by Angeles Link meets applicable clean renewable hydrogen standards.

In response to the comments concerning the overall environmental impacts of Angeles Link, SoCalGas anticipates further consideration of environmental impacts, including potential GHG emissions and criteria pollutants emissions from Angeles Link, as a part of the development of more detailed environmental analysis in support of a Certificate of Public Convenience and Necessity application to be filed with the California Public Utilities Commission (CPUC) and the CPUC's CEQA environmental review process (and for any federal action, the NEPA process).

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 7-7

V. Conclusion

CBE appreciates the opportunity to provide feedback. However, SoCalGas has chosen not to pursue representation of the communities along the ALP route and in areas they view as potential hydrogen production zones in Phase 1. To the extent that the Water Report speaks to environmental impacts in those communities, the voices of community members not represented in the ALP process at this time cannot be ignored. This feasibility study alone illustrates the significant challenges that water availability adds to the development of such extensive hydrogen infrastructure in Southern California. When looked at in the context of the released and forthcoming feasibility studies, it is essential that the significant challenges to hydrogen, and strategies to address these challenges need to be elucidated so that the communities this infrastructure will most impact can position themselves to be a meaningful part of the conversation. Both the report itself, and the ALP Phase 1 process fall short in this regard.

SOCALGAS RESPONSE TO COMMENT 7-7

In response to the comment concerning potential impacts to environmental justice communities from Angeles Link, SoCalGas has engaged in a stakeholder engagement process throughout the development and implementation of the Phase 1 feasibility studies. SoCalGas has prepared an ESJ Community Engagement Plan (ESJ Plan) and ESJ Screening. The ESJ Plan provides a framework for engaging ESJ communities during Phase 2 of Angeles Link to learn about those communities' most pressing concerns, solicit feedback on project design to minimize and address potential impacts, and gather ESJ community input on potential direct benefits desired by potentially impacted communities at large. The ESJ Screening provides baseline information on designated DACs and other demographic information for the potential preferred Angeles Link routes identified in Phase 1. The information provided in the ESJ Screening will support SoCalGas's efforts in Phase 2 to enhance future stakeholder engagement efforts and tailor outreach strategies in DAC and ESJ communities.

In response to this comment concerning potential impacts in areas identified as potential hydrogen production zones, please refer to Global Response 1 for additional information concerning the anticipated environmental review for third-party production projects and Global Response 7 regarding stakeholder engagement.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 7-8

CBE emphasizes, and echoes comments made in prior letters as well as in person at CBOSG and PAG meetings that the volume and speed at which report feedback is requested is vastly inappropriate for meaningful engagement and feedback on Phase 1 reports as is repeatedly emphasized in CPUC Decision 22-02-007.

SOCALGAS RESPONSE TO COMMENT 7-8

SoCalGas assumes that CBE is referring to the CPUC Decision D.22-12-055 in its comment above. SoCalGas's Angeles Link Memorandum Account application is A22-02-007.

Please refer to Global Response 2.

Comment Letter 8 – Environmental Defense Fund

Comment Letter 8

Environmental Defense Fund

August 7, 2024

Chester Britt
Planning Advisory Group Facilitator

Emily Grant
Angeles Link Senior Public Affairs Representative
Southern California Gas Company

Alisa Lykens
Director
Insignia Environmental

Subject: Environmental Defense Fund (EDF) Comments of Greenhouse Gas (GHG) Emissions Evaluation Draft Report

As a follow-up to the draft reports on greenhouse gas (GHG) emissions evaluation draft report shared July 2024, EDF submits the following comments.

Overall, EDF believes that the issue of GHG emissions reduction benefits expected from a potential dedicated Angeles Link hydrogen pipeline project **must be evaluated as a question of optimization and relative efficiencies**. Any emissions reductions expected from the Angeles Link project have to be examined relative to reductions expected from other decarbonization pathways available for the end-uses targeted for hydrogen adoption and serviced by the potential project. In turn, this evaluation must be conducted comprehensively, taking into account the GHG emissions impact of the entire value chain which ranges from the electricity used for hydrogen production to leakage expected from hydrogen transport and use.

Comment 08-01

For example, how do the expected GHG emissions benefits of a large pipeline project—in particular given the leakage concerns previously highlighted by EDF—compare to the analogous expected benefits of transmitting renewable electricity closer to end-users, either for direct electrification or on-site hydrogen production—that may experience line loss but avoid minimize hydrogen pipeline leakage? It is necessary to show not just the expected emissions benefits of the potential Angeles Link project, as the draft report focuses on; but the existence of a relative cost- and climate-efficiency benefit of building the pipeline over other decarbonization options. The draft report fails to provide such analysis.

Based on the above overall comments, EDF makes two specific points on the draft report. First, the GHG reductions benefits expected from a potential Angeles Link Pipeline must be **compared to other decarbonization pathways**; and **provide justification for the pipeline project specifically**. The draft report currently focuses exclusively on the expected benefits of hydrogen adoption—much of which does not depend on the Angeles Link Pipeline project but is instead already required by existing regulatory and policy decisions. For instance, the demand study draft report cited various policy and legislative initiatives for a zero-emissions mobility sector that target diesel use for heavy duty vehicle specifically as a driving force for hydrogen adoption in California.[1] The results of the demand study, in turn, inform the results of the GHG emissions evaluation draft report.[2] In order to justify the need for the Angeles Link Pipeline project based on these regulatory initiatives, SoCalGas needs to show clearly that hydrogen adoption in the targeted end-uses are either required and necessary (*i.e.*, it offers the only decarbonization pathway); or at the very least preferable to other pathways (*i.e.,* it offers the best pathway). The GHG emissions evaluation report, however, fails to provide such detailed comparative analysis.

Comment 08-01

Second, while the GHG emissions evaluation draft report incorporates the GHG impacts of hydrogen leakage, its **scope and evaluation are incomplete, as the draft report acknowledges**. EDF welcomes SoCalGas' efforts to calculate the direct GHG emissions impact of hydrogen leakage from a potential Angeles Link pipeline project; and the acknowledgement of hydrogen as an indirect GHG.[3] EDF also notes that SoCalGas acknowledges but does not quantify the potential for leakage for various end users throughout the draft report. [4] The draft report argues that "[e]stimating the potential for leakage associated with end users of Angeles Link was not feasible given the limited amount of information available", such as specific equipment and facility data.[5] However, the expected GHG emissions reduction benefits highlighted in the draft report depends on the amount of fossil fuel use displaced by potential hydrogen adoption for the different end-uses. Then, by extension, a complete picture of the GHG emissions reduction impacts must also include the potential downside of hydrogen adoption, as represented by leakage impacts. SoCalGas'

Comment 08-02

[1] Demand Study Draft Report at 24.
[2] GHG Emissions Evaluation Draft Report at 9.
[3] GHG Emissions Evaluation Draft Report at 79.
[4] GHG Emissions Evaluation Draft Report at 49.
[5] GHG Emissions Evaluation Draft Report at 28.

decision to avoid quantifying the end-use leakage impacts, therefore, paints an incomplete picture for the overall GHG emissions evaluation of the Angeles Link project.

Comment 08-02

Respectfully,

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ENVIRONMENTAL DEFENSE FUND COMMENT 8-1

As a follow-up to the draft reports on greenhouse gas (GHG) emissions evaluation draft report shared July 2024, EDF submits the following comments.

Overall, EDF believes that the issue of GHG emissions reduction benefits expected from a potential dedicated Angeles Link hydrogen pipeline project must be evaluated as a question of optimization and relative efficiencies. Any emissions reductions expected from the Angeles Link project have to be examined relative to reductions expected from other decarbonization pathways available for the end-uses targeted for hydrogen adoption and serviced by the potential project. In turn, this evaluation must be conducted comprehensively, taking into account the GHG emissions impact of the entire value chain which ranges from the electricity used for hydrogen production to leakage expected from hydrogen transport and use.

For example, how do the expected GHG emissions benefits of a large pipeline project—in particular given the leakage concerns previously highlighted by EDF—compare to the analogous expected benefits of transmitting renewable electricity closer to end-users, either for direct electrification or on-site hydrogen production—that may experience line loss but avoid minimize hydrogen pipeline leakage? It is necessary to show not just the expected emissions benefits of the potential Angeles Link project, as the draft report focuses on; but the existence of a relative cost and climate-efficiency benefit of building the pipeline over other decarbonization options. The draft report fails to provide such analysis.

Based on the above overall comments, EDF makes two specific points on the draft report. First, the GHG reductions benefits expected from a potential Angeles Link Pipeline must be compared to other decarbonization pathways; and provide justification for the pipeline project specifically. The draft report currently focuses exclusively on the expected benefits of hydrogen adoption—much of which does not depend on the Angeles Link Pipeline project but is instead already required by existing regulatory and policy decisions. For instance, the demand study draft report cited various policy and legislative initiatives for a zero-emissions mobility sector that target diesel use for heavy duty vehicle specifically as a driving force for hydrogen adoption in California. FN1 The results of the demand study, in turn, inform the results of the GHG emissions evaluation draft report. FN2 In order to justify the need for the Angeles Link Pipeline project based on these regulatory initiatives, SoCalGas needs to show clearly that hydrogen adoption in the targeted end-uses are either required and necessary (i.e., it offers the only decarbonization pathway); or at the very least preferable to other pathways (i.e., it offers the best pathway). The GHG emissions evaluation report, however, fails to provide such detailed comparative analysis.

FN1 – Demand Study Draft Report at 24.
FN2 – GHG Emissions Evaluation Draft Report at 9.

SOCALGAS RESPONSE TO COMMENT 8-1

SoCalGas acknowledges this comment concerning the comparison of potential GHG emissions reduction benefits from Angeles Link to other potential decarbonization pathways. As highlighted in the Demand Study, demand for clean renewable hydrogen is projected within SoCalGas's service territory for hard-to-electrify end uses across the mobility, power generation, and industrial sectors. Angeles Link proposes to deliver clean renewable hydrogen to meet the demand in those hard-to-electrify sectors, and the

Demand Study concludes that hydrogen is a feasible decarbonization alternative that can fit into and strengthen the broader state decarbonization portfolio. Further analysis comparing potential GHG emission reductions to alternative decarbonization pathways is outside of the scope of the Angeles Link feasibility analyses.

In response to the comment concerning accounting for potential GHG emissions from the entire value chain related to Angeles Link (e.g., electricity used for production and expected leakage from transport and use), the Hydrogen Leakage Assessment (Leakage Study) and Greenhouse Gas Emissions Evaluation (GHG Study) provide analysis of potential GHG emissions from the value chain to the extent such analysis could be conducted at this feasibility stage.

For example, the Leakage Study evaluates the potential for hydrogen leakage associated with new hydrogen pipeline infrastructure (including transportation and compression), as well as the potential for leakage associated with third-party production and third-party storage. Analysis of potential leakage associated with the last mile delivery and end users of hydrogen could not be included in the Phase 1 studies because the preferred Angeles Link route has yet to be selected and end user details have not yet been finalized. Uncertainty and insufficient data regarding potential leakage sources precluded preparation of estimates of potential leakage for last mile delivery. Additionally, supplemental information would be required to expand the scope of the Leakage Study to project hydrogen leakage rates for each sub-sector within the three primary sectors of potential end users (mobility, power generation, and hard-to electrify industrial). In response to this stakeholder feedback, clarification of the limitations of leakage analysis related to the last mile delivery and end users will be added to a new Section 4.1.1 in the final Leakage Study.

The GHG Study also analyzes potential GHG emissions associated with hydrogen combustion associated with new pipeline infrastructure, as well as the potential combustion associated with third-party production and third-party storage of clean renewable hydrogen. The GHG Study also analyzes the GHG emissions reductions associated with displaced fossil fuels by end users in the mobility, power, generation, and hard-to-electrify industrial sectors. Indirect GHGs from electricity used for third-party production was assumed to be zero because only renewable electricity could be used to produce electrolytic hydrogen that complies with the CPUC's definition of clean renewable hydrogen.

In response to this comment showing that hydrogen adoption for the targeted end-users is either required and necessary or at least a preferrable decarbonization pathway with respect to potential GHG emissions, a detailed comparison of potential GHG emissions reductions of Angeles Link as compared to alternatives is beyond the scope of the Phase 1 feasibility analyses. The degree of analysis that could be reasonably completed at this feasibility stage to compare Angeles Link to other decarbonization pathways is included in the separate Alternatives Study, Cost Effectiveness Study, and Environmental Analysis.

SoCalGas acknowledges EDF's comment regarding the GHG Study's reliance on SoCalGas's Demand Study and the need to compare the optimization and relative efficiencies between decarbonization alternatives, such as direct electrification.

In response to the request to show that hydrogen adoption in the targeted end-uses are either required and necessary or preferable to other decarbonization pathways, SoCalGas considered potential alternatives to Angeles Link in the Alternatives Study, which evaluates both hydrogen delivery alternatives, such as trucking and shipping, and non-hydrogen delivery alternatives, such as electrification and carbon capture and sequestration (refer to Alternatives Study, Section 4.2). The Cost

Effectiveness Study evaluated and compared the cost effectiveness of Angeles Link and the hydrogen delivery alternatives and non-hydrogen delivery alternatives selected for further analysis. The Alternatives Study incorporates findings from the Cost Effectiveness Study and the Environmental Analysis and concluded that across the hydrogen delivery alternatives evaluated, Angeles Link is the best suited option for the delivery of clean renewable hydrogen at scale across Central and Southern California, including the Los Angeles Basin, based on the criteria identified in the study. Angeles Link also performed well with respect to the criteria defined for the evaluation of non-hydrogen alternatives and is well positioned to serve hard-to-electrify industrial consumers, dispatchable electric generation, and heavy-duty transportation in Central and Southern California.

ENVIRONMENTAL DEFENSE FUND COMMENT 8-2

Second, while the GHG emissions evaluation draft report incorporates the GHG impacts of hydrogen leakage, its scope and evaluation are incomplete, as the draft report acknowledges. EDF welcomes SoCalGas' efforts to calculate the direct GHG emissions impact of hydrogen leakage from a potential Angeles Link pipeline project; and the acknowledgement of hydrogen as an indirect GHG. FN3 EDF also notes that SoCalGas acknowledges but does not quantify the potential for leakage for various end users throughout the draft report. FN4 The draft report argues that "[e]stimating the potential for leakage associated with end users of Angeles Link was not feasible given the limited amount of information available", such as specific equipment and facility data. FN5 However, the expected GHG emissions reduction benefits highlighted in the draft report depends on the amount of fossil fuel use displaced by potential hydrogen adoption for the different end-uses. Then, by extension, a complete picture of the GHG emissions reduction impacts must also include the potential downside of hydrogen adoption, as represented by leakage impacts. SoCalGas' decision to avoid quantifying the end-use leakage impacts, therefore, paints an incomplete picture for the overall GHG emissions evaluation of the Angeles Link project.

FN3 – GHG Emissions Evaluation Draft Report at 79.
FN4 – GHG Emissions Evaluation Draft Report at 49.
FN5 – GHG Emissions Evaluation Draft Report at 28.

SOCALGAS RESPONSE TO COMMENT 8-2

As discussed in SoCalGas's Q2 2024 Quarterly Report, given the feasibility stage of Phase 1, the draft Leakage Study focused on the information available at the time that the study was released. Additional information would be required to expand the scope of the Leakage Study beyond assessing the risks of and mitigations for hydrogen infrastructure leakage. Specifically, information related to projected hydrogen leakage rates for each sub-sector within the three primary sectors of potential end-users (mobility, power generation, and hard-to-electrify industrial) would be required to evaluate potential leakage associated with end users. Please refer to Global Response 4 in the Q2 2024 Quarterly Report for more details. In response to this stakeholder feedback, clarification of the limitations of leakage analysis related to the last mile delivery and end users will be added to a new Section 4.1.1 in the final Leakage Study.

Comment Letter 9 – Air Products

Comment Letter 9

August 7, 2024

VIA EMAIL TO
ALP1_PAG_FEEDBACK@INSIGNIAENV.COM

Emily Grant
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Re: Angeles Link Planning Advisory Group (PAG) Feedback of Air Products and Chemicals Inc. on Greenhouse Gas (GHG) Emissions Evaluation (July 2024 Draft)

Air Products and Chemicals, Inc. ("Air Products") submits the following feedback concerning the July 2024 draft GHG Emissions Evaluation.

Air Products expects that the below feedback will be addressed in the final Studies and in Southern California Gas Company's ("SoCalGas") quarterly reporting. Air Products also welcomes any response that SoCalGas may wish to provide to the comments below.

The GHG Emissions Evaluation Suffers From Flawed Assumptions

The GHG Emissions Evaluation rests on a number of flawed assumptions, including assumptions that are inconsistent with assumptions and timing adopted by regulatory agencies such as the California Air Resources Board ("CARB") or the California Public Utilities Commission ("CPUC"), and claims credit for reductions not directly tied to Angeles Link, while failing to include other relevant emissions. Those flaws are set forth in more detail below.

Comment 09-01

Refinery Emissions

The GHG Emissions Evaluation asserts that the majority of greenhouse gas reductions in the Hard to Electrify Industrial sectors would come from refineries, which would account for 65.5% of the reductions in 2030, with the percentages remaining consistent from 2030 to 2045, in the high throughput scenario.[1] This assertion is flawed for a number of reasons. First and foremost, CARB's 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) modeled a 94% reduction in refinery production in 2045.[2] This significant drop in production will drastically reduce the opportunities to reduce emissions by replacing natural gas usage at petroleum refineries.

[1] GHG Emissions Evaluation at 12.
[2] 2022 Scoping Plan at 2

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Hard To Electrify Industrial Sectors Transition to Hydrogen

In order to accelerate the transition to hydrogen, the GHG Emissions Evaluation assumes that the hard to Electrify Industrial sectors would "begin with hydrogen/natural gas blends in 2030 by the end users, behind the meter, and eventually transition to 100% hydrogen fuels by 2050." It is at best unclear at this point whether and when hydrogen blending will be permitted in natural gas pipelines, which would be required for end users to begin that transition. The CPUC declined to adopt any hydrogen blending standard in D.22-12-057, and instead directed the utilities, including SoCalGas, to propose pilot programs to determine the propriety of permitting hydrogen blending in existing natural gas pipelines. The joint amended application proposing those pilots was filed on March 1, 2024. The schedule proposed by applicants contemplates a final decision in March 2025—given the pendency of a motion to dismiss the amended application, a final decision will likely be delayed beyond that date. SoCalGas's projected schedule for its blending pilots extends for four years.[3] It is therefore unlikely that the Commission would render any decision on the propriety of blending hydrogen into existing natural gas lines until sometime well after 2030. The assumption that end users will begin using blended hydrogen from utility natural gas pipelines by 2030 therefore appears to be overly optimistic.

Comment 09-02

Mobility Reductions

The GHG Emissions Evaluation projects up to nearly 17 (low demand scenario) and 36 million metric tons (high demand scenario) of CO2e per year removed from SoCalGas geographic service territory by end users by 2045, with 72.5% (low demand scenario) and 50.3% (high demand scenario) of overall GHG reductions attributed to the mobility sector.[4] However, Angeles Link will not directly serve refueling stations. Nor does the GHG Emissions Evaluation provide any analysis of refueling station locations, or if or how Angeles Link routing might be consistent with the locations, or how these fueling stations might actually connect to Angles Link through a pipeline distribution system. Absent any analysis showing how and to what extent Angeles Link will be involved in providing hydrogen to these fueling stations, any GHG reductions associated with those fueling stations cannot be credited to Angeles Link.

Comment 09-03

Biomass Gasification

In sharp contrast to claiming credit for hydrogen fueling reductions, the GHG Emissions Evaluation states that GHG emission associated with the transport of feedstock, including for biomass gasification, are "out of scope."[5] While Air Products appreciates that the Evaluation does include in Appendix B a summary of estimated carbon intensity values for cradle to gate summarized from literature, that data can and should be used to estimate GHG emissions associated with feedstock transportation and feedstock preparation. Crediting GHG emissions

Comment 09-04

[3] Prepared Direct Testimony of Kevin Woo on behalf of Southern California Gas Company, Figure 4 at p. 11.
[4] GHG Emissions Evaluation at 10.
[5] *Id.* at 23.

reductions associated with hydrogen transportation on one hand, while failing to acknowledge transportation emissions associated with the production of that hydrogen, skews the analysis and fails to provide a complete picture of the GHG emissions impacts of Angeles Link.

Comment 09-04

Hydrogen Production Generally

The GHG Emissions Evaluation further minimizes GHG emissions associated with all production types by assuming that all electricity consumed as feedstock to electrolyzers or as process energy to production and transportation (compression) will have zero GHG emissions associated with it. It is extremely unlikely that all such electricity will be sourced from new renewable generation based on the need for grid connection and use over 24 hours at each location of demand. Even if sourced from existing renewable generation, resource shuffling associated with procurement of that electricity will result in GHG emissions. It is simply unrealistic to assume that there will be zero GHG emissions associated with the electricity needed for hydrogen production, and the GHG Emissions Evaluation should be revised to provide a more realistic estimate of production-related GHG emissions.

Comment 09-05

Conclusion

Air Products appreciates the opportunity to provide this feedback concerning the July 2024 Draft GHG Emissions Evaluation.

Respectfully,

Miles Heller Director, Global Greenhouse Gas,
Hydrogen, and Utility Regulatory Policy

123894371.1 0079635-00001

AIR PRODUCTS COMMENT 9-1

Air Products and Chemicals, Inc. ("Air Products") submits the following feedback concerning the July 2024 draft GHG Emissions Evaluation.

Air Products expects that the below feedback will be addressed in the final Studies and in Southern California Gas Company's ("SoCalGas") quarterly reporting. Air Products also welcomes any response that SoCalGas may wish to provide to the comments below.

The GHG Emissions Evaluation Suffers from Flawed Assumptions

The GHG Emissions Evaluation rests on a number of flawed assumptions, including assumptions that are inconsistent with assumptions and timing adopted by regulatory agencies such as the California Air Resources Board ("CARB") or the California Public Utilities Commission ("CPUC"), and claims credit for reductions not directly tied to Angeles Link, while failing to include other relevant emissions. Those flaws are set forth in more detail below.

Refinery Emissions

The GHG Emissions Evaluation asserts that the majority of greenhouse gas reductions in the Hard to Electrify Industrial sectors would come from refineries, which would account for 65.5% of the reductions in 2030, with the percentages remaining consistent from 2030 to 2045, in the high throughput scenario. FN1 This assertion is flawed for a number of reasons. First and foremost, CARB's 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) modeled a 94% reduction in refinery production in 2045. FN2 This significant drop in production will drastically reduce the opportunities to reduce emissions by replacing natural gas usage at petroleum refineries.

FN1 – GHG Emissions Evaluation at 12.
FN2 – 2022 Scoping Plan at 2

SOCALGAS RESPONSE TO COMMENT 9-1

The GHG Study reflects the anticipated end user reductions for the Hard-to-Electrify Industrial sector. The refinery sub-sector was only considered in the high throughput scenario. The results are shown in Figure 8B of the Study Report. The GHG analysis is based on the values provided in the Demand Study. As discussed in SoCalGas's Q1 2024 Quarterly Report, hydrogen demand projections reflected in SoCalGas's Demand Study are based on the latest market and technology information that was peer reviewed by experts at third parties, including National Renewable Energy Lab (NREL), SCAQMD, University of California Los Angeles (UCLA), UC Irvine (UCI), and UC Davis (UCD). While there may be differences in the amount of hydrogen demand projected in all the referenced studies, there is consensus among agencies and researchers that projected demand exists in the power, mobility, and industrial sectors, and that demand in those sectors is expected to grow over the next two decades. The Demand Study's conclusions are near or within the range of recently released projections of hydrogen demand in California.

With respect to CARB'S 2022 Scoping Plan and refinery reduction, please refer to Response to Comment 33-12.

AIR PRODUCTS COMMENT 9-2

Hard To Electrify Industrial Sectors Transition to Hydrogen

In order to accelerate the transition to hydrogen, the GHG Emissions Evaluation assumes that the hard to Electrify Industrial sectors would "begin with hydrogen/natural gas blends in 2030 by the end users, behind the meter, and eventually transition to 100% hydrogen fuels by 2050." It is at best unclear at this point whether and when hydrogen blending will be permitted in natural gas pipelines, which would be required for end users to begin that transition. The CPUC declined to adopt any hydrogen blending standard in D.22-12-057, and instead directed the utilities, including SoCalGas, to propose pilot programs to determine the propriety of permitting hydrogen blending in existing natural gas pipelines. The joint amended application proposing those pilots was filed on March 1, 2024. The schedule proposed by applicants contemplates a final decision in March 2025—given the pendency of a motion to dismiss the amended application, a final decision will likely be delayed beyond that date. SoCalGas's projected schedule for its blending pilots extends for four years. FN3 It is therefore unlikely that the Commission would render any decision on the propriety of blending hydrogen into existing natural gas lines until sometime well after 2030. The assumption that end users will begin using blended hydrogen from utility natural gas pipelines by 2030 therefore appears to be overly optimistic.

FN3 – Prepared Direct Testimony of Kevin Woo on behalf of Southern California Gas Company, Figure 4 at p. 11.

SOCALGAS RESPONSE TO COMMENT 9-2

Angeles Link is proposed as a non-discriminatory pipeline system dedicated to public use that would transport clean renewable hydrogen[15] from regional third-party production and storage sites to end users in Central and Southern California, including the Los Angeles Basin. As stated in Section 3.5.2.3 of the GHG Study, hydrogen blending, if any, is assumed to occur at the end user and behind the meter.

SoCalGas's hydrogen blending application is completely separate from Angeles Link and moving through the CPUC process on an independent timeline.

[15] In D.22-12-055 at 42 and Findings of Fact (FOF) 34-35, clean renewable hydrogen refers to hydrogen that does not exceed 4 kilograms of carbon dioxide equivalent (CO_2e) produced on a lifecycle basis per kilogram of hydrogen produced and does not use fossil fuels in the hydrogen production process, where fossil fuels are defined as a mixture of hydrocarbons including coal, petroleum, or natural gas, occurring in and extracted from underground deposits.

AIR PRODUCTS COMMENT 9-3

Mobility Reductions

The GHG Emissions Evaluation projects up to nearly 17 (low demand scenario) and 36 million metric tons (high demand scenario) of CO2e per year removed from SoCalGas geographic service territory by end users by 2045, with 72.5% (low demand scenario) and 50.3% (high demand scenario) of overall GHG reductions attributed to the mobility sector. FN4 However, Angeles Link will not directly serve refueling stations. Nor does the GHG Emissions Evaluation provide any analysis of refueling station locations, or if or how Angeles Link routing might be consistent with the locations, or how these fueling stations might actually connect to Angles Link through a pipeline distribution system. Absent any analysis showing how and to what extent Angeles Link will be involved in providing hydrogen to these fueling stations, any GHG reductions associated with those fueling stations cannot be credited to Angeles Link.

FN4 – GHG Emissions Evaluation at 10.

SOCALGAS RESPONSE TO COMMENT 9-3

As noted in the GHG Study and reflected in Air Products' comment, mobility is the largest anticipated end-user sector for GHG emission reductions, accounting for 72.5% and 50.3% of overall reductions in 2045 for the Conservative and Ambitious Demand scenarios, respectively, due to the substitution of hydrogen fuel cells for fossil fuels. The assumptions for the Mobility sector are primarily that diesel and gasoline fuel will be displaced, and vehicles would convert to hydrogen fuel cells with zero emissions. Emission factors for GHG from displaced diesel and gasoline fuel were developed using California Air Resources Board (CARB) Emission Factor model[16] data. Details regarding specific end users to be served by Angeles Link will be determined in future phases. As summarized in the separate Routing Analysis, directional pathways for the Angeles link pipeline system are being considered based on the locations of potential consumers of clean renewable hydrogen, including in the mobility sector. Please refer to the draft Routing Analysis for information regarding potential pipeline routes.

[16] CARB On-Road Emission Factor: https://ww2.arb.ca.gov/our-work/programs/msei/on-road-emfac

AIR PRODUCTS COMMENT 9-4

Biomass Gasification

In sharp contrast to claiming credit for hydrogen fueling reductions, the GHG Emissions Evaluation states that GHG emission associated with the transport of feedstock, including for biomass gasification, are "out of scope." FN5 While Air Products appreciates that the Evaluation does include in Appendix B a summary of estimated carbon intensity values for cradle to gate summarized from literature, that data can and should be used to estimate GHG emissions associated with feedstock transportation and feedstock preparation. Crediting GHG emissions reductions associated with hydrogen transportation on one hand, while failing to acknowledge transportation emissions associated with the production of that hydrogen, skews the analysis and fails to provide a complete picture of the GHG emissions impacts of Angeles Link.

FN5 – Id. at 23.

SOCALGAS RESPONSE TO COMMENT 9-4

Angeles Link is proposed as a non-discriminatory pipeline system dedicated to public use that would transport clean renewable hydrogen[17] from regional third-party production and storage sites to end users in Central and Southern California, including the Los Angeles Basin. Third-party producers will select the source and type of biomass that may be used during biomass gasification which will impact the carbon intensity of the biomass. The biomass used may affect the eligibility of whether the hydrogen produced may be transported via Angeles Link.[18] Please also refer to Global Response 6.

[17] In D.22-12-055 at 42 and Findings of Fact (FOF) 34-35, clean renewable hydrogen refers to hydrogen that does not exceed 4 kilograms of carbon dioxide equivalent (CO2e) produced on a lifecycle basis per kilogram of hydrogen produced and does not use fossil fuels in the hydrogen production process, where fossil fuels are defined as a mixture of hydrocarbons including coal, petroleum, or natural gas, occurring in and extracted from underground deposits.

[18] *Id.*

AIR PRODUCTS COMMENT 9-5

Hydrogen Production Generally

The GHG Emissions Evaluation further minimizes GHG emissions associated with all production types by assuming that all electricity consumed as feedstock to electrolyzers or as process energy to production and transportation (compression) will have zero GHG emissions associated with it. It is extremely unlikely that all such electricity will be sourced from new renewable generation based on the need for grid connection and use over 24 hours at each location of demand. Even if sourced from existing renewable generation, resource shuffling associated with procurement of that electricity will result in GHG emissions. It is simply unrealistic to assume that there will be zero GHG emissions associated with the electricity needed for hydrogen production, and the GHG Emissions Evaluation should be revised to provide a more realistic estimate of production-related GHG emissions.

Conclusion

Air Products appreciates the opportunity to provide this feedback concerning the July 2024 Draft GHG Emissions Evaluation

SOCALGAS RESPONSE TO COMMENT 9-5

SoCalGas acknowledges this comment concerning the potential GHG emissions from the electricity used to power electrolyzers for production. As the GHG Study explains, for purposes of the feasibility analysis, it was assumed that only renewable electricity would be used for production in line with the CPUC's definition of clean renewable hydrogen, which does not allow for the use fossil fuels in the hydrogen production process. SoCalGas will not be producing clean renewable hydrogen as part of Angeles Link, and it is anticipated that third-party producers would complete thorough environmental review of their projects when proposed pursuant to the CEQA and the NEPA, as applicable, and that review would evaluate the potential direct and indirect GHG emissions associated with that production.

In addition, the separate Production Study sets forth the potential measures SoCalGas could take to confirm that the hydrogen transported by Angeles Link meets those applicable clean renewable hydrogen standards. (Refer to Production Study, Section 2.5.)

Comment Letter 10 – Natural Resources Defense Council

Comment Letter 10

NRDC

August 13th, 2024

Chester Britt
Planning Advisory Group Facilitator

Emily Grant
Angeles Link Senior Public Affairs Representative
Southern California Gas Company

Alisa Lykens
Director
Insignia Environmental

Subject: Natural Resources Defense Council Comments on the Greenhouse Gas Emissions (GHG) Evaluation Draft Report

As a follow-up to the GHG Emissions Evaluation draft report shared on July 10th, the Natural Resources Defense Council (NRDC) provides the following comments and feedback.

1. **Electricity emissions**

First, the report inadequately covers emissions from electricity used in the production of hydrogen. The report assumes that all electricity inputs, to electrolysis or any other production pathways, will have zero associated GHG emissions. This is directly at odds with SoCalGas and Angeles Link's lack of commitment to require the three pillars of incrementality, hourly matching, and geographic deliverability for electrolytic production, as proposed by the Biden administration's proposed rule for the 45V tax credit in December 2023[1]. Without requiring the three pillars, or some other mechanism, there is no reason to assume that the electricity used for hydrogen production to serve the pipeline does not increase GHG emissions on the grid.

Comment 10-01

While SoCalGas has not to our knowledge taken a public position against the three pillars, SoCalGas is a partner of the ARCHES hydrogen hub, with the Angeles Link pipeline a constituent project of ARCHES. The ARCHES hub has been publicly opposed to the three pillars[2], despite strong evidence that they are required in California to meet the emissions

[1] Proposed Rule by the Internal Revenue Service and Treasury on the Section 45V Credit for Production of Clean Hydrogen, December 2023 https://www.federalregister.gov/documents/2023/12/26/2023-28359/section-45v-credit-for-production-of-clean-hydrogen-section-48a15-election-to-treat-clean-hydrogen

[2] February 27th 2024 comment from Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) to the Treasury on the proposed 45V rule of December 2023, https://www.regulations.gov/comment/IRS-2023-0066-29465

thresholds required by the statute of the Inflation Reduction Act to qualify for the 45V tax credit. Therefore, rather than assuming that electrolytic hydrogen that is delivered by Angeles Link will be zero emissions, the GHG Emissions Evaluation Report must model the range of possible grid impacts.

We offer two studies as examples of the potential scale of GHG impacts from electrolytic production. Energy Innovation found that without requiring incrementality (also known as additionality), electrolytic hydrogen produced in California will have a GHG intensity of over 20 kgCO2e per kg of hydrogen[3]. Taking the medium demand scenario from the draft report, where 1 MMT of hydrogen delivered through Angeles Link results in an emissions reduction of 7.8 MMT CO2e due to displaced use of fossil fuels, the emissions associated with production would be over 20 MMT CO2e. The emissions from production are more than double the savings from using hydrogen, eliminating the climate benefit of Angeles Link and resulting in a a net increase in emissions. Further, Princeton University studied the long-run emissions impact of various hydrogen tax credit requirements, and similarly found that in California, consequential emissions from hydrogen production without the three pillars are approximately 20 kg CO2 per kg of hydrogen.[4] The authors of this paper have also explained in a follow up paper[5] why their results are different, and more accurately represent the real world, than the short-run modelling relied upon by ARCHES and other groups attempting to weaken the three pillars. There is strong consensus among long-run models of the need for the three pillars to ensure emissions do not increase due to hydrogen production.

Comment 10-01

2. **Emissions savings that are forfeited by diverting clean energy to hydrogen production**

Second, the draft report does not consider the GHG emissions consequences of diverting clean energy from other more productive uses. In a world with constrained renewable build out, this is a crucial consideration. For a direct example, battery electric trucks can travel three times farther than hydrogen fuel cell trucks for the same amount of renewable energy, therefore displacing three times more diesel emissions per unit of renewable energy.[6] While certain specific heavy duty trucking needs may be well served by hydrogen fuel cell trucks, battery

Comment 10-02

[3] Energy Innovation. (n.d.). *Smart Design Of 45V Hydrogen Production Tax Credit Will Reduce Emissions And Grow the Industry—Energy Innovation: Policy and Technology*. Retrieved August 15, 2023, from https://energyinnovation.org/publication/smart-design-of-45v-hydrogen-production-tax-credit-will-reduce-emissions-and-grow-the-industry/

[4] Ricks, W., Xu, Q., & Jenkins, J. D. (2023). Minimizing emissions from grid-based hydrogen production in the United States. *Environmental Research Letters*, *18*(1), 014025. https://doi.org/10.1088/1748-9326/acacb5

[5] Ricks, W., Gagnon, P., & Jenkins, J. D. (2024). Short-run marginal emission factors neglect impactful phenomena and are unsuitable for assessing the power sector emissions impacts of hydrogen electrolysis. *Energy Policy*, *189*, 114119. https://doi.org/10.1016/j.enpol.2024.114119

[6] Wilson, S. (2023). *Hydrogen-Powered Heavy-Duty Trucks: A review of the environmental and economic implications of hydrogen fuel for on-road freight*. Union of Concerned Scientists. https://doi.org/10.47923/2023.15274

electric trucks will always have this significant efficiency advantage and therefore likely serve the majority of the heavy duty market as well as all of the light and medium duty market.

For power generation, using hydrogen as energy storage only has a round trip efficiency of approximately in the range of 18-46%[7], and therefore can only be justified for long duration storage beyond the capabilities of batteries or other storage mediums with more favorable efficiencies. Given that some of the hydrogen delivered by Angeles Link is proposed to be combusted to generate power, and the fact that the hydrogen may not even be produced from all renewable energy (due to not requiring the three pillars), let alone entirely from avoided curtailment of renewables that could not be stored in batteries, there are significant GHG emissions consequences not captured in this draft report.

Even for hydrogen use cases that cannot be served by direct electrification, there is still an opportunity cost to using renewable energy for the production of hydrogen if it would otherwise have been used to displace fossil fuels on the grid, for example in a battery electric vehicle or a heat pump. This opportunity cost has GHG emissions impacts that are not captured by this draft report. One way to minimize, although not always eliminate, this impact is to require the three pillars, including incrementality, for hydrogen production.

Comment 10-02

3. Emissions from biomass and RNG production pathways

Third, the report assumes that the carbon content of biomass and biomethane (also known as renewable natural gas or RNG) used for gasification or steam methane reformation is net zero. However, this assumption will not hold true unless these are unavoidable waste feedstocks. Without adequate guardrails, in particular around the use of credits or a book and claim system for biomethane, considerable GHG emissions could be underreported for these pathways. The greenhouse gas impacts from leakage of biomethane have also not been considered. SoCalGas should examine the full range of GHG impacts from these feedstocks and detail any requirements that will be made of their biomass and biomethane hydrogen production pathways to minimize these.

Similarly to electricity, the report should also consider if these biogenic feedstocks could be better utilized directly. Transforming biomethane to hydrogen involves energy losses that could be avoided if the biomethane can be used directly. The report should examine if more emissions could be displaced by direct use of biomethane compared to using it for hydrogen.

Comment 10-03

4. Warming impact of hydrogen emissions

NRDC acknowledges the progress made on the issue of the warming impact of hydrogen with its inclusion in this report. However, the current estimates in the report are likely to be a significant underestimate of the full indirect warming impact from hydrogen leakage. The

Comment 10-04

[7] https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/hydrogen-technology-faces-efficiency-disadvantage-in-power-storage-race-65162028

warming impacts estimated in the draft report rely on the levels of leakage from the leakage report, which fails to take into account any hydrogen leakage during production or end use, and only includes hydrogen leakage from the pipeline itself. This is inconsistent with the GHG accounting framework for other warming gases, where the impacts of using hydrogen on emission from fossil fuels at the end use stage, and the impacts of combusting feedstocks at the production stage, are clearly within scope. Therefore both this report and the leakage report should be updated to include leakage estimates for the entire hydrogen value chain associated with the proposed pipeline. Also, the estimated warming impact needs to be factored into the headline GHG impacts, not reported separately.

Comment 10-04

5. **Links to demand study**

Finally, as detailed in our joint comments with the Environmental Defense Fund on the demand study draft report on February 23rd 2024, we find significant shortcomings in the demand study and potential overestimations of hydrogen demand to be served by Angeles Link. The results are much higher than, for example, the California Air Resources Board's Scoping Plan. The calculations of GHG emissions reductions in this report, which rely on the demand scenarios that result from the demand study, are predicated on the same extremely high levels of demand for hydrogen. SoCalGas should incorporate the feedback from EDF, NRDC and the rest of the Pipeline Advisory Group to the demand study and apply the updated results to the GHG evaluation.

Comment 10-05

Respectfully,

Dr Pete Budden
Hydrogen Advocate, Climate and Energy

Natural Resources Defense Council
40 W 20th St
New York, NY 10011
Email: pbudden@nrdc.org

NATURAL RESOURCES DEFENSE COUNCIL COMMENT 10-1

As a follow-up to the GHG Emissions Evaluation draft report shared on July 10th, the Natural Resources Defense Council (NRDC) provides the following comments and feedback.

Electricity emissions

First, the report inadequately covers emissions from electricity used in the production of hydrogen. The report assumes that all electricity inputs, to electrolysis or any other production pathways, will have zero associated GHG emissions. This is directly at odds with SoCalGas and Angeles Link's lack of commitment to require the three pillars of incrementality, hourly matching, and geographic deliverability for electrolytic production, as proposed by the Biden administration's proposed rule for the 45V tax credit in December 2023 FN1. Without requiring the three pillars, or some other mechanism, there is no reason to assume that the electricity used for hydrogen production to serve the pipeline does not increase GHG emissions on the grid.

While SoCalGas has not to our knowledge taken a public position against the three pillars, SoCalGas is a partner of the ARCHES hydrogen hub, with the Angeles Link pipeline a constituent project of ARCHES. The ARCHES hub has been publicly opposed to the three pillars FN2, despite strong evidence that they are required in California to meet the emissions thresholds required by the statute of the Inflation Reduction Act to qualify for the 45V tax credit. Therefore, rather than assuming that electrolytic hydrogen that is delivered by Angeles Link will be zero emissions, the GHG Emissions Evaluation Report must model the range of possible grid impacts.

We offer two studies as examples of the potential scale of GHG impacts from electrolytic production. Energy Innovation found that without requiring incrementality (also known as additionality), electrolytic hydrogen produced in California will have a GHG intensity of over 20 kgCO2e per kg of hydrogen FN3. Taking the medium demand scenario from the draft report, where 1 MMT of hydrogen delivered through Angeles Link results in an emissions reduction of 7.8 MMT CO2e due to displaced use of fossil fuels, the emissions associated with production would be over 20 MMT CO2e. The emissions from production are more than double the savings from using hydrogen, eliminating the climate benefit of Angeles Link and resulting in a net increase in emissions. Further, Princeton University studied the long-run emissions impact of various hydrogen tax credit requirements, and similarly found that in California, consequential emissions from hydrogen production without the three pillars are approximately 20 kg CO2 per kg of hydrogen. FN4 The authors of this paper have also explained in a follow up paperFN5 why their results are different, and more accurately represent the real world, than the short-run modelling relied upon by ARCHES and other groups attempting to weaken the three pillars. There is strong consensus among long-run models of the need for the three pillars to ensure emissions do not increase due to hydrogen production.

FN1 – Proposed Rule by the Internal Revenue Service and Treasury on the Section 45V Credit for Production of Clean Hydrogen, December 2023
https://www.federalregister.gov/documents/2023/12/26/2023-28359/section-45v-credit-for-production-of-clean-hydrogen-section-48a15-election-to-treat-clean-hydrogen

FN2 – February 27th 2024 comment from Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) to the Treasury on the proposed 45V rule of December 2023,
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FN3 – Energy Innovation. (n.d.). Smart Design Of 45V Hydrogen Production Tax Credit Will Reduce Emissions And Grow the Industry—Energy Innovation: Policy and Technology. Retrieved August 15, 2023, from https://energyinnovation.org/publication/smart-design-of-45v-hydrogen-production-tax-credit-will-reduceemissions-and-grow-the-industry/

FN4 – Ricks, W., Xu, Q., & Jenkins, J. D. (2023). Minimizing emissions from grid-based hydrogen production in the United States. Environmental Research Letters, 18(1), 014025. https://doi.org/10.1088/1748-9326/acacb5

FN5 – Ricks, W., Gagnon, P., & Jenkins, J. D. (2024). Short-run marginal emission factors neglect impactful phenomena and are unsuitable for assessing the power sector emissions impacts of hydrogen electrolysis. Energy Policy, 189, 114119. https://doi.org/10.1016/j.enpol.2024.114119

SOCALGAS RESPONSE TO COMMENT 10-1

As previously noted herein, Angeles Link is proposed as a non-discriminatory pipeline system dedicated to public use that would transport clean renewable hydrogen[19] from regional third-party production and storage sites to end users in Central and Southern California, including the Los Angeles Basin. SoCalGas's participation in ARCHES does not negate its commitment to and compliance with D.22-12-055. As the GHG Study explains, for purposes of the feasibility analysis, it was assumed that only renewable electricity would be used for production in line with the CPUC's definition of clean renewable hydrogen, which does not allow for the use fossil fuels in the hydrogen production process. SoCalGas will not be producing clean renewable hydrogen as part of Angeles Link, and it is anticipated that third-party producers would complete thorough environmental review of their projects when proposed pursuant to the CEQA and the NEPA, as applicable, and that review would evaluate the potential direct and indirect GHG emissions associated with that production. In addition, the separate Production Study sets forth the potential measures SoCalGas could take to confirm that the hydrogen transported by Angeles Link meets those applicable clean renewable hydrogen standards. (Refer to Production Study, Section 2.5.)

SoCalGas acknowledges the reference study materials provided by the commenter. The article "Minimizing emissions from grid-based hydrogen production in the United States" indicates that the 20 kg CO2e per kg hydrogen referenced by the commenter would result from electrolysis using 100% gas fired electricity. This hydrogen would not meet the CPUC definition of clean renewable hydrogen[19] and would not qualify for transmission by Angeles Link. In the article "Short-run marginal emission factors neglect impactful phenomena and are unsuitable for assessing the power sector emissions impacts of hydrogen electrolysis" the authors conclude that no method is perfect for evaluating electric-sector emissions impacts of hydrogen electrolysis.

[19] In D.22-12-055 at 42 and Findings of Fact (FOF) 34-35, clean renewable hydrogen refers to hydrogen that does not exceed 4 kilograms of carbon dioxide equivalent (CO2e) produced on a lifecycle basis per kilogram of hydrogen produced and does not use fossil fuels in the hydrogen production process, where fossil fuels are defined as a mixture of hydrocarbons including coal, petroleum, or natural gas, occurring in and extracted from underground deposits.

NATURAL RESOURCES DEFENSE COUNCIL COMMENT 10-2

Emissions savings that are forfeited by diverting clean energy to hydrogen production

Second, the draft report does not consider the GHG emissions consequences of diverting clean energy from other more productive uses. In a world with constrained renewable build out, this is a crucial consideration. For a direct example, battery electric trucks can travel three times farther than hydrogen fuel cell trucks for the same amount of renewable energy, therefore displacing three times more diesel emissions per unit of renewable energy. FN6 While certain specific heavy duty trucking needs may be well served by hydrogen fuel cell trucks, battery electric trucks will always have this significant efficiency advantage and therefore likely serve the majority of the heavy duty market as well as all of the light and medium duty market.

For power generation, using hydrogen as energy storage only has a round trip efficiency of approximately in the range of 18-46% FN7, and therefore can only be justified for long duration storage beyond the capabilities of batteries or other storage mediums with more favorable efficiencies. Given that some of the hydrogen delivered by Angeles Link is proposed to be combusted to generate power, and the fact that the hydrogen may not even be produced from all renewable energy (due to not requiring the three pillars), let alone entirely from avoided curtailment of renewables that could not be stored in batteries, there are significant GHG emissions consequences not captured in this draft report.

Even for hydrogen use cases that cannot be served by direct electrification, there is still an opportunity cost to using renewable energy for the production of hydrogen if it would otherwise have been used to displace fossil fuels on the grid, for example in a battery electric vehicle or a heat pump. This opportunity cost has GHG emissions impacts that are not captured by this draft report. One way to minimize, although not always eliminate, this impact is to require the three pillars, including incrementality, for hydrogen production.

FN6 – Wilson, S. (2023). Hydrogen-Powered Heavy-Duty Trucks: A review of the environmental and economic implications of hydrogen fuel for on -road freight. Union of Concerned Scientists. https://doi.org/10.47923/2023.15274

FN7 – https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/hydrogentechnology-faces-efficiency-disadvantage-in-power-storage-race-6516202

SOCALGAS RESPONSE TO COMMENT 10-2

SoCalGas acknowledges these comments. Conducting a state-wide evaluation of how the various clean energy resources will be allocated in the future and the associated GHG emissions consequences is beyond the scope of the GHG Study. It is relevant to mention that the feasibility study focuses on the aspects of the mobility sector and the hard-to-electrify industrial sector where hydrogen provides benefits with respect to GHG emissions reductions that electricity cannot.

As previously stated, Angeles Link would transport clean renewable hydrogen and SoCalGas's participation in ARCHES does not negate its commitment to and compliance with D.22-12-055. As the GHG Study explains, for purposes of the feasibility analysis, it was assumed that only renewable

electricity would be used for production in line with the CPUC's definition of clean renewable hydrogen, which does not allow for the use fossil fuels in the hydrogen production process.

Please note that regulatory changes may affect the roll-out and availability of certain technologies and the allocation of other energy sources. Cost effectiveness and affordability are important considerations for any technology, including, as provided in the commenter's example, trucks and battery energy storage.

NATURAL RESOURCES DEFENSE COUNCIL COMMENT 10-3

Emissions from biomass and RNG production pathways

Third, the report assumes that the carbon content of biomass and biomethane (also known as renewable natural gas or RNG) used for gasification or steam methane reformation is net zero. However, this assumption will not hold true unless these are unavoidable waste feedstocks. Without adequate guardrails, in particular around the use of credits or a book and claim system for biomethane, considerable GHG emissions could be underreported for these pathways. The greenhouse gas impacts from leakage of biomethane have also not been considered. SoCalGas should examine the full range of GHG impacts from these feedstocks and detail any requirements that will be made of their biomass and biomethane hydrogen production pathways to minimize these.

Similarly to electricity, the report should also consider if these biogenic feedstocks could be better utilized directly. Transforming biomethane to hydrogen involves energy losses that could be avoided if the biomethane can be used directly. The report should examine if more emissions could be displaced by direct use of biomethane compared to using it for hydrogen.

SOCALGAS RESPONSE TO COMMENT 10-3

In response to the comment concerning the carbon content of the renewable RNG used for gasification or SMR, the GHG Study discusses the potential use of RNG as a feedstock for SMR that could satisfy the CPUC's definition of clean renewable hydrogen. Details regarding the process are provided in Appendix A of the GHG Study. The Study states: "For the purposes of this study, it was assumed that renewable natural gas generated from dairy farms would be the feedstock for the SMR process." Anticipated GHG emissions associated with biomass gasification are described in detail in Appendix A of the GHG Study. The Study states that: "Based on the scientific literature, biomass gasification is likely a "carbon neutral" process and may have negative life cycle greenhouse gas emissions. It is assumed for the purposes of this study, that a "carbon neutral" source of biomass will be selected for the production of hydrogen to be distributed by Angeles Link." In addition, the separate Production Planning & Assessment Study (Production Study) sets forth the potential measures SoCalGas could take to confirm that the hydrogen transported by Angeles Link meets those applicable clean renewable hydrogen standards. (Refer to Production Study, Section 2.5.)

SoCalGas will not be producing clean renewable hydrogen as part of Angeles Link, and it is anticipated that third-party producers would complete thorough environmental review of their projects when proposed pursuant to the CEQA and NEPA, as applicable, and that review would evaluate the potential GHG emissions associated with that production.

Potential GHG emission associated with RNG used for gasification or SMR could be evaluated at the time such third-party production projects are proposed based on the specific details of those projects. In response to the comment concerning the potential leakage from of biomethane, given that SoCalGas does not propose to produce clean renewable hydrogen and that details of third-party production projects are not available, analysis of potential leakage from biomethane, beyond the anticipated ranges for third party production options provided in the Leakage Study, would be speculative and is outside the scope of the Angeles Link feasibility analyses. A preliminary high-level volumetric analysis of leakage associated with general hydrogen infrastructure and Angeles Link infrastructure was included in the

Leakage Study and those results were used in the GHG Study to estimate the impact of the potential for leakage on the overall estimated GHG reductions.

In response to the comment concerning the use of biogenic feedstocks directly, such analysis is outside the scope of the Angeles Link feasibility analyses.

NATURAL RESOURCES DEFENSE COUNCIL COMMENT 10-4

Warming impact of hydrogen emissions

NRDC acknowledges the progress made on the issue of the warming impact of hydrogen with its inclusion in this report. However, the current estimates in the report are likely to be a significant underestimate of the full indirect warming impact from hydrogen leakage. The warming impacts estimated in the draft report rely on the levels of leakage from the leakage report, which fails to take into account any hydrogen leakage during production or end use, and only includes hydrogen leakage from the pipeline itself. This is inconsistent with the GHG accounting framework for other warming gases, where the impacts of using hydrogen on emission from fossil fuels at the end use stage, and the impacts of combusting feedstocks at the production stage, are clearly within scope. Therefore, both this report and the leakage report should be updated to include leakage estimates for the entire hydrogen value chain associated with the proposed pipeline. Also, the estimated warming impact needs to be factored into the headline GHG impacts, not reported separately.

SOCALGAS RESPONSE TO COMMENT 10-4

Within the Leakage Study, a high-level estimate of the potential for leakage was prepared for general hydrogen infrastructure which includes pipeline infrastructure, compression, and also third-party production and storage, as described in Section 4.3 of the Leakage Study. A similar analysis was also performed for Angeles Link infrastructure comprised of pipelines and compressors. This information was used to estimate the potential impact to overall GHG emission reductions, for both general hydrogen infrastructure and Angeles Link infrastructure, as described in Section 9.2 of the GHG Study. With respect to end-users, additional information would be needed to expand the scope of the Leakage Study to project hydrogen leakage rates for each sub-sector within the three primary sectors of potential end-users (mobility, power generation, and hard-to-electrify industrial). This Phase 1 analysis was conducted using a top-down approach, at a high level rather than at a granular facility level and equipment specific level. The limited information that has been found regarding the potential for leakage at end users was included in Global Response 2 in the Q2 2024 Angeles Link Quarterly Report. Further investigation would be needed to evaluate whether any of the estimated values amongst the wide ranges would appropriate predictors for Angeles Link end users. The GHG analysis was prepared in response to stakeholder requests and given the speculative nature of the preliminary high-level leakage estimates was provided in a separate section of the GHG Study rather than incorporated into the overall GHG emission reduction estimates.

NATURAL RESOURCES DEFENSE COUNCIL COMMENT 10-5

Links to demand study

Finally, as detailed in our joint comments with the Environmental Defense Fund on the demand study draft report on February 23rd 2024, we find significant shortcomings in the demand study and potential overestimations of hydrogen demand to be served by Angeles Link. The results are much higher than, for example, the California Air Resources Board's Scoping Plan. The calculations of GHG emissions reductions in this report, which rely on the demand scenarios that result from the demand study, are predicated on the same extremely high levels of demand for hydrogen. SoCalGas should incorporate the feedback from EDF, NRDC and the rest of the Pipeline Advisory Group to the demand study and apply the updated results to the GHG evaluation.

SOCALGAS RESPONSE TO COMMENT 10-5

Please refer to SoCalGas's Q1 2024 Angeles Link Quarterly Report (Global Response 1 – Demand Study) and the Demand Study for further information on hydrogen demand.

Comment Letter 11 – Communities for a Better Environment

Comment Letter 11

COMMUNITIES FOR A BETTER ENVIRONMENT
40 years | established 1978

August 14, 2024

Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback to Southern California Gas Company on Greenhouse Gas Emissions Evaluation Draft Report

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Greenhouse Gas Emissions Evaluation Draft Report (Draft Report) provided on July 10, 2024. First and foremost, a greenhouse gas (GHG) emissions study should identify emissions sources for a proposed project. Once emissions sources have been identified, the study can investigate each source's GHG emissions volume, characteristics, and impacts. The emissions from each source must be identified and quantified to develop a picture of the whole project's estimated emissions. The foundation of the project's estimated emissions must be the basis for the study to proceed to analyze project emissions reductions. The Draft Report does not identify all GHG emissions sources for the Angeles Link Project (ALP). Rather, it analyzes fragments of the emissions from "third-party production, third-party storage, and transmission of hydrogen" before turning to make sweeping assumptions about emissions reductions based on limited data. The result is a report which does not accurately estimate the ALP's GHG emissions or the emissions reduction that the project will facilitate.

Comment 11-01

Several of the most significant omissions or flawed assumptions are raised by Communities for a Better Environment here. As an initial matter, the Draft Report does not correct several significant errors raised by CBE's March 29, 2024 feedback on SoCalGas's "Greenhouse Gas Emissions Preliminary Data and Findings" In that feedback, CBE noted that the preliminary findings:

- Relied on flawed demand data in calculating greenhouse gas emissions and emissions reductions.
- Severely underestimated emissions from hydrogen production.
- Ignored lifetime emissions from hydrogen infrastructure.

As this letter explores, the Draft Report builds on these errors, by failing to analyze emissions from project construction, water treatment, water procurement, and methane leakage. These omissions and the compounding effect of overreliance on the flawed demand report result in emissions calculation failures.

1

I. The Draft Report fails to examine significant sources of climate pollution that must be explored to establish an accurate depiction of the ALP's greenhouse gas impacts

The Draft Report assumes that zero climate warming emissions will be generated to electrolyze, gasify, or steam reform the hydrogen transported by the ALP between 2030-2045. Each of these production methods can produce GHG emissions. Both biomass gasification and steam methane reformation (SMR) are chemical reactions that necessarily produce GHG emissions.[1] Electrolysis produces GHG emission unless all energy needs (including water conveyance and intensive purification) are supplied by dedicated zero emission resources like wind or solar. The Draft Report's assumption that hydrogen production will produce zero-emissions by 2030 is not realistic.

While CBE strongly advocates for hydrogen to be produced exclusively through electrolysis powered by wind and solar, there are no laws or regulations which mandate this. The California Air Resources Board's 2022 Scoping Plan assumes that two-thirds of the Statewide Hydrogen demand (1.9 million metric tons (MMT) per year, which is significantly lower than the ALP Demand Study estimates) will be produced by electrolysis by 2045. Supplying just this portion via electrolysis would require approximately 25 gigawatts of new, dedicated "off-grid"[2] solar capacity.[3] CARB ambitiously assumes that this capacity will be available by 2045; the Draft Report assumes without support that this capacity will be available by 2030. The 2030 timeline would require over 5 gigawatts of new solar every year built solely for hydrogen production on top of California's existing solar build rate. Concerningly, the Draft Report does not provide support for a 2030 timeline for development of off-grid resources that could result in a zero-emission scenario.

Comment 11-02

The Draft Report's GHG emissions assumptions for biomass gasification and steam methane reformation must be rectified. The GHG study assumes that biomass gasification will not produce GHG emissions.[4] The process of biomass gasification creates CO_2 emissions.[5] Strangely, while the Draft Report notes that "[t]he carbon intensity of biomass gasification can vary based on a variety of… inputs" the report nonetheless assumes zero-emissions for the process.[6] The process of SMR creates CO_2 emissions.[7] Without carbon capture systems, which

[1] PSE Healthy Energy, Green Hydrogen Proposals Across California, at 20-21, May 21, 2024, (available online at https://www.psehealthyenergy.org/wp-content/uploads/2024/05/Green-Hydrogen-Proposals-Across-California.pdf).
[2] Dedicated, off grid renewables are necessary for zero-emissions hydrogen. Simply adding zero-emission generation capacity to the grid does achieve zero-emissions.
[3] Green Hydrogen Proposals Across California at 55.
[4] The Draft Report assumes that SMR will produce nominal GHG emissions from N_2O but does not discuss CO_2 emissions.
[5] US DOE, Hydrogen Production: Biomass Gasification, (https://www.energy.gov/eere/fuelcells/hydrogen-production-biomass-gasification); Draft Report at 122.
[6] Draft Report at 123.
[7] US DOE, Hydrogen Production: Natural Gas Reforming, (https://www.energy.gov/eere/fuelcells/hydrogen-production-natural-gas-reforming); Draft Report at 122.

2

increase energy intensity, SMR generates 8.47 kilograms of CO_2 per kilogram of hydrogen. In other words, without a clear discussion of where the ALP's hydrogen sources avoid these emissions, one can assume 12.7 MMT of CO_2 equivalent for the ALP's 1.5 MMT throughput of hydrogen.[8] The Draft Report does not explain why these per unit emissions for gasification or SMR are not calculated, let alone final emissions value. The Report's assumptions are further complicated by its conclusion that various forms of combustion equipment are fueled by zero-emissions hydrogen without substantiation. Without proper analysis of such potentially significant sources of GHG emissions, the Draft Report provides a misleading picture of potential ALP related GHG emissions.

Comment 11-02

II. The Draft Report is in large part premised on the draft Demand Report, which is both flawed and does not represent the carrying capacity of the ALP

The Draft Report bases a large portion of the discussion and conclusion on theoretical emissions and emissions reductions based on hydrogen usage estimated in SoCalGas' Demand Study. The Demand Study does not accurately forecast hydrogen demand which skews the Draft Report's stated emissions figures. This error is compounded because neither the Demand Study nor the Draft Report closely consider the impact of hydrogen alternatives (and whether the claimed emissions reductions benefits will be achieved by hydrogen or by electrification). Parties have already raised that Demand Study does not appropriately account for the cost of hydrogen, the volume supplied by the ALP, or the timing of hydrogen project readiness.[9] These errors result in a substantially inflated demand. In fact, the Demand Study estimates hydrogen demand three-times greater than CARB's 2022 Scoping Plan[10] and four times greater than the ALP's maximum estimated throughput.[11] In applying the overly broad projections of the Demand Study, the Draft Report fails to clearly explain how the inflated Sothern California demand estimates reflect or relate to emissions or emissions reductions specifically from the ALP.

Comment 11-03

III. The Draft Report ignores lifetime emissions from hydrogen infrastructure

The Draft Report repeats the error of the initial GHG Study by using a brief, 15-year window to examine ALP GHG emissions and emissions reductions. Not only does the Draft

Comment 11-04

[8] Or 50 MMT of CO_2 equivalent emissions for the entire high demand scenario. Mary Katebah, et al., Analysis of hydrogen production costs in Steam-Methane Reforming considering integration with electrolysis or CO_2 capture, at 4, Cleaner Engineering and Technology 10 (2022) (https://doi.org/10.1016/j.clet.2022.100552).
[9] Utility Consumers' Action Network, Feedback for SoCalGas Regarding Demand Study Technical Approach/Data & Preliminary Findings, Sept. 25, 2023; Environmental Defense Fund & Natural Resources Defense Council, Environmental Defense Fund and Natural Resources Defense Council Comments on the Demand Study Draft Report, Feb. 23, 2024; UCAN, Feedback for SoCalGas Regarding Angeles Link Demand Report Draft, Feb. 26, 2024.
[10] The Scoping Plan estimates a hydrogen demand of approximately 1.9 MMT per year *statewide in 2045*. Green Hydrogen Proposals Across California at 17, fn. 16.
[11] Draft Report at 9.

Report acknowledge that federal hydrogen production standards look at lifecycle emissions, Appendix B discusses available data on lifecycle emissions (referred to as "well-to-gate").[12] Despite this, the data discussed in Appendix B is not incorporated into the Draft Report, which without explanation assumes zero or nominal emissions for all hydrogen production scenarios.

Comment 11-04

The Draft Report's limited 2030-2045 window also excludes crucial future impacts such as extended reliance on and intensification production of methane to produce hydrogen, and continued acceleration of direct electrification eliminating emissions ahead of hydrogen. Direct electrification is significantly more efficient and less expensive than hydrogen for many applications SoCalGas claims the ALP will serve.[13] The Draft Report does not analyze GHG emissions from hydrogen feedstocks or hydrogen alternatives. As CBE previously raised, without this analysis, the ALP's emissions and emissions reductions claims are not credible.

Comment 11-05

IV. The Draft Report ignores known sources of climate emissions

The Draft Report does not analyze emissions from project construction, water treatment, water procurement, and methane leakage, despite available data. First and foremost, a GHG emissions report should identify emissions sources for a proposed project. Once those sources have been identified for study (and for the awareness of parties involved in the ALP process) the report can and should discuss each of the source emissions (and emissions reductions, as the Draft Report does so extensively).

The Draft Report fails to take this initial step, missing several emissions sources entirely and burying mention of others, sans analysis, deep in appendices. The following examples illustrate SoCalGas's procedural failures in analysis despite topic-specific prompting:

Comment 11-06

- *Water Feedstock Emissions*: Several parties, in comments and meetings, have raised the issue of emissions stemming from water procurement and processing. The Draft Report, in Appendix B mentions that water "may" require treatment, increasing energy demand, but neither analyzes this issue nor integrates it into the Draft Report. Without understanding the energy intensity of water treatment (all water sources analyzed in the ALP Water Study required treatment), the Draft Report is not complete.
- *Project Construction*: The ALP, if constructed, will generate GHG emissions from construction, as acknowledged in SoCalGas's Environmental Social Justice Draft Screening Report and the Environmental Analysis Draft Report.[14] Though the Draft

[12] Draft Report at 99, 121-23 (appx. B).
[13] *See, e.g.* Green Hydrogen Proposals Across California at 29-42, figs. 3.1-3.4; Draft Report at 12.
[14] SoCalGas, Environmental Social Justice Draft Screening, July 2024, at 11 (acknowledged as Ozone). SoCalGas, Environmental Analysis Draft Report, July 2024, at 6. "Pipeline construction, operation, and maintenance could result in potential impacts associated with air quality and GHG emissions."

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Report covers the period "from construction"[15] through 2045, it does not consider construction emissions.

- *Methane Leakage*: Methane is a powerful greenhouse gas. "Upstream emissions have a substantial impact on overall [hydrogen production] plant emissions and the dominant aspect is the methane leak rate."[16] Despite citing studies which analyze methane leakage in the hydrogen industry, the GHG report does not discuss the issue.

Comment 11-06

These are just three examples of what could be numerous omissions from the Draft Report's emissions analysis. These examples raise significant concerns regarding the scope and reliability of the Draft Report's GHG emissions analysis.

V. Conclusion

Communities for a Better Environment appreciates the opportunity to provide feedback on the Draft Report. Due to the omissions and flawed assumptions discussed above, the Draft Report does not provide meaningful GHG emissions data for the ALP. The focus on emissions reductions, while several emissions sources and emissions values are either ignored or unreasonably reduced, indicates that the Draft Report severely underestimates the ALP's GHG impacts. CBE recommends SoCalGas rectify all issues raised in this letter before issuing a final GHG report to provide serviceable data by which the ALP can be assessed.

Comment 11-07

Respectfully Submitted,

Theo Caretto
Communities for a Better Environment

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group
Angeles Link PAG Service List

[15] Draft Report at 20.
[16] Mary Katebah, et al. at 11.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 11-1

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Greenhouse Gas Emissions Evaluation Draft Report (Draft Report) provided on July 10, 2024. First and foremost, a greenhouse gas (GHG) emissions study should identify emissions sources for a proposed project. Once emissions sources have been identified, the study can investigate each source's GHG emissions volume, characteristics, and impacts. The emissions from each source must be identified and quantified to develop a picture of the whole project's estimated emissions. The foundation of the project's estimated emissions must be the basis for the study to proceed to analyze project emissions reductions. The Draft Report does not identify all GHG emissions sources for the Angeles Link Project (ALP). Rather, it analyzes fragments of the emissions from "third-party production, third-party storage, and transmission of hydrogen" before turning to make sweeping assumptions about emissions reductions based on limited data. The result is a report which does not accurately estimate the ALP's GHG emissions or the emissions reduction that the project will facilitate.

Several of the most significant omissions or flawed assumptions are raised by Communities for a Better Environment here. As an initial matter, the Draft Report does not correct several significant errors raised by CBE's March 29, 2024 feedback on SoCalGas's "Greenhouse Gas Emissions Preliminary Data and Findings" In that feedback, CBE noted that the preliminary findings:

- Relied on flawed demand data in calculating greenhouse gas emissions and emissions reductions.
- Severely underestimated emissions from hydrogen production.
- Ignored lifetime emissions from hydrogen infrastructure.

As this letter explores, the Draft Report builds on these errors, by failing to analyze emissions from project construction, water treatment, water procurement, and methane leakage. These omissions and the compounding effect of overreliance on the flawed demand report result in emissions calculation failures.

SOCALGAS RESPONSE TO COMMENT 11-1

As stated in the GHG Study, this feasibility study is based on information currently available, and the analysis and corresponding conclusions are likely to evolve over time.

Concerning data from the Demand Study used to estimate GHG emissions and emission reductions, please refer to Response to Comment 8-1, Response to Comment 9-1, Demand Study, and Q1 2024 Quarterly Report (Global Response 1 – Demand Study), for more information about hydrogen demand projections.

In response to the comment concerning emissions from hydrogen production, please refer to Responses to Comments 4-3, 4-4, and 5-3 in the Q1 2024 Quarterly Report for assumptions used to estimate potential GHG emissions from third-party hydrogen production. Angeles Link will convey clean renewable hydrogen as defined by applicable regulatory requirements.

In response to the comment concerning lifetime emissions from hydrogen infrastructure, please refer to Response to Comment 4-4 in the Q1 2024 Quarterly Report and Appendix B (Carbon Intensity Evaluation of Third Party Production Options) of the GHG Study.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 11-2

I. The Draft Report fails to examine significant sources of climate pollution that must be explored to establish an accurate depiction of the ALP's greenhouse gas impacts

The Draft Report assumes that zero climate warming emissions will be generated to electrolyze, gasify, or steam reform the hydrogen transported by the ALP between 2030-2045. Each of these production methods can produce GHG emissions. Both biomass gasification and steam methane reformation (SMR) are chemical reactions that necessarily produce GHG emissions' Electrolysis produces GHG emission unless all energy needs (including water conveyance and intensive purification) are supplied by dedicated zero emission resources like wind or solar. The Draft Report's assumption that hydrogen production will produce zero emissions by 2030 is not realistic.

While CBE strongly advocates for hydrogen to be produced exclusively through electrolysis powered by wind and solar, there are no laws or regulations which mandate this. The California Air Resources Board's 2022 Scoping Plan assumes that two-thirds of the Statewide Hydrogen demand (1.9 million metric tons (MMT) per year, which is significantly lower than the ALP Demand Study estimates) will be produced by electrolysis by 2045. Supplying just this portion via electrolysis would require approximately 25 gigawatts of new, dedicated "off-grid" FN2 solar capacity. FN3 CARB ambitiously assumes that this capacity will be available by 2045; the Draft Report assumes without support that this capacity will be available by 2030. The 2030 timeline would require over 5 gigawatts of new solar every year built solely for hydrogen production on top of California's existing solar build rate. Concerningly, the Draft Report does not provide support for a 2030 timeline for development of off-grid resources that could result in a zero-emission scenario.

The Draft Report's GHG emissions assumptions for biomass gasification and steam methane reformation must be rectified. The GHG study assumes that biomass gasification will not produce GHG emissions. FN4 The process of biomass gasification creates CO2 emissions. FN5 Strangely, while the Draft Report notes that "[t]he carbon intensity of biomass gasification can vary based on a variety of… inputs" the report nonetheless assumes zero-emissions for the process. FN6 The process of SMR creates CO2 emissions. FN7 Without carbon capture systems, which increase energy intensity, SMR generates 8.47 kilograms of CO2 per kilogram of hydrogen. In other words, without a clear discussion of where the ALP's hydrogen sources avoid these emissions, one can assume 12.7 MMT of CO2 equivalent for the ALP's 1.5 MMT throughput of hydrogen. FN8 The Draft Report does not explain why these per unit emissions for gasification or SMR are not calculated, let alone final emissions value. The Report's assumptions are further complicated by its conclusion that various forms of combustion equipment are fueled by zero-emissions hydrogen without substantiation. Without proper analysis of such potentially significant sources of GHG emissions, the Draft Report provides a misleading picture of potential ALP related GHG emissions.

FN1 – PSE Healthy Energy, Green Hydrogen Proposals Across California, at 20-21, May 21, 2024, (available online at https://www.psehealthyenergy.org/wp-content/uploads/2024/05/Green-Hydrogen-Proposals-Across-California.pdf).

FN2 – Dedicated, off grid renewables are necessary for zero-emissions hydrogen. Simply adding zero-emission generation capacity to the grid does achieve zero-emissions.

FN3 – Green Hydrogen Proposals Across California at 55.

FN4 – The Draft Report assumes that SMR will produce nominal GHG emissions from N2O but does not discuss CO2 emissions.

FN5 – US DOE, Hydrogen Production: Biomass Gasification, (https://www.energy.gov/eere/fuelcells/hydrogenproduction-biomass-gasification); Draft Report at 122.

FN6 – Draft Report at 123.

FN7 – US DOE, Hydrogen Production: Natural Gas Reforming, (https://www.energy.gov/eere/fuelcells/hydrogenproduction-natural-gas-reforming); Draft Report at 122.

FN8 – Or 50 MMT of CO2 equivalent emissions for the entire high demand scenario. Mary Katebah, et al., Analysis of hydrogen production costs in Steam-Methane Reforming considering integration with electrolysis or CO2 capture, at 4, Cleaner Engineering and Technology 10 (2022) (https://doi.org/10.1016/j.clet.2022.100552).

SOCALGAS RESPONSE TO COMMENT 11-2

Contrary to the comment provided, as shown in Table 10 of the GHG Study, the GHG estimates for third-party production options range from 0 to 12,701 MT CO_2e per year depending on the year, throughput scenario, and production scenario. Various scenarios were evaluated to develop this range as described in the GHG Study and the highest values were used to represent each component of the proposed infrastructure that was analyzed.

The GHG Study analysis is based on anticipated Angeles Link throughput values (i.e., ranging from 0.5 million metric tonnes (MMT) per year to 1.5 MMT per year) as described in the GHG Study. The 1.9 MMT/yr value mentioned in the comment was the value evaluated as the conservative Demand Scenario value for 2045 (rather than 2030 as noted by the stakeholder).

With respect to comments regarding biomass gasification and steam methane reforming (SMR) of renewable natural gas (RNG), details regarding GHG emissions for third-party production options and for carbon intensity of third-party production options are provided in Appendix A and Appendix B, respectively, of the GHG Study. In response to the comment concerning the carbon content of the renewable RNG used for gasification or SMR, the GHG Study discusses the potential use of RNG as a feedstock for SMR that could satisfy the CPUC's definition of clean renewable hydrogen. Details regarding the process are provided in Appendix A of the GHG Study. The Study states: "For the purposes of this study, it was assumed that renewable natural gas generated from dairy farms would be the feedstock for the SMR process." Anticipated GHG emissions associated with biomass gasification are described in detail in Appendix A of the GHG Study. The Study states that: "Based on the scientific literature, biomass gasification is likely a "carbon neutral" process and may have negative life cycle greenhouse gas emissions. It is assumed for the purposes of this study, that a "carbon neutral" source of biomass will be selected for the production of hydrogen to be distributed by Angeles Link." SoCalGas will not be producing clean renewable hydrogen as part of Angeles Link, and it is anticipated that third-party producers would complete thorough environmental review of their projects when proposed pursuant to the CEQA and the NEPA, as applicable, and that review would evaluate the potential GHG

emissions associated with that production. In addition, the separate Production Study sets forth the potential measures SoCalGas could take to confirm that the hydrogen transported by Angeles Link meets those applicable clean renewable hydrogen standards. (Refer to Production Study, Section 2.5.)

Please also refer to Global Response 6.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 11-3

II. The Draft Report is in large part premised on the draft Demand Report, which is both flawed and does not represent the carrying capacity of the ALP

The Draft Report bases a large portion of the discussion and conclusion on theoretical emissions and emissions reductions based on hydrogen usage estimated in SoCalGas' Demand Study. The Demand Study does not accurately forecast hydrogen demand which skews the Draft Report's stated emissions figures. This error is compounded because neither the Demand Study nor the Draft Report closely consider the impact of hydrogen alternatives (and whether the claimed emissions reductions benefits will be achieved by hydrogen or by electrification). Parties have already raised that Demand Study does not appropriately account for the cost of hydrogen, the volume supplied by the ALP, or the timing of hydrogen project readiness. FN9 These errors result in a substantially inflated demand. In fact, the Demand Study estimates hydrogen demand three times greater than CARB's 2022 Scoping Plan FN10 and four times greater than the ALP's maximum estimated throughput. FN11 In applying the overly broad projections of the Demand Study, the Draft Report fails to clearly explain how the inflated Sothern California demand estimates reflect or relate to emissions or emissions reductions specifically from the ALP.

FN9 – Utility Consumers' Action Network, Feedback for SoCalGas Regarding Demand Study Technical Approach/Data & Preliminary Findings, Sept. 25, 2023; Environmental Defense Fund & Natural Resources Defense Council, Environmental Defense Fund and Natural Resources Defense Council Comments on the Demand Study Draft Report, Feb. 23, 2024; UCAN, Feedback for SoCalGas Regarding Angeles Link Demand Report Draft, Feb. 26, 2024.

FN10 – The Scoping Plan estimates a hydrogen demand of approximately 1.9 MMT per year statewide in 2045. Green Hydrogen Proposals Across California at 17, fn. 16.

FN11 – Draft Report at 9.

SOCALGAS RESPONSE TO COMMENT 11-3

The GHG Study conducts analyses related to the Demand Scenarios, as well as based on anticipated Angeles Link throughput values (i.e., ranging from 0.5 MMT per year to 1.5 MMT per year) as described in the GHG Study. The estimated overall GHG reductions are provided in Table 16 of the GHG Study with detailed results for each aspect of general hydrogen infrastructure and end users provided in Tables 10 through 15. For additional response related to the Demand Study assumptions that informed the GHG analysis, please refer to Response to Comment 8-1, Response to Comment 9-1, and the Q1 2024 Quarterly Report (Global Response 1 – Demand Study).

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 11-4

III. The Draft Report ignores lifetime emissions from hydrogen infrastructure

The Draft Report repeats the error of the initial GHG Study by using a brief, 15-year window to examine ALP GHG emissions and emissions reductions. Not only does the Draft Report acknowledge that federal hydrogen production standards look at lifecycle emissions, Appendix B discusses available data on lifecycle emissions (referred to as "well-to-gate"). FN12 Despite this, the data discussed in Appendix B is not incorporated into the Draft Report, which without explanation assumes zero or nominal emissions for all hydrogen production scenarios.

FN12 – Draft Report at 99, 121-23 (appx. B).

SOCALGAS RESPONSE TO COMMENT 11-4

The GHG Study analysis was based on Demand Study assumptions including the fifteen-year window from 2030 to 2045 that was evaluated. The estimated range of GHG emissions for third-party production options is provided in Table 10 of the GHG Study. Contrary to the comment, as shown in Table 10, the GHG estimates for third-party production options range from 0 to 12,701 MT CO2e per year depending on the year, throughput scenario, and production scenario. Various scenarios were evaluated to develop this range as described in the GHG Study and the highest values were used to represent each component of the proposed infrastructure that was analyzed.

The information provided in Appendix B was added in response to stakeholder's request. Additional clarification will be added to the GHG Study Sections 3.2.1, 5.1.1, 7.1.1, and Appendix B.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 11-5

The Draft Report's limited 2030-2045 window also excludes crucial future impacts such as extended reliance on and intensification production of methane to produce hydrogen, and continued acceleration of direct electrification eliminating emissions ahead of hydrogen. Direct electrification is significantly more efficient and less expensive than hydrogen for many applications SoCalGas claims the ALP will serve. FN13 The Draft Report does not analyze GHG emissions from hydrogen feedstocks or hydrogen alternatives. As CBE previously raised, without this analysis, the ALP's emissions and emissions reductions claims are not credible.

FN13 – See, e.g. Green Hydrogen Proposals Across California at 29-42, figs. 3.1-3.4; Draft Report at 12.

SOCALGAS RESPONSE TO COMMENT 11-5

The GHG Study analysis was based on Demand Study assumptions including the fifteen-year window from 2030 to 2045 that was evaluated. For additional response related to the Demand Study, please refer to Response to Comment 9-1 and SoCalGas's Q1 2024 Angeles Link Quarterly Report (Global Response 1 – Demand Study). For consideration of alternatives, please refer to the Alternatives Study.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 11-6

IV. The Draft Report ignores known sources of climate emissions

The Draft Report does not analyze emissions from project construction, water treatment, water procurement, and methane leakage, despite available data. First and foremost, a GHG emissions report should identify emissions sources for a proposed project. Once those sources have been identified for study (and for the awareness of parties involved in the ALP process) the report can and should discuss each of the source emissions (and emissions reductions, as the Draft Report does so extensively).

The Draft Report fails to take this initial step, missing several emissions sources entirely and burying mention of others, sans analysis, deep in appendices. The following examples illustrate SoCalGas's procedural failures in analysis despite topic-specific prompting:

• Water Feedstock Emissions: Several parties, in comments and meetings, have raised the issue of emissions stemming from water procurement and processing. The Draft Report, in Appendix B mentions that water "may" require treatment, increasing energy demand, but neither analyzes this issue nor integrates it into the Draft Report. Without understanding the energy intensity of water treatment (all water sources analyzed in the ALP Water Study required treatment), the Draft Report is not complete.

• Project Construction: The ALP, if constructed, will generate GHG emissions from construction, as acknowledged in SoCalGas's Environmental Social Justice Draft Screening Report and the Environmental Analysis Draft Report. FN14 Though the Draft Report covers the period "from construction" FN15 through 2045, it does not consider construction emissions.

• Methane Leakage: Methane is a powerful greenhouse gas. "Upstream emissions have a substantial impact on overall [hydrogen production] plant emissions and the dominant aspect is the methane leak rate." FN16 Despite citing studies which analyze methane leakage in the hydrogen industry, the GHG report does not discuss the issue.

These are just three examples of what could be numerous omissions from the Draft Report's emissions analysis. These examples raise significant concerns regarding the scope and reliability of the Draft Report's GHG emissions analysis.

FN14 – SoCalGas, Environmental Social Justice Draft Screening, July 2024, at 11 (acknowledged as Ozone). SoCalGas, Environmental Analysis Draft Report, July 2024, at 6. "Pipeline construction, operation, and maintenance could result in potential impacts associated with air quality and GHG emissions."

FN15 – Draft Report at 20.
FN16 – Mary Katebah, et al. at 11.

SOCALGAS RESPONSE TO COMMENT 11-6

In response to the comment concerning potential GHG emissions from the construction of Angeles Link, more granular analysis would be speculative at this time. Project specific construction emissions for Angeles Link will be evaluated in future phases as a part of the CEQA/NEPA process, as more details of

the project description are refined. Details necessary for the analysis of GHG emissions associated with construction include a single preferred pipeline route, in addition to more developed information related to the ancillary equipment, earthwork equipment, and other construction equipment needed for construction.

In response to the comment concerning potential GHG emissions associated with water conveyance and treatment that may be needed for clean renewable hydrogen production, SoCalGas does not proposed to produce clean renewable hydrogen as part of Angeles Link. In response to stakeholders requesting information related to GHG emissions and water conveyance and treatment, SoCalGas added a new chapter to the Water Resources Evaluation (Chapter 5: Supplemental Desktop Analysis - Greenhouse Gas Emissions Associated with Water Treatment and Conveyance). This desktop analysis provides the level of analysis that could be completed at this feasibility stage. Third-party producers would evaluate potential GHG emissions associated with water conveyance and treatment for production at the time specific production projects are proposed. For additional information related to third-party producers conducting analysis of GHG emissions associated with water conveyance and treatment, please also refer to Global Response 1.

In response to the comment concerning methane leakage, this was out of scope for the Leakage and GHG Studies. However, for hydrogen leakage, within the Leakage Study, a high-level estimate of the potential for leakage was prepared for general hydrogen infrastructure which includes pipeline infrastructure, compression, and also third-party production and storage, as described in Section 4.3 of the Leakage Study. A similar analysis was also performed for Angeles Link infrastructure comprised of pipelines and compressors. This information was used to estimate the potential impact to overall GHG emission reductions, for both general hydrogen infrastructure and Angeles Link infrastructure, as described in Section 9.2 of the GHG Study.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 11-7

V. Conclusion

Communities for a Better Environment appreciates the opportunity to provide feedback on the Draft Report. Due to the omissions and flawed assumptions discussed above, the Draft Report does not provide meaningful GHG emissions data for the ALP. The focus on emissions reductions, while several emissions sources and emissions values are either ignored or unreasonably reduced, indicates that the Draft Report severely underestimates the ALP's GHG impacts. CBE recommends SoCalGas rectify all issues raised in this letter before issuing a final GHG report to provide serviceable data by which the ALP can be assessed.

SOCALGAS RESPONSE TO COMMENT 11-7

This GHG Study conducts an initial evaluation of projected GHG emissions from hydrogen infrastructure including those attributable to third-party production and third-party storage, as well as anticipated GHG reductions from end users. This feasibility study is based on information currently available, and the analysis and corresponding conclusions are expected to evolve over time.

Comment Letter 12 – Communities for a Better Environment

Comment Letter 12

COMMUNITIES FOR A BETTER ENVIRONMENT
40 years | established 1978

August 14, 2024

Southern California Gas Company
555 West Fifth Street
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback for Southern California Gas Company on the Nitrogen Oxides (NOx) and Other Air Emissions Assessment Draft Report

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Nitrogen Oxides (NOx) and other Air Emissions Assessment Draft Report (the "Report" or "Study") provided on July 17, 2024. This letter discusses serious errors that the final report must remedy. The Report fails to discuss NOx emissions or other air emissions focused on construction and operations of Angeles Link and the emissions impact on communities. Instead, it repeatedly emphasizes that there will be widespread market adoption of hydrogen in California and that the Angeles Link Project (ALP) will help satisfy this high demand for clean renewable hydrogen. It contends that third-party production will generate relatively little NOx and claims that end-uses of transported hydrogen will result in massive emissions reductions. California Public Utilities Commission (CPUC) Decision 22-12-055 emphasizes the importance of stakeholder engagement. Meaningful engagement is impeded where key information is either omitted or presented in a misleading manner. Particularly, the Report:

Comment 12-01

- Cherry Picks What is Within Scope and Out of Scope for the Study, Claims and Overemphasizes Emissions Reductions to Make ALP Seem Beneficial, and Minimizes or Excludes Facts that are Unfavorable to Perception of ALP
- Features Faulty, Unreasonable Assumptions about NOx Emissions, Especially Related to Biomass Gasification
- Draws a Major False Equivalency between Electrolysis and Biomass Gasification
- Contains Internal Contradictions about Third-Party Hydrogen Production Methods and Renewable Electricity
- Lacks Comparisons to NOx Emission Reductions from Battery Electric Vehicles Displacing Fossil Fuels in the Mobility Sector
- Relies on Proxy Emission Factors and Concedes Many Unknowns about 100% Hydrogen, Thereby Undermining the Supposed Feasibility of ALP

1

I. The Report Cherry Picks What is Within Scope and Out of Scope for the Study, Claims and Overemphasizes Emissions Reductions to Make ALP Seem Beneficial, and Minimizes or Excludes Facts that are Unfavorable to Perception of ALP

The Report selectively includes favorable aspects of Angeles Link and the lifecycle of hydrogen as being within the scope of a Phase 1 feasibility study and excludes the unfavorable aspects as being out of scope. Critically, the Report does not include air pollution emissions from hydrogen combustion in the commercial sector. The Study also buries this caveat deep in the report. For example, we are not told until the section containing SoCalGas's responses to stakeholder comments more than two-thirds of the way into the report that "[t]he Study does not evaluate hydrogen combustion for commercial…end users."[1] The major problem here is that although SoCalGas takes credit for NOx and other emissions reductions from third-party end users,[2] SoCalGas distances itself from environmentally harmful emissions added to the atmosphere by end users, such as those associated with hydrogen combustion.

Comment 12-01

The Study excludes more than the hydrogen combustion of commercial end users. It also chooses not to "evaluate the NOx associated with water conveyance or the transportation of other materials such as biomass to the production site or biomass feed preparation as those details are beyond the scope of this feasibility study."[3] The Report's omission of biomass transportation emissions is particularly troubling because the Report repeatedly claims that the biomass gasification scenario of third-party hydrogen production involves "zero NOx."[4] The Report explains that since biomass gasification "does not use combustion, there is no potential for NOx emissions associated with biomass gasification."[5] As explained in the next section of this letter, this is a faulty and unreasonable assumption.

II. The Report Features Faulty, Unreasonable Assumptions about NOx Emissions, Especially Related to Biomass Gasification

The Report/Study applies assumptions skewed in favor of the Angeles Link project when presented with unfavorable data regarding NOx emissions. For example, in relation to biomass gasification, the Report notes one study that found that "there is potential for nitrogen contamination in the outlet of the biomass gasification system if fuel nitrogen is present."[6] This means that if nitrogen is present in biomass feedstock, biomass gasification is not entirely clean, and the inference can be made that nitrogen in biomass feedstock can lead to NOx emissions. Yet

Comment 12-02

[1] Report at 12.4.
[2] Report at 2.1 ("The study…estimates NOx emission reductions from end users of hydrogen in the mobility, power generation, and hard to electrify industrial sectors, to determine anticipated overall NOx reductions.").
[3] Report at 12.4.
[4] Report at 3.8, 3.9, 7.4, 8.20, 12.4.
[5] Report at 3.2.
[6] Report at 3.9-3.10.

the Report contradictorily assumes "no nitrogen is contained in the biomass or any other fuel source for use in hydrogen production."[7] This is a nonsensical assumption because the Report itself acknowledges that biomass in the form of animal waste is "high in protein;"[8] proteins are made up of amino acids, which in turn are made up of elements like nitrogen. SoCalGas does not explain the unique set of conditions in which the biomass feedstock used to produce hydrogen could somehow entirely lack nitrogen; instead SoCalGas improperly chooses to assume "there are no NOx emissions from biomass gasification."[9]

Another unreasonable assumption the Report makes about biomass gasification deals with the moisture content of biomass feedstock. The Report notes that biomass gasification "requires dry biomass" and admits the possibility that biomass at a gasification facility site might contain moisture "that would require drying on-site."[10] Therefore, it can be inferred that industrial processes to dry out biomass would generate various types of air emissions, potentially even NOx emissions. Purportedly, "[d]ue to the level of uncertainty around whether on-site drying would be required for each specific biomass gasification facility," the Report makes another biased assumption that "biomass would be procured ready to utilize and would not require moisture removal on-site."[11] Uncertainty should tip the scales in favor of assuming the potential for *more* air emissions, not reduced emissions or no emissions. But likely because the added air emissions of drying out biomass would contradict SoCalGas's depiction of biomass gasification as a "zero NOx" production method of hydrogen, the study elects the dry biomass assumption, despite the unreasonableness of that assumption.

Comment 12-02

A recent report on green hydrogen proposals in California[12] further demonstrates that biomass gasification involves several polluting steps that the Report either ignores or makes faulty assumptions about. As noted above, SoCalGas decides in the Report that biomass transportation to hydrogen production sites is outside the scope of this study.[13] Yet transportation emissions, including NOx emissions, can only be plausibly excluded if the biomass gasification facilities are "located only where the appropriate biomass feedstocks are abundant[.]"[14] In contrast to SoCalGas's chosen assumption that biomass transportation is beyond the scope of this study, it is far more likely that at least some transportation will be required to any third-party production sites. This transportation "will result in increased pollution along common trucking corridors and potentially in the communities surrounding the gasification plants unless biomass

[7] Report at 3.10.
[8] Report at 3.9.
[9] Report at 3.10.
[10] Report at 3.10.
[11] Report at 3.10.
[12] PSE Healthy Energy, Green Hydrogen Proposals Across California: An Assessment of opportunities and challenges of using hydrogen to meet state climate goals, (May 21, 2024), https://www.psehealthyenergy.org/wp-content/uploads/2024/05/Green-Hydrogen-Proposals-Across-California.pdf.
[13] Report at 12.4.
[14] Green Hydrogen Proposals Across California at 60.

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feedstocks are transported using zero-emission vehicles."[15] SoCalGas's flawed and misleading assumptions about zero NOx for biomass gasification must be corrected in the final version of the Report.

Comment 12-02

III. The Report Draws a Major False Equivalency between Electrolysis and Biomass Gasification

The Report repeatedly draws a false equivalency between electrolysis and biomass gasification by claiming there are zero NOx emissions when producing hydrogen by 100% electrolysis or biomass gasification.[16] Hydrogen production from electrolysis is only truly green if the three pillars of incrementality, temporality, and deliverability are met.[17] If electrolysis relies on combustion of gas for power generation, then NOx emissions result. Further, research indicates that: "Dust, soot, tar, and particulate matter are all components of the gas created during [biomass] gasification, and the exhaust gas contains carbon monoxide, harmful organic compounds such as benzene, NOx, and particulate matter."[18] Clearly then, biomass gasification involves NOx emissions and other harmful air pollutants like particulate matter. In contrast, green electrolysis using renewable, non-combustion resources does not result in such NOx emissions. SoCalGas's false equivalency about electrolysis and biomass gasification is compounded by the fact that electrolytic hydrogen is generally significantly more energy efficient than biomass gasification.[19] Therefore, biomass gasification categorically cannot be classified as having zero NOx emissions and should not be lumped together with electrolysis powered by additional renewable energy from wind and solar.

Comment 12-03

IV. The Report Contains Internal Contradictions about Third-Party Hydrogen Production Methods and Renewable Electricity

The Report also describes some assumptions that contain internal contradictions and inaccuracies. Specifically, the Report states: "The draft NOx study report assumes that production of hydrogen will use renewable electricity with zero NOx emissions regardless of production method – electrolysis, biomass gasification, or steam methane reforming, although electricity is only assumed to be used for electrolysis." First, regarding zero NOx emissions, the rest of the Report admits that steam methane reformation (SMR) "has NOx emissions and those potential emissions were evaluated" or describes SMR fueled by renewable natural gas (RNG) feedstock so there is "the potential for NOx formation."[20] So, the stated assumption in Chapter

Comment 12-04

[15] Green Hydrogen Proposals Across California at 85.
[16] Report at 3.9, 7.4, 7.5, 8.20, 8.21
[17] Morgan Rote, Why a strong '3 pillar' framework makes sense for pivotal hydrogen tax credit, Environmental Defense Fund (Feb. 8, 2024), https://blogs.edf.org/energyexchange/2024/02/08/why-a-strong-3-pillar-framework-makes-sense-for-pivotal-hydrogen-tax-credit/.
[18] Green Hydrogen Proposals Across California at 85.
[19] Green Hydrogen Proposals Across California at 31, 93.
[20] Report at 3.10.

12 is inaccurate with respect to the claim of zero NOx emissions related to steam methane reforming. Second, although CBE would like SoCalGas to commit to utilizing third-party hydrogen only produced by green electrolysis for Angeles Link, SoCalGas has not committed to that throughout the Phase 1 process, as it continues to call for hydrogen produced by biomass gasification and steam methane reformation. Therefore, the assumption about hydrogen production using "renewable electricity with zero NOx emissions regardless of production method" is not only contradictory to SoCalGas's position but also unsubstantiated.[21]

Comment 12-04

V. The Report Lacks Comparisons to NOx Emission Reductions from Battery Electric Vehicles Displacing Fossil Fuels in the Mobility Sector

CBE is concerned that this study and the Demand Study underpinning it both fail to accurately address NOx emissions reductions associated with the displacement of fossil fuel powered vehicles by battery electric vehicles (BEVs) between 2030-2045. The Report states: "The Demand Study projected the anticipated fossil fuel displacement associated with FCEVs [fuel cell electric vehicles] only. The associated NOx reductions were estimated only for conversion to FCEVs; this study does not project emission reductions related to fossil fuel displacement that will be associated with BEVs."[22] For this NOx and other air emissions study to be credible, the final Report must include side-by-side comparisons of added NOx emission additions and reductions between hydrogen powered FCEVs and renewable electricity powered BEVs. Even if direct electrification and BEVs are discussed in the separate Project Options and Alternatives Draft Report, that is insufficient because SoCalGas released the Project Options and Alternatives report more than a week after this NOx report and it has a separate, later feedback deadline. It is unfair to put the burden on stakeholders already juggling multiple overlapping studies and feedback deadlines to dig for alternatives comparisons when commenting on this entirely pro-hydrogen NOx report.

Comment 12-05

VI. The Report Relies on Proxy Emission Factors and Concedes Many Unknowns about 100% Hydrogen, Thereby Undermining the Supposed Feasibility of ALP

With respect to NOx emissions factor, CBE is alarmed by the Report's characterization of the many unknowns regarding constructing and operating a massive pipeline to transport 100% hydrogen. The Report notes the following about hydrogen combustion: "research completed for this study did not reveal any published hydrogen-specific combustion emission factors;" "direct measurements of NOx emissions from practical combustion systems using pure hydrogen are scarce at the present time;" "very little test data is available, as few types of combustion units can effectively operate on pure 100% fuel at this time."[23] The Report even admits that it could

Comment 12-06

[21] See CBE Feedback to Southern California Gas Company on Greenhouse Gas Emissions Evaluation Draft Report, at 2-3, Aug. 14, 2024.
[22] Report at 7.7.
[23] Report at 3.5.

not utilize direct measurements of NOx emissions from combustion units "representative of hydrogen combustion technology to quantify NOx emissions within this study"[24] because such test data does not yet exist. Since published and reputable hydrogen emission factors are not yet available, the Report relies on proxy emission factors to quantify NOx emissions from hydrogen combustion.[25] Yet, without citing to any source about the validity of proxy emission factors for this type of emissions study, the Report confidently claims: "Proxy emissions factors are compatible with the Demand Study, were sufficient to estimate end-user emissions, available for combustion units, and applicable across the entire project geography." Setting aside the overinflated hydrogen projections in the Demand Study, the numerous flaws in this Report we have discussed, as well as the many unknowns about hydrogen, indicate that this NOx emissions feasibility study cannot reasonably be relied upon as a fair evaluation of the air quality impacts of Angeles Link.

Comment 12-06

VII. Conclusion

Communities for a Better Environment appreciates the opportunity to provide feedback on the Report. Due to the Report's omissions and misleading discussion outlined above, CBE strongly objects to the characterization of emissions represented in this report. Accurate emissions estimates must be provided for communities to engage in meaningful dialogue with SoCalGas regarding the ALP. CBE recommends SoCalGas rectify all issues raised in this letter before issuing a final NOx and Other Air Emissions report to provide serviceable data by which the ALP can be assessed.

Sincerely,

Jay Parepally
Communities for a Better Environment

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group
Angeles Link service list

[22] Report at 7.7.
[23] Report at 3.6.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 12-1

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Nitrogen Oxides (NOx) and other Air Emissions Assessment Draft Report (the "Report" or "Study") provided on July 17, 2024. This letter discusses serious errors that the final report must remedy. The Report fails to discuss NOx emissions or other air emissions focused on construction and operations of Angeles Link and the emissions impact on communities. Instead, it repeatedly emphasizes that there will be widespread market adoption of hydrogen in California and that the Angeles Link Project (ALP) will help satisfy this high demand for clean renewable hydrogen. It contends that third-party production will generate relatively little NOx and claims that end-uses of transported hydrogen will result in massive emissions reductions. California Public Utilities Commission (CPUC) Decision 22-12-055 emphasizes the importance of stakeholder engagement. Meaningful engagement is impeded where key information is either omitted or presented in a misleading manner. Particularly, the Report:

• Cherry Picks What is Within Scope and Out of Scope for the Study, Claims and Overemphasizes Emissions Reductions to Make ALP Seem Beneficial, and Minimizes or Excludes Facts that are Unfavorable to Perception of ALP
• Features Faulty, Unreasonable Assumptions about NOx Emissions, Especially Related to Biomass Gasification
• Draws a Major False Equivalency between Electrolysis and Biomass Gasification
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• Lacks Comparisons to NOx Emission Reductions from Battery Electric Vehicles Displacing Fossil Fuels in the Mobility Sector
• Relies on Proxy Emission Factors and Concedes Many Unknowns about 100% Hydrogen, Thereby Undermining the Supposed Feasibility of ALP

I. The Report Cherry Picks What is Within Scope and Out of Scope for the Study, Claims and Overemphasizes Emissions Reductions to Make ALP Seem Beneficial, and Minimizes or Excludes Facts that are Unfavorable to Perception of ALP

The Report selectively includes favorable aspects of Angeles Link and the lifecycle of hydrogen as being within the scope of a Phase 1 feasibility study and excludes the unfavorable aspects as being out of scope. Critically, the Report does not include air pollution emissions from hydrogen combustion in the commercial sector. The Study also buries this caveat deep in the report. For example, we are not told until the section containing SoCalGas's responses to stakeholder comments more than two-thirds of the way into the report that "[t]he Study does not evaluate hydrogen combustion for commercial…end users." FN1 The major problem here is that although SoCalGas takes credit for NOx and other emissions reductions from third-party end users, FN2 SoCalGas distances itself from environmentally harmful emissions added to the atmosphere by end users, such as those associated with hydrogen combustion.

The Study excludes more than the hydrogen combustion of commercial end users. It also chooses not to "evaluate the NOx associated with water conveyance or the transportation of other materials such as biomass to the production site or biomass feed preparation as those details are beyond the scope of this feasibility study." FN3 The Report's omission of biomass transportation emissions is particularly troubling because the Report repeatedly claims that the biomass gasification scenario of third-party hydrogen production involves "zero NOx." FN4 The Report explains that since biomass gasification "does

not use combustion, there is no potential for NOx emissions associated with biomass gasification." FN5 As explained in the next section of this letter, this is a faulty and unreasonable assumption.

FN1 – Report at 12.4.

FN2 – Report at 2.1 ("The study…estimates NOx emission reductions from end users of hydrogen in the mobility, power generation, and hard to electrify industrial sectors, to determine anticipated overall NOx reductions.").

FN3 – Report at 12.4.

FN4 – Report at 3.8, 3.9, 7.4, 8.20, 12.4.

FN5 – Report at 3.2.

SOCALGAS RESPONSE TO COMMENT 12-1

The NOx Study is based on the assumptions in the Demand Study including the focus on the mobility, power generation, and hard-to-electrify industrial end user sectors. The commercial sector was not evaluated in the Demand Study and therefore not included in the NOx study.

As noted by the commenter, the limitations of this feasibility study are addressed in the NOx Study, Section 11.2 Uncertainty. With respect to transportation of biomass, please refer to Global Response 6.

In response to the comment concerning potential NOx emissions associated with water conveyance for third-party production, that analysis was outside of the scope of the Angeles Link Phase 1 feasibility studies. As summarized in Response to Comment 7-6, analysis of potential criteria pollutants associated with conveyance and treatment of water for production of clean renewable hydrogen would be performed by third-party producers. At such time as producers seek permits/agency authorizations for hydrogen production, these projects would undergo a thorough environmental review under the CEQA and/or NEPA, as applicable, and the environmental review would likely include an analysis of criteria pollutants associated with development of those projects.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 12-2

II. The Report Features Faulty, Unreasonable Assumptions about NOx Emissions, Especially Related to Biomass Gasification

The Report/Study applies assumptions skewed in favor of the Angeles Link project when presented with unfavorable data regarding NOx emissions. For example, in relation to biomass gasification, the Report notes one study that found that "there is potential for nitrogen contamination in the outlet of the biomass gasification system if fuel nitrogen is present." FN6 This means that if nitrogen is present in biomass feedstock, biomass gasification is not entirely clean, and the inference can be made that nitrogen in biomass feedstock can lead to NOx emissions. Yet the Report contradictorily assumes "no nitrogen is contained in the biomass or any other fuel source for use in hydrogen production." FN7 This is a nonsensical assumption because the Report itself acknowledges that biomass in the form of animal waste is "high in protein;" FN8 proteins are made up of amino acids, which in turn are made up of elements like nitrogen. SoCalGas does not explain the unique set of conditions in which the biomass feedstock used to produce hydrogen could somehow entirely lack nitrogen; instead SoCalGas improperly chooses to assume "there are no NOx emissions from biomass gasification." FN9

Another unreasonable assumption the Report makes about biomass gasification deals with the moisture content of biomass feedstock. The Report notes that biomass gasification "requires dry biomass" and admits the possibility that biomass at a gasification facility site might contain moisture "that would require drying on-site." FN10 Therefore, it can be inferred that industrial processes to dry out biomass would generate various types of air emissions, potentially even NOx emissions. Purportedly, "[d]ue to the level of uncertainty around whether on-site drying would be required for each specific biomass gasification facility," the Report makes another biased assumption that "biomass would be procured ready to utilize and would not require moisture removal on-site." FN11 Uncertainty should tip the scales in favor of assuming the potential for more air emissions, not reduced emissions or no emissions. But likely because the added air emissions of drying out biomass would contradict SoCalGas's depiction of biomass gasification as a "zero NOx" production method of hydrogen, the study elects the dry biomass assumption, despite the unreasonableness of that assumption.

A recent report on green hydrogen proposals in California FN12 further demonstrates that biomass gasification involves several polluting steps that the Report either ignores or makes faulty assumptions about. As noted above, SoCalGas decides in the Report that biomass transportation to hydrogen production sites is outside the scope of this study. FN13 Yet transportation emissions, including NOx emissions, can only be plausibly excluded if the biomass gasification facilities are "located only where the appropriate biomass feedstocks are abundant[.]" FN14 In contrast to SoCalGas's chosen assumption that biomass transportation is beyond the scope of this study, it is far more likely that at least some transportation will be required to any third-party production sites. This transportation "will result in increased pollution along common trucking corridors and potentially in the communities surrounding the gasification plants unless biomass feedstocks are transported using zero-emission vehicles." FN15 SoCalGas's flawed and misleading assumptions about zero NOx for biomass gasification must be corrected in the final version of the Report.

FN6 – Report at 3.9-3.10.
FN7 – Report at 3.10.
FN8 – Report at 3.9.
FN9 – Report at 3.10.

FN10 – Report at 3.10.
FN11 – Report at 3.10.

FN12 – PSE Healthy Energy, Green Hydrogen Proposals Across California: An Assessment of opportunities and challenges of using hydrogen to meet state climate goals, (May 21, 2024), https://www.psehealthyenergy.org/wpcontent/uploads/2024/05/Green-Hydrogen-Proposals-Across-California.pdf.

FN13 – Report at 12.4.
FN14 – Green Hydrogen Proposals Across California at 60.
FN15 – Green Hydrogen Proposals Across California at 85.

SOCALGAS RESPONSE TO COMMENT 12-2

Given the feasibility phase of Angeles Link, to prepare the NOx Study, several assumptions were made. With respect to third-party production options, three were evaluated: 1) electrolysis; 2) biomass gasification; and 3) SMR of RNG. A wide variety of production options within these three primary options were presented for informational purposes. However, Angeles Link will only be able to deliver production that meets CPUC's definition of clean renewable hydrogen.

In addition to the excerpts provided by the commentor related to biomass gasification, the NOx Study includes additional relevant details. This is important because the literature studies reviewed varied with respect to conclusions related to NOx. For example, Section 3.5.1 of the Draft NOx Study Report states: "Direct emissions measurement data for biomass gasification was not discovered. In addition, no calculation methodologies for NOx and other air pollutants were identified for the biomass gasification process. As biomass gasification is not a true combustion process, there is no known potential pathway for the formation of NOx emissions." Gasification also typically occurs in a low oxygen environment at equivalence ratios around 0.25 to 0.50, which minimizes the potential for NOx formation. Studies have noted that in gasification systems where the formation for NOx emissions is possible, De-NOx technologies can be utilized for removal.[20] Another study noted that N_2 is typically the primary nitrogen component in the produced syngas, and that ammonia may also occur, particularly when using biomass such as animal waste that is high in protein. This study notes that standard catalytic reduction methods typically used for NOx reduction can be used to reduce any nitrogen compound in the produced syngas.[21] One study completed by Sikarwar et al (2016) notes that there is the potential for nitrogen contamination in the outlet of the biomass gasification system if fuel nitrogen is present.[22]"

Please also refer to Global Response 6.

[20] Safavi, S.M., C. Richter, and R. Unnthorsson, 2021, Dioxins and Furan Emissions from Gasification, in Gassification, V. Silva and C.E. Tuna, editors, https://www.intechopen.com/chapters/74698

[21] Balas, M., M. Lisy, J. Kubick, Jiri Pospisil, 2014, Syngas Cleaning by Wet Scrubber, WSEAS Transactions on Heat and Mass Transfer 9: 195-204, https://www.wseas.org/multimedia/journals/heat/2014/a025712-169.pdf

[22] Sikarwar, V.S., M. Zhao, P. Clough, J. Yao, X. Zhong, M. Zaki Memon, N. Shah, E.J. Anthony and P.S. Fennell, 2016, An overview of advances in biomass gasification, Energy and Environmental Science 9(10): 2927-3304, https://pubs.rsc.org/en/content/articlepdf/2016/ee/c6ee00935b

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 12-3

III. The Report Draws a Major False Equivalency between Electrolysis and Biomass Gasification

The Report repeatedly draws a false equivalency between electrolysis and biomass gasification by claiming there are zero NOx emissions when producing hydrogen by 100% electrolysis or biomass gasification. FN16 Hydrogen production from electrolysis is only truly green if the three pillars of incrementality, temporality, and deliverability are met. FN17 If electrolysis relies on combustion of gas for power generation, then NOx emissions result. Further, research indicates that: "Dust, soot, tar, and particulate matter are all components of the gas created during [biomass] gasification, and the exhaust gas contains carbon monoxide, harmful organic compounds such as benzene, NOx, and particulate matter." FN18 Clearly then, biomass gasification involves NOx emissions and other harmful air pollutants like particulate matter. In contrast, green electrolysis using renewable, non-combustion resources does not result in such NOx emissions. SoCalGas's false equivalency about electrolysis and biomass gasification is compounded by the fact that electrolytic hydrogen is generally significantly more energy efficient than biomass gasification. FN19 Therefore, biomass gasification categorically cannot be classified as having zero NOx emissions and should not be lumped together with electrolysis powered by additional renewable energy from wind and solar.

FN16 – Report at 3.9, 7.4, 7.5, 8.20, 8.21

FN17 – Morgan Rote, Why a strong '3 pillar' framework makes sense for pivotal hydrogen tax credit, Environmental Defense Fund (Feb. 8, 2024), https://blogs.edf.org/energyexchange/2024/02/08/why-a-strong-3-pillar-frameworkmakes-sense-for-pivotal-hydrogen-tax-credit/.

FN18 – Green Hydrogen Proposals Across California at 85.

FN19 – Green Hydrogen Proposals Across California at 31, 93.

SOCALGAS RESPONSE TO COMMENT 12-3

The NOx Study considered third-party production options that could meet the CPUC's definition of clean renewable hydrogen: 1) electrolysis; 2) biomass gasification; and 3) SMR of RNG.

Please note that the NOx Study does not create an equivalency between electrolysis and biomass gasification other than that the results for NOx happen to be the same for both based on the assumptions used to prepare the NOx emissions estimates for third-party production.

With respect to electrolysis as a third-party production option, the NOx Study assumes that renewable electricity will be used for electrolysis and therefore will result in zero onsite NOx emissions.

The document "Green Hydrogen Proposals Across California" provided by the commentor was reviewed. The information cited by FN18 was not available in the document it referenced (i.e., Intelligent Energy for Europe Programme, 2009) or in the document that one referenced (i.e., Biomass Action Plan, 2005). It is unclear where this information about biomass production is coming from and further evaluation was not possible.

The NOx Study referenced the more recent information related to Hydrogen Production on the DOE Website as discussed in the NOx Study. This DOE website states that: “Biomass gasification is a mature technology pathway that uses a controlled process involving heat, steam, and oxygen to convert biomass to hydrogen and other products, without combustion.”

Please refer to Global Response 6 regarding comments related to biomass gasification.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 12-4

IV. The Report Contains Internal Contradictions about Third-Party Hydrogen Production Methods and Renewable Electricity

The Report also describes some assumptions that contain internal contradictions and inaccuracies. Specifically, the Report states: "The draft NOx study report assumes that production of hydrogen will use renewable electricity with zero NOx emissions regardless of production method – electrolysis, biomass gasification, or steam methane reforming, although electricity is only assumed to be used for electrolysis." First, regarding zero NOx emissions, the rest of the Report admits that steam methane reformation (SMR) "has NOx emissions and those potential emissions were evaluated" or describes SMR fueled by renewable natural gas (RNG) feedstock so there is "the potential for NOx formation." FN20 So, the stated assumption in Chapter 12 is inaccurate with respect to the claim of zero NOx emissions related to steam methane reforming. Second, although CBE would like SoCalGas to commit to utilizing third-party hydrogen only produced by green electrolysis for Angeles Link, SoCalGas has not committed to that throughout the Phase 1 process, as it continues to call for hydrogen produced by biomass gasification and steam methane reformation. Therefore, the assumption about hydrogen production using "renewable electricity with zero NOx emissions regardless of production method" is not only contradictory to SoCalGas's position but also unsubstantiated. FN21

FN20 – Report at 3.10.

FN21 – See CBE Feedback to Southern California Gas Company on Greenhouse Gas Emissions Evaluation Draft Report, at 2-3, Aug. 14, 2024.

SOCALGAS RESPONSE TO COMMENT 12-4

The quoted statement referenced above does not speak to assumptions or claims regarding zero NOx emissions related to steam methane reforming but points out that renewable electricity with zero NOx emissions will be used regardless of production method. Edits will be made to the NOx Study including in Table 48 to provide clarification. Only hydrogen that meets the CPUC definition of clean renewable hydrogen would qualify for transmission by Angeles Link.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 12-5

V. The Report Lacks Comparisons to NOx Emission Reductions from Battery Electric Vehicles Displacing Fossil Fuels in the Mobility Sector

CBE is concerned that this study and the Demand Study underpinning it both fail to accurately address NOx emissions reductions associated with the displacement of fossil fuel powered vehicles by battery electric vehicles (BEVs) between 2030-2045. The Report states: "The Demand Study projected the anticipated fossil fuel displacement associated with FCEVs [fuel cell electric vehicles] only. The associated NOx reductions were estimated only for conversion to FCEVs; this study does not project emission reductions related to fossil fuel displacement that will be associated with BEVs." FN22 For this NOx and other air emissions study to be credible, the final Report must include side-by-side comparisons of added NOx emission additions and reductions between hydrogen powered FCEVs and renewable electricity powered BEVs. Even if direct electrification and BEVs are discussed in the separate Project Options and Alternatives Draft Report, that is insufficient because SoCalGas released the Project Options and Alternatives report more than a week after this NOx report and it has a separate, later feedback deadline. It is unfair to put the burden on stakeholders already juggling multiple overlapping studies and feedback deadlines to dig for alternatives comparisons when commenting on this entirely pro-hydrogen NOx report.

FN22 – Report at 7.7.

SOCALGAS RESPONSE TO COMMENT 12-5

The CPUC's Phase 1 Decision requires at Ordering Paragraph 6(h) to assess potential NOx emissions associated with Angeles Link including appropriate controls to minimize and mitigate such emissions. The NOx Study assesses the potential for both NOx emissions increases and reductions associated with Angeles Link, which accounts for emissions from not just transmission of hydrogen, but also from third-party production, third-party storage, and at end users. The NOx assessment evaluates potential NOx and other air emissions associated with end users in the mobility, power generation, and hard-to-abate industrial sectors as defined in the Demand Study. Since BEVs are not potential end users of Angeles Link, analysis related to BEVs is beyond the scope of the NOx Study.

As noted in the comment, direct electrification and BEVs are discussed in the separate Alternatives Study.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 12-6

VI. The Report Relies on Proxy Emission Factors and Concedes Many Unknowns about 100% Hydrogen, Thereby Undermining the Supposed Feasibility of ALP

With respect to NOx emissions factor, CBE is alarmed by the Report's characterization of the many unknowns regarding constructing and operating a massive pipeline to transport 100% hydrogen. The Report notes the following about hydrogen combustion: "research completed for this study did not reveal any published hydrogen-specific combustion emission factors;" "direct measurements of NOx emissions from practical combustion systems using pure hydrogen are scarce at the present time;" "very little test data is available, as few types of combustion units can effectively operate on pure 100% fuel at this time." FN23 The Report even admits that it could not utilize direct measurements of NOx emissions from combustion units "representative of hydrogen combustion technology to quantify NOx emissions within this study" FN24 because such test data does not yet exist. Since published and reputable hydrogen emission factors are not yet available, the Report relies on proxy emission factors to quantify NOx emissions from hydrogen combustion. FN25 Yet, without citing to any source about the validity of proxy emission factors for this type of emissions study, the Report confidently claims: "Proxy emissions factors are compatible with the Demand Study, were sufficient to estimate end-user emissions, available for combustion units, and applicable across the entire project geography." Setting aside the overinflated hydrogen projections in the Demand Study, the numerous flaws in this Report we have discussed, as well as the many unknowns about hydrogen, indicate that this NOx emissions feasibility study cannot reasonably be relied upon as a fair evaluation of the air quality impacts of Angeles Link.

VII. Conclusion

Communities for a Better Environment appreciates the opportunity to provide feedback on the Report. Due to the Report's omissions and misleading discussion outlined above, CBE strongly objects to the characterization of emissions represented in this report. Accurate emissions estimates must be provided for communities to engage in meaningful dialogue with SoCalGas regarding the ALP. CBE recommends SoCalGas rectify all issues raised in this letter before issuing a final NOx and Other Air Emissions report to provide serviceable data by which the ALP can be assessed.

FN23 – Report at 3.5.
FN24 – Report at 3.5.
FN25 – Report at 3.6.

SOCALGAS RESPONSE TO COMMENT 12-6

The Phase 1 studies do not estimate emissions associated with construction because it is too premature to estimate construction emissions at this feasibility phase of Angeles Link. Additionally, construction emissions will be analyzed during the CEQA/NEPA process.

Developing a methodology to estimate NOx emission factors associated with the combustion of hydrogen was required since agencies such as EPA, CARB, and local air districts have not issued NOx emission factors specific to the combustion of hydrogen. The methodology is described in detail in Appendix A of the NOx Study.

As noted in the NOx Study, analysis related to NOx emissions is limited based on the information that is available, but emissions estimates can be further refined as more information becomes available. The NOx Study acknowledges that limited data exists in the literature for actual measurements of NOx emissions associated with combustion of clean renewable hydrogen and that combustion technology and post-combustion treatment technology is anticipated to develop over time. Further refinements to Angeles Link will inform future quantification estimates for NOx emissions and NOx minimization opportunities.

Comment Letter 13 – Cal Advocates

Comment Letter 13

The Public ADVOCATES OFFICE

August 16, 2024

Informal Comments of the Public Advocates Office on Southern California Gas Company's July 2024 Production Planning & Assessment Draft Report for the Angeles Link Hydrogen Project

The Public Advocates Office (Cal Advocates) at the California Public Utilities Commission (Commission) provides these comments on Southern California Gas Company's (SoCalGas) *Angeles Link Preliminary Production Planning & Assessment Draft Report* (Production Planning report) issued on July 19, 2024. The Production Planning report discusses the potential sources of clean renewable hydrogen, the requisite land and infrastructure inputs, and estimated production costs, as required by the Commission's Decision for the Angeles Link Phase 1 feasibility studies.[1] The desktop-only Production Planning report does not utilize all publicly-available data for its analysis, particularly in the Production Land Assessment section, and thus makes inaccurate estimates based on the data which SoCalGas limits itself to. Cal Advocates provides comments and makes recommendations on the following three issues:

Comment 13-01

1. SoCalGas should consult with permitting agencies in potential production areas and revise its land use estimates based on publicly available data and information.
2. SoCalGas should expand the analysis of potential production areas beyond its service territory.
3. SoCalGas should explore alternative renewable energy production technologies other than solar.

1. SoCalGas should consult with permitting agencies in potential production areas and revise its land use estimates based on publicly available data and information

The Production Planning report assumes 240,000 acres for 39 GW of solar capacity will be necessary to produce 1.5 million tons per year (MMTPY) of clean renewable hydrogen.[2] SoCalGas states that 1.932 million total acres are available in its service territory and, therefore, the area required for solar represents only 12 percent of this available area.[3] SoCalGas considered various desktop screening criteria to arrive at this estimate, including avoiding urban/suburban development, environmental regions such as parks and preserves,

Comment 13-02

[1] Southern California Gas Company's *Angeles Link Preliminary Production Planning & Assessment Draft Report* at 3-4. Commission Decision (D).22-12-055 approving Angeles Link Memorandum Account to record Phase One Costs at https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M500/K167/500167327.PDF. Date accessed: August 12, 2024.

[2] *Production Planning & Assessment Draft Report* at 47.

[3] *Production Planning & Assessment Draft Report* at 47. The total 1.932 million acres are found in San Joaquin Valley (535,000 acres), Lancaster (1,124,000 acres), and Blythe (273,000 acres).

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bodies of water, and topography greater than 15 percent slope.[4] This list of constraints is insufficient, however, as SoCalGas explicitly does not consider state and local zoning and land use ordinances.[5] This oversight means SoCalGas considers land as available that is reserved for existing or developing solar projects, or excluded from future solar development (see the list below for publicly accessible data from the California Energy Commission (CEC)).[6]

Consequently, the draft report's conclusion about the amount of available land for hydrogen production in SoCalGas service territory is grossly optimistic. Calculations using Figure 10.2 in the Production Planning report – which maps potential production areas identified by SoCalGas – overlaid with CEC exclusions data suggest that SoCalGas overestimated the available production area by 25 to 30 percent in San Joaquin Valley, by 40 to 50 percent in Lancaster, and by 60 to 80 percent in Blythe (see Figure 1). Land use management plans, as well as the location of existing solar facilities are therefore important determinants of land availability. Cal Advocates recommends that SoCalGas review the publicly available data identified in Appendix A and revise its estimate of the available acreage.

Comment 13-02

Permitting authorities include not only State agencies such as the CEC, but also the County and City governments. Assembly Bill 205 (2022) granted CEC the authority to permit powerplant construction as an alternative to permitting through Counties, but local governments should not be ignored.[7] For example, the City of Lancaster has been promoting itself as "Hydrogen City" and its encouragement of renewable energy development within its territory could create competition for land.[8] Similarly, the Bureau of Land Management (BLM) sets restrictions on solar development on Federally managed land in the Blythe region.[9] Ultimately, the production study must identify any legal or land use policy limitations that would impact production, and in turn, inform transmission pipeline size and location. SoCalGas must consult the proper permitting authorities in potential production areas to ascertain actual land availability (as set in land use management plans and local tolerance for solar development).

[4] *Production Planning & Assessment Draft Report* at 45 and 46.

[5] *Production Planning & Assessment Draft Report* at 48. SoCalGas submitted a separate *High Level Feasibility Assessment & Permitting Analysis Draft Report*, which analyzes permitting issues only for pipelines.

[6] For existing solar development, see CEC Solar Footprints in California. https://cecgis-caenergy.opendata.arcgis.com/datasets/CAEnergy::solar-footprints-in-california/about. For land prohibited from solar use for protection, technological, or economic reasons, see CEC Base Exclusions (Solar). https://cecgis-caenergy.opendata.arcgis.com/datasets/CAEnergy::base-exclusions-solar-1/about. Date accessed: August 12, 2024.

[7] See Public Resources Code 25545 at https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=15.&title=&part=&chapter=6.2.&article=. Date accessed: August 12, 2024.

[8] Lancaster "Hydrogen City" at https://www.cityoflancasterca.org/our-city/about-us/sustainability/green-practices/hydrogen. Date accessed: August 12, 2024.

[9] Desert Renewable Conservation Plan Land Use Plan Amendment (LUPA) at https://eplanning.blm.gov/public_projects/lup/66459/133474/163144/DRECP_BLM_LUPA.pdf. See also https://eplanning.blm.gov/public_projects/lup/66459/20012404/250016892/II.3_Preferred_Alternative.pdf. Date accessed: August 12, 2024.

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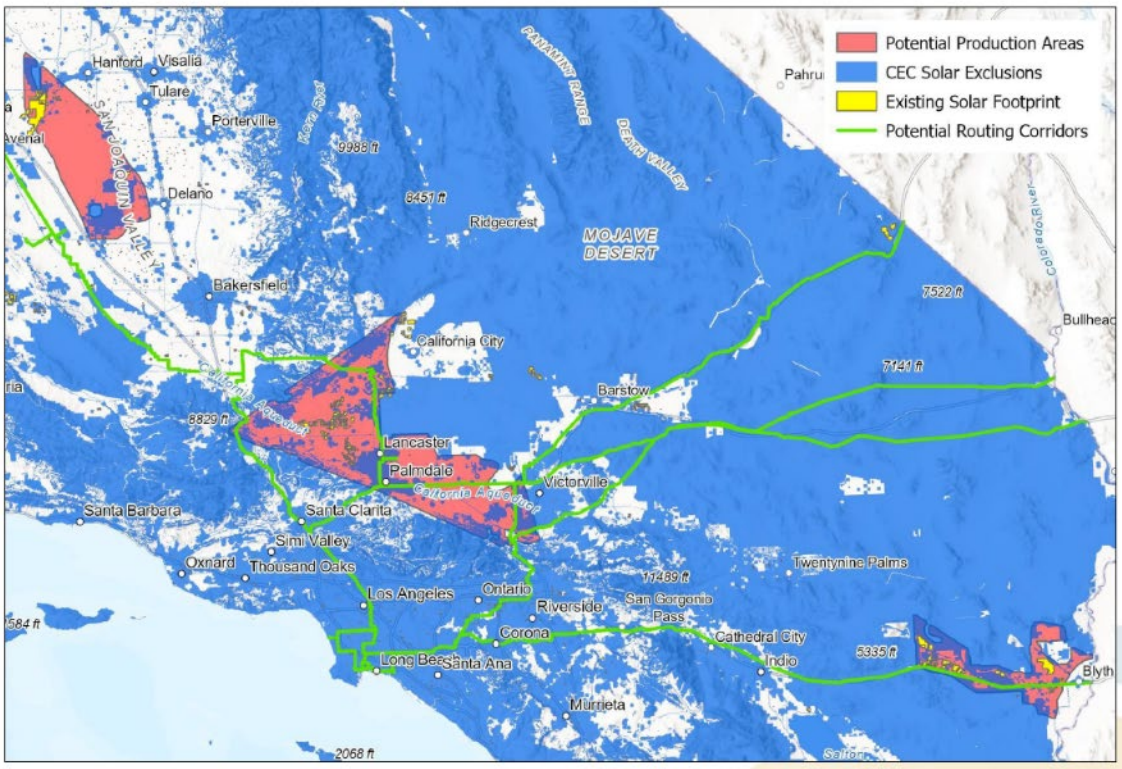

Figure 1: Overlap between SoCalGas-reported potential hydrogen production areas and CEC-determined solar exclusions

Comment 13-02

3

SoCalGas's Angeles Link Preliminary Routing/Configuration Analysis Draft Report identifies the most feasible Angeles Link hydrogen pipeline to be one that would serve the San Joaquin and Lancaster regions.[10] To fulfill the proposed 1.5 MMTPY scenario, Cal Advocates estimates that such a pipeline would require that 20% (240,000 acres/1.182 million acres) of suitable land be dedicated to solar for hydrogen production. This is a historic degree of land conversion, and SoCalGas has provided no assessment of local, state, or federal agencies agreement with, or awareness of these studies. So that the Commission can make a fully informed appraisal of the feasible size of a pipeline, it is essential that SoCalGas both review and integrate the sources of information presented in Appendix A and consult with land management and permitting agencies. Without these actions, the scenario is likely to draw inaccurate conclusions about the availability of the type and scale of renewable energy resources that could be used to create hydrogen.

Comment 13-03

2. SoCalGas should expand the analysis of potential production areas beyond their service territory

The Production Planning report restricts its analysis of the available land for solar production to areas within the SoCalGas service territory. This is an arbitrary restriction on the scope of the study. SoCalGas should expand its analysis of potential production areas into the service territories of other utilities. For example, SoCalGas is already considering a hydrogen pipeline routing corridor from PG&E's service territory in northern San Joaquin Valley.[11] Given the solar exclusions in southern California, the greater San Joaquin Valley region shows greater promise for solar development. SoCalGas should identify potential production areas in PG&E service territory that could feed a northern San Joaquin Valley corridor. Thus, the Production Planning report likely underestimates the total available land for hydrogen production in the state as a whole.

Comment 13-04

3. SoCalGas should explore alternative renewable energy production technologies other than solar

The Production Planning report also assumes the use of only solar energy for hydrogen production. SoCalGas should consider other renewable energy technologies, especially geothermal generation in the Salton Sea area near Blythe. The Production Planning report dismisses geothermal technologies because of feasibility issues such as project discovery and siting difficulty, uncertain access to adequate fluid temperatures and flows, uncertainty about proximity to energy demand, and uncertainty around technology and project costs.[12] However, the Salton Sea is a Known Geothermal Resource Area (KGRA) that resolves much of the uncertainties that

Comment 13-05

[10] Southern California Gas Company's *Angeles Link Preliminary Routing/Configuration Analysis Draft Report* at 42-44.

[11] In Figures 10.1 and 10.2 of the Production Planning study, SoCalGas shows a conceptual routing option to the northwest of its service territory within PG&E's domain.

[12] Production Planning report at 57.

SoCalGas raises.[13] The Imperial Valley Geothermal Project already operates 11 geothermal power stations in the Salton Sea Geothermal Field, and experts estimate that the Salton Sea KGRA could support further development of 2 GW of additional power plant capacity.[14] Financial incentives – such as the CEC's Geothermal Grant and Loan Program or lithium extraction (with the colocation of lithium recovery facilities with geothermal power plants) – for developing geothermal power at the Salton Sea could also prove attractive.[15]

Comment 13-05

Conclusion

In summary, SoCalGas should review its assumptions in its Production Planning report. To demonstrate more accurately where 240,000 acres of solar can feasibly be permitted, SoCalGas must consult with the primary land use permitting authorities to understand what development is occurring and the limits in existing land use plans. SoCalGas should also expand the scope of its study to include regions outside its service territory and consider renewable energy production beyond solar.

Comment 13-06

[13] CEC Geothermal Energy at https://www.energy.ca.gov/data-reports/california-power-generation-and-power-sources/geothermal-energy. Date accessed: August 12, 2024.

[14] Lithium Valley Commission Report at 30. https://www.energy.ca.gov/data-reports/california-power-generation-and-power-sources/geothermal-energy/lithium-valley. Date accessed: August 12, 2024.

[15] CEC Geothermal Grant and Loan Program. https://www.energy.ca.gov/programs-and-topics/programs/geothermal-grant-and-loan-program. Date accessed: August 12, 2024.

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Appendix A - Public Data for Solar Energy Siting Considerations in Angeles Link

Cal Advocates provides this list of publicly available data which can help inform SoCalGas's considerations on available solar energy siting in its production analysis for the proposed Angeles Link Hydrogen Project.

- California Energy Commission
  - Solar Footprints in California. https://cecgis-caenergy.opendata.arcgis.com/datasets/CAEnergy::solar-footprints-in-california/about
  - Base Exclusions (Solar). https://cecgis-caenergy.opendata.arcgis.com/datasets/CAEnergy::base-exclusions-solar-1/about
  - Geothermal Energy. https://www.energy.ca.gov/data-reports/california-power-generation-and-power-sources/geothermal-energy
- Bureau of Land Management
  - BLM California Renewable Energy Projects. https://gbp-blm-egis.hub.arcgis.com/maps/9b663af4613847d7a3ec1c1a81a02c85/about
  - BLM Land Use Plan Amendment (LUPA) Renewable Energy Designations.
    - LUPA Document. https://eplanning.blm.gov/public_projects/lup/66459/133474/163144/DRECP_BLM_LUPA.pdf
    - LUPA Map. https://gis.data.ca.gov/datasets/CAEnergy::blm-lupa-renewable-energy-designations/about
- County General Plans and Land Use
  - Fresno County. https://www.fresnocountyca.gov/Departments/Public-Works-and-Planning/divisions-of-public-works-and-planning/development-services-division/planning-and-land-use
  - Kern County. https://kernplanning.com/planning/planning-documents/general-plans-elements/
  - Kings County. https://www.countyofkingsca.gov/departments/community-development-agency
  - Los Angeles County. https://planning.lacounty.gov/long-range-planning/
    - Renewable Energy. https://case.planning.lacounty.gov/energy/
  - Riverside County. https://planning.rctlma.org/
    - Energy Division. https://www.rivcoenergy.com/
  - Tulare County. https://tularecounty.ca.gov/rma/planning-building/
- City of Lancaster
  - Sustainability. https://www.cityoflancasterca.org/our-city/about-us/sustainability
  - General and Master Plans. https://www.cityoflancasterca.org/our-city/departments-services/development-services/planning
- City of Blythe
  - General Plan and Zoning Maps. https://cityofblythe.ca.gov/27/Planning-Zoning

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CAL ADVOCATES COMMENT 13-1

The Public Advocates Office (Cal Advocates) at the California Public Utilities Commission (Commission) provides these comments on Southern California Gas Company's (SoCalGas) Angeles Link Preliminary Production Planning & Assessment Draft Report (Production Planning report) issued on July 19, 2024. The Production Planning report discusses the potential sources of clean renewable hydrogen, the requisite land and infrastructure inputs, and estimated production costs, as required by the Commission's Decision for the Angeles Link Phase 1 feasibility studies. FN1 The desktop-only Production Planning report does not utilize all publicly available data for its analysis, particularly in the Production Land Assessment section, and thus makes inaccurate estimates based on the data which SoCalGas limits itself to. Cal Advocates provides comments and makes recommendations on the following three issues:

1. SoCalGas should consult with permitting agencies in potential production areas and revise its land use estimates based on publicly available data and information.

2. SoCalGas should expand the analysis of potential production areas beyond its service territory.

3. SoCalGas should explore alternative renewable energy production technologies other than solar.

FN1 – Southern California Gas Company's Angeles Link Preliminary Production Planning & Assessment Draft Report at 3-4. Commission Decision (D).22-12-055 approving Angeles Link Memorandum Account to record Phase One Costs at https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M500/K167/500167327.PDF. Date accessed August 12, 2024.

SOCALGAS RESPONSE TO COMMENT 13-1

Responses are numbered consistent with Cal Advocates numbering above.

1. As noted in the Q2 2024 Angeles Link Quarterly Report Response to Comment 2-3, SoCalGas does not propose to produce clean renewable hydrogen as part of Angeles Link and expects third-party producers to perform analysis and engage with the relevant permitting agencies to assess potential production areas. SoCalGas expects third-party producers to take into account the distinct parameters and specific requirements of their respective projects. Accordingly, consultations with local, state, and federal permitting agencies regarding permissible land uses for hydrogen production in production areas was considered beyond the scope of the Phase 1 Production Study. As described in the Production Study, Section 10.2, the land analysis utilized ArcGIS software to identify large areas of land that took into account various data points (e.g., excluded National and state parks, government refuges, military ranges, topography greater than 15%, setbacks from highways, water, and other sensitive areas). Nonetheless, SoCalGas acknowledges the incremental analysis performed by Cal Advocates. For further response to the data sources cited by Cal Advocates and to the incremental analysis, please refer to Response to Comment 13-2.

2. For purposes of the Phase 1 feasibility stage, the Production Study evaluated land for potential clean renewable hydrogen production facilities that could be supported by the Angeles Link system. The

Production Study focused on land availability within SoCalGas's territory as a point of reference to understand production feasibility within the service territory. However, the Production Study acknowledges that production locations that are outside the SoCalGas service territory (e.g., projects included as part of the ARCHES California hydrogen hub) could potentially benefit from an interconnected open access pipeline system such as Angeles Link. Detailed analysis on production potential outside of SoCalGas's service territory was considered outside the scope of the study for purposes of the feasibility analysis.

3. The Phase 1 Production Study (Appendix A: Renewable Energy Technology Assessment for Hydrogen Production) provides an overview of various alternative renewable energy power sources SoCalGas explored other than solar and their potential suitability to support clean renewable hydrogen production in SoCalGas's service territory. Those alternative energy power sources include wind, biomethane, biomass, geothermal, hydroelectric, and offshore wind.

CAL ADVOCATES COMMENT 13-2

1. SoCalGas should consult with permitting agencies in potential production areas and revise its land use estimates based on publicly available data and information.

The Production Planning report assumes 240,000 acres for 39 GW of solar capacity will be necessary to produce 1.5 million tons per year (MMTPY) of clean renewable hydrogen. FN2 SoCalGas states that 1.932 million total acres are available in its service territory and, therefore, the area required for solar represents only 12 percent of this available area. FN3 SoCalGas considered various desktop screening criteria to arrive at this estimate, including avoiding urban/suburban development, environmental regions such as parks and preserves, bodies of water, and topography greater than 15 percent slope. FN4 This list of constraints is insufficient, however, as SoCalGas explicitly does not consider state and local zoning and land use ordinances. FN5 This oversight means SoCalGas considers land as available that is reserved for existing or developing solar projects, or excluded from future solar development (see the list below for publicly accessible data from the California Energy Commission (CEC)). FN6

Consequently, the draft report's conclusion about the amount of available land for hydrogen production in SoCalGas service territory is grossly optimistic. Calculations using Figure 10.2 in the Production Planning report – which maps potential production areas identified by SoCalGas – overlaid with CEC exclusions data suggest that SoCalGas overestimated the available production area by 25 to 30 percent in San Joaquin Valley, by 40 to 50 percent in Lancaster, and by 60 to 80 percent in Blythe (see Figure 1). Land use management plans, as well as the location of existing solar facilities are therefore important determinants of land availability. Cal Advocates recommends that SoCalGas review the publicly available data identified in Appendix A and revise its estimate of the available acreage.

Permitting authorities include not only State agencies such as the CEC, but also the County and City governments. Assembly Bill 205 (2022) granted CEC the authority to permit powerplant construction as an alternative to permitting through Counties, but local governments should not be ignored. FN7 For example, the City of Lancaster has been promoting itself as "Hydrogen City" and its encouragement of renewable energy development within its territory could create competition for land. FN8 Similarly, the Bureau of Land Management (BLM) sets restrictions on solar development on Federally managed land in the Blythe region. FN9 Ultimately, the production study must identify any legal or land use policy limitations that would impact production, and in turn, inform transmission pipeline size and location. SoCalGas must consult the proper permitting authorities in potential production areas to ascertain actual land availability (as set in land use management plans and local tolerance for solar development).

FN2 – Production Planning & Assessment Draft Report at 47.

FN3 – Production Planning & Assessment Draft Report at 47. The total 1.932 million acres are found in San Joaquin Valley (535,000 acres), Lancaster (1,124,000 acres), and Blythe (273,000 acres).

FN4 – Production Planning & Assessment Draft Report at 45 and 46.

FN5 – Production Planning & Assessment Draft Report at 48. SoCalGas submitted a separate High Level Feasibility Assessment & Permitting Analysis Draft Report, which analyzes permitting issues only for pipelines.

FN6 – For existing solar development, see CEC Solar Footprints in California. https://cecgis-caenergy.opendata.arcgis.com/datasets/CAEnergy::solar-footprints-in-california/about. For land

prohibited from solar use for protection, technological, or economic reasons, see CEC Base Exclusions (Solar). https://cecgis-caenergy.opendata.arcgis.com/datasets/CAEnergy::base-exclusions-solar 1/about. Date accessed: August 12, 2024.

FN7 – See Public Resources Code 25545 at https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=15.&title=&part=&chapter=6.2.&article=. Date accessed: August 12, 2024.

FN8 – Lancaster "Hydrogen City" at https://www.cityoflancasterca.org/our-city/about-us/sustainability/green-practices/hydrogen. Date accessed: August 12, 2024.

FN9 – Desert Renewable Conservation Plan Land Use Plan Amendment (LUPA) at https://eplanning.blm.gov/public_projects/lup/66459/133474/163144/DRECP_BLM_LUPA.pdf. See also https://eplanning.blm.gov/public_projects/lup/66459/20012404/250016892/II.3_Preferred_Alternative.pdf. Date accessed: August 12, 2024.

SOCALGAS RESPONSE TO COMMENT 13-2

In the Production Study, Section 10.0 Production Land Assessment, a land assessment was completed to determine the availability of land that could be utilized for large scale third-party hydrogen production development. The objective of this assessment was to understand clean renewable hydrogen production potential that Angeles Link could transport at scale to areas of demand. The assessment identified abundant land available for clean renewable hydrogen production. Identification of potential clean renewable hydrogen producers will be included in Phase 2 of Angeles Link.

As indicated in Cal Advocates' comments 13-2 and 13-5, additional constraints on the land boundaries assessed could change the amount of land identified for clean renewable hydrogen production. In response to this feedback, SoCalGas performed supplemental calculations by applying the suggested additional constraints to the acreage of available land identified in the Production Study. The supplemental calculations are located in the Table: Land Requirements - Supplemental Calculations, below. This supplemental analysis will also be summarized in the final Production Study report, Section 12, Stakeholder Feedback.

Based on the supplemental calculations, applying those additional suggested land constraints does not materially alter the overall conclusion. Specifically, the Production Study concludes approximately 240,000 acres will be needed for hydrogen production up to 1.5 MMT/Y. The Production Study finds this acreage represents approximately 12% of the land available across the three identified production areas (San Joaquin Valley, Lancaster, Blythe). As summarized in the table below, when applying the additional land constraints identified by this comment, the acreage needed to produce 1.5 MMT/Y represents approximately 17% to 18% of land available across the three production areas, representing an increase from the 12% identified in the Production Study. This suggests that land availability, even when applying additional constraints as Cal Advocates suggests, would be sufficient to support large scale hydrogen production.

SoCalGas also acknowledges Cal Advocates' recommendation to further evaluate local zoning and land use ordinances that may further constrain land availability for production. SoCalGas took into account

land use considerations such as the location of national and state parks, government refuges, preserves, and military ranges as well as setbacks from culturally and environmentally sensitive areas. Given that SoCalGas does not propose a specific production project as part of Angeles Link, granular analysis of local land use constraints was not within the scope of this feasibility analysis. Further, as state and local jurisdictions continue to assess decarbonization objectives, the land available for hydrogen production by third-party producers may continue to evolve. SoCalGas expects third-party producers to perform site specific analysis given the unique characteristics and requirements of each producer's operation.

Table: Land Requirements – Supplemental Calculations

		Supplemental Calculations Using Additional Suggested Constraints from Cal Advocates in Comment 13-2[23]	
Production Area	Production Study Section 10.3 Acres Available	Land Availability with Suggested Additional Constraints Applied (Low)	Land Availability with Suggested Additional Constraints Applied (High)
San Joaquin Valley	535,000	411,538	428,000
Lancaster	1,124,000	749,333	802,857
Blythe	273,000	151,667	170,625
Totals	1,932,000	1,312,538	1,401,482
Acres needed for 1.5 MMTPY	240,000		
Land needed for hydrogen production (240,000 acres) as percentage of total land available across production areas with suggested constraints applied	12%	18%	17%

[23] Cal Advocates states in its comment that it used data from the CEC to independently analyze how additional constraints would impact land availability for hydrogen production. SoCalGas did not validate Cal Advocates analysis but did consider the potential acreage and percentage impact on the three production areas as cited in Cal Advocates' comment for reference.

CAL ADVOCATES COMMENT 13-3

SoCalGas's Angeles Link Preliminary Routing/Configuration Analysis Draft Report identifies the most feasible Angeles Link hydrogen pipeline to be one that would serve the San Joaquin and Lancaster regions. FN10 To fulfill the proposed 1.5 MMTPY scenario, Cal Advocates estimates that such a pipeline would require that 20% (240,000 acres/1.182 million acres) of suitable land be dedicated to solar for hydrogen production. This is a historic degree of land conversion, and SoCalGas has provided no assessment of local, state, or federal agencies agreement with, or awareness of these studies. So that the Commission can make a fully informed appraisal of the feasible size of a pipeline, it is essential that SoCalGas both review and integrate the sources of information presented in Appendix A and consult with land management and permitting agencies. Without these actions, the scenario is likely to draw inaccurate conclusions about the availability of the type and scale of renewable energy resources that could be used to create hydrogen.

FN10 – Southern California Gas Company's Angeles Link Preliminary Routing/Configuration Analysis Draft Report at 42-44.

SOCALGAS RESPONSE TO COMMENT 13-3

In response to the comment concerning information in Appendix A of the Production Study, as noted in the Q2 2024 Angeles Link Quarterly Report Responses to Comments 1-5, 2-3 and 2-6, the market information presented in Appendix A is meant to provide a reference of potential future renewable energy projects proposed and/or under development in SoCalGas's service territory. This was integrated into the study considering stakeholder feedback to provide additional information on how clean renewable hydrogen production projects may develop within SoCalGas's service territory.

In response to the comment concerning the historic degree of land conversion, the Production Study in Section 10.3 references research indicating that alternative approaches could require more land (please refer to FN47 in Section 10.3 of the Production Study).

In response to the comment concerning consultation with permitting agencies, please refer to Response to Comment 13-1.

CAL ADVOCATES COMMENT 13-4

2. SoCalGas should expand the analysis of potential production areas beyond their service territory

The Production Planning report restricts its analysis of the available land for solar production to areas within the SoCalGas service territory. This is an arbitrary restriction on the scope of the study. SoCalGas should expand its analysis of potential production areas into the service territories of other utilities. For example, SoCalGas is already considering a hydrogen pipeline routing corridor from PG&E's service territory in northern San Joaquin Valley. FN11 Given the solar exclusions in southern California, the greater San Joaquin Valley region shows greater promise for solar development. SoCalGas should identify potential production areas in PG&E service territory that could feed a northern San Joaquin Valley corridor. Thus, the Production Planning report likely underestimates the total available land for hydrogen production in the state as a whole.

FN11 – In Figures 10.1 and 10.2 of the Production Planning study, SoCalGas shows a conceptual routing option to the northwest of its service territory within PG&E's domain.

SOCALGAS RESPONSE TO COMMENT 13-4

For purposes of this feasibility analysis, the scope of the Production Study was limited to provide an understanding of potential production within SoCalGas's service territory. SoCalGas acknowledges production projects outside of SoCalGas's service territory may also produce clean renewable hydrogen that could be transported by an interconnected open access pipeline system such as Angeles Link. For further response, please refer to Responses to Comments 13-1 and 13-2.

CAL ADVOCATES COMMENT 13-5

3. SoCalGas should explore alternative renewable energy production technologies other than solar

The Production Planning report also assumes the use of only solar energy for hydrogen production. SoCalGas should consider other renewable energy technologies, especially geothermal generation in the Salton Sea area near Blythe. The Production Planning report dismisses geothermal technologies because of feasibility issues such as project discovery and siting difficulty, uncertain access to adequate fluid temperatures and flows, uncertainty about proximity to energy demand, and uncertainty around technology and project costs. FN12 However, the Salton Sea is a Known Geothermal Resource Area (KGRA) that resolves much of the uncertainties that SoCalGas raises. FN13 The Imperial Valley Geothermal Project already operates 11 geothermal power stations in the Salton Sea Geothermal Field, and experts estimate that the Salton Sea KGRA could support further development of 2 GW of additional power plant capacity. FN14 Financial incentives – such as the CEC's Geothermal Grant and Loan Program or lithium extraction (with the colocation of lithium recovery facilities with geothermal power plants) – for developing geothermal power at the Salton Sea could also prove attractive. FN15

FN12 – Production Planning report at 57.

FN13 – CEC Geothermal Energy at https://www.energy.ca.gov/data-reports/california-power-generation-and-powersources/geothermal-energy. Date accessed: August 12, 2024.

FN14 – Lithium Valley Commission Report at 30. https://www.energy.ca.gov/data-reports/california-power-generation-and-powersources/geothermal-energy/lithium-valley. Date accessed: August 12, 2024.

FN15 – CEC Geothermal Grant and Loan Program. https://www.energy.ca.gov/programs-and-topics/programs/geothermal-grantand-loan-program. Date accessed: August 12, 2024.

SOCALGAS RESPONSE TO COMMENT 13-5

SoCalGas recognizes additional alternative renewable production technologies may further enable clean renewable hydrogen production that could be transported by Angeles Link. SoCalGas does not propose producing clean renewable hydrogen as part of Angeles Link. At this feasibility stage, SoCalGas currently assumes solar-based electrolytic hydrogen potential to inform potential routing of Angeles Link pipelines as solar is considered the most widely suitable power resource for SoCalGas's service territory. SoCalGas will continue to assess the potential for Angeles Link to serve third-party clean renewable hydrogen producers using various production technologies, and welcomes additional outreach from producers and stakeholders.

CAL ADVOCATES COMMENT 13-6

Conclusion

In summary, SoCalGas should review its assumptions in its Production Planning report. To demonstrate more accurately where 240,000 acres of solar can feasibly be permitted, SoCalGas must consult with the primary land use permitting authorities to understand what development is occurring and the limits in existing land use plans. SoCalGas should also expand the scope of its study to include regions outside its service territory and consider renewable energy production beyond solar.

SOCALGAS RESPONSE TO COMMENT 13-6

Please refer to Responses to Comments 13-1, 13-2 and 13-5.

Comment Letter 14 – California Greenworks

Comment Letter 14

Notes and comments on ESJ Draft Engagement Plant and ESJ Screening

- Curious why "non-discriminatory" is emphasized. What is, or has been, normal with pipeline systems? Who is the intended audience? — **Comment 14-01**
- Under Background section, perhaps end in an end note or hyperlink which lists all the orgs that have been involved in the PAG and CBOSG.
- Good job in explicitly stating the stakeholder input and SCG's direct output — **Comment 14-02**
- Under goals of the plan, goal bullet point 2, providing information seems passive. Maybe frame it a but more collaboratively? (workshops, informal interviews, etc)
- What will the processes be for monitoring and assuring quality/efficacity for the community benefits plan?
- Can you elaborate on the direct and indirect benefits for stakeholders/communities — **Comment 14-03**
- I would caution on an over-reliance on elected officials for DAC perspectives/needs/wants. There is often a level of mistrust between DAC and government.
- When you get around to it, more clarity on the *how often* and *how* the engagement strategies will take place
- For Phase 2 engagement meeting approach: as part of EJ, please make sure to value stakeholders time, through either incentives (food, beverage, gift cards) or compensation (stipends, honorariums) — **Comment 14-04**

Notes and comments on ESJ Draft Social Justice Screening

- I appreciate the linkage with the appropriate macro-level EJ initiatives
- I would appreciate also in the tables for census tracts, the addition of two more metrics: EnviroScreen overall percentile, and the pollution burden percent. (please see the end for an example)[1]. It allows me to quickly and more meaningfully analyze the tract (beyond classification of DAC). — **Comment 14-05**
- Section 2.3. As a part of EJ, a general environmental description would also be helpful (type of environment, historical environmental concerns). While this may exist in other reports (environmental impact report), it should also be a part of the EJ assessment. — **Comment 14-06**
- I would love to see what the EJ benefits could be. I know it's all conceptual at this stage, but SCG should know what they are capable of providing and letting stakeholders know a starting off point would be helpful. — **Comment 14-07**
- In the document, my side notes that show EJ+ means a short hand for me saying these communities could use a lot of love and attention. It would be powerful for SCG to treat these communities with an overabundance of — **Comment 14-08**

benefits. One idea I have is that since you have the data, you can determine if a community is in need of, jobs, education, green space, etc. Obviously waiting for feedback from the communities for what is desired on-the-ground and the best means of acquiring/distributing the benefits

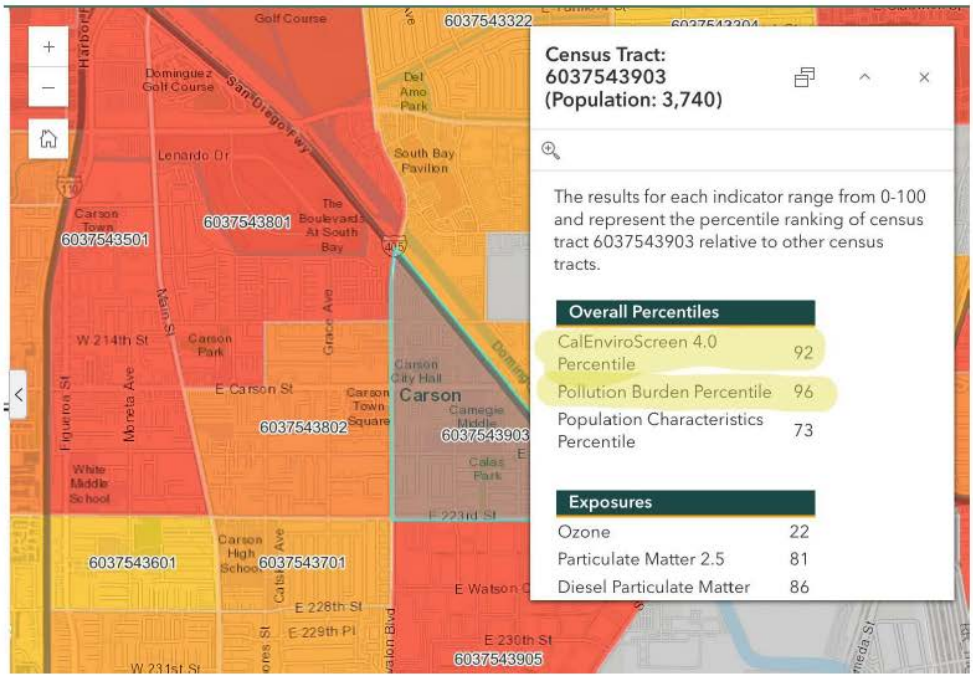
- Also, for the sake of the reader, having a (small) map of the proposed line would help me situate/contextualize the route segments
- Knowing the criteria of assessment would also be helpful for sake of transparency. For grants, a lot of grantors have scoring systems of how they will assess

Comment 14-08

Comment 14-09

Comment 14-10

1



CALIFORNIA GREENWORKS COMMENT 14-1

Curious why “non-discriminatory” is emphasized. What is, or has been, normal with pipeline systems? Who is the intended audience?

SOCALGAS RESPONSE TO COMMENT 14-1

SoCalGas operates and maintains "open access" pipelines. Open access is the principle that gas pipeline operators must provide access to their pipeline systems to all shippers or customers who meet the necessary qualifications and requirements. The term “non-discriminatory” conveys that the Angeles Link pipeline system would be an open access pipeline system and be available to all shippers who meet clean renewable hydrogen and system specifications, unlike a private pipeline company, which can determine who can and cannot use a pipeline system.

CALIFORNIA GREENWORKS COMMENT 14-2

Under Background section, perhaps end in an end note or hyperlink which lists all the orgs that have been involved in the PAG and CBOSG.

Good job in explicitly stating the stakeholder input and SCG's direct output

Under goals of the plan, goal bullet point 2, providing information seems passive. Maybe frame it a but more collaboratively? (workshops, informal interviews, etc)

SOCALGAS RESPONSE TO COMMENT 14-2

In response to the suggestions in this comment, the final ESJ Plan will be revised accordingly. In response to the comment concerning the list of organizations that have been involved in the PAG and CBOSG for Angeles Link, a new appendix (Appendix A) will be added with the list of PAG and CBOSG members. In response to the comment concerning the goal related to engagement with ESJ communities, the bullet will be revised to address the plan for active engagement with ESJ communities in Phase 2.

CALIFORNIA GREENWORKS COMMENT 14-3

What will the processes be for monitoring and assuring quality/efficacity for the community benefits plan?

Can you elaborate on the direct and indirect benefits for stakeholders/communities?

I would caution on an over-reliance on elected officials for DAC perspectives/needs/wants. There is often a level of mistrust between DAC and government.

When you get around to it, more clarity on the how often and how the engagement strategies will take place.

SOCALGAS RESPONSE TO COMMENT 14-3

In response to the comment concerning monitoring community benefits, SoCalGas plans to engage with community members, stakeholders, and local organizations through its proposed Phase 2 stakeholder engagement activities to gather input and incorporate feedback into the Community Benefits Plan. SoCalGas will rely on community input to determine the preferred processes for monitoring and facilitating the execution of the Community Benefits Plan.

In response to the comment concerning direct and indirect benefits, delivery of clean renewable hydrogen through Angeles Link could lead to significant criteria air pollutant emissions reductions and associated health benefits in these communities, which have been disproportionately impacted by emissions from ports and major transportation corridors. Angeles Link could also lead to significant greenhouse gas emissions reductions. In the ESJ Plan, the reader is referred to the Phase 1 NOx and Other Air Emissions Assessment and Greenhouse Gas Emissions Evaluation for further details on these benefits. Further, Angeles Link could bring significant economic and workforce benefits in ESJ Communities along potential preferred pipeline routes. In the ESJ Plan, the reader is directed to the Phase 1 Workforce Planning & Training Evaluation for further details.

In response to the comment concerning elected officials, SoCalGas recognizes the potential mistrust between DACs and government. Leveraging elected officials was a recommendation from CBOSG members during a CBOSG meeting held on September 2023. (Please see Section III of SoCalGas's Angeles Link Phase 1 Q3 2023 Quarterly Report for a summary of the breakout session activity). In light of this, SoCalGas will consult with community stakeholders on whether to engage local elected officials.

In response to the comment concerning the timing of engagement strategies, the engagement approach in Phase 2 is subject to CPUC authorization for these activities. Meeting cadence and timing is not known at this time; however, SoCalGas will communicate with stakeholders the timing of these engagement approaches when further details are known.

CALIFORNIA GREENWORKS COMMENT 14-4

For Phase 2 engagement meeting approach: as part of EJ, please make sure to value stakeholders time, through either incentives (food, beverage, gift cards) or compensation (stipends, honorariums).

SOCALGAS RESPONSE TO COMMENT 14-4

Subject to CPUC authorization, SoCalGas is planning to compensate community based organizations for their participation in the Phase 2 stakeholder engagement process.

CALIFORNIA GREENWORKS COMMENT 14-5

I appreciate the linkage with the appropriate macro-level EJ initiatives.

I would appreciate also in the tables for census tracts, the addition of two more metrics: EnviroScreen overall percentile, and the pollution burden percent. (please see the end for an example). It allows me to quickly and more meaningfully analyze the tract (beyond classification of DAC).

SOCALGAS RESPONSE TO COMMENT 14-5

In response to this feedback, the Disadvantaged Community Designation Tables in Section 3 Existing Conditions of the Environmental and Social Justice Screening will be updated to include both the CalEnviroScreen Overall Percentile and the CalEnviroScreen Pollution Burden Percentile for each study area. Table 3: Disadvantage Community Designations – Study Area 1A will be updated as well as each subsequent study area with a similar table.

CALIFORNIA GREENWORKS COMMENT 14-6

Section 2.3. As a part of EJ, a general environmental description would also be helpful (type of environment, historical environmental concerns). While this may exist in other reports (environmental impact report), it should also be a part of the EJ assessment.

SOCALGAS RESPONSE TO COMMENT 14-6

The Angeles Link Phase 1 Environmental Analysis provides a high-level overview of existing environmental resources in the study areas, including air quality standards, biological resources, cultural and tribal cultural resources, energy resources, hazards and hazardous materials, hydrological resources, and land use, which can be cross referenced by segment to the ESJ Screening.

CALIFORNIA GREENWORKS COMMENT 14-7

I would love to see what the EJ benefits could be. I know it's all conceptual at this stage, but SCG should know what they are capable of providing and letting stakeholders know a starting off point would be helpful.

SOCALGAS RESPONSE TO COMMENT 14-7

SoCalGas acknowledges the interest in potential benefits that may come from Angeles Link. As summarized in Response to Comment 14-3, delivery of clean renewable hydrogen through Angeles Link could lead to several direct and indirect benefits, including economic, workforce, improved air quality, and greenhouse gas emission reduction benefits. Additional details on potential benefits to ESJ communities would be premature at this feasibility stage. Please also refer to Global Response 8 for additional information on the limitations of the ESJ Screening analysis and an understanding of the particular impacts certain communities may face at this feasibility stage.

CALIFORNIA GREENWORKS COMMENT 14-8

In the document, my side notes that show EJ+ means a short hand for me saying these communities could use a lot of love and attention. It would be powerful for SCG to treat these communities with an overabundance of benefits. One idea I have is that since you have the data, you can determine if a community is in need of, jobs, education, green space, etc. Obviously waiting for feedback from the communities for what is desired on-the-ground and the best means of acquiring/distributing the benefits.

SOCALGAS RESPONSE TO COMMENT 14-8

SoCalGas acknowledges this comment and will be developing a Community Benefits Plan as part of Phase 2. The Community Benefits Plan will be developed with stakeholder input and include consideration of benefits such as jobs, education and greenspace. Please refer to Section 5 of the ESJ Plan for more information on the development of the Community Benefits Plan.

CALIFORNIA GREENWORKS COMMENT 14-9

Also, for the sake of the reader, having a (small) map of the proposed line would help me situate/contextualize the route segments.

SOCALGAS RESPONSE TO COMMENT 14-9

In response to this comment, Figure 1-1 Overview Map of Evaluated Segments will be added to Section 1.2 Project Description of the Environmental and Social Justice Screening. The map shows the different routes within each study area.

CALIFORNIA GREENWORKS COMMENT 14-10

Knowing the criteria of assessment would also be helpful for sake of transparency. For grants, a lot of grantors have scoring systems of how they will assess.

SOCALGAS RESPONSE TO COMMENT 14-10

For the ESJ Screening, CalEnviroScreen and the Climate and Economic Justice Screening Tool were used to collect data, which was presented in the ESJ Screening draft report. Based on comments on the draft ESJ Screening, data from the Community Development Index, which was created by University of Southern California Neighborhood Data for Social Change, will be added to the final report. The Community Development Index does score neighborhoods based on four priority areas and can be leveraged, along with community input and other data, in future assessments. At this point, additional criteria for assessment have not been developed and something SoCalGas would seek input from potentially impacted communities to help develop.

Comment Letter 15 – Green Hydrogen Coalition

Comment Letter 15

August 20, 2024

Southern California Gas Company
555 West Fifth Street
Los Angeles, CA 90013

Submitted via email to: ALP1_Study_PAG_Feedback@insigniaenv.com

RE: Feedback for Southern California Gas Company on
1. Production Planning and Assessment Draft Report (Dated July 2024)
2. Preliminary Routing /Configuration Analysis (Draft)

The Green Hydrogen Coalition ('GHC') is appreciative of SoCalGas' effort to implement Angeles Link, the nation's first dedicated common carrier renewable hydrogen pipeline, as it is an essential component of California's goal of economy wide decarbonization and our transition away from fossil fuels. The GHC is a California educational 501(c)(3) non-profit organization that was formed in 2019 to recognize the game-changing potential of "green hydrogen" to accelerate multi-sector decarbonization and combat climate change. The GHC's mission is to facilitate policies and practices that advance green hydrogen production and use across all sectors of the economy to accelerate a carbon-free energy future and a just energy transition.

Comment 15-01

Background/Basis for GHC's Comments

From 2020-2023 the GHC launched and completed HyBuild Los Angeles, a multi stakeholder independent system planning effort to determine if it is commercially and technically possible to create a mass-scale green hydrogen ecosystem to displace fossil fuels across multiple sectors. This effort was geared toward first identifying potential multi-sectoral buyers/demand for the renewable hydrogen and then architecting the needed scaled production and transport infrastructure to serve that demand. Findings from this effort were highly encouraging. The GHC found that achieving a mass-scale green hydrogen economy to rapidly displace fossil fuels in several hard to abate sectors is indeed technically and commercially possible. It will require shared, scaled infrastructure; namely green hydrogen pipeline transport connected to underground geologic storage of hydrogen. This infrastructure combination affords the lowest cost pathway to achieving mass-scale supply assurance and low delivered cost to enable widespread adoption of GH2. The successful implementation of Angeles Link is thus a gating factor for Southern California's realization of a green hydrogen economy and a faster transition away from fossil fuels economywide. The GHC is pleased to see that many of the assumptions and findings in the Socalgas draft reports are consistent with the HyBuild LA findings.

Green Hydrogen Coalition
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GHC Comments: Production Planning and Assessment Draft Report

1. HyBuild LA demand assessment findings are consistent with the preliminary findings from the Angeles Link work to date, namely the forecasted demand scenarios for the pipeline sizing (0.5, 1.0 and 1.5 million metric tons per year). The GHC's findings were based on direct interviews with potential scalable multi sectoral off takers in the LA basin, to ascertain and qualify potential demand for green hydrogen. **Comment 15-01**
2. The GHC found that there was significant renewable resource in the locations identified by Socalgas for third party clean renewable hydrogen production, including locations in the San Joaquin Valley, and near Lancaster CA. GHC also applauds SoCalGas' thorough evaluation of potential geologic storage options for green hydrogen, including not only commercially available salt dome storage but also the potential for hydrogen storage in depleted oil and gas fields. **Comment 15-02**
3. The GHC also found that utility-scale solar is the lowest cost and most scalable source of renewable electricity for electrolytically produced hydrogen (as compared to onshore and offshore wind and rooftop solar) **Comment 15-03**
4. While GHC did not study waste to hydrogen pathways as part of HyBuild LA due to budget constraints, GHC strongly supports and applauds Socalgas' exploration of various biomass to hydrogen technologies. The GHC strongly supports the use of non-recyclable and non-compostable waste, especially municipal waste, as a valuable feedstock for the production of Clean Hydrogen. **Comment 15-04**
5. The attached Biofuels article jointly authored by the Professors from University of California Berkeley, University of California Agriculture and Natural Resources and Stanford University found that hydrogen projects from all three sources of waste deliver positive internal rates of return, with municipal solid waste being the highest at 37%, suggesting that "hydrogen production from these waste streams would be a financially worthwhile enterprise at scale in CA"[1]. **Comment 15-05**
6. GHC encourages Socalgas to continue to explore these pathways, particularly given the high taxpayer burden of dealing with this waste today. For example, LA is burdened with a significant and expensive waste removal problem that costs taxpayers $700 million per year, **Comment 15-06**

[1] Page 6: 2023 Society of Industrial Chemistry and John Wiley C Sons Ltd – Biofuels, Bioprod, Bioref.. (2023) DOI: 10.1002/bbb/2492 Authors: Haris Gilani, Dept of Environmental Science, University of CA Berkeley; Karim Ibrik, Stanford University, Daniel Sanchez, University of California Agriculture and Natural Resources

Green Hydrogen Coalition
10265 Rockingham Dr., Suite #100-4061, Sacramento, CA 95827 ghcoalition.org

and more than $2 billion per year if wastewater treatment is included.[2] The portion of waste that cannot be recycled or composted produces methane emissions and its removal via diesel powered trucks to landfills contributes to toxic air pollution and road congestion. **The fraction of LA's solid waste that cannot be recycled or composted and is destined for landfills should be explored for conversion to clean hydrogen. GHC recommends that further work be undertaken in the next phase to evaluate specific in-basin opportunities for waste to hydrogen production, perhaps co located with existing waste sorting/collection locations.**

Comment 15-06

GHC Comments: Preliminary Routing /Configuration Analysis (Draft)

The GHC appreciates Socalgas' thoughtfulness in creating multiple pipeline routing options that take into consideration both system evaluation and route evaluation, following transit corridors. Establishing transport infrastructure that can connect multiple scaled producers with multiple scalable off takers is the key to realizing a cost competitive clean hydrogen economy and achieving deep economy wide decarbonization.

The GHC also appreciates the attention given to prioritizing needed pipeline infrastructure to support ARCHES, which will drive the first scaled green hydrogen production and off take projects statewide.

Comment 15-07

Finally, the GHC appreciates Socalgas' development of an Environmental Justice and Social Justice Community Engagement Plan which includes potential alternative route Variation 1 that minimizes main pipeline route mileage traversing DACs in the LA Basin. While it is critically important to avoid impacts to such communities during the construction phase of Angeles Link, it is important to also factor in the broader costs and benefits to DACs. For example, Route Variation 1 may minimize construction impacts by avoiding traversing DACs, but in so doing could potentially minimize the beneficial impacts for disadvantaged communities either by

1. delaying or increasing the delivered hydrogen cost for clean renewable hydrogen in heavily trafficked transit corridors and

Comment 15-08

[2] City of LA 2023-2024 Adopted Budget; solid waste collection and disposal cost is budgeted at $669,819,775 for 2023-2024; an additional $1,328,074,031 is budgeted for wastewater collection and treatment page 6: 2023-24 Budget Summary_FINALrev.pdf (lacity.gov)

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2. delaying and increasing the delivered cost for clean renewable hydrogen to municipalities including local electric generation facilities that must remain online to ensure grid reliability. For these latter generation plants, access to clean renewable hydrogen will be key to enabling their transition away from natural gas usage, the current default fuel. In other words, sitting Angeles Link too far away from these large municipal loads (and their vehicle/truck fleets) may in advertently slow their adoption of clean hydrogen and unnecessarily prolong the continued use of fossil fuels in/around DACs.

Comment 15-08

Notably, the GHC's work on HyBuild LA identified significant air quality, public health and economic development opportunities that will result from a scaled green hydrogen economy for Southern California, largely due its ability to displace the combustion of diesel fuel. The impact of reduced emissions is significant - for a single winter month in 2045 the value of public health benefits exceeded $350 million for the LA Basin, representing 27 fewer premature deaths, 964 fewer hospitalizations for respiratory and cardiovascular illness and 7,500 fewer work loss days. These benefits will only be achievable by establishing a cost competitive alternative fuel to gasoline and diesel fuel, and to achieve that goal pipeline transport is essential.

Comment 15-09

The GHC looks forward to participating in the final October PAG meeting and to the opportunity to further comments as additional analyses are completed.

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GREEN HYDROGEN COALITION COMMENT 15-1

RE: Feedback for Southern California Gas Company on

1. Production Planning and Assessment Draft Report (Dated July 2024)
2. Preliminary Routing /Configuration Analysis (Draft)

The Green Hydrogen Coalition ('GHC') is appreciative of SoCalGas' effort to implement Angeles Link, the nation's first dedicated common carrier renewable hydrogen pipeline, as it is an essential component of California's goal of economy wide decarbonization and our transition away from fossil fuels. The GHC is a California educational 501(c)(3) non-profit organization that was formed in 2019 to recognize the game-changing potential of "green hydrogen" to accelerate multisector decarbonization and combat climate change. The GHC's mission is to facilitate policies and practices that advance green hydrogen production and use across all sectors of the economy to accelerate a carbon-free energy future and a just energy transition.

Background/Basis for GHC's Comments

From 2020-2023 the GHC launched and completed HyBuild Los Angeles, a multi stakeholder independent system planning effort to determine if it is commercially and technically possible to create a mass-scale green hydrogen ecosystem to displace fossil fuels across multiple sectors. This effort was geared toward first identifying potential multi-sectoral buyers/demand for the renewable hydrogen and then architecting the needed scaled production and transport infrastructure to serve that demand. Findings from this effort were highly encouraging. The GHC found that achieving a mass-scale green hydrogen economy to rapidly displace fossil fuels in several hard to abate sectors is indeed technically and commercially possible. It will require shared, scaled infrastructure; namely green hydrogen pipeline transport connected to underground geologic storage of hydrogen. This infrastructure combination affords the lowest cost pathway to achieving mass-scale supply assurance and low delivered cost to enable widespread adoption of GH2. The successful implementation of Angeles Link is thus a gating factor for Southern California's realization of a green hydrogen economy and a faster transition away from fossil fuels economywide. The GHC is pleased to see that many of the assumptions and findings in the Socalgas draft reports are consistent with the HyBuild LA findings.

GHC Comments: Production Planning and Assessment Draft Report

1. HyBuild LA demand assessment findings are consistent with the preliminary findings from the Angeles Link work to date, namely the forecasted demand scenarios for the pipeline sizing (0.5, 1.0 and 1.5 million metric tons per year). The GHC's findings were based on direct interviews with potential scalable multi sectoral off takers in the LA basin, to ascertain and qualify potential demand for green hydrogen.

SOCALGAS RESPONSE TO COMMENT 15-1

SoCalGas acknowledges the background/basis of GHC's comments and agrees that the Angeles Link Demand Study findings and forecasted demand scenarios of 0.5 – 1.5 MMT/Y are consistent with the findings in HyBuild LA.

GREEN HYDROGEN COALITION COMMENT 15-2

2. The GHC found that there was significant renewable resource in the locations identified by Socalgas for third-party clean renewable hydrogen production, including locations in the San Joaquin Valley, and near Lancaster CA. GHC also applauds SoCalGas' thorough evaluation of potential geologic storage options for green hydrogen, including not only commercially available salt dome storage but also the potential for hydrogen storage in depleted oil and gas fields.

SOCALGAS RESPONSE TO COMMENT 15-2

SoCalGas acknowledges GHC's comment affirming the production locations identified and storage assessment as detailed in the Production Study.

GREEN HYDROGEN COALITION COMMENT 15-3

3. The GHC also found that utility-scale solar is the lowest cost and most scalable source of renewable electricity for electrolytically produced hydrogen (as compared to onshore and offshore wind and rooftop solar).

SOCALGAS RESPONSE TO COMMENT 15-3

SoCalGas acknowledges GHC's feedback that found utility scale solar to be the lowest cost and most scalable electrolytic hydrogen production pathway for electrolytically produced hydrogen.

GREEN HYDROGEN COALITION COMMENT 15-4

4. While GHC did not study waste to hydrogen pathways as part of HyBuild LA due to budget constraints, GHC strongly supports and applauds SoCalGas' exploration of various biomass to hydrogen technologies. The GHC strongly supports the use of non-recyclable and non-compostable waste, especially municipal waste, as a valuable feedstock for the production of Clean Hydrogen.

SOCALGAS RESPONSE TO COMMENT 15-4

SoCalGas acknowledges GHC's feedback on SoCalGas's exploration of third-party biomass-based hydrogen production potential.

GREEN HYDROGEN COALITION COMMENT 15-5

5. The attached Biofuels article jointly authored by the Professors from University of California Berkeley, University of California Agriculture and Natural Resources and Stanford University found that hydrogen projects from all three sources of waste deliver positive internal rates of return, with municipal solid waste being the highest at 37%, suggesting that "hydrogen production from these waste streams would be a financially worthwhile enterprise at scale in CA" FN1.

FN1 – Page 6: 2023 Society of Industrial Chemistry and John Wiley & Sons Ltd – Biofuels, Bioprod, Bioref. (2023) DOI: 10.1002/bbb/2492 Authors: Haris Gilani, Dept of Environmental Science, University of CA Berkeley; Karim Ibrik, Stanford University, Daniel Sanchez, University of California Agriculture and Natural Resources

SOCALGAS RESPONSE TO COMMENT 15-5

SoCalGas acknowledges the article shared regarding the potential for hydrogen production from various waste streams and its potential to contribute to hydrogen production. SoCalGas will continue to assess potential third-party production locations that can provide clean renewable hydrogen in the development of a preferred route during Phase 2.

GREEN HYDROGEN COALITION COMMENT 15-6

6. GHC encourages Socalgas to continue to explore these pathways, particularly given the high taxpayer burden of dealing with this waste today. For example, LA is burdened with a significant and expensive waste removal problem that costs taxpayers $700 million per year, and more than $2 billion per year if wastewater treatment is included.FN2 The portion of waste that cannot be recycled or composted produces methane emissions and its removal via diesel powered trucks to landfills contributes to toxic air pollution and road congestion. The fraction of LA's solid waste that cannot be recycled or composted and is destined for landfills should be explored for conversion to clean hydrogen. GHC recommends that further work be undertaken in the next phase to evaluate specific in-basin opportunities for waste to hydrogen production, perhaps co located with existing waste sorting/collection locations.

FN2 – City of LA 2023-2024 Adopted Budget; solid waste collection and disposal cost is budgeted at $669,819,775 for 2023-2024; an additional $1,328,074,031 is budgeted for wastewater collection and treatment page 6:2023-24 Budget Summary_FINALrev.pdf (lacity.gov)

SOCALGAS RESPONSE TO COMMENT 15-6

SoCalGas acknowledges GHC's comments and notes that Angeles Link seeks to address several of the concerns expressed by the commenter, namely enabling the transport of third-party clean renewable hydrogen to support various end users in power generation, mobility, and hard-to-electrify industrial sectors. Biomethane produced at landfills, wastewater treatment plants and dairies is also a pathway to decarbonization as recognized by the Commission in its Rulemaking 13-02-008 implementing Senate Bill 1440 Biomethane Procurement Program. Ultimately, hydrogen production, whether in-basin or elsewhere, will be performed by third parties. Clean renewable hydrogen could be transported via Angeles Link as authorized by the Commission to support decarbonization goals. SoCalGas will continue to assess potential third-party clean renewable hydrogen production that meets the Decision's requirements.

GREEN HYDROGEN COALITION COMMENT 15-7

GHC Comments: Preliminary Routing /Configuration Analysis (Draft)

The GHC appreciates Socalgas' thoughtfulness in creating multiple pipeline routing options that take into consideration both system evaluation and route evaluation, following transit corridors. Establishing transport infrastructure that can connect multiple scaled producers with multiple scalable off takers is the key to realizing a cost competitive clean hydrogen economy and achieving deep economy wide decarbonization.

The GHC also appreciates the attention given to prioritizing needed pipeline infrastructure to support ARCHES, which will drive the first scaled green hydrogen production and off take projects statewide.

SOCALGAS RESPONSE TO COMMENT 15-7

SoCalGas acknowledges this feedback on the system and route evaluation and on the identified pipeline segments within ARCHES. Please refer to Global Response 3.

GREEN HYDROGEN COALITION COMMENT 15-8

Finally, the GHC appreciates Socalgas' development of an Environmental Justice and Social Justice Community Engagement Plan which includes potential alternative route Variation 1 that minimizes main pipeline route mileage traversing DACs in the LA Basin. While it is critically important to avoid impacts to such communities during the construction phase of Angeles Link, it is important to also factor in the broader costs and benefits to DACs. For example, Route Variation 1 may minimize construction impacts by avoiding traversing DACs, but in so doing could potentially minimize the beneficial impacts for disadvantaged communities either by

1. delaying or increasing the delivered hydrogen cost for clean renewable hydrogen in heavily trafficked transit corridors and

2. delaying and increasing the delivered cost for clean renewable hydrogen to municipalities including local electric generation facilities that must remain online to ensure grid reliability. For these latter generation plants, access to clean renewable hydrogen will be key to enabling their transition away from natural gas usage, the current default fuel. In other words, sitting Angeles Link too far away from these large municipal loads (and their vehicle/truck fleets) may in advertently slow their adoption of clean hydrogen and unnecessarily prolong the continued use of fossil fuels in/around DACs.

SOCALGAS RESPONSE TO COMMENT 15-8

SoCalGas acknowledges this feedback. Future preferred route selection will factor in engineering, environmental, and social justice considerations and select a route that optimizes the delivered cost of hydrogen and adoption of clean renewable hydrogen across California.

GREEN HYDROGEN COALITION COMMENT 15-9

Notably, the GHC's work on HyBuild LA identified significant air quality, public health and economic development opportunities that will result from a scaled green hydrogen economy for Southern California, largely due its ability to displace the combustion of diesel fuel. The impact of reduced emissions is significant - for a single winter month in 2045 the value of public health benefits exceeded $350 million for the LA Basin, representing 27 fewer premature deaths, 964 fewer hospitalizations for respiratory and cardiovascular illness and 7,500 fewer work loss days. These benefits will only be achievable by establishing a cost competitive alternative fuel to gasoline and diesel fuel, and to achieve that goal pipeline transport is essential.

The GHC looks forward to participating in the final October PAG meeting and to the opportunity to further comments as additional analyses are completed.

SOCALGAS RESPONSE TO COMMENT 15-9

SoCalGas acknowledges this comment.

Comment Letter 16 – Southern California Generation Coalition

Comment Letter 16

SOUTHERN CALIFORNIA GENERATION COALITION
COMMENT ON ANGELES LINK PHASE I
DRAFT PRODUCTION PLANNING & ASSESSMENT

August 21, 2024

Submitted via Email to:
ALP1_STUDY_PAG_FEEDBACK@INSIGNIAENV.COM

The Southern California Generation Coalition ("SCGC") respectfully comments on the draft Angeles Link Phase 1 Production & Planning Assessment ("Draft Production Assessment") posted by the Southern California Gas Company ("SoCalGas") in the Angeles Link Living Library on July 19, 2024.

I. INTRODUCTION AND SUMMARY

The Draft Production Assessment provides the most comprehensive assessment so far of the potential for storing hydrogen in what SoCalGas calls the Area of Interest ("AOI") for Angeles Link. The AOI is an area encompassing the SoCalGas and SDG&E service territories in California plus the states of Nevada, Utah, and Arizona.[1] SoCalGas projects a significant level of power sector demand for hydrogen transported through Angeles Link, but storage would be essential for the power plants. However, storage is not included in planning for Angeles Link currently.

Comment 16-01

The Draft Production Assessment indicates that the best option for storage for the power sector would be underground hydrogen storage ("UHS") near power sector demand. For the reasons discussed below, UHS to serve Angeles Link power sector demand should be included in Angeles Link studies.

[1] Draft Production Study, p. 87.

1

SCGC Angeles Link Draft Production Planning & Assessment

II. POWER SECTOR DEMAND.

SoCalGas projects significant power sector demand for hydrogen transported through Angeles Link. In the Draft Production Assessment, SoCalGas says that in 2045 the power sector is expected to make up 45 percent of demand in the ambitious case for Angeles Link throughput, 51 percent of demand in the moderate case, and 38 percent in the conservative case.[2] However, SoCalGas projects that the power sector demand will have only a 15 percent capacity factor.[3] SoCalGas also observes that hydrogen supply to the power sector will need to ramp quickly to make up for power loss as wind and solar resources go offline.[4]

Storage will be essential to provide for the projected power sector ramp requirements. Storage will also be essential to enable utilization of upstream Angeles Link capacity at a high enough load factor to make the capacity economic. Nevertheless, SoCalGas says that hydrogen storage is not currently part of Angeles Link.[5]

Comment 16-02

III. THE DRAFT PRODUCTION ASSESSMENT INDICATES THAT UHS NEAR POWER SECTOR DEMAND IS THE BEST STORAGE OPTION.

The Draft Production Assessment says that storage could be provided in various ways, including line pack, construction of a parallel pipeline on portions of the pipeline system, on-site storage by upstream hydrogen producers or downstream hydrogen end users, and dedicated aboveground or underground storage.[6] However, the Draft Production Assessment states that while aboveground hydrogen storage is technically viable, storing hydrogen above ground comes with significant costs at limited capacities which makes it "challenging to use as a means of steadying the energy production from renewable sources at large volumes in a centralized

[2] *Ibid*, p. 37.
[3] *Ibid*, p. 35.
[4] *Ibid*.
[5] *Ibid*, p. 36.
[6] *Ibid*, p. 36.

location."[7] Thus, the Draft Production Assessment indicates that the preferable option for the power sector is UHS which is as proximate as possible to downstream power sector demand.

Comment 16-02

IV. THE DRAFT PRODUCTION ASSESSMENT INDICATES THAT UHS COULD SERVE THE POWER SECTOR.

The Draft Production Assessment says that a total of 297 oil and gas fields and six salt basins were evaluated within the four-state AOI.[8] The Draft Production Assessment also says that depleted reservoirs in oil and gas fields offer the most economical options.[9] At least two currently undeveloped fields that have a geologic confidence of adequacy greater than fifty percent are located in the Los Angeles Basin.[10]

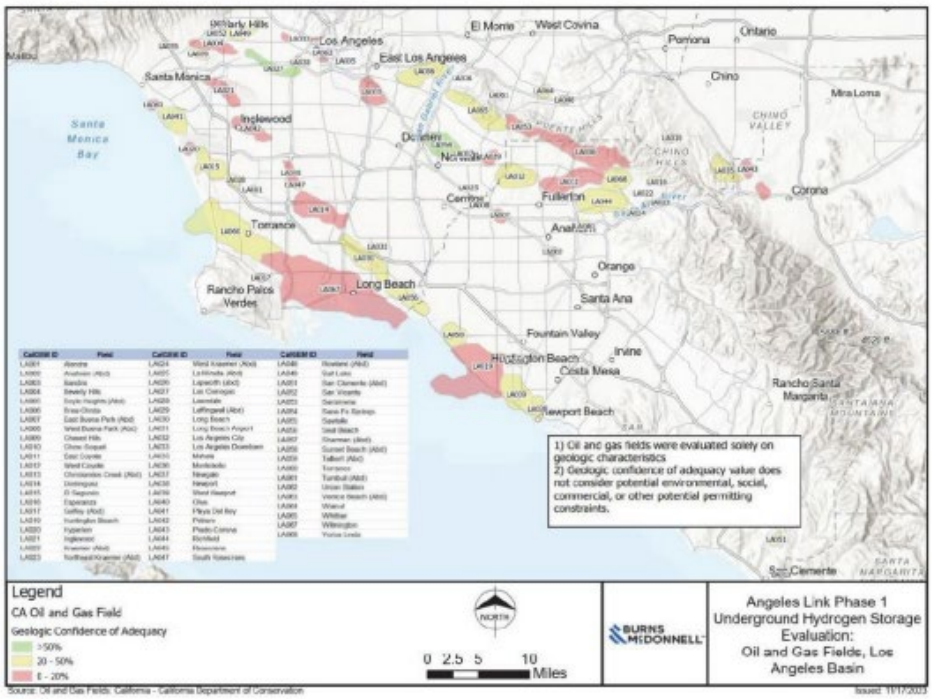
Comment 16-03

[7] *Ibid*, p. 40.

[8] *Ibid*, p. 73.

[9] *Ibid*, p. 74.

[10] *Ibid*, p. 98.



Comment 16-03

11

Another field that should be considered is Honor Rancho. It is located adjacent to the route of Angeles Link from the San Joaquin Valley to Santa Clarita. Although SoCalGas currently operates a natural gas storage facility at Honor Rancho, there may be unutilized strata which are not connected to natural gas storage strata but which are sufficiently porous and permeable to be used to store hydrogen.

SoCalGas says without explanation, "While existing SoCalGas facilities were evaluated for geologic adequacy because they are located within the study area, they are not currently

[11] *Ibid.*.

being considered as storage options for Angeles Link."[12] Honor Rancho should be considered if it is geologically adequate.

Comment 16-03

The California Energy Commission ("CEC") is funding a study to evaluate the feasibility of using existing underground storage facilities to store clean renewable hydrogen in California.[13] At the CEC's April 17, 2024 Pre-Application Workshop, the CEC summarized the purpose of it solicitation as follows: "Fund a project that will evaluate the technical and economic feasibility of using existing underground gas storage to store clean renewable hydrogen in California."[14] The CEC study should include Honor Rancho.

Comment 16-04

SoCalGas observes that even though there are no currently permitted examples of UHS in depleted oil and gas reservoirs,[15] "these structures have held an accumulation of hydrocarbons under significant pressure for millions of years, suggesting that they may likely be capable of containing other gases such as hydrogen…."[16]

Comment 16-05

[12] *Ibid*, p. 40, footnote 44.

[13] *Ibid*, p. 40.

[14] GFO-23-503, Feasibility of Underground Hydrogen Storage in California, Pre-Application Workshop, p. 11 (April 17, 2024)

[15] *Ibid*, p. 77

[16] Draft Production Assessment, p. 84.

V. CONCLUSION

UHS which would make Angeles Link operationally and economically viable to serve low load factor power sector demand should be included in the Angeles Link hydrogen transportation studies so that Angeles Link will have the potential to be useful for the power sector.

Comment 16-06

Respectively submitted,

/s/ Norman A. Pedersen

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Attorneys for the **SOUTHERN CALIFORNIA GENERATION COALITION**

Dated: August 21, 2024

SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 16-1

The Southern California Generation Coalition ("SCGC") respectfully comments on the draft Angeles Link Phase 1 Production & Planning Assessment ("Draft Production Assessment") posted by the Southern California Gas Company ("SoCalGas") in the Angeles Link Living Library on July 19, 2024.

I. INTRODUCTION AND SUMMARY

The Draft Production Assessment provides the most comprehensive assessment so far of the potential for storing hydrogen in what SoCalGas calls the Area of Interest ("AOI") for Angeles Link. The AOI is an area encompassing the SoCalGas and SDG&E service territories in California plus the states of Nevada, Utah, and Arizona.FN1 SoCalGas projects a significant level of power sector demand for hydrogen transported through Angeles Link, but storage would be essential for the power plants. However, storage is not included in planning for Angeles Link currently.

The Draft Production Assessment indicates that the best option for storage for the power sector would be underground hydrogen storage ("UHS") near power sector demand. For the reasons discussed below, UHS to serve Angeles Link power sector demand should be included in Angeles Link studies.

FN1 – Draft Production Study, p. 87.

SOCALGAS RESPONSE TO COMMENT 16-1

The Production Study includes storage related analysis with the assumption that third parties will develop storage solutions. As summarized in the Production Study, as Angeles Link is further designed, and in alignment with the development of system requirements, the role of storage to support regional hydrogen producers and end users will be considered. Distributed storage equipment located at third-party production and end user sites, along with line pack (storing and then withdrawing gas supplies from the pipeline), can provide storage capacity while larger scale storage technologies are developed over time to support regional hydrogen hub requirements. Please refer to the Production Study (Section 8) as well as Appendix B and C for storage-related details.

The Production Study does not determine a single option for storage for the power sector but, instead, evaluates the potential of hydrogen storage and various storage options that could support both third party hydrogen producers and end-users.

SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 16-2

II. POWER SECTOR DEMAND.

SoCalGas projects significant power sector demand for hydrogen transported through Angeles Link. In the Draft Production Assessment, SoCalGas says that in 2045 the power sector is expected to make up 45 percent of demand in the ambitious case for Angeles Link throughput, 51 percent of demand in the moderate case, and 38 percent in the conservative case.FN2 However, SoCalGas projects that the power sector demand will have only a 15 percent capacity factor.FN3 SoCalGas also observes that hydrogen supply to the power sector will need to ramp quickly to make up for power loss as wind and solar resources go offline.FN4

Storage will be essential to provide for the projected power sector ramp requirements. Storage will also be essential to enable utilization of upstream Angeles Link capacity at a high enough load factor to make the capacity economic. Nevertheless, SoCalGas says that hydrogen storage is not currently part of Angeles Link.FN5

III. THE DRAFT PRODUCTION ASSESSMENT INDICATES THAT UHS NEAR POWER SECTOR DEMAND IS THE BEST STORAGE OPTION.

The Draft Production Assessment says that storage could be provided in various ways, including line pack, construction of a parallel pipeline on portions of the pipeline system, on-site storage by upstream hydrogen producers or downstream hydrogen end users, and dedicated aboveground or underground storage.FN6 However, the Draft Production Assessment states that while aboveground hydrogen storage is technically viable, storing hydrogen above ground comes with significant costs at limited capacities which makes it "challenging to use as a means of steadying the energy production from renewable sources at large volumes in a centralized location."FN7 Thus, the Draft Production Assessment indicates that the preferable option for the power sector is UHS which is as proximate as possible to downstream power sector demand.

FN2 – Ibid, p. 37.
FN3 – Ibid, p. 35.
FN4 – Ibid.
FN5 – Ibid, p. 36.
FN6 – Ibid, p. 36.
FN7 – Ibid, p. 40.

SOCALGAS RESPONSE TO COMMENT 16-2

SoCalGas acknowledges the role of storage as part of the hydrogen ecosystem and its ability to support supply and demand of clean renewable hydrogen that could be transported via Angeles Link. Third-party storage can play an important role to balance hydrogen supply with demand, primarily due to the intermittent nature of renewables and expected demand profiles of the power generation, mobility, and industrial sectors. SoCalGas recognizes short and long-term storage requirements will likely evolve as technologies and the broader hydrogen market develops.

The Production Study does not determine a single option or preferred location for storage for the power sector but, instead, evaluates the potential of underground hydrogen storage (UHS), as one among various storage options, that could support both third party hydrogen producers and end-users in the short and long term. To the extent UHS is a feasible option, it is expected to store larger quantities of clean renewable hydrogen that could support the variable needs of the power sector.

SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 16-3

IV. THE DRAFT PRODUCTION ASSESSMENT INDICATES THAT UHS COULD SERVE THE POWER SECTOR.

The Draft Production Assessment says that a total of 297 oil and gas fields and six salt basins were evaluated within the four-state AOI.FN8 The Draft Production Assessment also says that depleted reservoirs in oil and gas fields offer the most economical options.FN9 At least two currently undeveloped fields that have a geologic confidence of adequacy greater than fifty percent are located in the Los Angeles Basin. FN10

Another field that should be considered is Honor Rancho. It is located adjacent to the route of Angeles Link from the San Joaquin Valley to Santa Clarita. Although SoCalGas currently operates a natural gas storage facility at Honor Rancho, there may be unutilized strata which are not connected to natural gas storage strata but which are sufficiently porous and permeable to be used to store hydrogen.

SoCalGas says without explanation, "While existing SoCalGas facilities were evaluated for geologic adequacy because they are located within the study area, they are not currently being considered as storage options for Angeles Link." FN12 Honor Rancho should be considered if it is geologically adequate.

FN8 – Ibid, p. 73.
FN9 – Ibid, p. 74.
FN10 – Ibid, p. 98.
FN11 – Ibid.
FN12 – Ibid, p. 40, footnote 44.

SOCALGAS RESPONSE TO COMMENT 16-3

Based on preliminary geologic feasibility conducted in Phase 1, the screening of underground depleted oil and gas fields for potential suitability for storage is preliminary in nature intended as a screening tool only. Additional evaluation would need to be performed to determine technical feasibility and efficacy of storing hydrogen in specific underground geologic formations.

SoCalGas acknowledges SCGC's recommendation to include storage at its existing Honor Rancho Storage Field. This analysis is outside the scope of these Phase 1 feasibility studies. However, SoCalGas recognizes the value of providing storage near load centers and with Commission direction to do so, would evaluate the feasibility of hydrogen storage at Honor Rancho.

SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 16-4

The California Energy Commission ("CEC") is funding a study to evaluate the feasibility of using existing underground storage facilities to store clean renewable hydrogen in California.FN13 At the CEC's April 17, 2024 Pre-Application Workshop, the CEC summarized the purpose of it solicitation as follows: "Fund a project that will evaluate the technical and economic feasibility of using existing underground gas storage to store clean renewable hydrogen in California."FN14 The CEC study should include Honor Rancho.

FN13 – Ibid, p. 40.
FN14 – GFO-23-503, Feasibility of Underground Hydrogen Storage in California, Pre-Application Workshop, p. 11 (April 17, 2024)

SOCALGAS RESPONSE TO COMMENT 16-4

SoCalGas is aware of the CEC solicitations and of the CEC's award of the solicitation to Lawrence Berkeley National Laboratory (LBNL) to fund for a project that will evaluate the technical and economic feasibility of using existing underground gas storage facilities to store clean renewable hydrogen in California.[24] The CEC noted that site-specific assessments will help to better understand the safety and performance of converting underground gas storage to hydrogen. The project will study underground gas storage facilities in California for their potential to store clean renewable hydrogen, and will estimate levelized costs of hydrogen storage, levelized total capital costs, and operations and maintenance costs. Consistent with past research endeavors, SoCalGas continues to be open to consider ways to support a broader understanding of storage options.

[24] CEC, GFO-23-503 - Feasibility of Underground Hydrogen Storage in California, Solicitation Status-Results Table: https://www.energy.ca.gov/solicitations/2024-04/gfo-23-503-feasibility-underground-hydrogen-storage-california

SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 16-5

SoCalGas observes that even though there are no currently permitted examples of UHS in depleted oil and gas reservoirs, FN15 "these structures have held an accumulation of hydrocarbons under significant pressure for millions of years, suggesting that they may likely be capable of containing other gases such as hydrogen…." FN16

FN15 – Ibid, p. 77
FN16 – Draft Production Assessment, p. 84.

SOCALGAS RESPONSE TO COMMENT 16-5

As noted in Appendix B of the Production Study, SoCalGas's assessment is intended as a screening tool. SoCalGas will continue to monitor updates pertaining to utilization of depleted oil and gas reservoirs for underground hydrogen storage.

SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 16-6

V. CONCLUSION

UHS which would make Angeles Link operationally and economically viable to serve low load factor power sector demand should be included in the Angeles Link hydrogen transportation studies so that Angeles Link will have the potential to be useful for the power sector.

SOCALGAS RESPONSE TO COMMENT 16-6

Please refer to Responses to Comments 16-1 and 16-2.

Comment Letter 17 – Southern California Generation Coalition

Comment Letter 17

SOUTHERN CALIFORNIA GENERATION COALITION
COMMENT ON ANGELES LINK PHASE I
DRAFT PRELIMINARY ROUTING/CONFIGURATION ANALYSIS

August 21, 2024

Submitted via Email to:
ALP1_STUDY_PAG_FEEDBACK@INSIGNIAENV.COM

The Southern California Generation Coalition ("SCGC") respectfully comments on the draft Angeles Link Phase 1 Preliminary Routing/Configuration Analysis ("Draft Routing Analysis") posted by the Southern California Gas Company ("SoCalGas") in the Angeles Link Living Library on July 19, 2024.

I. Introduction and Summary.

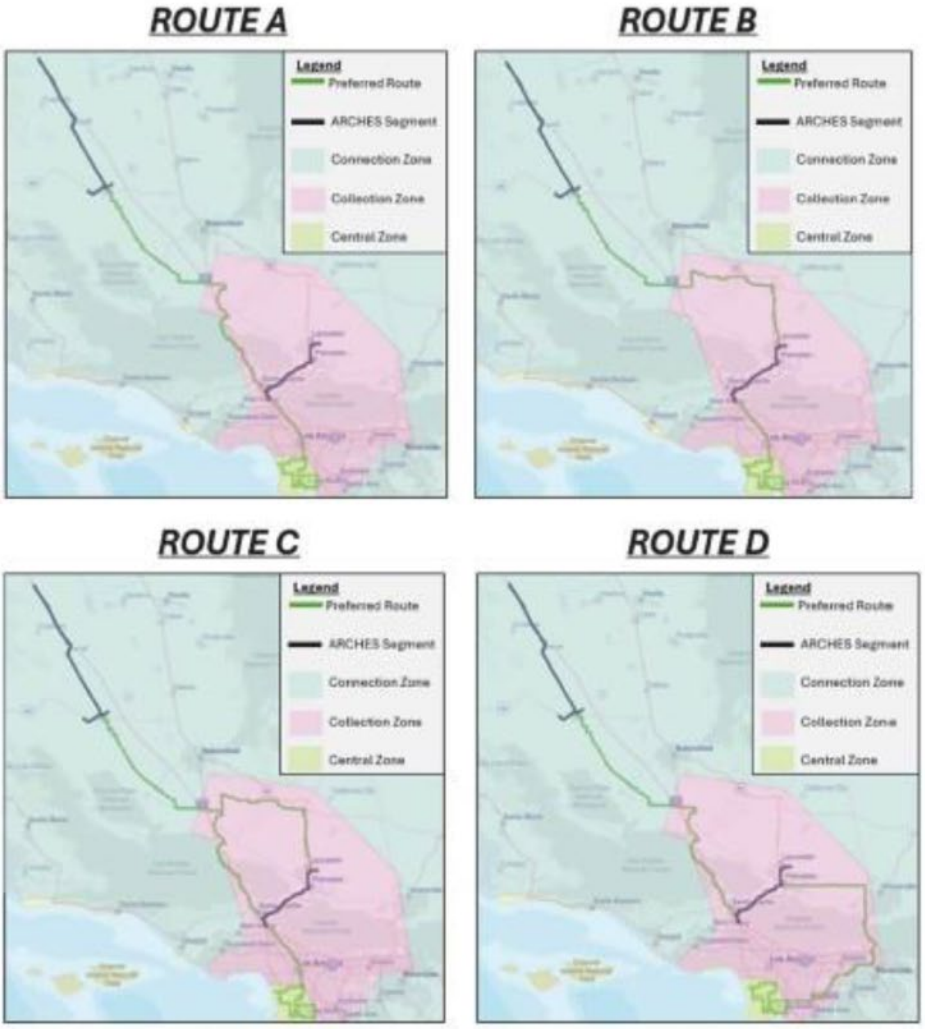
SoCalGas says that the Draft Routing Analysis is "Preliminary" and "was conducted at a high level" to identify "broad directional pathways with the highest potential for achieving the purpose of the Angeles Link Pipeline System."[1] The selection of a single preferred route would be left to Application ("A.") 22-02-007 Phase 2 in which SoCalGas will prepare a Front End Engineering and Design ("FEED") for the Angeles Link Pipeline.[2] Thus, the Phase 1 Draft Routing Analysis posted on July 19, 2024, presents the options that are to be narrowed to one preferred route in Phase 2.

The Draft Routing Analysis presents Preferred Routes A, B, C, and D leading from production areas in the San Joaquin Valley and near Lancaster to demand in what SoCalGas calls the "Central Zone" in Los Angeles County, the region shaded in yellow on the maps below that generally lies south of Century Boulevard and west of I-605:

Comment 17-01

[1] Draft Routing Analysis, p. 5.

[2] *Ibid.*



Comment 17-01

Figure 23. Preferred Route Configurations with Zones

3

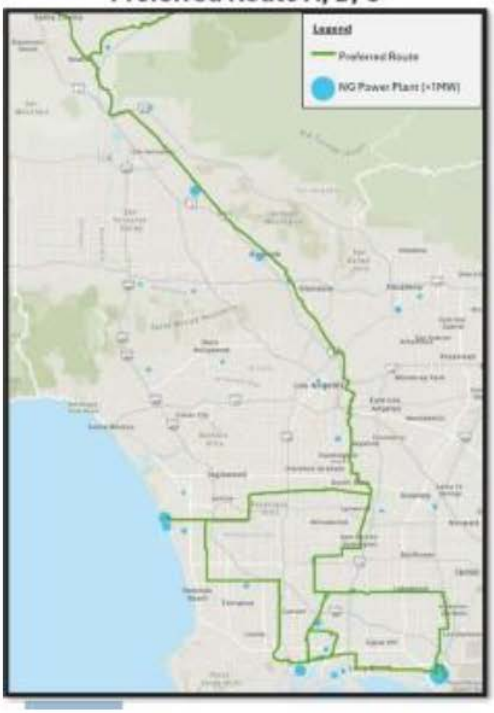
[3] Draft Routing Analysis, p. 43.

2

SCGC Angeles Link Routing Comment 08162024

SoCalGas should narrow its Phase 2 analysis to Routes A, B, and C and should discard Route D. As discussed below, Route D would fail to serve potential load that would be served by the common segment of Routes A, B, and C, which would extend from near the I-5/I-210 interchange through San Fernando, Burbank, and Glendale, to Los Angeles and then to South Gate:

Preferred Route A, B, C



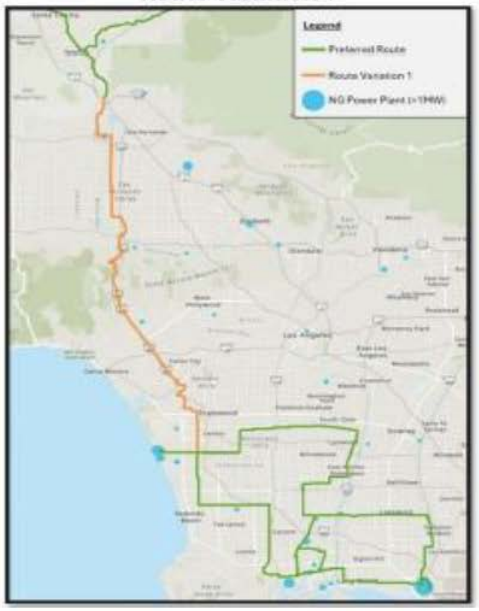
[4]

SCGC also discourages any further consideration in Phase 2 of what SoCalGas labels "Route Variation 1." Variation 1 would generally follow the I-405 freeway from the I-5/I-405 interchange south to Inglewood, bypassing the eastern San Fernando Valley:

Comment 17-01

[4] *Ibid*, p. 61.

Route Variation 1



[5]

Comment 17-01

The common segment of Routes A, B, and C through the eastern San Fernando Valley is close to important potential offtake facilities and passes through more level terrain than Variation 1.[6] Angeles Link Routes A, B, or C are superior to both Route D and Variation 1.

II. Route D Would Fail to Serve Major Potential Offtake Sites in Eastern San Fernando Valley and Would Be Longer, Less Level, and More Costly than Routes A, B, and C.

Instead of following I-5 south from Santa Clarita through the San Francisco Valley to Los Angeles and then to South Gate, Route D would bypass the San Fernando Valley entirely by running east from Palmdale toward Victorville. Route D would then turn south following I-15 toward Riverside and then would finally turn southwest to serve demand:

[5] *Ibid*, p. 58.

[6] *Ibid*, pp. 60-61.

Figure 35. Preferred Route D Map

[7]

The best that can be said for Route D is that it would potentially serve more offtake sites that were identified by the Alliance for Renewable Clean Hydrogen Energy Systems ("ARCHES") than Routes A, B, and C:

Table 5. Preferred Route Specific Characterization Comparison

	Route Configuration			
Characterization	**A**	**B**	**C**	**D**
ARCHES Production Sites	5	5	5	7
ARCHES Offtake Sites	8	8	9	15
Demand Access, %	83%	83%	83%	92%

[8]

However, as can be seen from Table 5, in spite of the number of ARCHES offtake sites increasing from eight or nine for Routes A, B, and C, to fifteen for Route D, demand access only

Comment 17-01

[7] *Ibid*, p. 58.

[8] *Ibid*, p. 51.

increases by nine percentage points for Route D. Important potential offtake sites in the eastern San Fernando Valley would be left completely unserved under Route D. Additionally, Route D would be longer than Preferred Routes A, B, and C, would be less level, and would cost substantially more than Preferred Routes A, B, and C.

A. Route D Would Leave Important Potential Power Plant Demand Unserved.

SoCalGas says that in its evaluation presented in the Draft Routing Analysis, the "focus was placed on corridors that reside in close proximity to the potential demand sectors for Angeles Link to connect with demand…."[9] However, Route D would leave important power plant demand unserved. Routes A, B, and C would follow a common route through the San Fernando Valley, resulting in all three routes being close to the 576-megawatt Valley Generating Station and the 323-megawatt Magnolia Power Project. Other potential power plant off-take lies east of Routes A, B, and C near the California 134 Freeway, including the Pasadena Water and Power Glenarm power plant.

Comment 17-01

SoCalGas observes in the Draft Angeles Link Demand Report ("Draft Demand Report") posted on January 17, 2024, that "we do not expect to see total dispatchable capacity requirements to decline significantly from the capacity in place today in SoCalGas' service territory."[10] Instead, there will be a need for approximately nine incremental gigawatts of hydrogen combustion turbine generation by 2045.[11] Thus, the power plants that Routes A, B. and C could serve but which would be left unserved by Route D are likely to be needed in 2045 as well as today.

[9] *Ibid*, p. 18.

[10] Draft Demand Report, p. 52.

[11] *Ibid*, p. 44; California Air Resources Board, 2022 Scoping Plan for Achieving Carbon Neutrality, p. 203, Figure 4-5, "Projected New Electricity Resources Needed by 2045 in the Scoping Plan Scenario."

B. Route D Would Leave Important Potential Mobility Demand Unserved.

Route D would also fail to serve potential mobility demand along or proximate to the I-5 corridor through Los Angeles. Additional demand along I-5 that could be served from Routes A, B, or C but not Route D could arise from high Heavy Duty Vehicle ("HDV") demand along the I-5 truck corridor. SoCalGas expects that "fleet operators will look for diesel replacements that can operate as similarly as possible to diesel trucks today (short refueling times, long range, and a distributed fueling network)."[12] Thus, the HDV demand that would be likely along the corridor served by Routes A, B, and C but left unserved by Route D would be about the same if not more than the current demand for diesel fuel along the corridor.

Comment 17-01

There are additional potential points of mobility demand along the I-5 corridor that Routes A, B, or C could serve but which would be stranded by Route D. The common segment of Routes A. B, and C is proximate to Hollywood-Burbank Airport. SoCalGas recognizes that there is a "high degree of uncertainty" about the demand for hydrogen from the aviation sector, but SoCalGas's Ambitious Demand Scenario includes aviation demand for clean hydrogen in 2045.[13]

Routes A, B, and C also would be proximate to Union Station in Los Angeles, and they would be proximate to Union Pacific's Los Angeles Transportation Center ("LATC") Intermodal Terminal. Trains and HDVs converge at the Terminal, potentially presenting additional offtake for Angeles Link. Route D would bypass Union Station and the LATC Intermodal Terminal.

[12] Draft Demand Report, p. 17.

[13] *Ibid*, p. 32.

C. Route D Would Be Longer than Routes A, B, and C.

Out of the four preferred routes identified in the Draft Routing Analysis, Route D would be the longest at 481 miles.[14] Route A would have the shortest length, 390 miles,[15] and Route B would be the next shortest at 406 miles.[16] Route C would be 472 miles long,[17] but it would cost approximately the same as the shortest route, Route A.[18] The loop in Route C north of Santa Clarita would allow for flow splitting, a lower pressure drop, and smaller diameter--hence less costly--pipes in the downstream Angeles Link Central Zone as compared to the downstream pipe diameters required in the Central Zone for Routes A and B.[19]

Route D, by contrast, would be lengthy at 481 miles, 91 miles longer than Route A and 75 miles longer than Route B, and Route D would not have the cost-reducing hydraulic advantages of Route C.[20]

D. The Route for Route D Would Be More Mountainous than the Route for Routes A, B, and C.

Route D would be more mountainous than Routes A, B, and C, increasing Route D's cost. All four preferred routes would incur the cost of traversing the Tejon Pass along I-5, 4,160 feet in elevation. However, Route D would have an added disadvantage. After traversing the Tejon Pass, Route D would backtrack to Victorville and then turn south to traverse the Cajon Pass, 3,776 feet in elevation, along I-15. Thus, Route D presents the disadvantage of traversing both of the major mountain passes into the Los Angeles load center rather than just one.

Comment 17-01

[14] Draft Routing Analysis, p. 58.

[15] *Ibid*, p. 55.

[16] *Ibid*, p. 56.

[17] *Ibid*, p. 57.

[18] Draft Pipeline Sizing Criteria, p. 56.

[19] *Ibid*, p. 36.

[20] Draft Routing Report, p. 58.

E. Route D Would Cost More than Routes A, B, and C.

SoCalGas projects that Route D would cost more than Routes A, B, or C. In the Draft Angeles Link Phase I Pipeline Sizing & Design Criteria Report ("Draft Pipeline Sizing Report") posted on July 19, 2024, SoCalGas presented its Class 5 estimates for Routes A, B, C, and D:

Table 18 - Preferred Route Single-Run Configuration Cost Estimate Summary

Single-Run Configuration	Installed Pipe, miles	Pipe Sizes, inches	Approx Total Pipeline Cost*	No. of Compressor Station(s)	Approx Total Compressor Cost*	Approx Total Cost* (CapEx)
Route A	390	16", 20", 24", 30", 36"	$6 B	2 @ 50,000 hp (each)	$3 B	$9 B
Route B	406	20", 36"	$7 B	2 @ 50,000 hp (each)	$3 B	$10 B
Route C	472	20", 24", 30", 36"	$6B	2 @ 50,000 hp (each)	$3 B	$9 B
Route D	481	24", 36"	$8 B	2 @ 50,000 hp (each)	$3 B	$11 B

[21]

Comment 17-01

Route D would have a total Class 5 estimated cost that would be $2 billion more than either Route A or Route C. Thus, Route D represents a 22 percent higher cost in order to serve only nine percent more offtake, according to SoCalGas' Draft Routing Analysis.[22] SoCalGas does not explain why it estimates that Route D would cost 22 percent more than either Routes A or C. However, the longer length of Route D plus the need to traverse the Cajon Pass as well as the Tejon Pass to reach the Los Angeles Basin likely provide much of the explanation.

If Route D is to be considered at all, only the southern-most portion should be considered as a future expansion of the Angeles Link pipeline from the Central Zone to the Inland Empire.

[21] Draft Pipeline Sizing Criteria, p. 56. Cost based on Class 5 estimates, which have accuracy ranges of 20% to 50% on the low side, and +30% to +100% on the high side.

[22] Draft Routing Analysis, p. 51, Table 5.

III. Variation 1 Is Even Worse than Route D.

SoCalGas's Variation 1 is even worse than Route D. In addition to leaving unserved the nine percent additional offtake that SoCalGas says would be served by Route D, Variation 1 would leave unserved the entire demand in the eastern San Fernando Valley. SoCalGas does not quantify the amount of offtake that would be left unserved in the eastern San Fernando Valley, but it clearly would be substantial.

The purpose of constructing Angeles Link is to provide clean hydrogen from points of production in the San Joaquin Valley and in the Lancaster area to points of demand. By failing to serve both the offtake that would be served by Route D and the offtake in the eastern San Fernando Valley, Variation 1 would fail to meet the most fundamental objective of constructing Angeles Link, providing clean hydrogen to points of demand.

The ostensible reason for Variation 1 is to avoid disadvantaged communities. SoCalGas presents the following Figure 26 in an attempt to make the case for Variation 1:

Comment 17-01

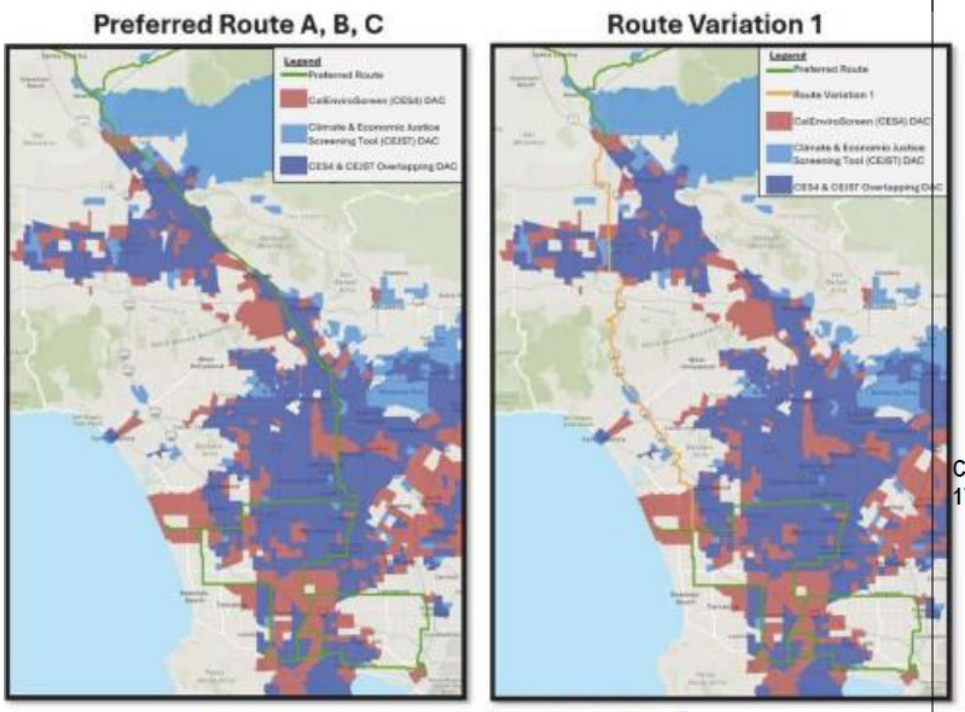


Figure 26. Illustration of Route Variation 1 and DAC[23]

Comment 17-01

23

However, pipelines differ from above-ground structures. Pipelines are underground. Except during the time of construction, pipelines are out of sight. Additionally, given the current stringent Pipeline and Hazardous Materials Safety Administration and California Public Utilities Commission safety requirements for operating gas pipelines, safety concerns are low for all communities including disadvantaged communities.

For the common segment of routes A, B, and C that would be eliminated by Route D and Variation 1, the route is predominently through rights of way that are predominantly if not completely commercial or industrial. Much of the route is under San Fernando Road in the San

[23] Draft Routing Analysis, p. 47.

11

SCGC Angeles Link Routing Comment 08162024

Fernando Valley. Variation 1 is ostensibly presented to avoid disadvantaged communites, but in addition to being underground and, thus, out of sight, the rights of way avoid neigborhoods.

SoCalGas does not present cost estimates for Variation 1, but it is reasonable to assume that Variation 1 would have increased costs in comparison to Routes A, B, and C, given that the pipeline would have to traverse the Sepulveda Pass to deliver gas to the Central Zone in the South Bay region of Los Angeles County.[24] Thus, Variation 1 would supply less demand than Routes A, B, or C while costing more and simultaneously providing little if any tangible benefit for disadvantaged communities in the eastern San Fernando Valley. SoCalGas should not spend further resources on Variation 1 in Phase 2.

Comment 17-01

IV. Conclusion.

For the reasons discussed above, SCGC urges SoCalGas not to expand further resources on Route D or Variation 1 in Phase 2.

SCGC appreciates this opportunity to comment on the July 19, 2024, Draft Routing Analysis.

Respectively submitted,

/s/ Norman A. Pedersen

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Attorneys for the **SOUTHERN CALIFORNIA GENERATION COALITION**

Dated: August 21, 2024

[24] Draft Routing Study, p. 15.

SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 17-1

The Southern California Generation Coalition ("SCGC") respectfully comments on the draft Angeles Link Phase 1 Preliminary Routing/Configuration Analysis ("Draft Routing Analysis") posted by the Southern California Gas Company ("SoCalGas") in the Angeles Link Living Library on July 19, 2024.

I. Introduction and Summary.

SoCalGas says that the Draft Routing Analysis is "Preliminary" and "was conducted at a high level" to identify "broad directional pathways with the highest potential for achieving the purpose of the Angeles Link Pipeline System." FN1 The selection of a single preferred route would be left to Application ("A.") 22-02-007 Phase 2 in which SoCalGas will prepare a Front End Engineering and Design ("FEED") for the Angeles Link Pipeline. FN2 Thus, the Phase 1 Draft Routing Analysis posted on July 19, 2024, presents the options that are to be narrowed to one preferred route in Phase 2.

The Draft Routing Analysis presents Preferred Routes A, B, C, and D leading from production areas in the San Joaquin Valley and near Lancaster to demand in what SoCalGas calls the "Central Zone" in Los Angeles County, the region shaded in yellow on the maps below that generally lies south of Century Boulevard and west of I-605:

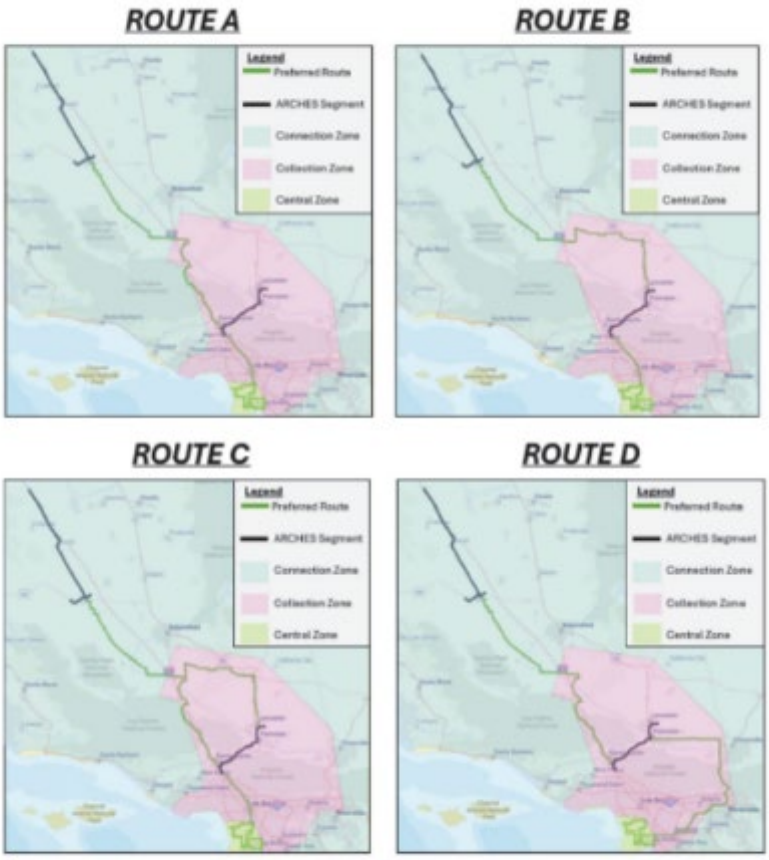
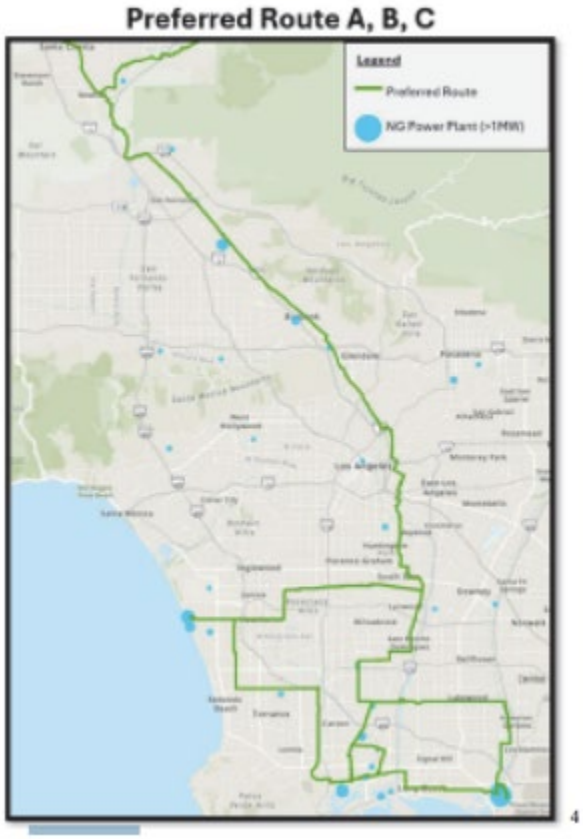


Figure 23. Preferred Route Configurations with Zones

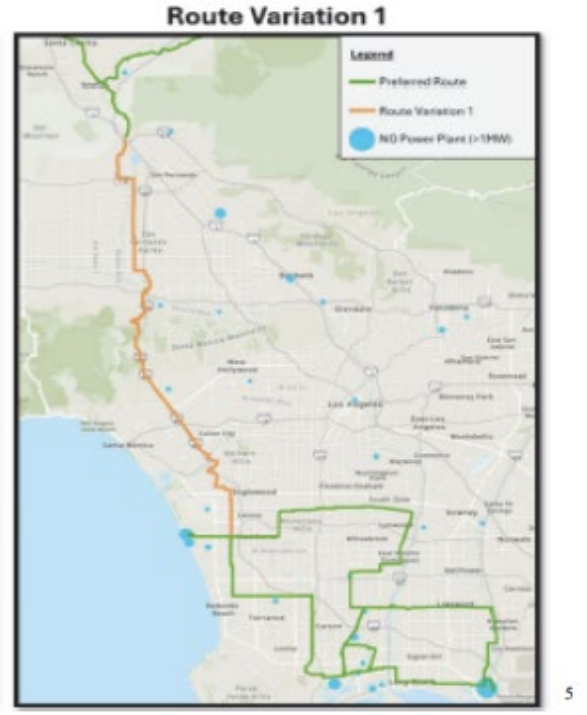
FN3

SoCalGas should narrow its Phase 2 analysis to Routes A, B, and C and should discard Route D. As discussed below, Route D would fail to serve potential load that would be served by the common segment of Routes A, B, and C, which would extend from near the I-5/I-210 interchange through San Fernando, Burbank, and Glendale, to Los Angeles and then to South Gate:



FN4

SCGC also discourages any further consideration in Phase 2 of what SoCalGas labels “Route Variation 1.” Variation 1 would generally follow the I-405 freeway from the I-5/I-405 interchange south to Inglewood, bypassing the eastern San Fernando Valley:



FN5

The common segment of Routes A, B, and C through the eastern San Fernando Valley is close to important potential offtake facilities and passes through more level terrain than Variation 1. FN6 Angeles Link Routes A, B, or C are superior to both Route D and Variation 1.

II. Route D Would Fail to Serve Major Potential Offtake Sites in Eastern San Fernando Valley and Would Be Longer, Less Level, and More Costly than Routes A, B, and C.

Instead of following I-5 south from Santa Clarita through the San Francisco Valley to Los Angeles and then to South Gate, Route D would bypass the San Fernando Valley entirely by running east from Palmdale toward Victorville. Route D would then turn south following I-15 toward Riverside and then would finally turn southwest to serve demand:

Figure 35. Preferred Route D Map

7

FN7

The best that can be said for Route D is that it would potentially serve more offtake sites that were identified by the Alliance for Renewable Clean Hydrogen Energy Systems ("ARCHES") than Routes A, B, and C:

Table 5. Preferred Route Specific Characterization Comparison

	Route Configuration			
Characterization	**A**	**B**	**C**	**D**
ARCHES Production Sites	5	5	5	7
ARCHES Offtake Sites	8	8	9	15
Demand Access, %	83%	83%	83%	92%

8

FN8

However, as can be seen from Table 5, in spite of the number of ARCHES offtake sites increasing from eight or nine for Routes A, B, and C, to fifteen for Route D, demand access only increases by nine percentage points for Route D. Important potential offtake sites in the eastern San Fernando Valley would be left completely unserved under Route D. Additionally, Route D would be longer than Preferred Routes A, B, and C, would be less level, and would cost substantially more than Preferred Routes A, B, and C.

A. Route D Would Leave Important Potential Power Plant Demand Unserved.

SoCalGas says that in its evaluation presented in the Draft Routing Analysis, the "focus was placed on corridors that reside in close proximity to the potential demand sectors for Angeles Link to connect with demand…." FN9 However, Route D would leave important power plant demand unserved. Routes A, B, and C would follow a common route through the San Fernando Valley, resulting in all three routes being close to the 576-megawatt Valley Generating Station and the 323-megawatt Magnolia Power Project. Other potential power plant off-take lies east of Routes A, B, and C near the California 134 Freeway, including the Pasadena Water and Power Glenarm power plant.

SoCalGas observes in the Draft Angeles Link Demand Report ("Draft Demand Report") posted on January 17, 2024, that "we do not expect to see total dispatchable capacity requirements to decline significantly from the capacity in place today in SoCalGas' service territory." FN10 Instead, there will be a need for approximately nine incremental gigawatts of hydrogen combustion turbine generation by 2045. FN11 Thus, the power plants that Routes A, B. and C could serve but which would be left unserved by Route D are likely to be needed in 2045 as well as today.

B. Route D Would Leave Important Potential Mobility Demand Unserved.

Route D would also fail to serve potential mobility demand along or proximate to the I-5 corridor through Los Angeles. Additional demand along I-5 that could be served from Routes A, B, or C but not Route D could arise from high Heavy Duty Vehicle ("HDV") demand along the I-5 truck corridor. SoCalGas expects that "fleet operators will look for diesel replacements that can operate as similarly as possible to diesel trucks today (short refueling times, long range, and a distributed fueling network)."FN12 Thus, the HDV demand that would be likely along the corridor served by Routes A, B, and C but left unserved by Route D would be about the same if not more than the current demand for diesel fuel along the corridor.

Here are additional potential points of mobility demand along the I-5 corridor that Routes A, B, or C could serve but which would be stranded by Route D. The common segment of Routes A. B, and C is proximate to Hollywood-Burbank Airport. SoCalGas recognizes that there is a "high degree of uncertainty" about the demand for hydrogen from the aviation sector, but SoCalGas's Ambitious Demand Scenario includes aviation demand for clean hydrogen in 2045.FN13Routes A, B, and C also would be proximate to Union Station in Los Angeles, and they would be proximate to Union Pacific's Los Angeles Transportation Center ("LATC") Intermodal Terminal. Trains and HDVs converge at the Terminal, potentially presenting additional offtake for Angeles Link. Route D would bypass Union Station and the LATC Intermodal Terminal.

C. Route D Would Be Longer than Routes A, B, and C.

Out of the four preferred routes identified in the Draft Routing Analysis, Route D would be the longest at 481 miles. FN14 Route A would have the shortest length, 390 miles, FN15 and Route B would be the next shortest at 406 miles. FN16 Route C would be 472 miles long, FN17 but it would cost approximately the same as the shortest route, Route A. FN18 The loop in Route C north of Santa Clarita would allow for flow splitting, a lower pressure drop, and smaller diameter--hence less costly--pipes in the downstream Angeles Link Central Zone as compared to the downstream pipe diameters required in the Central Zone for Routes A and B. FN19

Route D, by contrast, would be lengthy at 481 miles, 91 miles longer than Route A and 75 miles longer than Route B, and Route D would not have the cost-reducing hydraulic advantages of Route C. FN20

D. The Route for Route D Would Be More Mountainous than the Route for Routes A, B, and C.

Route D would be more mountainous than Routes A, B, and C, increasing Route D's cost. All four preferred routes would incur the cost of traversing the Tejon Pass along I-5, 4,160 feet in elevation. However, Route D would have an added disadvantage. After traversing the Tejon Pass, Route D would backtrack to Victorville and then turn south to traverse the Cajon Pass, 3,776 feet in elevation, along I-15. Thus, Route D presents the disadvantage of traversing both of the major mountain passes into the Los Angeles load center rather than just one.

E. Route D Would Cost More than Routes A, B, and C.

SoCalGas projects that Route D would cost more than Routes A, B, or C. In the Draft Angeles Link Phase I Pipeline Sizing & Design Criteria Report ("Draft Pipeline Sizing Report") posted on July 19, 2024, SoCalGas presented its Class 5 estimates for Routes A, B, C, and D:

Table 18 - Preferred Route Single-Run Configuration Cost Estimate Summary

Single-Run Configuration	Installed Pipe, miles	Pipe Sizes, inches	Approx Total Pipeline Cost*	No. of Compressor Station(s)	Approx Total Compressor Cost*	Approx Total Cost* (CapEx)
Route A	390	16", 20", 24", 30", 36"	$6 B	2 @ 50,000 hp (each)	$3 B	$9 B
Route B	406	20", 36"	$7 B	2 @ 50,000 hp (each)	$3 B	$10 B
Route C	472	20", 24", 30", 36"	$6B	2 @ 50,000 hp (each)	$3 B	$9 B
Route D	481	24", 36"	$8 B	2 @ 50,000 hp (each)	$3 B	$11 B

21

FN21

Route D would have a total Class 5 estimated cost that would be $2 billion more than either Route A or Route C. Thus, Route D represents a 22 percent higher cost in order to serve only nine percent more offtake, according to SoCalGas' Draft Routing Analysis. FN22 SoCalGas does not explain why it estimates that Route D would cost 22 percent more than either Routes A or C. However, the longer length of Route D plus the need to traverse the Cajon Pass as well as the Tejon Pass to reach the Los Angeles Basin likely provide much of the explanation.

If Route D is to be considered at all, only the southern-most portion should be considered as a future expansion of the Angeles Link pipeline from the Central Zone to the Inland Empire.

III. Variation 1 Is Even Worse than Route D.

SoCalGas's Variation 1 is even worse than Route D. In addition to leaving unserved the nine percent additional offtake that SoCalGas says would be served by Route D, Variation 1 would leave unserved the entire demand in the eastern San Fernando Valley. SoCalGas does not quantify the amount of offtake that would be left unserved in the eastern San Fernando Valley, but it clearly would be substantial.

The purpose of constructing Angeles Link is to provide clean hydrogen from points of production in the San Joaquin Valley and in the Lancaster area to points of demand. By failing to serve both the offtake

that would be served by Route D and the offtake in the eastern San Fernando Valley, Variation 1 would fail to meet the most fundamental objective of constructing Angeles Link, providing clean hydrogen to points of demand.
The ostensible reason for Variation 1 is to avoid disadvantaged communities. SoCalGas presents the following Figure 26 in an attempt to make the case for Variation 1:

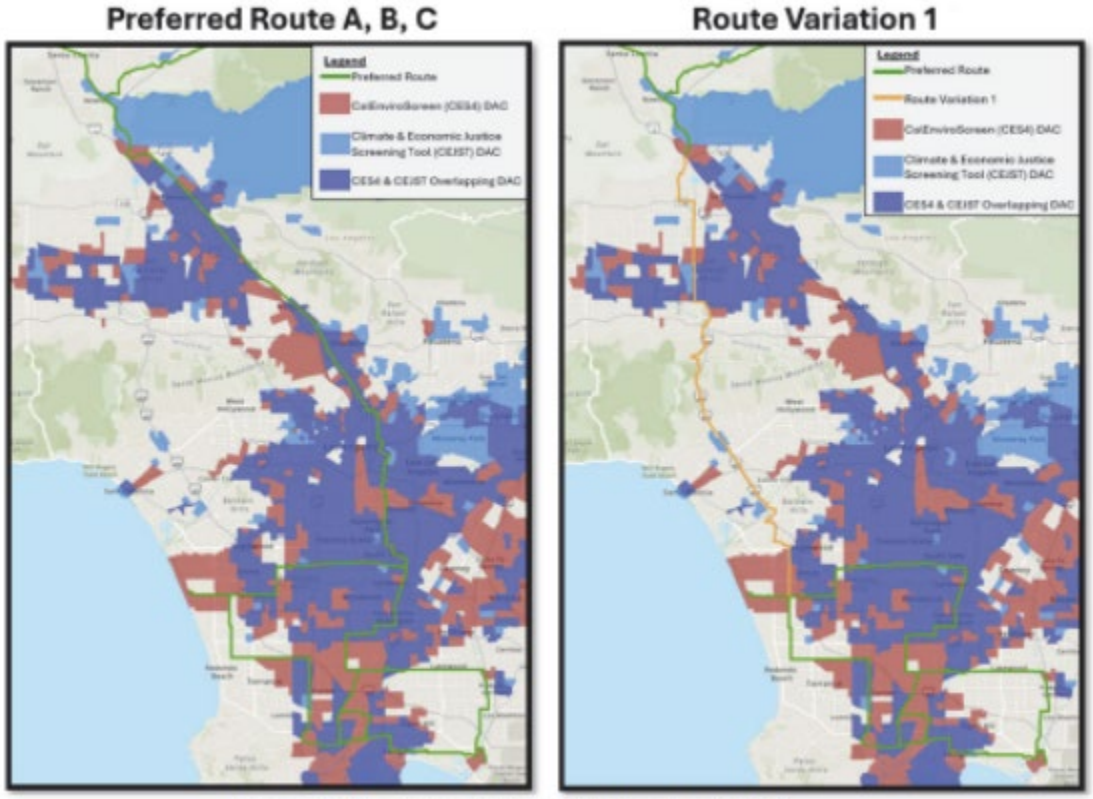


Figure 26. Illustration of Route Variation 1 and DAC[43]

23

FN23

However, pipelines differ from above-ground structures. Pipelines are underground. Except during the time of construction, pipelines are out of sight. Additionally, given the current stringent Pipeline and Hazardous Materials Safety Administration and California Public Utilities Commission safety requirements for operating gas pipelines, safety concerns are low for all communities including disadvantaged communities.

For the common segment of routes A, B, and C that would be eliminated by Route D and Variation 1, the route is predominantly through rights of way that are predominantly if not completely commercial or industrial. Much of the route is under San Fernando Road in the San Fernando Valley. Variation 1 is ostensibly presented to avoid disadvantaged communities, but in addition to being underground and, thus, out of sight, the rights of way avoid neighborhoods.

SoCalGas does not present cost estimates for Variation 1, but it is reasonable to assume that Variation 1 would have increased costs in comparison to Routes A, B, and C, given that the pipeline would have to traverse the Sepulveda Pass to deliver gas to the Central Zone in the South Bay region of Los Angeles

County. FN24 Thus, Variation 1 would supply less demand than Routes A, B, or C while costing more and simultaneously providing little if any tangible benefit for disadvantaged communities in the eastern San Fernando Valley. SoCalGas should not spend further resources on Variation 1 in Phase 2.

IV. Conclusion.

For the reasons discussed above, SCGC urges SoCalGas not to expand further resources on Route D or Variation 1 in Phase 2. SCGC appreciates this opportunity to comment on the July 19, 2024, Draft Routing Analysis.

FN1 – Draft Routing Analysis, p. 5.
FN2 – Ibid.
FN3 – Draft Routing Analysis, p. 43.
FN4 – Ibid, p. 61.
FN5 – Ibid, p. 58.
FN6 – Ibid, pp. 60-61.
FN7 – Ibid, p. 58.
FN8 – Ibid, p. 51.
FN9 – Ibid, p. 18
FN10 – Draft Demand Report, p. 52.

FN11 – Ibid, p. 44; California Air Resources Board, 2022 Scoping Plan for Achieving Carbon Neutrality, p. 203, Figure 4-5, "Projected New Electricity Resources Needed by 2045 in the Scoping Plan Scenario."

FN12 – Draft Demand Report, p. 17.
FN13 – Ibid, p. 32.
FN14 – Draft Routing Analysis, p. 58.
FN15 – Ibid, p. 55.
FN16 – Ibid, p. 56.
FN17 – Ibid, p. 57.
FN18 – Draft Pipeline Sizing Criteria, p. 56.
FN19 – Ibid, p. 36.
FN20 – Draft Routing Report, p. 58.

FN21 – Draft Pipeline Sizing Criteria, p. 56. Cost based on Class 5 estimates, which have accuracy ranges of 20% to 50% on the low side, and +30% to +100% on the high side.

FN22 – Draft Routing Analysis, p. 51, Table 5.
FN23 – Draft Routing Analysis, p. 47.
FN24 – Draft Routing Analysis, p.15.

SOCALGAS RESPONSE TO COMMENT 17-1

Please refer to Global Response 5.

Comment Letter 18 – Southern California Generation Coalition

Comment Letter 18

SOUTHERN CALIFORNIA GENERATION COALITION
COMMENT ON ANGELES LINK PHASE 1
DRAFT PIPELINE SIZING & DESIGN CRITERIA

August 21, 2024

Submitted via Email to:
ALP1_STUDY_PAG_FEEDBACK@INSIGNIAENV.COM

The Southern California Generation Coalition ("SCGC") respectfully comments on the draft Angeles Link Phase 1 Pipeline Sizing & Design Criteria ("Draft Design") posted by the Southern California Gas Company ("SoCalGas") in the Angeles Link Living Library on July 19, 2024.

I. INTRODUCTION AND SUMMARY

The Draft Design presents a Cost Estimate Summary for Preferred Routes A, B, C, and D in Table 18:

Table 18 - Preferred Route Single-Run Configuration Cost Estimate Summary

Single-Run Configuration	Installed Pipe, miles	Pipe Sizes, inches	Approx Total Pipeline Cost*	No. of Compressor Station(s)	Approx Total Compressor Cost*	Approx Total Cost* (CapEx)
Route A	390	16", 20", 24", 30", 36"	$6 B	2 @ 50,000 hp (each)	$3 B	$9 B
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Route C	472	20", 24", 30", 36"	$6B	2 @ 50,000 hp (each)	$3 B	$9 B
Route D	481	24", 36"	$8 B	2 @ 50,000 hp (each)	$3 B	$11 B

[1]

The costs presented in Table 18 are based on Class 5 estimates which have accuracy ranges of -20 percent to -50 percent on the low side and +30 percent to +100 percent on the high side.[2]

Comment 18-01

[1] Draft Design, p. 56.

[2] *Ibid.*

For the reasons discussed in SCGC's August 21, 2024 comment on the Angeles Link Phase 1 Draft Prelimnary Routing/Configuration Analysis ("Draft Routing Analysis"), SoCalGas should not expend further resources on Route D, narrowing the Preferred Routes to Routes A, B, and C.

Comment 18-01

SCGC urges SoCalGas to refine the Class 5 estimates presented in Table 18 not only to narrow the accuracy ranges but to substantially reduce the projected costs. The costs presented in Table 18 threaten to make Angeles Link uneconomic.

It appears that the Table 18 cost estimates are stated in 2024 dollars. Thus, SCGC attempted to compare today's rate for gas transportation service on the SoCalGas system to what would be today's rate for transportation service on Angeles Link if the pipeline were constructed at the projected capital cost.

For transportation on the SoCalGas system from points of receipt into the SoCalGas system to deliver natural gas for burn, noncore customers such as the SCGC members currently pay the Schedule No. G-BTS rate for Backbone Transmission Service and the Schedule No. G-TLS rate for local transmission service. The current BTS rate for electric generators is $0.70913/Dth. The TLS rate for electric generators is $0.8819/Dth (omitting CARB-related adders). The total of the two charges is $1.59103/Dth.

Comment 18-02

SCGC's preferred routes as discussed in SCGC's comments on the Draft Routing Analysis are Routes A, B, and C. The total Class 5 estimated cost for both Route A and Route C is $9 billion. SCGC calculated the rate required to cover the $9 billion capital component with no additions for operation and maintenance ("O&M") expense or loaders and with no addition for storage. SCGC assumed that the annual first year capital-related revenue requirement would be ten percent of the total $9 billion Class 5 estimate total, which would translate into a rate for transportation of hydrogen on Angeles Link of $5.28/Dth, assuming the maximum throughput of

1.5 million tonnes/year.[3] Thus, the hydrogen transportation rate under this simplified scenario is three to four times the current rate for SoCalGas natural gas transportation service. Of course, today's rate for transportion service includes O&M expense and other costs that are not included in the calculation of the capital-only hydrogent transportation rate of $5.28/Dth.

SCGC urges SoCalGas to not only refine its Class 5 estimates but also to be diligent in reducing the cost of Angeles Link transportation service.

Comment 18-02

Respectively submitted,

/s/ Norman A. Pedersen

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Attorneys for the **SOUTHERN CALIFORNIA GENERATION COALITION**

Dated: August 21, 2024

[3] The heat content of hydrogen (H_2) is 51,623 Btu/lb x 2.2 lb/kg =113,570 Btu/kg. Stating this in MMBtu or Dth, one gets: 113,570 Btu/kg = 0.11357 Dth/kg x 1000 kg/tonne = 113.57 Dth/tonne. If the pipeline delivers 1.5 million tonnes per year and, assuming a $900 million capital related revenue requirement (10% of $9 billion) for the year, the formula is 1.5 x 10^6 tonnes/year x 113.57 Dth/tonne = 170.355 x 10^6 Dth/year

$\frac{\$900 \times 10^6}{170.355 \times 10^6 \text{ Dth}} = \$5.28/\text{Dth}$

SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 18-1

The Southern California Generation Coalition ("SCGC") respectfully comments on the draft Angeles Link Phase 1 Pipeline Sizing & Design Criteria ("Draft Design") posted by the Southern California Gas Company ("SoCalGas") in the Angeles Link Living Library on July 19, 2024.

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1

The costs presented in Table 18 are based on Class 5 estimates which have accuracy ranges of -20 percent to -50 percent on the low side and +30 percent to +100 percent on the high side.FN2 For the reasons discussed in SCGC's August 21, 2024 comment on the Angeles Link Phase 1 Draft Preliminary Routing/Configuration Analysis ("Draft Routing Analysis"), SoCalGas should not expend further resources on Route D, narrowing the Preferred Routes to Routes A, B, and C.

SCGC urges SoCalGas to refine the Class 5 estimates presented in Table 18 not only to narrow the accuracy ranges but to substantially reduce the projected costs. The costs presented in Table 18 threaten to make Angeles Link uneconomic.

FN1 – Draft Design, p. 56.
FN2 – Ibid.

SOCALGAS RESPONSE TO COMMENT 18-1

Please refer to Global Response 5.

SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 18-2

It appears that the Table 18 cost estimates are stated in 2024 dollars. Thus, SCGC attempted to compare today's rate for gas transportation service on the SoCalGas system to what would be today's rate for transportation service on Angeles Link if the pipeline were constructed at the projected capital cost. For transportation on the SoCalGas system from points of receipt into the SoCalGas system to deliver natural gas for burn, noncore customers such as the SCGC members currently pay the Schedule No. G-BTS rate for Backbone Transmission Service and the Schedule No. GTLS rate for local transmission service. The current BTS rate for electric generators is $0.70913/Dth. The TLS rate for electric generators is $0.8819/Dth (omitting CARB-related adders). The total of the two charges is $1.59103/Dth.

SCGC's preferred routes as discussed in SCGC's comments on the Draft Routing Analysis are Routes A, B, and C. The total Class 5 estimated cost for both Route A and Route C is $9 billion. SCGC calculated the rate required to cover the $9 billion capital component with no additions for operation and maintenance ("O&M") expense or loaders and with no addition for storage. SCGC assumed that the annual first year capital-related revenue requirement would be ten percent of the total $9 billion Class 5 estimate total, which would translate into a rate for transportation of hydrogen on Angeles Link of $5.28/Dth, assuming the maximum throughput of 1.5 million tonnes/year.FN3 Thus, the hydrogen transportation rate under this simplified scenario is three to four times the current rate for SoCalGas natural gas transportation service. Of course, today's rate for transportation service includes O&M expense and other costs that are not included in the calculation of the capital-only hydrogen transportation rate of $5.28/Dth.

SCGC urges SoCalGas to not only refine its Class 5 estimates but also to be diligent in reducing the cost of Angeles Link transportation service.

FN3 – The heat content of hydrogen (H2) is 51,623 Btu/lb x 2.2 lb/kg =113,570 Btu/kg. Stating this in MMBtu or Dth, one gets: 113,570 Btu/kg = 0.11357 Dth/kg x 1000 kg/tonne = 113.57 Dth/tonne. If the pipeline delivers 1.5 million tonnes per year and, assuming a $900 million capital related revenue requirement (10% of $9 billion) for the year, the formula is 1.5 x 10^6 tonnes/year x 113.57 Dth/tonne = 170.355 x 10^6 Dth/year.

$$\frac{\$900\ x\ 10^6}{170.355\ x\ 10^6\ Dth} = \$5.28/Dth$$

SOCALGAS RESPONSE TO COMMENT 18-2

In response to the comment concerning refining the Class 5 estimates, please refer to Comment 18-1.

As described in the Affordability Framework, in response to the comment concerning the overall cost of Angeles Link, this should be considered in the broader context of decarbonization solutions and the role clean renewable hydrogen can play (and its transport via pipeline) to support a cost-effective energy transition. In future phases of Angeles Link, SoCalGas will select a preferred route and develop refined project cost estimates that would inform the development of an estimated revenue requirement and potential ratemaking proceedings. SoCalGas will monitor and evaluate opportunities to reduce project costs with respect to project siting and design, funding options, and rate design, while maintaining reliability and safety and minimizing environmental impacts. The Affordability Framework identifies

several and many considerations that go into the ultimate rate design once these variables are further defined.

Comment Letter 19 – Utility Workers Union of America

Comment Letter 19

Utility Workers Union of America (UWUA),
AFL-CIO, Local 483
P.O. Box 2346
Downey, CA 90242

8/27/2024

Comments to PAG Routing Analysis Study/Pipeline Sizing and Design

My name is Ernest Shaw, and I am President of the Utility Workers Union of America, Local 483 AFL-CIO (UWUA 483) in Southern California. Since 1970, UWUA Local 483 has served as the collective bargaining representative for the workforce that is responsible for transportation and storage of gas and all molecules that pass through SoCalGas' pipelines. We are also responsible for the safety, preventative maintenance, and repair of all SoCalGas gas transmission lines and certain distribution high-pressure supply lines. Local 483's members consistently patrol all of its pipelines daily/monthly/quarterly/semi-annually/annually, via-damage prevention, locate and mark, high pressure standby's, class location survey, special leak survey, leak survey, aerial leak survey, leak survey by boat, internal line inspection (pigging), valve inspections, valve station inspections, and pipeline patrol, and report any and all abnormal operating conditions when found.

Comment 19-01

UWUA, Local 483's 3,385 miles of jurisdiction spreads across broader Southern California, from the Nevada border to the Arizona boarder to the Mexican border and as far north as Fresno County. Although we are SoCalGas employees, our jurisdiction also includes parts of SDG&E, PG&E, Long Beach Gas and Oil, City of Vernon's Public Utilities, and Southwest Gas service areas. Throughout our jurisdiction, we serve over 21 million California families and businesses. Despite our vast jurisdiction and critical responsibilities, at present, UWUA, Local 483 represents approximately 350 employees of SoCalGas. Our members work oftentimes around the clock to ensure we have a reliable and safe energy pipeline infrastructure system.

We are in strong support of the proposed Angeles Link Pipeline system, particularly as we get closer to the energy transition towards a net zero goal of GHG emissions. Building and maintaining the Angeles Link pipeline will create and sustain good union jobs in our respective sectors, while decarbonizing the greater industrial economies of southern California.

In addition, we are in favor of the proposed preferred routes described in the routing/configuration analysis draft report due to its likely proximity to critical hydrogen production sites with known and potential end users in industrial, heavy-duty transportation and power generation applications. Further, using the preferred routing analysis for the proposed pipeline would have likely synergies with potential ARCHES production and off-take sites.

With respect to the pipeline sizing and design criteria draft report, we are in alignment to have portions of the Angeles Link System with parallel lines, or "dual-runs." Using this approach will ensure a more comprehensive approach for reliability and resiliency. For example, if a portion of a pipeline needs to be temporarily shut down for maintenance, a parallel line or dual run would allow the alternate line to run while the line is being worked on. As it is stated in the draft report, "This pipeline configuration can improve system resiliency during potential disruptions, minimize downtime, and allow for continuous operation." (Page 21).

Angeles Link offers an achievable opportunity for sectors that of which are difficult if not nearly impossible to fully electrify. There is no safer, more cost effective, and efficient way of transporting energy than through a pipeline. The members of UWUA 483 already possess many of the skillsets and labor-ready requirements to emerge into the energy transition of hydrogen. With that in mind, the members of UWUA 483 strongly support Angeles Link.

Comment 19-01

Thank you,
UWUA 483 President

UTILITY WORKERS UNION OF AMERICA COMMENT 19-1

My name is Ernest Shaw, and I am President of the Utility Workers Union of America, Local 483 AFL-CIO (UWUA 483) in Southern California. Since 1970, UWUA Local 483 has served as the collective bargaining representative for the workforce that is responsible for transportation and storage of gas and all molecules that pass through SoCalGas' pipelines. We are also responsible for the safety, preventative maintenance, and repair of all SoCalGas gas transmission lines and certain distribution high-pressure supply lines. Local 483's members consistently patrol all of its pipelines daily/monthly/quarterly/semi-annually/annually, via-damage prevention, locate and mark, high pressure standby's, class location survey, special leak survey, leak survey, aerial leak survey, leak survey by boat, internal line inspection (pigging), valve inspections, valve station inspections, and pipeline patrol, and report any and all abnormal operating conditions when found.

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In addition, we are in favor of the proposed preferred routes described in the routing/configuration analysis draft report due to its likely proximity to critical hydrogen production sites with known and potential end users in industrial, heavy-duty transportation and power generation applications. Further, using the preferred routing analysis for the proposed pipeline would have likely synergies with potential ARCHES production and off-take sites.
With respect to the pipeline sizing and design criteria draft report, we are in alignment to have portions of the Angeles Link System with parallel lines, or "dual-runs." Using this approach will ensure a more comprehensive approach for reliability and resiliency. For example, if a portion of a pipeline needs to be temporarily shut down for maintenance, a parallel line or dual run would allow the alternate line to run while the line is being worked on. As it is stated in the draft report, "This pipeline configuration can improve system resiliency during potential disruptions, minimize downtime, and allow for continuous operation." (Page 21).

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SOCALGAS RESPONSE TO COMMENT 19-1

SoCalGas acknowledges the support of the proposed Angeles Link Pipeline system and having portions of the system with parallel lines or “dual-runs” in the preliminary Design Study findings. Please note that the Angeles Link pipeline design will be refined in Phase 2 when a preferred route is selected and other system components including, but not limited to, third-party producers, end-users, and compressor stations are considered, which may influence the need for single- and/or dual-run piping configurations.

Please also refer to Global Response 3.

Comment Letter 20 – United Association Local Union 250

Comment Letter 20

From: Ben Clayton
Sent: Tuesday, August 27, 2024 11:16 AM
To: ALP1 Study PAG Feedback
Subject: Comments Regarding Angels Link Phase One

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from ben.clayton@ua250.org. Learn why this is important

P

AG,
My name is Ben Clayton, Business Manager of United Association Local Union 250 Steamfitters, Welders & Apprentices in Los Angeles Ca.. We currently have 6,500 members and we are in support of the Angeles Link project.

Our pipeline jurisdiction covers transmission and distribution in Santa Barbara, Santa Maria, Ventura, Imperial, Riverside, Imperial, San Diego, L.A. County and a large percentage of our membership will be working on this clean renewable hydrogen delivery system throughout Southern California.

Comment 20-01

We are also in favor of the four proposed routes and the pipeline sizing in the draft reports.
As a supplier of manpower for this project we can help provide these jobs to our members that live in the communities that are affected, wherever the routing is. As far as the sizing, the bigger the better. This is an expensive project, it would be shame to complete then realize we should have gone to a larger diameter or a parallel/dual run system to accommodate the needs of this renewable hydrogen and the potential of ARCHES offtake sites.

Again Local 250 members proudly supports this project.

Regards,

Ben
Ben Clayton
Business Manager / Fin. Sec'y-Treas.
UA Local Union 250
(310) 660-0035

Comment Letter 20

Comments regarding Angels Link Phase One

My name is Hector Carbajal, UA Local 250 member and Business Representative for Pipeline work.

UA Local 250 represent close to 6,600 members, including journeymen, welders, apprentices, metal trade helpers, safety attendants and HVAC&R.

For many years our skilled (pipeliners) members have been building and maintaining pipeline infrastructures throughout Southern California.

I'm writing this letter in support of the proposed Angels Link Pipeline system which will deliver clean and renewable HYDROGEN throughout Central and Southern California.

Angels Link will create a clean energy infrastructure needed in California and ensure a better future for working families and provide job opportunities to people in working class communities who have the skillsets required to adjust to the energy transition.

UA Local 250 and myself are in favor of the geographic regions of the four potential preferred routes identified in the preliminary Routing/ Configuration Analysis Draft Report.

The proposed route from San Joaquin Valley to Los Angeles regions would connect critical production sites with end users in industrial, mobility and power generation sectors and would connect potential ARCHES production and offtake sites.

Comment 20-02

Sincerely,

Hector Carbajal

UA Local Union 250

Business Representative

(310)912- 2498

Hector.carbajal@ua250.org

UNITED ASSOCIATION LOCAL UNION 250 COMMENT 20-1

My name is Ben Clayton, Business Manager of United Association Local Union 250 Steamfitters, Welders & Apprentices in Los Angeles Ca.. We currently have 6,500 members and we are in support of the Angeles Link project.

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Again Local 250 members proudly supports this project.

SOCALGAS RESPONSE TO COMMENT 20-1

SoCalGas acknowledges the support of Angeles Link and the four preliminary preferred routes and the pipeline sizing in the draft reports.

Please also refer to Global Response 3.

UNITED ASSOCIATION LOCAL UNION 250 COMMENT 20-2

My name is Hector Carbajal, UA Local 250 member and Business Representative for Pipeline work.

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UA Local 250 and myself are in favor of the geographic regions of the four potential preferred routes identified in the preliminary Routing/ Configuration Analysis Draft Report.

The proposed route from San Joaquin Valley to Los Angeles regions would connect critical production sites with end users in industrial, mobility and power generation sectors and would connect potential ARCHES production and offtake sites.

SOCALGAS RESPONSE TO COMMENT 20-2

SoCalGas acknowledges the support of Angeles Link and the four preliminary preferred routes in the draft reports.

Please also refer to Global Response 3.

Comment Letter 21 – Soledad Enrichment Action

Comment Letter 21

Soledad Enrichment Action

"Transforming livessinCf' 1972•

o: (213) 480-4200 f: (213) 480-4199 a: 222 N. Virgil Ave., Los Angeles, CA 90004

Dear SoCalGas,

I am writing to express my strong support for the Angeles Link Project as outlined in the Environmental and Social Justice (ESJ) Community Engagement Plan. The project's commitment to delivering clean, renewable hydrogen to Central and Southern California, including the Greater East Los Angeles area and South Los Angeles, represents a vital step toward reducing greenhouse gas emissions and advancing environmental justice in the region.

Soledad Emichment Action, Inc. (a community based nonprofit for over 52 years) has been a part of the CBO work group for SoCalGas's Angeles Link Phase One scope. We have attended all the meetings and feel that our voice has been included and respected. Rarely does a large utility agency take such effort in order to engage grassroot organizations that represent those most vulnerable to climate change .

The proactive approach SoCalGas has taken in developing the ESJ Plan, which includes engaging with cormnunity-based orga11izations, 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.

Comment 21-01

Lam particularly encouraged by the plan's alignment with the California Public Utilities Commission's (CPUC) ESJ Action Plan, as well as its focus on creating economic opportunities and improving air quality in communities that have historically been disproportionately impacted by industrial activities. The inclusion of strategies to educate and involve ESJ communities in discussions about the project's impact, and the development of community benefits plans, underscores the project's potential to deliver meaningful and lasting benefits to the region.

furthermore, the project's commitment to workfiorce development, with the potential to create thousands of jobs during constrnction and operation, offers significant economic benefits to communities along the proposed routes. By integrating the principles of equity and access throughout the project's development, SoCalGas is setting a strong example for future clean energy initiatives, including ARCHES.

We understand also, that Phase 1 is a conceptual stage and that Phase 2 will be an even more effortful collaboration with CBO's directly affected by the Angeles Link route. It is commendable that SoCalGas has the foresight to encourage and lay the groundwork to this aspect of Phase 2.

In conclusion and without any reservations, I support the Angeles Link Project and the efforts of SoCalGas to engage with and uplift Black and Brown communities most affiected by environmental change and historic injustices. I look forward to being witness to the impact this project will have on both the built and social enviromnent.

Thank you for your commitment to a cleaner, transparent and more equitable future.

Respectfiully,

Nathan Arias
President/CEO

SOLEDAD ENRICHMENT ACTION COMMENT 21-1

I am writing to express my strong support for the Angeles Link Project as outlined in the Environmental and Social Justice (ESJ) Community Engagement Plan. The project's commitment to delivering clean, renewable hydrogen to Central and Southern California, including the Greater Los Angeles area and South Los Angeles, represents a vital step toward reducing greenhouse gas emissions and advancing environmental justice in the region.

Soledad Enrichment Action, Inc. (a community based nonprofit for over 52 years) has been a part of the CBO work group for SoCalGas's Angeles Link Phase One scope. We have attended all the meetings and feel that our voice has been included and respected. Rarely does a large utility agency take such effort in order to engage grassroot organizations that represents those most vulnerable to climate change.

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.

I am particularly encouraged by the plan's alignment with the California Public Utilities Commission's (CPUC) ESJ Action Plan, as well as its focus on creating economic opportunities and improving air quality in communities that have historically been disproportionately impacted by industrial activities. The inclusion of strategies to educate and involve ESJ communities in discussions about the project's impact, and the development of community benefits plans, underscores the project's potential to deliver meaningful and lasting benefits to the region.

Furthermore, the project's commitment to workforce development, with the potential to create thousands of jobs during construction and operation, offers significant economic benefits to communities along the proposed routes. By integrating the principles of equity and access throughout the project's development, SoCalGas is setting a strong example for future clean energy initiatives, including ARCHES.

We understand also, that Phase 1 is a conceptual stage and that Phase 2 will be an even more effortful collaboration with CBO's directly affected by the Angeles Link route. It is commendable that SoCalGas has the foresight to encourage and lay the groundwork to this aspect of Phase 2.

In conclusion and without any reservations, I support the Angeles Link Project and the efforts of SoCalGas to engage with and uplift Black and Brown communities most affected by environmental change and historic injustices. I look forward to being witness to the impact this project will have on both the built and social environment.

Thank you for your commitment to a cleaner, transparent and more equitable future.

SOCALGAS RESPONSE TO COMMENT 21-1

SoCalGas acknowledges the support of Angeles Link and the ESJ Plan. Please also refer to Global Response 3.

Comment Letter 22 – California Greenworks

Comment Letter 22

8/16/2024
Dear SoCal Gas, Angeles Link,

I am writing to express my strong support for the Angeles Link Project as outlined in the Environmental and Social Justice (ESJ) Community Engagement Plan. The project's commitment to delivering clean, renewable hydrogen to Central and Southern California, including the Los Angeles Basin, represents a critical step toward reducing greenhouse gas emissions and advancing environmental justice in the region.

California Greenworks (an Environmental Justice nonprofit for over 20 years) has been a part of the CBO work group for SoCalGas's Angeles Link Phase One scope. We have attended all the meetings and feel that our input is valued and impactful. Rarely does a large utility/entity take such effort in order to engage grassroot organizations that represent those most vulnerable to climate change.

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 commendable. This commitment to transparency and community involvement, particularly in disadvantaged communities, ensures that the voices of those most affected by environmental and social justice issues are heard and addressed.

Comment 22-01

I am particularly encouraged by the plan's alignment with the California Public Utilities Commission's (CPUC) ESJ Action Plan, as well as its focus on creating economic opportunities and improving air quality in communities that have historically been disproportionately impacted by industrial activities. The inclusion of strategies to educate and involve ESJ communities in discussions about the project's impact, and the development of community benefits plans, underscores the project's potential to deliver meaningful and lasting benefits to the region.

Furthermore, the project's commitment to workforce development, with the potential to create thousands of jobs during construction and operation, offers significant economic benefits to communities along the proposed routes. By integrating the principles of equity and access throughout the project's development, SoCalGas is setting a strong example for future clean energy initiatives.

We understand also, that Phase 1 is a conceptual stage and that Phase 2 will be an even more effortful collaboration with CBO's directly affected by the Angeles Link route. It is commendable that SoCal Gas has the foresight to encourage and lay the groundwork to this aspect of Phase 2.

In conclusion, I fully support the Angeles Link Project and the efforts of SoCalGas to engage with and uplift the communities most affected by environmental challenges. I look forward to seeing the positive impact this project will have on both the environment and the residents of Southern California.

Comment 22-01

Thank you for your commitment to a cleaner, more equitable future.

Sincerely,

Michael Berns, PhD
Director of Projects and Programs
California Greenworks
Michael.berns@calgrnwks.org
310.342.0119
9800 S. La Cienega Blvd., Suite 200
Inglewood CA 90301
www.californiagreenworks.org

CALIFORNIA GREENWORKS COMMENT 22-1

I am writing to express my strong support for the Angeles Link Project as outlined in the Environmental and Social Justice (ESJ) Community Engagement Plan. The project's commitment to delivering clean, renewable hydrogen to Central and Southern California, including the Los Angeles Basin, represents a critical step toward reducing greenhouse gas emissions and advancing environmental justice in the region.

California Greenworks (an Environmental Justice nonprofit for over 20 years) has been a part of the CBO work group for SoCalGas's Angeles Link Phase One scope. We have attended all the meetings and feel that our input is valued and impactful. Rarely does a large utility/entity take such effort in order to engage grassroot organizations that represent those most vulnerable to climate change.

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 commendable. This commitment to transparency and community involvement, particularly in disadvantaged communities, ensures that the voices of those most affected by environmental and social justice issues are heard and addressed.

I am particularly encouraged by the plan's alignment with the California Public Utilities Commission's (CPUC) ESJ Action Plan, as well as its focus on creating economic opportunities and improving air quality in communities that have historically been disproportionately impacted by industrial activities. The inclusion of strategies to educate and involve ESJ communities in discussions about the project's impact, and the development of community benefits plans, underscores the project's potential to deliver meaningful and lasting benefits to the region.

Furthermore, the project's commitment to workforce development, with the potential to create thousands of jobs during construction and operation, offers significant economic benefits to communities along the proposed routes. By integrating the principles of equity and access throughout the project's development, SoCalGas is setting a strong example for future clean energy initiatives.

We understand also, that Phase 1 is a conceptual stage and that Phase 2 will be an even more effortful collaboration with CBO's directly affected by the Angeles Link route. It is commendable that SoCal Gas has the foresight to encourage and lay the groundwork to this aspect of Phase 2.

In conclusion, I fully support the Angeles Link Project and the efforts of SoCalGas to engage with and uplift the communities most affected by environmental challenges. I look forward to seeing the positive impact this project will have on both the environment and the residents of Southern California. Thank you for your commitment to a cleaner, more equitable future.

SOCALGAS RESPONSE TO COMMENT 22-1

SoCalGas acknowledges the support of Angeles Link and the ESJ Plan.

Please also refer to Global Response 3.

Comment Letter 23 – Environmental Defense Fund

Comment Letter 23

Environmental Defense Fund

August 30, 2024

Chester Britt
Planning Advisory Group Facilitator

Emily Grant
Angeles Link Senior Public Affairs Representative
Southern California Gas Company

Alisa Lykens
Director
Insignia Environmental

Subject: Environmental Defense Fund Comments on Pipeline Sizing & Design Criteria Draft Report

Environmental Defense Fund (EDF) shares the following comments to the pipeline sizing & design criteria draft report shared by the Southern California Gas Company (SoCalGas) and the Angeles Link Planning Advisory Group (PAG) Facilitator team. Overall, EDF highlights that any final pipeline sizing and design criteria must adequately address concerns already acknowledged in the Leakage Preliminary Data and Findings and the role of hydrogen as an indirect greenhouse gas (GHG) as acknowledged in the draft report on GHG emissions evaluation.[1] However, the draft report **focuses solely on safety and structural integrity concerns**, failing to account for leakage concerns already acknowledged in other Phase 1 studies.

Comment 23-01

First, the draft report cites to several key codes and standards relevant to hydrogen pipeline transport, including American Petroleum Institute (API) and American Society of Mechanical Engineers (ASME) standards, which **fall short of the levels of regulation and pipeline integrity needed to address the climate impacts of hydrogen leakage**.[2] These existing codes and standards are focused on safety management and structural integrity of a hydrogen pipeline which are important but insufficient. In its previous PAG meeting feedback, EDF noted the need for more stringent leakage detection methods and standards, given the emerging concerns around hydrogen as an indirect GHG.[3] Pipeline material selection is particularly critical here since a continuous hydrogen leak, as opposed to a single "pulse" of emissions, can have compounded climate impacts

Comment 23-02

[1] GHG Emissions Evaluation draft report at 79; Leakage Preliminary Data and Findings at 3.
[2] Pipeline Sizing & Design Criteria Draft Report at 12.
[3] EDF Comments on October 18th PAG Workshop Discussions, Nov 3, 2023, at 3.

that can undo much of the environmental benefits expected from hydrogen adoption.[4] SoCalGas should, at a minimum, explicitly note that industry standards do not adequately address the higher climate-effectiveness standards for leak detection; and acknowledge the need to adhere to a more stringent detection and material selection standard to ensure climate-effectiveness of hydrogen adoption via the Angeles Link Project.

Comment 23-02

Similarly, discussions around hydrogen embrittlement included in the draft report are centered exclusively around structural integrity concerns, while **failing to note their leakage and climate impacts**.[5] The challenge of leaks in the existing natural gas system serves as a direct analogy highlighting the importance of addressing this issue upfront. For decades, methane leakage from gas pipelines was dealt exclusively as an immediate safety risk, which allowed for widespread climate, health, and long-term safety risks to continue unabated.[6] To prevent a similar mistake from happening with hydrogen pipeline transport, the conversation around material selection and pipeline design must extend beyond immediate structural integrity concerns as well. Moreover, EDF believes such comprehensive discussion of various concerns around hydrogen embrittlement must also extend to any potential exploration of repurposing existing gas infrastructure.

Comment 23-03

Finally, the scenario and route configuration results shared in the draft report further highlights **the need to compare the potential Angeles Link pipeline project with other decarbonization pathways for cost- and climate-effectiveness**. The scenario results in the draft report outline certain logistical and technical assumptions that serve as parameters for potential pipeline configurations. For example, Scenario 2 assumes a pipeline supplying hydrogen from the Lancaster production location to the LA basin—approximately 100 miles apart. However, because of the need to connect to a hydrogen storage facility, the actual route mileage estimated in the draft study is more than three times that distance at 314 miles.[7] Furthermore, the draft report states that access to "potential salt cavern storage in both Arizona and Utah" is assumed for the Blythe

Comment 23-04

[4] Ocko, I. B. and Hamburg, S. P.: Climate consequences of hydrogen emissions, Atmos. Chem. Phys., 22, 9349–9368, https://doi.org/10.5194/acp-22-9349-2022, 2022.
[5] Pipeline Sizing & Design Criteria Draft Report at 47.
[6] EDF, "Why are natural gas leaks a problem?", accessible at: https://www.edf.org/climate/methanemaps/leaks-problem. See also, Renee McVay, *Methane Emissions from U.S. Gas Pipeline Leaks*, EDF, August 2023, at 7, accessible at: https://www.edf.org/sites/default/files/documents/Pipeline%20Methane%20Leaks%20Report.pdf.
[7] Pipeline Sizing & Design Criteria Draft Report at 23.

production location, one of the three production locations identified in the report.[8] Given the lack of regulatory clarity around interstate hydrogen transport, assumptions based on out-of-state hydrogen storage is a highly speculative at best—and raises questions around the feasibility of such scenarios.[9] In its comments to the GHG Emissions Evaluation Draft report, EDF highlighted the need to evaluate potential benefits of the Angeles Link project in terms of "optimization and relative efficiencies" in comparison with other decarbonization pathways. [10] A recent research article authored by EDF scientists further reveal the need for dedicated infrastructure—as opposed to repurposing existing natural gas infrastructure—with material and design standards that account for hydrogen's chemical and physical characteristics[11] The assumptions and parameters around pipeline design and configuration further underscore the need for such a comparative approach—which should also take into account the concerns around hydrogen leakage and climate impacts raised in the first two points of these comments.

Comment 23-04

Comment 23-05

Respectfully,

Michael Colvin
Director, California Energy Program

Joon Hun Seong
Senior Energy Decarbonization Analyst

Thomas Saito
Schneider Intern, Western Electricity Markets

Environmental Defense Fund
123 Mission Street
San Francisco, CA 94105
Email: mcolvin@edf.org
Email: jseong@edf.org

[8] Pipeline Sizing & Design Criteria Draft Report at 22.
[9] EDF notes that the question around inter-state transport was already raised by Mr. Norman Pedersen representing Southern California Generation Coalition at the October 18, 2023, PAG meeting, and echoed by EDF Feedback Comments submitted November 3, 2023.
[10] EDF Comments on GHG Evaluation Draft Report at 1.
[11] Martin P, Ocko IB, Esquivel-Elizondo S, et al. A review of challenges with using the natural gas system for hydrogen. *Energy Sci Eng*. 2024; 1-15. doi:10.1002/ese3.1861

ENVIRONMENTAL DEFENSE FUND COMMENT 23-1

Environmental Defense Fund (EDF) shares the following comments to the pipeline sizing & design criteria draft report shared by the Southern California Gas Company (SoCalGas) and the Angeles Link Planning Advisory Group (PAG) Facilitator team. Overall**,** EDF highlights that any final pipeline sizing and design criteria must adequately address concerns already acknowledged in the Leakage Preliminary Data and Findings and the role of hydrogen as an indirect greenhouse gas (GHG) as acknowledged in the draft report on GHG emissions evaluation.FN1 However, the draft report focuses solely on safety and structural integrity concerns, failing to account for leakage concerns already acknowledged in other Phase 1 studies.

FN1 – GHG Emissions Evaluation draft report at 79; Leakage Preliminary Data and Findings at 3.

SOCALGAS RESPONSE TO COMMENT 23-1

SoCalGas acknowledges this comment. Section 8.0 of the Safety Study points to the Leakage Study. Section 4.4 of the Leakage Study identifies potential opportunities to minimize leakage through engineering and design, operation and maintenance, and repair considerations that will be examined in the design development of Angeles Link in Phase 2.

ENVIRONMENTAL DEFENSE FUND COMMENT 23-2

First, the draft report cites to several key codes and standards relevant to hydrogen pipeline transport, including American Petroleum Institute (API) and American Society of Mechanical Engineers (ASME) standards, which fall short of the levels of regulation and pipeline integrity needed to address the climate impacts of hydrogen leakage. FN2 These existing codes and standards are focused on safety management and structural integrity of a hydrogen pipeline which are important but insufficient. In its previous PAG meeting feedback, EDF noted the need for more stringent leakage detection methods and standards, given the emerging concerns around hydrogen as an indirect GHG.FN3 Pipeline material selection is particularly critical here since a continuous hydrogen leak, as opposed to a single "pulse" of emissions, can have compounded climate impacts that can undo much of the environmental benefits expected from hydrogen adoption.FN4 SoCalGas should, at a minimum, explicitly note that industry standards do not adequately address the higher climate-effectiveness standards for leak detection; and acknowledge the need to adhere to a more stringent detection and material selection standard to ensure climate-effectiveness of hydrogen adoption via the Angeles Link Project.

FN2 – Pipeline Sizing & Design Criteria Draft Report at 12.
FN3 – EDF Comments on October 18th PAG Workshop Discussions, Nov 3, 2023, at 3.

FN4 – Ocko, I. B. and Hamburg, S. P.: Climate consequences of hydrogen emissions, Atmos. Chem. Phys., 22, 9349–9368, https://doi.org/10.5194/acp-22-9349-2022, 2022.

SOCALGAS RESPONSE TO COMMENT 23-2

SoCalGas will monitor the development of regulations and design standards that may affect hydrogen leakage and incorporate into Phase 2 pipeline design, material selection, integrity management program, and safety plan considerations where applicable. As described in Response to Comment 23-1, Section 4.4 of Leakage Study identifies potential opportunities to minimize leakage through engineering and design, operation, and maintenance and repair considerations that will be examined in the design development of Angeles Link in Phase 2.

ENVIRONMENTAL DEFENSE FUND COMMENT 23-3

Similarly, discussions around hydrogen embrittlement included in the draft report are centered exclusively around structural integrity concerns, while failing to note their leakage and climate impacts. FN5 The challenge of leaks in the existing natural gas system serves as a direct analogy highlighting the importance of addressing this issue upfront. For decades, methane leakage from gas pipelines was dealt exclusively as an immediate safety risk, which allowed for widespread climate, health, and long-term safety risks to continue unabated.FN6 To prevent a similar mistake from happening with hydrogen pipeline transport, the conversation around material selection and pipeline design must extend beyond immediate structural integrity concerns as well. Moreover, EDF believes such comprehensive discussion of various concerns around hydrogen embrittlement must also extend to any potential exploration of repurposing existing gas infrastructure.

FN5 – Pipeline Sizing & Design Criteria Draft Report at 47.

FN6 – EDF, "Why are natural gas leaks a problem?", accessible at: https://www.edf.org/climate/methanemaps/leaks-problem. See also, Renee McVay, Methane Emissions from U.S. Gas Pipeline Leaks, EDF, August 2023, at 7, accessible at: https://www.edf.org/sites/default/files/documents/Pipeline%20Methane%20Leaks%20Report.pdf.

SOCALGAS RESPONSE TO COMMENT 23-3

SoCalGas's Phase 1 feasibility studies address hydrogen leakage in the Leakage Study and GHG emissions in the GHG Study. The Design Study evaluates and determines a preliminary range of pipeline diameters and pressure profiles. Additionally, technical specifications such as operating parameters, suitable equipment, logistics, and materials of construction were considered to support an efficient and reliable pipeline system. This evaluation was completed through literature review, hydraulic modeling, and data from other Phase 1 Studies. Various factors will impact material selection. A comprehensive material selection evaluation will be performed in Phase 2, which will consider leak minimization measures in design, operation, and maintenance, after a preferred route is selected, operating conditions are established, and detailed engineering and design work commences.

ENVIRONMENTAL DEFENSE FUND COMMENT 23-4

Finally, the scenario and route configuration results shared in the draft report further highlights the need to compare the potential Angeles Link pipeline project with other decarbonization pathways for cost- and climate-effectiveness. The scenario results in the draft report outline certain logistical and technical assumptions that serve as parameters for potential pipeline configurations. For example, Scenario 2 assumes a pipeline supplying hydrogen from the Lancaster production location to the LA basin—approximately 100 miles apart. However, because of the need to connect to a hydrogen storage facility, the actual route mileage estimated in the draft study is more than three times that distance at 314 miles.FN7 Furthermore, the draft report states that access to "potential salt cavern storage in both Arizona and Utah" is assumed for the Blythe production location, one of the three production locations identified in the report.FN8 Given the lack of regulatory clarity around interstate hydrogen transport, assumptions based on out-of-state hydrogen storage is a highly speculative at best—and raises questions around the feasibility of such scenarios.FN9 In its comments to the GHG Emissions Evaluation Draft report, EDF highlighted the need to evaluate potential benefits of the Angeles Link project in terms of "optimization and relative efficiencies" in comparison with other decarbonization pathways.FN10

FN7 – Pipeline Sizing & Design Criteria Draft Report at 23.
FN8 – Pipeline Sizing & Design Criteria Draft Report at 22.

FN9 – EDF notes that the question around inter-state transport was already raised by Mr. Norman Pedersen representing Southern California Generation Coalition at the October 18, 2023, PAG meeting, and echoed by EDF Feedback Comments submitted November 3, 2023.

FN10 – EDF Comments on GHG Evaluation Draft Report at 1.

SOCALGAS RESPONSE TO COMMENT 23-4

SoCalGas acknowledges this comment concerning the comparison of Angeles Link with other decarbonization pathways for cost-effectiveness and potential climate-related impacts. The level of analysis that can be reasonably conducted at this feasibility stage to compare Angeles Link to other decarbonization pathways is addressed in the Alternatives Study, Cost Effectiveness Study, and Environmental Analysis. Further analysis comparing potential GHG emissions reductions to alternative decarbonization pathways is outside of the scope of the Angeles Link feasibility analyses. Please refer to Response to Comment 8-1 for additional information regarding comparison of the optimization and relative efficiencies of Angeles Link to other decarbonization pathways.

With regard to the comment regarding storage, as discussed in the Production Study, Section 8.0 Evaluation of Potential Hydrogen Storage, aboveground and underground storage is not currently part of Angeles Link. As Angeles Link is further designed and, in alignment with the development of system requirements, the role of storage to support regional hydrogen producers and end users should be considered. Distributed storage equipment located at third-party production and end user sites, along with line pack (storing and then withdrawing gas supplies from the pipeline), can provide storage capacity while larger scale storage technologies are developed over time to support regional hydrogen hub requirements. The potential location, capacity and type of storage and the potential pipeline mileage needed to interconnect to storage would be speculative at this time.

ENVIRONMENTAL DEFENSE FUND COMMENT 23-5

A recent research article authored by EDF scientists further reveal the need for dedicated infrastructure—as opposed to repurposing existing natural gas infrastructure—with material and design standards that account for hydrogen's chemical and physical characteristics FN11 The assumptions and parameters around pipeline design and configuration further underscore the need for such a comparative approach—which should also take into account the concerns around hydrogen leakage and climate impacts raised in the first two points of these comments.

FN11 – Martin P, Ocko IB, Esquivel-Elizondo S, et al. A review of challenges with using the natural gas system for hydrogen. *Energy Sci Eng. 2024*; 1-15. Doi:10.1002/ese3.1861.

SOCALGAS RESPONSE TO COMMENT 23-5

Angeles Link is envisioned as a new, dedicated open access hydrogen pipeline transportation system. In alignment with stakeholder comments, a high-level literature review of repurposing existing natural gas pipelines for hydrogen gas service was completed in the Design Study for technical viability and industry best practice research purposes only.

Please also refer to Responses to Comments 23-1 and 23-2.

Comment Letter 24 – Coalition for Responsible Community Development

Comment Letter 24

From: Kenta Estrada-Darley
Sent: Thursday, August 29, 2024 11:06 AM
To: ALP1 Study CBO Feedback
Cc: Ricardo Mendoza
Subject: Comments for Environmental Social Justice Plan

Follow Up Flag: Follow up
Flag Status: Flagged

To whom it may concern,

Please see below for comments from the Coalition for Responsible Community Development (CRCD), member of the SoCal Gas Angeles Link CBOSG regarding the "Environmental Social Justice Community Draft Engagement Plan and ESJ Screening" report.

- CRCD commends and appreciates the pro-active and comprehensive stakeholder engagement process that SoCal Gas has carried out during phase 1 of the Angeles Link studies. Feedback from stakeholder groups, including the CBOSG, have been incorporated into the ESJ Engagement Plan and reflect a multi-tiered approach to engage communities potentially impacted by the Angeles Link pipeline in a transparent and responsible manner.
- We also commend the efforts of SoCal Gas to secure representation and active engagement from stakeholders from communities of color that have been historically disinvested and disproportionately impacted by environmental justice issues and support efforts to expand this representation as the project moves into phase 2.
- We supports the proactive discussion regarding a Community Benefits Plan that would govern the project and the potential for the project to create pathways into careers with family sustaining wages and meaningful procurement opportunities for local small businesses and looks forward to continued discussions on the plan.
- We are encouraged by the ESJ Plan's alignment with multiple goals from the California Public Utility Committee ESJ Action Plan.
- We commend the efforts of the preliminary routing/configuration analysis to provide alternative routes that will not impact, low-income communities of color that have been disproportionately impacted by environmental justice issues.
- Lastly, we would like to share an additional screening tool, the South LA All In Community Development Index, developed by our agency in partnership with USC Neighborhood Data for Social Change, as an additional layer to identify communities that have been historically impacted by systemic racism and disinvestment through the community development lens of jobs, education, affordable and stable housing and access to capital.

Comment 24-01

Comment 24-02

Kenta Estrada-Darley | Senior Director of South LA All In
South LA All In
CRCD: 213.743.6193 | M: 323.861.2991
kestrada-darley@crcdboard.org | www.crcdboard.org
COALITION for RESPONSIBLE COMMUNITY DEVELOPMENT

View CRCD's 2022 Annual Report

COALITION FOR RESPONSIBLE COMMUNITY DEVELOPMENT COMMENT 24-1

Please see below for comments from the Coalition for Responsible Community Development (CRCD), member of the SoCal Gas Angeles Link CBOSG regarding the "Environmental Social Justice Community Draft Engagement Plan and ESJ Screening" report.

- CRCD commends and appreciates the pro-active and comprehensive stakeholder engagement process that SoCal Gas has carried out during phase 1 of the Angeles Link studies. Feedback from stakeholder groups, including the CBOSG, have been incorporated into the ESJ Engagement Plan and reflect a multi-tiered approach to engage communities potentially impacted by the Angeles Link pipeline in a transparent and responsible manner.

- We also commend the efforts of SoCal Gas to secure representation and active engagement from stakeholders from communities of color that have been historically disinvested and disproportionately impacted by environmental justice issues and support efforts to expand this representation as the project moves into phase 2.

- We supports the proactive discussion regarding a Community Benefits Plan that would govern the project and the potential for the project to create pathways into careers with family sustaining wages and meaningful procurement opportunities for local small businesses and looks forward to continued discussions on the plan.

- We are encouraged by the ESJ Plan's alignment with multiple goals from the California Public Utility Committee ESJ Action Plan.

- We commend the efforts of the preliminary routing/configuration analysis to provide alternative routes that will not impact, low-income communities of color that have been disproportionately impacted by environmental justice issues.

SOCALGAS RESPONSE TO COMMENT 24-1

SoCalGas acknowledges this comment concerning public engagement and the potential routes for Angeles Link. Please also refer to Global Responses 3 and 5.

COALITION FOR RESPONSIBLE COMMUNITY DEVELOPMENT COMMENT 24-2

- Lastly, we would like to share an additional screening tool, the South LA All In Community Development Index, developed by our agency in partnership with USC Neighborhood Data for Social Change, as an additional layer to identify communities that have been historically impacted by systemic racism and disinvestment through the community development lens of jobs, education, affordable and stable housing and access to capital.

SOCALGAS RESPONSE TO COMMENT 24-2

SoCalGas reviewed the South LA All In Community Development Index screening tool and has incorporated the Geographic Information System (GIS) data into the ESJ Screening. In addition, the ESJ Screening was revised to include the priority groups for each census track, including housing stability and affordability, access to capital, good jobs, and education to determine the investment needs of communities within each study area. More specifically, Section 1.0 Approach will be updated to incorporate information on the Community Development Index screening tool and Section 2.2 Geospatial Mapping Tools will be revised to include the Community Development Index screening tool, where previously only the CalEnviroScreen 4.0 and the Climate and Economic Justice Screening Tool are discussed.

Comment Letter 25 – Protect Playa Now

Comment Letter 25

August 22, 2024
Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback on Environmental Social Justice Plan Report

I am writing to express significant concerns about the "Environmental Social Justice Plan" for the SoCalGas Angeles Link Project. The plan, as currently presented, does not go far enough to ensure that disadvantaged communities are actively involved and protected throughout the project.

Key Concerns:

Community Engagement:

The plan does not provide sufficient mechanisms for continuous and meaningful engagement with impacted communities, as required by the Equity Principles for Hydrogen. This lack of engagement risks further marginalizing these communities and undermining the project's legitimacy.

1. **Lack of Specific, Actionable Engagement Strategies:** The plan likely included broad commitments to community engagement but did not outline clear, actionable steps for how this engagement would be maintained throughout the project's lifecycle. Without specific strategies, such as regular community meetings, transparent communication channels, and clear timelines for feedback, the engagement becomes superficial rather than substantive.
2. **Insufficient Inclusion of Marginalized Voices:** The Equity Principles for Hydrogen emphasize the importance of including voices from historically marginalized communities in all stages of project development. The plan may have failed to ensure that these communities were genuinely included in decision-making processes. For example, if the plan only provided for one-off consultations rather than ongoing dialogue, it would fall short of what is needed to ensure continuous and meaningful engagement.
3. **Tokenistic Approaches to Community Involvement:** The plan might have included community representatives in advisory roles without giving them real power or influence over project decisions. This tokenism undermines trust and fails to empower communities to shape outcomes in ways that address their specific needs and concerns. Meaningful engagement requires that these communities have a significant and ongoing role in shaping the project's direction.
4. **Lack of Transparency and Accountability:** Without mechanisms for regular reporting back to the community on how their input is being used or for holding the project accountable to the communities it impacts, the plan risks being seen as a box-ticking exercise rather than a genuine effort to engage. Transparency in decision-making and clear accountability measures are crucial for building trust and ensuring that the project meets the equity standards it claims to uphold.
5. **Inadequate Cultural Competency:** The plan may have failed to consider the cultural and linguistic needs of diverse communities, which is essential for effective engagement. If the

Comment 25-01

project did not provide information and resources in multiple languages or did not tailor its outreach to culturally specific contexts, it would further alienate the communities it intends to serve.

6. **Limited Opportunities for Ongoing Feedback:** Continuous engagement means providing multiple, ongoing opportunities for feedback and dialogue throughout the project's development and implementation. If the plan only allowed for initial input with no clear pathways for follow-up or ongoing involvement, it would not meet the standard for meaningful engagement as required by the Equity Principles for Hydrogen.

Comment 25-01

Mapping and Environmental Justice Concerns:

I appreciate that the report includes more detailed and zoomed-in maps, which help provide a clearer picture of the project's impact on different areas. However, it would be more effective if these maps were interactive, allowing stakeholders to explore specific areas in greater detail.

One of the most concerning aspects, made evident by the maps, is that the majority of the project routes through urban areas will pass through environmental justice communities. This seems to be a direct result of aligning the new hydrogen pipelines with existing natural gas lines. As discussed in an earlier meeting, this approach risks perpetuating environmental racism. Historically, natural gas lines were placed in certain areas due to racial and economic discrimination, and overlaying hydrogen pipelines in the same locations continues this legacy of inequality. By doing so, the project may disproportionately impact these communities, which already face significant environmental burdens.

Comment 25-02

Recommendations:

- Implement interactive maps to allow stakeholders to explore specific areas and understand the impacts in greater detail.
- Reevaluate the pipeline routing decisions to avoid perpetuating environmental racism by overlaying new infrastructure on existing lines that were historically placed due to discriminatory practices.
- Develop a comprehensive strategy for ensuring cultural and linguistic inclusivity in all communication and engagement efforts.
- Establish ongoing mechanisms for meaningful community engagement, ensuring that affected communities are involved in decision-making processes throughout the project's lifecycle.

Comment 25-03

Strengthening these aspects of the plan is essential for aligning the project with the Equity Principles for Hydrogen and ensuring that it does not perpetuate existing environmental injustices.

Sincerely,

Faith Myhra, Organizing Member
Protect Playa Now
protectplayanow@gmail.com

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group

PROTECT PLAYA NOW COMMENT 25-1

I am writing to express significant concerns about the "Environmental Social Justice Plan" for the SoCalGas Angeles Link Project. The plan, as currently presented, does not go far enough to ensure that disadvantaged communities are actively involved and protected throughout the project.

Key Concerns:

Community Engagement:

The plan does not provide sufficient mechanisms for continuous and meaningful engagement with impacted communities, as required by the Equity Principles for Hydrogen. This lack of engagement risks further marginalizing these communities and undermining the project’s legitimacy.

1. Lack of Specific, Actionable Engagement Strategies: The plan likely included broad commitments to community engagement but did not outline clear, actionable steps for how this engagement would be maintained throughout the project's lifecycle. Without specific strategies, such as regular community meetings, transparent communication channels, and clear timelines for feedback, the engagement becomes superficial rather than substantive.
2. Insufficient Inclusion of Marginalized Voices: The Equity Principles for Hydrogen emphasize the importance of including voices from historically marginalized communities in all stages of project development. The plan may have failed to ensure that these communities were genuinely included in decision-making processes. For example, if the plan only provided for one-off consultations rather than ongoing dialogue, it would fall short of what is needed to ensure continuous and meaningful engagement.
3. Tokenistic Approaches to Community Involvement: The plan might have included community representatives in advisory roles without giving them real power or influence over project decisions. This tokenism undermines trust and fails to empower communities to shape outcomes in ways that address their specific needs and concerns. Meaningful engagement requires that these communities have a significant and ongoing role in shaping the project's direction.
4. Lack of Transparency and Accountability: Without mechanisms for regular reporting back to the community on how their input is being used or for holding the project accountable to the communities it impacts, the plan risks being seen as a box-ticking exercise rather than a genuine effort to engage. Transparency in decision-making and clear accountability measures are crucial for building trust and ensuring that the project meets the equity standards it claims to uphold.
5. Inadequate Cultural Competency: The plan may have failed to consider the cultural and linguistic needs of diverse communities, which is essential for effective engagement. If the project did not provide information and resources in multiple languages or did not tailor its outreach to culturally specific contexts, it would further alienate the communities it intends to serve.
6. Limited Opportunities for Ongoing Feedback: Continuous engagement means providing multiple, ongoing opportunities for feedback and dialogue throughout the project's development and implementation. If the plan only allowed for initial input with no clear pathways for follow-up or ongoing involvement, it would not meet the standard for meaningful engagement as required by

the Equity Principles for Hydrogen.

SOCALGAS RESPONSE TO COMMENT 25-1

SoCalGas believes draft plan is a first step in engaging communities that have been historically overlooked in the stakeholder engagement process. The ESJ Plan is a first step at developing a framework to meaningfully engage with stakeholders with active community involvement along the way in a transparent manner. Specific engagement approaches, such as regular community meetings that allow for ongoing dialogue and clear timelines for feedback, will be developed during Phase 2, when the timeline for project development is better defined. The goals of the ESJ Plan include strategies to build relationships with important stakeholders and groups, including low-income households, people of color, minority neighborhoods, immigrants, linguistically isolated communities and households, and households without internet. Cultural and linguistic needs of diverse communities are an important consideration and SoCalGas proposes to translate materials for accessibility (see Section 9) as well as provide interpretation services. SoCalGas may conduct specialized small-group meetings as an engagement approach as needed to reach subgroups within disadvantaged communities which can include, but is not limited to, low-income households, people of color, linguistically isolated neighborhoods, or immigrant communities.

Please also refer to Global Responses 7 and 9.

PROTECT PLAYA NOW COMMENT 25-2

Mapping and Environmental Justice Concerns:

I appreciate that the report includes more detailed and zoomed-in maps, which help provide a clearer picture of the project's impact on different areas. However, it would be more effective if these maps were interactive, allowing stakeholders to explore specific areas in greater detail.

One of the most concerning aspects, made evident by the maps, is that the majority of the project routes through urban areas will pass through environmental justice communities. This seems to be a direct result of aligning the new hydrogen pipelines with existing natural gas lines. As discussed in an earlier meeting, this approach risks perpetuating environmental racism. Historically, natural gas lines were placed in certain areas due to racial and economic discrimination, and overlaying hydrogen pipelines in the same locations continues this legacy of inequality. By doing so, the project may disproportionately impact these communities, which already face significant environmental burdens.

SOCALGAS RESPONSE TO COMMENT 25-2

SoCalGas will consider developing interactive maps for stakeholders to explore project areas in future phases of Angeles Link. Since SoCalGas is currently in the feasibility stage of Angeles Link, and therefore, more refined potential alignments are not available and as such, developing interactive maps at this point would be premature.

SoCalGas acknowledges that historical injustices related to the placement of projects in underserved communities of color occurred and SoCalGas is dedicated to a stakeholder process that aims to minimize future impacts on these communities. While it may be difficult to completely avoid these areas, given the high concentration of DACs in the LA basin, the intention of Angeles Link is to serve customers that are hardest to decarbonize. Ultimately, delivering clean renewable hydrogen via Angeles Link could result in cleaner air for these communities. In response to the ESJ Screening results and stakeholder feedback, the Routing Analysis being conducted in Phase 1 was updated to include a route variation for future consideration that reduces traversing through ESJ communities and DACs. Please also refer to Global Response 5 for additional information on the routing process and consideration of the potential route variation in Phase 2.

PROTECT PLAYA NOW COMMENT 25-3

Recommendations:

- Implement interactive maps to allow stakeholders to explore specific areas and understand the impacts in greater detail.
- Reevaluate the pipeline routing decisions to avoid perpetuating environmental racism by overlaying new infrastructure on existing lines that were historically placed due to discriminatory practices.
- Develop a comprehensive strategy for ensuring cultural and linguistic inclusivity in all communication and engagement efforts.
- Establish ongoing mechanisms for meaningful community engagement, ensuring that affected communities are involved in decision-making processes throughout the project's lifecycle.

Strengthening these aspects of the plan is essential for aligning the project with the Equity Principles for Hydrogen and ensuring that it does not perpetuate existing environmental injustices.

SOCALGAS RESPONSE TO COMMENT 25-3

Please refer to Response to Comment 25-2 and Global Responses 5, 7 and 9.

Comment Letter 26 – Protect Playa Now

Comment Letter 26

August 22, 2024
Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback on Preliminary Routing/Configuration Analysis Report

I am writing to provide critical feedback on the "Preliminary Routing/Configuration Analysis" report for the SoCalGas Angeles Link Project. The report raises serious concerns about the potential impacts on vulnerable communities and fails to align with the Equity Principles for Hydrogen.

Key Concerns:

Environmental and Safety Risks: The report does not sufficiently address the potential impacts of the proposed routes on densely populated and environmentally sensitive areas. The current routing decisions risk exacerbating environmental injustices by disproportionately impacting low-income communities and communities of color.

Comment 26-01

Recommendations:

Prioritize route selection that minimizes environmental and safety risks, especially in vulnerable communities, in accordance with the Equity Principles for Hydrogen.

These concerns need to be addressed in the final routing plan to prevent further environmental injustices and to align the project with the Equity Principles for Hydrogen.

Sincerely,

Faith Myhra, Organizing Member
Protect Playa Now
protectplayanow@gmail.com

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group

PROTECT PLAYA NOW COMMENT 26-1

I am writing to provide critical feedback on the "Preliminary Routing/Configuration Analysis" report for the SoCalGas Angeles Link Project. The report raises serious concerns about the potential impacts on vulnerable communities and fails to align with the Equity Principles for Hydrogen.

Key Concerns:

Environmental and Safety Risks: The report does not sufficiently address the potential impacts of the proposed routes on densely populated and environmentally sensitive areas. The current routing decisions risk exacerbating environmental injustices by disproportionately impacting low-income communities and communities of color.

Recommendations:

Prioritize route selection that minimizes environmental and safety risks, especially in vulnerable communities, in accordance with the Equity Principles for Hydrogen.

These concerns need to be addressed in the final routing plan to prevent further environmental injustices and to align the project with the Equity Principles for Hydrogen.

SOCALGAS RESPONSE TO COMMENT 26-1

With regards to route selection please refer to Global Response 5. With regard to potential impacts to environmental justice communities, please refer to Global Response 7. With regard to the Equity Principles, please refer to Global Response 9.

Comment Letter 27 – Protect Playa Now

Comment Letter 27

August 22, 2024
Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback on Pipeline Sizing and Design Criteria Report

I am writing to provide feedback on the "Pipeline Sizing and Design Criteria" report for the SoCalGas Angeles Link Project. The report inadequately addresses the significant safety risks associated with hydrogen transport and fails to align with the Equity Principles for Hydrogen.

Key Concerns:

1. **Safety Risks**: The report does not fully address the risks of hydrogen leakage, metal embrittlement, and explosions. These issues are particularly concerning for communities that are already overburdened by environmental hazards.
2. **Risk Assessment and Communication**: The report lacks a detailed risk assessment and does not outline specific safety protocols. There is also a need for transparent and continuous communication with affected communities, ensuring they are informed and involved in the decision-making process.

Recommendations:

- Develop a comprehensive safety plan that fully addresses the risks associated with hydrogen transport, with a focus on protecting vulnerable communities.
- Ensure transparent communication and a detailed risk assessment in line with the Equity Principles for Hydrogen.

Addressing these safety concerns in the final report is imperative to protect public safety and align with the Equity Principles for Hydrogen.

Comment 27-01

Sincerely,

Faith Myhra, Organizing Member
Protect Playa Now
protectplayanow@gmail.com

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group

PROTECT PLAYA NOW COMMENT 27-1

I am writing to provide feedback on the "Pipeline Sizing and Design Criteria" report for the SoCalGas Angeles Link Project. The report inadequately addresses the significant safety risks associated with hydrogen transport and fails to align with the Equity Principles for Hydrogen.

Key Concerns:

1. Safety Risks: The report does not fully address the risks of hydrogen leakage, metal embrittlement, and explosions. These issues are particularly concerning for communities that are already overburdened by environmental hazards.

2. Risk Assessment and Communication: The report lacks a detailed risk assessment and does not outline specific safety protocols. There is also a need for transparent and continuous communication with affected communities, ensuring they are informed and involved in the decision-making process.

Recommendations:

- Develop a comprehensive safety plan that fully addresses the risks associated with hydrogen transport, with a focus on protecting vulnerable communities.

- Ensure transparent communication and a detailed risk assessment in line with the Equity Principles for Hydrogen.

Addressing these safety concerns in the final report is imperative to protect public safety and align with the Equity Principles for Hydrogen.

SOCALGAS RESPONSE TO COMMENT 27-1

In response to the comment concerning safety, please refer to Global Response 4. In response to the comment concerning communication and engagement with communities, please refer to Global Response 7, and in response to a request for information on the proposed ESJ Plan and SoCalGas's alignment with the Equity Principles for Hydrogen, please refer to Global Response 9.

Comment Letter 28 – Protect Playa Now

Comment Letter 28

August 22, 2024
Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback on Production Planning & Assessment Draft Report

I am writing to express significant concerns regarding the "Production Planning & Assessment" report for the SoCalGas Angeles Link Project. The report, as it stands, fails to align with the Equity Principles for Hydrogen and does not adequately address the potential environmental justice impacts. — Comment 28-01

Key Concerns:

1. **Water Usage**: The report lacks a thorough analysis of the substantial water resources required for hydrogen production, particularly given California's ongoing water scarcity. This omission is alarming, as it contradicts the principles of environmental justice by potentially exacerbating water access issues for already vulnerable communities. — Comment 28-02
2. **Biomass and Biogas**: The inclusion of biomass and biogas as hydrogen sources directly conflicts with the commitment to equity and environmental justice. These methods pose significant environmental and public health risks, especially to low-income communities and communities of color who are already disproportionately burdened by pollution. — Comment 28-03
3. **Alternative Pathways**: The report's narrow focus on hydrogen production neglects to consider more equitable and sustainable energy alternatives. A broader evaluation of electrification, which aligns more closely with equity principles, is essential. — Comment 28-04

Recommendations:

- Conduct a more detailed analysis of water usage to ensure sustainability and equity in resource allocation. — Comment 28-02
- Reassess the inclusion of biomass and biogas, focusing on cleaner, more equitable energy sources. — Comment 28-03
- Expand the scope of the report to include a comprehensive evaluation of electrification and other alternatives that align with the Equity Principles for Hydrogen. — Comment 28-04

These concerns must be addressed in the final report to ensure the project does not perpetuate existing environmental injustices and aligns with the Equity Principles for Hydrogen. — Comment 28-05

Sincerely,

Faith Myhra, Organizing Member
Protect Playa Now
protectplayanow@gmail.com

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group

PROTECT PLAYA NOW COMMENT 28-1

I am writing to express significant concerns regarding the "Production Planning & Assessment" report for the SoCalGas Angeles Link Project. The report, as it stands, fails to align with the Equity Principles for Hydrogen and does not adequately address the potential environmental justice impacts.

SOCALGAS RESPONSE TO COMMENT 28-1

SoCalGas acknowledges this comment related to the Equity Principles and application of those principles to production projects. While storage is evaluated in the Production Study, Section 8.0 Evaluation of Potential Hydrogen Storage, SoCalGas does not propose to produce clean renewable hydrogen as part of Angeles Link.

SoCalGas believes the Equity Principles provide a foundation that can help guide SoCalGas as Angeles Link develops further to foster meaningful conversations between environmental justice advocates and SoCalGas. For additional response related to the Equity Principles for the specific development of Angeles Link, please refer to Appendix 3A in SoCalGas's Q4 2023 Quarterly Report.

PROTECT PLAYA NOW COMMENT 28-2

Key Concerns:

1. Water Usage: The report lacks a thorough analysis of the substantial water resources required for hydrogen production, particularly given California's ongoing water scarcity. This omission is alarming, as it contradicts the principles of environmental justice by potentially exacerbating water access issues for already vulnerable communities.

Recommendations:

- Conduct a more detailed analysis of water usage to ensure sustainability and equity in resource allocation.

SOCALGAS RESPONSE TO COMMENT 28-2

SoCalGas acknowledges this comment related to the water resources required for clean renewable hydrogen production. SoCalGas does not propose to produce clean renewable hydrogen as part of Angeles Link. The Water Evaluation provides analysis related to water resources third-party producers may pursue to produce clean renewable hydrogen. The Water Evaluation also provides analysis related to water use and clean renewable hydrogen production, including analysis of water quality requirements, acquisition and purification costs, challenges and opportunities related to water supplies, and a desktop analysis of greenhouse gas emissions associated with water conveyance and treatment.

SoCalGas expects third-party producers to conduct analysis of water supplies and the potential impacts of using water for hydrogen production when the details of such production projects are proposed. For additional information related to the analysis third-party producers would conduct, please refer to Global Response 1.

PROTECT PLAYA NOW COMMENT 28-3

2. Biomass and Biogas: The inclusion of biomass and biogas as hydrogen sources directly conflicts with the commitment to equity and environmental justice. These methods pose significant environmental and public health risks, especially to low-income communities and communities of color who are already disproportionately burdened by pollution.

Recommendation:

- Reassess the inclusion of biomass and biogas, focusing on cleaner, more equitable energy sources.

SOCALGAS RESPONSE TO COMMENT 28-3

SoCalGas does not propose to produce clean renewable hydrogen as part of Angeles Link. The Production Study provides analysis of hydrogen production, including the use of biomass and biogas as potential ways to produce clean renewable hydrogen consistent with the requirements set forth in Decision D.22-12-055 for Angeles Link. SoCalGas is committed to transporting clean renewable hydrogen that meets regulatory requirements set forth by the CPUC.

For the development of Angeles Link, which does not include production, SoCalGas is committed to addressing equity and environmental justice concerns. Please refer to Response to Comment 28-1 for additional response related to the Equity Principles. Please refer to SoCalGas's separate ESJ Plan for additional information on SoCalGas's framework for engaging ESJ Communities during Phase 2 of Angeles Link.

PROTECT PLAYA NOW COMMENT 28-4

3. Alternative Pathways: The report's narrow focus on hydrogen production neglects to consider more equitable and sustainable energy alternatives. A broader evaluation of electrification, which aligns more closely with equity principles, is essential.

Recommendation:

- Expand the scope of the report to include a comprehensive evaluation of electrification and other alternatives that align with the Equity Principles for Hydrogen.

SOCALGAS RESPONSE TO COMMENT 28-4

Three separate Angeles Link Phase 1 feasibility studies provide analysis of alternatives to Angeles Link, including hydrogen delivery alternatives and non-hydrogen delivery alternatives such as electrification. Those studies include: (i) the Alternatives Study, which includes analysis evaluating the alternatives' potential to achieve the state's decarbonization goals; (ii) the Cost Effectiveness Study, which provides a cost comparison of the alternatives identified for cost analysis; and (iii) the Environmental Analysis, which provides a high-level summary of potential environmental impacts associated with the alternatives selected for environmental analysis. Please refer to those studies for additional information.

PROTECT PLAYA NOW COMMENT 28-5

These concerns must be addressed in the final report to ensure the project does not perpetuate existing environmental injustices and aligns with the Equity Principles for Hydrogen.

SOCALGAS RESPONSE TO COMMENT 28-5

Please refer to Global Response 9 and Responses to Comments 28-1 through 28-4.

Comment Letter 29 – Protect Playa Now

Comment Letter 29

August 22, 2024
Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback on High-Level Feasibility Assessment and Permitting Analysis Report

I am writing to provide critical feedback on the "High-Level Feasibility Assessment and Permitting Analysis" report for the SoCalGas Angeles Link Project. The report falls short in addressing several critical areas, particularly those related to equity and environmental justice.

Key Concerns:

GHG and NOx Emissions: The report does not adequately analyze the potential greenhouse gas (GHG) and nitrogen oxides (NOx) emissions from hydrogen combustion. This is particularly concerning given the disproportionate impact these emissions could have on disadvantaged communities.

Comment 29-01

Recommendations:

Conduct a detailed analysis of GHG and NOx emissions and their potential impacts on vulnerable communities.

These issues must be addressed in the final report to ensure that the project aligns with the Equity Principles for Hydrogen and protects the most vulnerable populations.

Sincerely,

Faith Myhra, Organizing Member
Protect Playa Now
protectplayanow@gmail.com

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group

PROTECT PLAYA NOW COMMENT 29-1

I am writing to provide critical feedback on the "High-Level Feasibility Assessment and Permitting Analysis" report for the SoCalGas Angeles Link Project. The report falls short in addressing several critical areas, particularly those related to equity and environmental justice.

Key Concerns:

GHG and NOx Emissions: The report does not adequately analyze the potential greenhouse gas (GHG) and nitrogen oxides (NOx) emissions from hydrogen combustion. This is particularly concerning given the disproportionate impact these emissions could have on disadvantaged communities.

Recommendations:

Conduct a detailed analysis of GHG and NOx emissions and their potential impacts on vulnerable communities.

These issues must be addressed in the final report to ensure that the project aligns with the Equity Principles for Hydrogen and protects the most vulnerable populations.

SOCALGAS RESPONSE TO COMMENT 29-1

While referring to the Permitting Analysis, this comment appears to concern the separate Angeles Link Phase 1 feasibility studies related to GHG emissions and NOx emissions. The Permitting Analysis evaluated at a desktop level the potential pipeline routes identified in Phase 1 to determine the potential permits and authorizations anticipated to be required for construction of Angeles Link. Analysis related to GHG emissions and NOx emissions is provided in separate Phase 1 feasibility reports.

SoCalGas is committed to addressing equity and environmental justice concerns for the development of Angeles Link. Please refer to Global Response 9 for additional response related to the Equity Principles and the ESJ Plan regarding SoCalGas's framework for engaging ESJ communities during Phase 2 of Angeles Link.

Comment Letter 30 – Protect Playa Now

Comment Letter 30

August 22, 2024
Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback on Environmental Analysis Report

I am writing to express significant concerns regarding the "Environmental Analysis" draft report for the SoCalGas Angeles Link Project. The report fails to adequately address several critical environmental and safety risks associated with hydrogen infrastructure, particularly in the context of densely populated urban areas like Los Angeles.

Comment 30-01

Key Concerns:

1. Hydrogen Leakage and Safety Concerns

- **Flammability and Leakage Risks**: Hydrogen is highly flammable and prone to leakage, especially when integrated into existing natural gas systems. This presents significant safety risks, particularly in densely populated areas. The report does not sufficiently address these concerns, increasing the likelihood of catastrophic accidents that could endanger public safety (Greenlining Institute, 2024).

Comment 30-02

2. Increased NOx Emissions and Health Impacts

- **Higher NOx Emissions**: The combustion of hydrogen produces higher levels of nitrogen oxides (NOx) compared to natural gas. This contributes to air pollution and exacerbates respiratory illnesses, such as childhood asthma—a particularly concerning issue in Los Angeles, which already struggles with poor air quality (NBC News, 2024; Earthjustice, 2024).

Comment 30-03

3. Water Resource Strain

- **Water-Intensive Production**: Hydrogen production, particularly through electrolysis, requires vast quantities of water. In a state like California, where water scarcity is a growing concern, this approach is unsustainable and risks exacerbating drought conditions (Greenlining Institute, 2024).

Comment 30-04

4. Hydrogen as an Indirect Greenhouse Gas

- **Amplification of Climate Change**: Hydrogen leakage into the atmosphere can indirectly exacerbate climate change by interacting with other greenhouse gases. Hydrogen contributes to the production of tropospheric ozone and extends the atmospheric lifetime of methane, one of the most potent greenhouse gases. This makes hydrogen leakage a significant environmental concern, as it can amplify the climate change impact of other greenhouse gases, undermining efforts to mitigate climate change (Nature Communications, 2023).

Comment 30-05

Conclusion:

The "Environmental Analysis" draft report does not adequately address the serious environmental and safety risks associated with hydrogen infrastructure. The potential for hydrogen leakage, increased NOx emissions, water resource strain, and the amplification of climate change through indirect greenhouse gas effects are all critical concerns that must be thoroughly evaluated and mitigated. I urge you to reconsider the current approach and explore more sustainable and safer alternatives to hydrogen infrastructure.

Comment 30-06

Sincerely,

Faith Myhra, Organizing Member
Protect Playa Now
protectplayanow@gmail.com

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group

PROTECT PLAYA NOW COMMENT 30-1

I am writing to express significant concerns regarding the "Environmental Analysis" draft report for the SoCalGas Angeles Link Project. The report fails to adequately address several critical environmental and safety risks associated with hydrogen infrastructure, particularly in the context of densely populated urban areas like Los Angeles.

SOCALGAS RESPONSE TO COMMENT 30-1

The Environmental Analysis is a desktop-level study to assess potential environmental impacts based on the level of information available at this time. SoCalGas will continue to evaluate the potential environmental impacts of Angeles Link in future phases as details of Angeles Link develop.

In response to the comment concerning potential impacts related to safety, at this feasibility stage in Phase 1, a street-level alignment evaluation of the preliminary preferred routes for Angeles Link was not conducted and is expected to occur in subsequent phases. This future-street level evaluation will enable more site-specific evaluation of potential safety considerations associated with the hydrogen infrastructure along the selected route for Angeles Link.

SoCalGas completed a separate Safety Study as part of the Phase 1 feasibility analyses. The Safety Study evaluates applicable federal, state, and industry codes, as well as standards and best practices for their application to a pipeline system of clean renewable hydrogen as applicable to Angeles Link.

Please also refer to Global Response 4.

PROTECT PLAYA NOW COMMENT 30-2

Key Concerns:

1. Hydrogen Leakage and Safety Concerns

    - Flammability and Leakage Risks: Hydrogen is highly flammable and prone to leakage, especially when integrated into existing natural gas systems. This presents significant safety risks, particularly in densely populated areas. The report does not sufficiently address these concerns, increasing the likelihood of catastrophic accidents that could endanger public safety (Greenlining Institute, 2024).

SOCALGAS RESPONSE TO COMMENT 30-2

Angeles Link is envisioned as a non-discriminatory open access pipeline system that would transport only clean renewable hydrogen; there will be no hydrogen/natural gas blend transported by Angeles Link. In addition, hydrogen leakage and the properties of hydrogen gas are addressed in the Leakage Study. Safety considerations are addressed in the Safety Study, which has also been reviewed by the Center for Hydrogen Safety, Hydrogen Safety Panel to provide third-party input. Pipeline engineering design is addressed in the Design Study. Detailed engineering will occur in a subsequent phase of Angeles Link once a preferred pipeline route is identified.

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PROTECT PLAYA NOW COMMENT 30-3

2. Increased NOx Emissions and Health Impacts

    - Higher NOx Emissions: The combustion of hydrogen produces higher levels of nitrogen oxides (NOx) compared to natural gas. This contributes to air pollution and exacerbates respiratory illnesses, such as childhood asthma—a particularly concerning issue in Los Angeles, which already struggles with poor air quality (NBC News, 2024; Earthjustice, 2024).

SOCALGAS RESPONSE TO COMMENT 30-3

As described in the NOx Study, for the mobility end user sector, displacement of diesel and gasoline with hydrogen fuel cell vehicles will result in lower NOx emissions. For the power generation and hard-to-electrify industrial end user sectors where natural gas would be displaced by hydrogen, the Study assumes that permitted NOx emission limits would stay the same or decrease given the requirements to make progress towards achieving attainment with the ozone national ambient air quality standard. Additionally, the NOx Study assumes that power generation and hard to electrify industrial end users will continue to comply with applicable Clean Air Act and air districts' permit requirements when transitioning to hydrogen fuel because it has been assumed that the California regulatory environment will not allow for an increase in permitted NOx emissions at stationary sources. Furthermore, it was assumed that adjustments to the hydrogen combustion process such as lowering of combustion temperature, modifying air/fuel ratios, and technological advancements would be in place so permitted NOx emissions would stay the same or decrease with the combustion of hydrogen in equipment in the power generation and hard to electrify industrial end user sectors.

SoCalGas concurs with the commenter that a reduction in air pollution may have an overall positive health impact. As demonstrated in its Phase 1 feasibility studies, Angeles Link, which is intended to serve the mobility, power generation, and hard-to-electrify industrial end user sectors, may provide meaningful reductions in NOx emissions and GHG emissions (which are related to climate change) by reducing reliance on fossil fuels.

SoCalGas notes that the commenter provides two references to "NBC News 2024" and "Earthjustice 2024" but does not provide the specific source reference so we are unable to access and review the material.

PROTECT PLAYA NOW COMMENT 30-4

3. Water Resource Strain

    - Water-Intensive Production: Hydrogen production, particularly through electrolysis, requires vast quantities of water. In a state like California, where water scarcity is a growing concern, this approach is unsustainable and risks exacerbating drought conditions (Greenlining Institute, 2024).

SOCALGAS RESPONSE TO COMMENT 30-4

SoCalGas evaluates water availability in its Water Evaluation. Please refer to Global Response 1.

PROTECT PLAYA NOW COMMENT 30-5

4. Hydrogen as an Indirect Greenhouse Gas

    - Amplification of Climate Change: Hydrogen leakage into the atmosphere can indirectly exacerbate climate change by interacting with other greenhouse gases. Hydrogen contributes to the production of tropospheric ozone and extends the atmospheric lifetime of methane, one of the most potent greenhouse gases. This makes hydrogen leakage a significant environmental concern, as it can amplify the climate change impact of other greenhouse gases, undermining efforts to mitigate climate change (Nature Communications, 2023).

SOCALGAS RESPONSE TO COMMENT 30-5

The GHG Study includes Section 9.1 which is focused on providing an extensive review of the available literature regarding the impact of hydrogen on climate change and includes Table 17 which summarizes the GWP 20 and GWP 100 estimates for hydrogen from a variety of published studies. The Study also includes Section 9.2 which takes the preliminary high-level volumetric estimate of hydrogen leakage for both general hydrogen infrastructure and Angeles Link infrastructure from the Leakage Study and predicts the impact to the predicted overall GHG reductions presented earlier in the GHG Study.

PROTECT PLAYA NOW COMMENT 30-6

Conclusion:

The "Environmental Analysis" draft report does not adequately address the serious environmental and safety risks associated with hydrogen infrastructure. The potential for hydrogen leakage, increased NOx emissions, water resource strain, and the amplification of climate change through indirect greenhouse gas effects are all critical concerns that must be thoroughly evaluated and mitigated. I urge you to reconsider the current approach and explore more sustainable and safer alternatives to hydrogen infrastructure.

SOCALGAS RESPONSE TO COMMENT 30-6

The Environmental Analysis is a feasibility-level study to assess potential environmental impacts based on the level of information available at this time. SoCalGas will continue to evaluate Angeles Link based on information as it becomes available and with ongoing stakeholder input. Please also refer to Responses to Comments 7-6, and 30-1 through 30-5.

Comment Letter 31 – Protect Playa Now

Comment Letter 31

August 22, 2024
Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback on High-Level Economic Analysis and Cost Effectiveness Report

I am writing to provide critical feedback on the "High-Level Economic Analysis and Cost Effectiveness" report for the SoCalGas Angeles Link Project. The following key points highlight significant concerns regarding the project's economic viability and the associated risks.

Key Concerns:

1. Economic Viability Concerns

- **High Costs & Challenges**: The hydrogen infrastructure proposed for the Angeles Link Project faces considerable costs and logistical hurdles, raising serious questions about its economic viability. These challenges mirror those seen globally, where similar issues have led to a slowdown in hydrogen projects, potentially resulting in stranded assets and placing undue financial burdens on ratepayers (Earthjustice, 2024).

2. Overestimated Demand & Economic Risk

- **Demand Overestimation**: SoCalGas has significantly overestimated the demand for hydrogen, projecting figures that are ten times higher than those estimated by California state agencies. This discrepancy is a severe concern, particularly in sectors like transportation and power generation where viable, non-hydrogen alternatives are available. Overestimating demand to this extent makes large-scale hydrogen infrastructure development not only unnecessary but also economically risky (Earthjustice, 2024).

3. Estimated Costs per Mile for Hydrogen Pipelines

- **New Pipelines**: The cost for constructing new hydrogen pipelines is estimated to range from $1 million to $2 million per mile, with costs influenced by factors such as terrain, pipeline diameter, and regulatory requirements (EHB, 2021; IEA, 2022).

4. Example Projects

- **European Hydrogen Backbone**: This large-scale project in Europe estimated costs at approximately $1.2 million to $2.4 million per mile, depending on regional factors (EHB, 2021).

Comment 31-01

Comment 31-02

Comment 31-03

Comment 31-04

- **Netherlands Halts Hydrogen Project**: The Netherlands canceled its National Hydrogen Pipeline Network due to high costs and unresolved technological challenges, shifting focus to more proven and cost-effective solutions (Reuters, 2023).

Comment 31-04

Conclusion:

Given the high costs, overestimated demand, and global challenges associated with hydrogen infrastructure, the Angeles Link Project represents a risky investment with questionable economic viability. It is crucial to reconsider this focus on hydrogen and explore more cost-effective and proven alternatives to avoid financial burdens on ratepayers and the risk of stranded assets.

Comment 31-05

Sincerely,

Faith Myhra, Organizing Member
Protect Playa Now
protectplayanow@gmail.com

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group

PROTECT PLAYA NOW COMMENT 31-1

I am writing to provide critical feedback on the "High-Level Economic Analysis and Cost Effectiveness" report for the SoCalGas Angeles Link Project. The following key points highlight significant concerns regarding the project's economic viability and the associated risks.

Key Concerns:

1. Economic Viability Concerns

    - High Costs & Challenges: The hydrogen infrastructure proposed for the Angeles Link Project faces considerable costs and logistical hurdles, raising serious questions about its economic viability. These challenges mirror those seen globally, where similar issues have led to a slowdown in hydrogen projects, potentially resulting in stranded assets and placing undue financial burdens on ratepayers (Earthjustice, 2024).

SOCALGAS RESPONSE TO COMMENT 31-1

Clean renewable hydrogen is expected to play an important role to meet California's decarbonization goals, as defined in the CARB 2022 Scoping Plan[25]. For example, as the CPUC's Decision recognizes, clean renewable hydrogen is one of the few viable carbon-free energy alternatives for the hard-to-electrify industries and the heavy-duty transportation sector.[9]

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 million tons per year (MTPY) in the conservative scenario to 5.9 MTPY in the ambitious scenario. This projected demand further supports the need for Angeles Link. Furthermore, as California transitions to a clean energy future, the Demand Study explains that appropriate policy and regulatory measures could help support the development and scaling of hydrogen infrastructure in a cost-effective manner.

As discussed in the Cost Effectiveness Study, clean renewable hydrogen can provide a cost-effective way to decarbonize hard-to-electrify sectors and help support electrification in other sectors. The cost effectiveness analysis demonstrated that amongst the hydrogen delivery alternatives, such as trucking and power transmission and distribution (T&D) with in-basin production, clean renewable hydrogen transported via Angeles Link is the most cost-effective means to deliver hydrogen into the LA Basin at scale.

Angeles Link was also found to be cost-effective for certain end uses when compared to non-hydrogen alternatives like electrification and carbon capture and sequestration. In the mobility and power sectors, hydrogen delivered via Angeles Link was found to be competitive with electrification.

[25] CARB 2022 Scoping Plan: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents

Clean renewable hydrogen is also receiving federal support. ARCHES recently signed a landmark $12.6 billion agreement to build a clean renewable Hydrogen Hub in California (California H2Hub) including includes up to $1.2 billion in federal funding, which will accelerate investment in clean renewable hydrogen infrastructure across California. Other efforts are underway to help reduce the delivered cost of hydrogen over time. For example, the DOE Hydrogen Shot seeks to reduce the cost of clean hydrogen by 80% to $1 per kilogram by 2031. Angeles Link can help support these efforts to reduce the delivered cost of hydrogen by providing cost-effective and scalable hydrogen transportation connective infrastructure.

With respect to investment decisions on hydrogen projects, Hydrogen Insights 2024, which was recently published in September 2024 by the Hydrogen Council in collaboration with McKinsey & Company, states that globally, clean hydrogen projects that "reached final investment decision (FID) have seen a dramatic increase from 102 committed projects in 2020, representing some USD [US Dollar] 10 billion in committed investment, to 434 in 2024, representing some USD 75 billion."[26]

[26] Hydrogen Insights 2024 by the Hydrogen Council at 4: Hydrogen Insights September 2023 (hydrogencouncil.com)

PROTECT PLAYA NOW COMMENT 31-2

2. Overestimated Demand & Economic Risk

    - Demand Overestimation: SoCalGas has significantly overestimated the demand for hydrogen, projecting figures that are ten times higher than those estimated by California state agencies. This discrepancy is a severe concern, particularly in sectors like transportation and power generation where viable, non-hydrogen alternatives are available. Overestimating demand to this extent makes large-scale hydrogen infrastructure development not only unnecessary but also economically risky (Earthjustice, 2024).

SOCALGAS RESPONSE TO COMMENT 31-2

Please refer to the Q1 2024 Global Response 1 which references California hydrogen demand projections from the CARB, the California Energy Commission (CEC), the ARCHES and UC Davis. Additionally, the Demand Study will be revised to include a new Table 9: Comparison of Demand Projection, Comparison to Other Studies which will include demand projections from these studies.

PROTECT PLAYA NOW COMMENT 31-3

3. Estimated Costs per Mile for Hydrogen Pipelines

    - New Pipelines: The cost for constructing new hydrogen pipelines is estimated to range from $1 million to $2 million per mile, with costs influenced by factors such as terrain, pipeline diameter, and regulatory requirements (EHB, 2021; IEA, 2022).

SOCALGAS RESPONSE TO COMMENT 31-3

Pipeline costs assumed for the Angeles Link are consistent with US (region specific) information. In the U.S., the cost of building hydrogen pipelines can be higher than the range provided by the commenter due to variables including regional labor rates, state, and local permitting requirements, environmental regulations, and land acquisition complexities. Additionally, factors such as terrain, urban density, and existing infrastructure vary widely across the U.S., contributing to cost differences.

EHB costs are pertinent to European markets and associated standards/pipeline specifications and may differ from the specifications/regulatory standards in the US.

Please refer to the Design Study for further information.

PROTECT PLAYA NOW COMMENT 31-4

4. Example Projects

    - European Hydrogen Backbone: This large-scale project in Europe estimated costs at approximately $1.2 million to $2.4 million per mile, depending on regional factors (EHB, 2021).

    - Netherlands Halts Hydrogen Project: The Netherlands canceled its National Hydrogen Pipeline Network due to high costs and unresolved technological challenges, shifting focus to more proven and cost-effective solutions (Reuters, 2023).

SOCALGAS RESPONSE TO COMMENT 31-4

SoCalGas points to S&P Global in October 2023 noting the Netherlands began construction of a national hydrogen pipeline network.[27] SoCalGas is not aware of any other news on the Netherlands canceling its National Hydrogen Pipeline Network.

Please also refer to Response to Comment 31-3.

[27] Netherlands begins construction of national hydrogen pipeline network: https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/102723-netherlands-begins-construction-of-national-hydrogen-pipeline-network

PROTECT PLAYA NOW COMMENT 31-5

Conclusion:

Given the high costs, overestimated demand, and global challenges associated with hydrogen infrastructure, the Angeles Link Project represents a risky investment with questionable economic viability. It is crucial to reconsider this focus on hydrogen and explore more cost-effective and proven alternatives to avoid financial burdens on ratepayers and the risk of stranded assets.

SOCALGAS RESPONSE TO COMMENT 31-5

Investments in clean energy projects such as Angeles Link are critical for long-term decarbonization and energy security goals for California. Angeles Link will enable transportation of clean renewable hydrogen from large-scale hydrogen production facilities to the various end users in Southern and Central California, including the LA Basin to support hard-to-electrify sectors, such as power generation, mobility, and industrial end users. The demand for clean renewable hydrogen is expected to grow significantly as governments and industries prioritize net-zero emissions, driven by policy mandates and technological advances that will improve cost-efficiencies over time, and accelerated through substantial federal and state investment in the California Hydrogen Hub.

Comment Letter 32 – Protect Playa Now

Comment Letter 32

August 22, 2024
Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback on Project Options and Alternatives Report

I am writing to provide detailed feedback on the "Project Options and Alternatives" report for the SoCalGas Angeles Link Project. While the report presents various options for hydrogen infrastructure, significant concerns arise when considering the broader context of Los Angeles' energy needs and the viability of hydrogen as a primary energy solution.

Key Concerns:

1. Inadequate Exploration of Renewable Energy Alternatives

- The report fails to thoroughly explore alternatives to hydrogen, particularly the potential of 100% renewable energy options. Los Angeles has the capacity to achieve 100% renewable energy by 2030, as demonstrated by comprehensive studies such as the "Clean Energy for Los Angeles" report, which outlines a viable path to full renewable integration. This approach would eliminate the need for large-scale hydrogen infrastructure and align more closely with the city's environmental goals(Clean-Energy-for-Los-An…).

2. Economic Viability Concerns

- The economic viability of hydrogen infrastructure is questionable, especially when compared to the costs associated with renewable energy. The transition to a 100% renewable energy system is not only feasible but also potentially less costly for ratepayers, as highlighted in the "Clean Energy for Los Angeles" report. The report shows that a renewable-based system can be achieved at nearly the same cost as the current trajectory, without the financial risks associated with hydrogen(Clean-Energy-for-Los-An…).

3. Perpetuation of Environmental Inequities

- Aligning new hydrogen pipelines with existing natural gas infrastructure risks perpetuating environmental injustices, particularly in communities historically burdened by fossil fuel projects. The report's failure to address this issue is concerning, especially given that renewable energy alternatives could avoid these negative impacts altogether.

4. Misalignment with Long-Term Environmental Goals

- Transitioning to clean energy should prioritize proven technologies like solar, wind, and energy storage, multi-day demand response, long-term duration storage, microgrids, community based

Comment 32-01

Comment 32-02

Comment 32-03

Comment 32-04

solar and storage projects, and energy efficiency over untested and expensive hydrogen infrastructure.

Comment 32-04

Recommendations:

- **Reevaluate Options**: Conduct a thorough analysis of 100% renewable energy alternatives, considering their economic feasibility, environmental benefits, and alignment with California's long-term goals.
- **Focus on Equity**: Ensure that any infrastructure development does not perpetuate environmental racism and aligns with the principles of environmental justice.
- **Prioritize Proven Solutions**: Given the economic and environmental uncertainties surrounding hydrogen, it is crucial to prioritize investments in proven renewable technologies.

Comment 32-05

These recommendations are critical for ensuring that the Angeles Link Project aligns with Los Angeles' environmental goals and does not exacerbate existing inequities.

Sincerely,

Faith Myhra, Organizing Member
Protect Playa Now
protectplayanow@gmail.com

CC:
Emily Grant, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group

PROTECT PLAYA NOW COMMENT 32-1

I am writing to provide detailed feedback on the "Project Options and Alternatives" report for the SoCalGas Angeles Link Project. While the report presents various options for hydrogen infrastructure, significant concerns arise when considering the broader context of Los Angeles' energy needs and the viability of hydrogen as a primary energy solution.

Key Concerns:

1. Inadequate Exploration of Renewable Energy Alternatives

    - The report fails to thoroughly explore alternatives to hydrogen, particularly the potential of 100% renewable energy options. Los Angeles has the capacity to achieve 100% renewable energy by 2030, as demonstrated by comprehensive studies such as the "Clean Energy for Los Angeles" report, which outlines a viable path to full renewable integration. This approach would eliminate the need for large-scale hydrogen infrastructure and align more closely with the city's environmental goals (Clean-Energy-for-Los-An…).

SOCALGAS RESPONSE TO COMMENT 32-1

SoCalGas assumes the "Clean Energy for Los Angeles" study is referencing the LADWP/NREL 2021 study "LA100: The Los Angeles 100% Renewable Energy Study"[28] ("LA100 Study") in its letter. SoCalGas also assumes that Protect Playa Now's references to "renewable energy options" are intended to refer to electrification served by traditional renewable energy resources, such as wind or solar power.

SoCalGas's Alternatives Study evaluates several alternatives including electrification (as a non-hydrogen alternative), served by renewables. In the context of this study, electrification refers to a combination of system level[29] transformation and use case level[30] technology changes including the grid infrastructure required to support growing electric load. The assessment of electrification was primarily conducted on a use case level for the purposes of this study (e.g., fuel cell electric vehicle (FCEV) vs. BEV for heavy-duty vehicles for the mobility sector). A broader evaluation of system-level electrification considerations was also conducted based on a high-level review of existing research, third-party studies, and California's decarbonization goals. These considerations are summarized in the Alternatives Study Section 4.3.2.1.1. with additional details in Appendix Section 7.3.3. System-Level Electrification.

SoCalGas notes that subsequent to the release of the 2021 LA100 Study, several major clean hydrogen policy milestones occurred. LADWP's 2022 Strategic Long Term Resource Plan (SLTRP) identifies the need for renewable fueled firm dispatchable power generation to meet robust energy system reliability in the

[28] Cochran, Jaquelin, and Paul Denholm, eds. 2021. The Los Angeles 100% Renewable Energy Study. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-79444. https://maps.nrel.gov/la100/

[29] System level electrification includes the incremental electricity generation, storage, and supporting upstream grid infrastructure requirements to meet wide-scale end use electrification needs.

[30] Use-case level electrification refers to replacing technologies or processes that use fossil fuels, like internal combustion engines and gas boilers, with electrically powered equivalents, such as electric vehicles or heat pumps. More detail at https://www.iea.org/energy-system/electricity/electrification

LA Basin. Based on the SLTRP assessment, LADWP's power generation in the LA Basin would be supported by combined-cycle and combustion turbine generating units running on 100% green hydrogen by 2035.[31] The Scattergood Modernization Project by LADWP proposes the establishment of a fast-ramping combined cycle unit to achieve operation on 100% clean renewable hydrogen by 2035. It is anticipated that multiple additional units designed to operate on green hydrogen will be constructed in the 2030s and 2040s, located at LADWP's Harbor, Haynes, Scattergood, and Valley Generating Stations.[32] The integration of these green hydrogen resources will enhance LADWP's in-basin generation capabilities, ensuring the maintenance of reliability and resiliency metrics in response to increasing load growth, which is primarily driven by electrification utilizing carbon-free generation methods.[33] In July 2024, the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) and the US Department of Energy (DOE) signed a $12.6 billion agreement, including up to $1.2 billion from the DOE and $11.4 billion in public and private matching funds, to build and expand clean energy infrastructure across California, including a California hydrogen hub.[34]

SoCalGas acknowledges that there are many potential forecasts for the energy needs of California, including the LA Basin, and the mechanisms to provide the needed energy. SoCalGas considers the assessment of the potential hydrogen demand within SoCalGas service territory as an important initial step in the Angeles Link Phase 1 studies. SoCalGas can use information about the potential hydrogen market in its service territory to inform which sectors and regions could be served by Angeles Link. In addition, this data served as a starting point to determine the expected range of throughput scenarios that could be served by Angeles Link. Future considerations around electric reliability as part of the Angeles Link system routing and design will occur in a future phase with safety, reliability and affordability remaining key underpinnings of any energy delivery system.

[31] LADWP, 2022 Power Strategic Long Term Resource Plan, https://www.ladwp.com/sites/default/files/2023-08/2022%20LADWP%20Power%20Strategic%20Long-Term%20Resource%20Plan_0.pdf

[32] *Id.*

[33] *Id.*

[34] California's renewable hydrogen hub officially launches. - Arches H2

PROTECT PLAYA NOW COMMENT 32-2

2. Economic Viability Concerns

    - The economic viability of hydrogen infrastructure is questionable, especially when compared to the costs associated with renewable energy. The transition to a 100% renewable energy system is not only feasible but also potentially less costly for ratepayers, as highlighted in the "Clean Energy for Los Angeles" report. The report shows that a renewable-based system can be achieved at nearly the same cost as the current trajectory, without the financial risks associated with hydrogen (Clean-Energy-for-Los-An…)

SOCALGAS RESPONSE TO COMMENT 32-2

The cost-effectiveness of Angeles Link as a decarbonization solution for power generation, mobility, and hard-to-electrify industrials is evaluated in the Cost Effectiveness Study. The Cost Effectiveness Study describes the methodology and analysis used to measure the cost effectiveness of Angeles Link against identified hydrogen-delivery alternatives and non-hydrogen alternatives for Phase 1 feasibility purposes. Section 1.3 (Key Findings) in the Cost Effectiveness Study determined that Angeles Link was the least cost option for hydrogen delivery alternatives (trucking, shipping) and cost competitive with non-hydrogen alternatives (electrification and carbon capture and sequestration (CCS)) as a decarbonization pathway for dispatchable power generation, heavy-duty transportation and certain hard-to-electrify industrial sectors.

SoCalGas notes that the LA100 Study, which is referenced in the comment, contemplates four scenarios evaluated against the different demand projections, including Senate Bill 100, Limited New Transmission, Transmission Focus, and Early & No Biofuels.[35] Furthermore, cost forecasts contemplated in the LA100 Study pre-date recent policy changes[36] at the federal and state level that will continue to mature a market for clean renewable hydrogen, and are therefore anticipated to drive down the cost of hydrogen. Lastly, the LA100 Study provided that there is a growing consensus that fully decarbonizing the State's economy will require increasing electrification and, for some end users, clean alternative fuels, such as clean renewable hydrogen.[37] Angeles Link can support both aspects of decarbonization by 1) supporting electrification at a time when electricity demand is rapidly increasing by providing a clean, firm alternative fuel for use in power generation, and 2) providing a clean fuel substitute to meaningfully reduce greenhouse gas emissions for hard-to-electrify sectors like heavy-duty transportation and multiple industrial sectors, which have been recognized as the most difficult and expensive sectors to decarbonize.[38] The State recognizes that statewide decarbonization will require significant investment, and various studies indicate that the development and integration of clean firm power technologies –

[35] NREL, LA 100 Study: https://www.nrel.gov/docs/fy21osti/79444-ES.pdf

[36] *Id.*

[37] *Id.* at ES-12, 6-3

[38] CARB 2022 Scoping Plan Update at 155: https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf (comparing estimated cost per metric ton of reduced Co2e for various measures, including decarbonizing industrial energy supply).

including clean renewable hydrogen – is the most cost-effective option for achieving the State's goals at scale.[39]

With regards to financial risks, a well-established hydrogen pipeline network with over 1,600 miles of operating hydrogen pipelines is currently functioning in the United States, supplying feedstock to the refining and petrochemical industries. The demand for hydrogen in the United States, was approximately 11 million metric tons per annum in 2021.[40] Hydrogen pipeline systems are a mature, and proven technology in the U.S. and U.S. Department of Transportation (DOT) has regulated hydrogen pipelines since the 1970s.[41]

[39] Section III of the SoCalGas Angeles Link Affordability Framework for detail on decarbonization studies and research.

[40] National Petroleum Council – Harnessing Hydrogen: A Key Element of the U.S. Energy Future: https://harnessinghydrogen.npc.org/

[41] US Department of Transportation – Pipeline & Hazardous Materials Safety Administration – Hydrogen: https://primis.phmsa.dot.gov/comm/hydrogen.htm

PROTECT PLAYA NOW COMMENT 32-3

3. Perpetuation of Environmental Inequities

    - Aligning new hydrogen pipelines with existing natural gas infrastructure risks perpetuating environmental injustices, particularly in communities historically burdened by fossil fuel projects. The report's failure to address this issue is concerning, especially given that renewable energy alternatives could avoid these negative impacts altogether.

SOCALGAS RESPONSE TO COMMENT 32-3

Routing considerations, including environmental social justice considerations, are addressed in SoCalGas's Routing Study rather than the Alternatives Study. Routing criteria includes consideration of environmental justice, and stakeholder input will continue to inform the selection of the final preferred route in a future phase of Angeles Link. Please refer to Global Response 5 for additional information related to general routing and environmental justice considerations for Angeles Link.

PROTECT PLAYA NOW COMMENT 32-4

4. Misalignment with Long-Term Environmental Goals

    - Transitioning to clean energy should prioritize proven technologies like solar, wind, and energy storage, multi-day demand response, long-term duration storage, microgrids, community based solar and storage projects, and energy efficiency over untested and expensive hydrogen infrastructure.

SOCALGAS RESPONSE TO COMMENT 32-4

SoCalGas recognizes this comment concerning other decarbonization pathways. There is growing consensus that fully decarbonizing the State's economy will require increasing electrification and, for some end users, clean alternative fuels, such as clean renewable hydrogen. There is also consensus among agencies and researchers that projected hydrogen demand exists in the power, mobility, and industrial sectors, that demand in those sectors is expected to grow over the next two decades, and that additional analysis is needed to better forecast what demand will be. The World Economic Forum notes that "pipelines will be indispensable for enabling wider use" because hydrogen can "decarbonize a range of sectors that might otherwise find it hard to go greener. These include long-haul transport such as ships, lorries and planes, and heavy industrial processes such as iron, steel and chemical production."[42] The International Energy Agency concludes that "hydrogen is an increasingly important piece of the net zero emissions by 2050 puzzle." SoCalGas envisions Angeles Link as a key decarbonization pathway for hard-to-electrify sectors.

In response to the comment regarding "untested and expensive" hydrogen infrastructure, there are currently about 1,600 miles of hydrogen pipelines currently operating in the US. Hydrogen pipeline systems are a mature, and proven technology in the U.S. and U.S. Department of Transportation (DOT) has regulated hydrogen pipelines since the 1970s.[43] California's energy transition will require significant investment – regardless of the selected technology – and the U.S. DOE and State of California through ARCHES has determined that clean renewable hydrogen is an important vehicle to decarbonization. In addition, the California Air Resources Board (CARB) has concluded clean molecules will be needed to decarbonize California.[44]

[42] World Economic Forum, 2023. Which countries are building hydrogen pipelines fastest? | World Economic Forum (weforum.org). December 13. Accessed September 16, 2024.

[43] US Department of Transportation – Pipeline & Hazardous Materials Safety Administration – Hydrogen: https://primis.phmsa.dot.gov/comm/hydrogen.htm

[44] CARB 2022 Scoping Plan: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents.

PROTECT PLAYA NOW COMMENT 32-5

Recommendations:

- Reevaluate Options: Conduct a thorough analysis of 100% renewable energy alternatives, considering their economic feasibility, environmental benefits, and alignment with California's long-term goals.
- Focus on Equity: Ensure that any infrastructure development does not perpetuate environmental racism and aligns with the principles of environmental justice.
- Prioritize Proven Solutions**:** Given the economic and environmental uncertainties surrounding hydrogen, it is crucial to prioritize investments in proven renewable technologies.

These recommendations are critical for ensuring that the Angeles Link Project aligns with Los Angeles' environmental goals and does not exacerbate existing inequities.

SOCALGAS RESPONSE TO COMMENT 32-5

Please refer to Responses to Comments 32-1 through 32-4.

Comment Letter 33 – Air Products

Comment Letter 33

August 30, 2024

VIA EMAIL TO
ALP1_PAG_FEEDBACK@INSIGNIAENV.COM

Emily Grant
Angeles Link Senior Public Affairs Manager
Southern California Gas Company
555 West Fifth Street
Los Angeles, CA 90013

Re: Angeles Link Planning Advisory Group (PAG) Feedback of Air Products and Chemicals Inc. on Production Planning and Assessment (July 2024 Draft); Project Options and Alternatives Report (July 2024 Draft); High-Level Economic Analysis and Cost Effectiveness (July 2024 Draft)

Air Products and Chemicals, Inc. ("Air Products") submits the following feedback concerning the July 2024 drafts of the Production Planning and Assessment; Project Options and Alternatives, and Environmental Assessment; and High Level Economic Analysis and Cost Effectiveness reports.

Air Products expects that the below feedback will be addressed in the final Studies and in Southern California Gas Company's ("SoCalGas") quarterly reporting. Air Products also welcomes any response that SoCalGas may wish to provide to the comments below.

General Comments

SoCalGas was originally authorized to begin recording costs for Phase One in D.22-12-055, issued December 20, 2022. In Phase One, SoCalGas was directed to conduct certain specified feasibility studies, which SoCalGas ultimately divided into fourteen reports. SoCalGas estimated that Phase One would take twelve to eighteen months and was required to actively engage the PAG in those efforts. Unfortunately, SoCalGas has waited until the end of that eighteen-month period to release most of the substantive results of its efforts. Information released prior the draft reports was minimal, and provided little detail, often consisting only of a few PowerPoint slides or bullet points. Drafts of ten of the fourteen reports were released in the final two weeks of July, providing the PAG with a very abbreviated schedule to review and comment – even after SoCalGas provide some modest additional time for some reports. The timing significantly impeded Air Products ability to review and comment on the draft reports, and Air Products does not believe this is consistent with the Commission's intent to provide for PAG engagement.

Comment 33-01

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Production Planning and Assessment Study

The Production Planning and Assessment Study draft assumes that solar power paired with electrolyzers will be the primary renewable energy source and technology. According to the draft report, "[f]or design purposes [the] study assumes renewable energy power requirements will be met with islanded power generation, and potentially local utility distribution power for start-up/shut-down operations" and that these "renewables would be incremental."[1] The study assumes that system curtailments will likely be sporadic and seasonal, and that if production facilities were grid-connected, curtailed energy could be used opportunistically to produce hydrogen.[2] These simplifying assumptions likely minimize costs, and fail to fully address how SoCalGas will ensure that the Link will adequately meet downstream demand. Downstream demand, just as with natural gas demand, will require reliability, including some redundancy to ensure that reliability. It does not appear that the simplified assumptions on which this study is based will provide a system that is sufficiently reliable and redundant or addresses the cost of providing that reliability and redundancy.

Comment 33-02

In Air Products comments on SoCalGas's Preliminary Findings for this study, it commented that the land requirements appeared to only address real estate needs for solar energy production and for the electrolysis units.[3] In addition to these components, hydrogen production facilities will also require space for hydrogen storage, battery energy storage, liquefaction equipment, purification equipment, blending equipment and other ancillary equipment associated with a typical production facility. The study does not appear to contemplate or incorporate these facilities either. Air Products suggests that the final report include a sample plot plan that shows what SoCalGas contemplates will be included in a typical production facility sized, in conjunction with other facilities, to meet the 1.5 MMTPY of hydrogen throughput assumed in the analysis.

Comment 33-03

Project Options and Alternatives

The draft Project Options and Alternatives assumes a project with a total throughput of approximately 0.5 to 1.5MMTPY over time.[4] That assumption is inconsistent with the California Air Resources Board's 2022 Scoping Plan, which assumes by 2030, clean hydrogen demand will be about 0.5 MMTPY and about 0.94 MMTPY in 2035, total. The report is thus assuming that the Link would supply up to and potentially above 100% of the total clean hydrogen demand in the state. That wildly overstates the ability of a single pipeline, linked to limited production sources, to supply demand across the state.

Comment 33-04

[1] Production Planning and Assessment Study at 53.
[2] *Id.* at 2.
[3] *Id.* at 52; *See* Air Products May 3, 2024 PAG Feedback on the Preliminary Routing/Configuration, Franchise, and Right-of-Way Analyses; Production Planning & Assessment; Plan for Applicable Safety Requirements; Workforce Planning & Training Evaluation; and High-Level Feasibility & Permitting Analysis at 3.
[4] Project Options and Alternatives at 16.

In analyzing reliability and resiliency,[5] the study overstates the scalability of a pipeline system, especially one that is intended to serve demand ranging from 0.5 MMTPY to 1.5 MMTPY. Production and demand development can be very incongruent, which can be difficult to manage. Pipelines must be sized initially to address anticipated demand growth, and production development can fail to track demand growth, or vice versa.

Comment 33-04

The study also overstates the reliability of a hydrogen pipeline that, at least at the early stages, will be connected to limited supply as it attempts to scale. A pipeline, especially at the lower range of demand, will not have the same resiliency as, for example trucking, which can immediately access multiple sources of supply and deliver to specific locations. The report also misrepresents the reliability of trucking, especially in the transportation sector. Our current transportation sector relies almost exclusively on trucked fuel for refueling stations. It is also much more scalable than a pipeline. A pipeline must be scaled for the maximum flow at each location; in contrast, trucking can easily serve new locations, and quickly adapt to changes in demand.

Comment 33-05

In Figure 20,[6] the study appears to assume that production costs for all scenarios other than localized hub would be identical. Nor does there appear to be a distinction between in-state and out-of-state production costs. Air Products requests that SoCalGas state the basis for these assumptions in the final report.

Comment 33-06

The report was limited in its analysis of ammonia as a long-distance carrier for hydrogen, in part, by assuming only shipment from northern and southern California to Southern California ports. The report asserts continuous, reliable power supply as an issue for ammonia production in-state but does not seem to find similar issues with the need for continuous, reliable power need for hydrogen production or compression in the proposed Link project. Overall, the report fails to recognize the long, successful history of producing, transporting and storing ammonia which can be applied to utilizing ammonia as a hydrogen carrier.

Comment 33-07

High-Level Economic Analysis and Cost Effectiveness

The Cost Effectiveness study suffers from a significant flaw in that it appears to analyze only the costs associated with the high-pressure transmission system—it fails to consider the costs associated with distribution or delivery systems needed to deliver hydrogen from the high-pressure transmission system to end users. To the extent such costs were included, the costs and assumptions on which those economics are based should be specifically set out—for example, the number and type of end users. The final study should separately set out the costs for the distribution or delivery systems, and the assumptions that were used to calculate such costs.

Comment 33-08

Although other draft reports do address purity requirements, including for fuel cell use versus other types of uses, that issue is not addressed in the Cost Effectiveness study. For example,

Comment 33-09

[5] *See id.* at 41.
[6] *Id.* at 84.

SoCalGas is relying on the transportation sector to supply much of the demand for the Link. However, purification systems would be needed at each refueling station in order the meet the purity requirements for fuel cell use. The costs associated with these requirements, as well as the impact on demand, could be significant and should be included in the final report.

Comment 33-09

As noted above in the discussion of the Project Options and Alternatives study, this study appears to assume that production costs for all scenarios other than localized hub would be identical.[7] Nor does there appear to be a distinction between in-state and out-of-state production costs. Air Products requests that SoCalGas state the basis for these assumptions in the final report.

Comment 33-10

The Cost Effectiveness study also assumes a throughput of 1.5 MMTPY. As noted in the discussion of the Project Options and Alternatives study, this assumption appears unrealistic and inconsistent with CARB's 2022 Scoping Plan. A sensitivity analysis should be done at lower demand levels, to explore the impacts on cost effectiveness in the event the system is substantially oversized.

Comment 33-11

The draft report assumes a cost of approximately $40/MMBtu for hydrogen, which it compares to the cost of natural gas plus the costs associated with carbon capture and storage. However, the cost comparison fails to take into account the difference in energy density between those two fuels. The comparison should be adjusted accordingly. Given the cost disparity, the draft report should also address the assumptions around drivers for fuel switching for large industrial sources, especially for those sources such as petroleum refineries where CARB's 2022 Scoping Plan assumes a 94% reduction in refinery production by 2045.

Comment 33-12

The study also assumes a tax credit pursuant to 26 U.S.C. § 45V for production of clean hydrogen. However, based on current proposed tax guidance, this would require compliance with specific provisions commonly known as the 'three pillars'-- incrementality, regionality and time-matching. Thus far, in public meetings, SoCalGas has been non-committal concerning whether it will require the produced hydrogen to meet those requirements. In fact, SoCalGas has claimed that it has not taken a position with respect to the 3 pillars which is untrue given its membership and even board-level position in trade associations where it has taken a position against the three pillars. To the extent that the hydrogen complies—and thus qualifies for a Section 45V tax credit—the costs of such compliance with the three pillars should be included in the study. To the extent such compliance costs are not included, the Section 45V tax credit should also not be included. Addressing these compliance costs is particularly important given that many prospective producers have claimed that compliance will render their projects uneconomic.

Comment 33-13

[7] *See, e.g.,* High Level Economics and Cost Effectiveness report at Figure 5, p. 32.

The Production Planning and Assessment study references battery storage, but no battery storage costs appear to be included in the economic calculation. Those costs should either be included or an explanation provided for why they are not included.

Comment 33-14

The use of depleted oil and gas reservoirs for underground hydrogen storage has not been proven, and salt caverns are not an option in the vicinity of the Link. Therefore, the Cost Effectiveness study would include a sensitivity analysis on the cost of above-ground storage, to illustrate cost impacts if depleted oil and gas reservoirs are ultimately not an option.

Comment 33-15

The study Assumptions Tables also provides cost assumptions as "discounted total costs",[8] but the study does not explain how those discounted costs were calculated, or the discount rate used. Please clarify these calculations in the final study.

Comment 33-16

Conclusion

Air Products appreciates the opportunity to provide this feedback concerning the Production Planning and Assessment (July 2024 Draft); Project Options and Alternatives Report (July 2024 Draft) and the High-Level Economic Analysis and Cost Effectiveness (July 2024 Draft).

Respectfully,

Miles Heller Director, Global Greenhouse Gas,
Hydrogen, and Utility Regulatory Policy

[8] *Id.* at Section 7.3 (Assumption Tables).

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AIR PRODUCTS COMMENT 33-1

Air Products and Chemicals, Inc. ("Air Products") submits the following feedback concerning the July 2024 drafts of the Production Planning and Assessment; Project Options and Alternatives, and Environmental Assessment; and High Level Economic Analysis and Cost Effectiveness reports.

Air Products expects that the below feedback will be addressed in the final Studies and in Southern California Gas Company's ("SoCalGas") quarterly reporting. Air Products also welcomes any response that SoCalGas may wish to provide to the comments below.

General Comments

SoCalGas was originally authorized to begin recording costs for Phase One in D.22-12-055, issued December 20, 2022. In Phase One, SoCalGas was directed to conduct certain specified feasibility studies, which SoCalGas ultimately divided into fourteen reports. SoCalGas estimated that Phase One would take twelve to eighteen months and was required to actively engage the PAG in those efforts. Unfortunately, SoCalGas has waited until the end of that eighteen-month period to release most of the substantive results of its efforts. Information released prior the draft reports was minimal, and provided little detail, often consisting only of a few PowerPoint slides or bullet points. Drafts of ten of the fourteen reports were released in the final two weeks of July, providing the PAG with a very abbreviated schedule to review and comment – even after SoCalGas provide some modest additional time for some reports. The timing significantly impeded Air Products ability to review and comment on the draft reports, and Air Products does not believe this is consistent with the Commission's intent to provide for PAG engagement.

SOCALGAS RESPONSE TO COMMENT 33-1

Please refer to Global Response 2.

AIR PRODUCTS COMMENT 33-2

Production Planning and Assessment Study

The Production Planning and Assessment Study draft assumes that solar power paired with electrolyzers will be the primary renewable energy source and technology. According to the draft report, "[f]or design purposes [the] study assumes renewable energy power requirements will be met with islanded power generation, and potentially local utility distribution power for start-up/shut-down operations" and that these "renewables would be incremental."FN1 The study assumes that system curtailments will likely be sporadic and seasonal, and that if production facilities were grid-connected, curtailed energy could be used opportunistically to produce hydrogen.FN2 These simplifying assumptions likely minimize costs, and fail to fully address how SoCalGas will ensure that the Link will adequately meet downstream demand. Downstream demand, just as with natural gas demand, will require reliability, including some redundancy to ensure that reliability**.** It does not appear that the simplified assumptions on which this study is based will provide a system that is sufficiently reliable and redundant or addresses the cost of providing that reliability and redundancy.

FN1 – Production Planning and Assessment Study at 53.
FN2 – Id. at 2.

SOCALGAS RESPONSE TO COMMENT 33-2

In response to the comment concerning minimizing costs through assumptions in the Production Study, the Production Study assumes solar power paired with electrolyzers will be the primary renewable energy source and technology for clean renewable hydrogen production. SoCalGas makes the simplifying assumption that required renewable power would be incremental and not grid connected (tied into high voltage transmission lines), which conservatively estimates costs rather than minimizing them.

In response to the comment concerning redundancy and reliability, SoCalGas recognizes the importance of reliability and redundancy. The Production Study assumes local utility distribution power is included for start-up/shut-down operations to support the reliability of production. In addition, reliability and redundancy are important factors considered in the design of Angeles Link for Angeles Link to serve its end users from third-party production facilities. Considerations for reliability and pipeline redundancy, with portions of potential preferred routes modelled as parallel pipelines, are included in the Phase 1 engineering studies such as the Design Study as well as the Routing Analysis.

AIR PRODUCTS COMMENT 33-3

In Air Products comments on SoCalGas's Preliminary Findings for this study, it commented that the land requirements appeared to only address real estate needs for solar energy production and for the electrolysis units.FN3 In addition to these components, hydrogen production facilities will also require space for hydrogen storage, battery energy storage, liquefaction equipment, purification equipment, blending equipment and other ancillary equipment associated with a typical production facility. The study does not appear to contemplate or incorporate these facilities either. Air Products suggests that the final report include a sample plot plan that shows what SoCalGas contemplates will be included in a typical production facility sized, in conjunction with other facilities, to meet the 1.5 MMTPY of hydrogen throughput assumed in the analysis.

FN3 – Id. at 52; See Air Products May 3, 2024 PAG Feedback on the Preliminary Routing/Configuration, Franchise, and Right-of-Way Analyses; Production Planning & Assessment; Plan for Applicable Safety Requirements; Workforce Planning & Training Evaluation; and High-Level Feasibility & Permitting Analysis at 3.

SOCALGAS RESPONSE TO COMMENT 33-3

In Section 9 of the Production Study, "Hydrogen Production Facility Design Basis," an illustrative diagram of a hydrogen production facility is provided along with assumptions made (See Figure 9.1). The land required for the solar facility is expected to account for the material amount of land usage that would support the electrolyzer. For purposes of this Phase 1 feasibility analysis, no on-site storage facility is assumed at the production site. If additional assets were included, it is not expected to materially impact the conclusions as the relative footprint of the additional assets would likely be de minimis. As third-party production develops and larger scale production facilities are built, a better understanding of production facility configurations and land footprints is expected to be available from third-party producers.

AIR PRODUCTS COMMENT 33-4

Project Options and Alternatives

The draft Project Options and Alternatives assumes a project with a total throughput of approximately 0.5 to 1.5MMTPY over time.FN4 That assumption is inconsistent with the California Air Resources Board's 2022 Scoping Plan, which assumes by 2030, clean hydrogen demand will be about 0.5 MMTPY and about 0.94 MMTPY in 2035, total. The report is thus assuming that the Link would supply up to and potentially above 100% of the total clean hydrogen demand in the state. That wildly overstates the ability of a single pipeline, linked to limited production sources, to supply demand across the state.

In analyzing reliability and resiliency,FN5 the study overstates the scalability of a pipeline system, especially one that is intended to serve demand ranging from 0.5 MMTPY to 1.5 MMTPY. Production and demand development can be very incongruent, which can be difficult to manage. Pipelines must be sized initially to address anticipated demand growth, and production development can fail to track demand growth, or vice versa.

FN4 – Project Options and Alternatives at 16.
FN5 – See id. at 41.

SOCALGAS RESPONSE TO COMMENT 33-4

Angeles Link's expected throughput is based on the Demand Study's projections and as noted in the Q1 2024 Quarterly Report Global Response 1, these projections were based on independently developed assumptions and analysis of potential hydrogen uptake in the SoCalGas service territory.

With regards to the CARB Scoping Plan projections, SoCalGas notes that the CARB 2022 Scoping Plan forecasts that by 2045, hydrogen demand in California will be 1.9 million metric tons per year, which is in alignment with the Demand Study's conservative scenario of demand within SoCalGas's service territory by 2045.[45] The Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) anticipates California hydrogen demand forecast at 17 million metric tons per annum by 2045. High-capacity pipelines are the cheapest alternative for transporting higher volumes of hydrogen over longer distances over land. As summarized in the Cost Effectiveness Study, pipelines are the most scalable because they are the lowest cost alternative for the end users which will drive adoption at scale.

As summarized in the Design Study, the design for the Angeles Link pipeline system is preliminary at this feasibility stage in its development. Angeles Linkis intended to be scalable and serve both lower, near-term demand in the 2030's and higher, long-term demand post 2045. In terms of its scalability, the preliminary design is based on the 2045 projected throughput of 1.5 MMTPY, with approximately 0.5-0.75 MMTPY being transported from each regional third-party production locations. Through this

[45] 2022, CARB Scoping Plan: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change scoping-plan/2022-scoping-plan-documents Internal conversion of 0.2315 exajoules to tonnes that includes commercial, industrial, oil & gas extraction, petroleum refining, residential, TCU (transportation communication and utilities) and transportation; excludes electric generation.

preliminary design, the Angeles Link system would be capable of meeting the near-term anticipated 0.5 MMTPY throughput by operating compressor stations and the pipeline system at a lower capacity.

The Demand Study was peer reviewed by experts at third parties, including NREL, South Coast AQMD, UCLA, UC Irvine, and UC Davis. Moreover, in response to stakeholder feedback, the Demand Study will incorporate a new section titled "Comparison to Other Studies" to provide a comparison of demand projections by 2025 from various forecasts from public agencies or third-party reports. This section also references the National Petroleum Council Harnessing Hydrogen Study (2023).[46] In addition, a new section will be added to the final Demand Study titled, "Total Addressable Market vs. Angeles Link Throughput Scenarios" in response to stakeholder feedback which summarizes that the Angeles Link throughput scenarios are a portion of the total market demand for clean renewable hydrogen.

With respect to supply and demand, SoCalGas acknowledges this comment and agrees that demand and supply management, something SoCalGas currently does in its pipeline gas operations, is critical for market development. As such, future considerations for Phase 2 studies include reliability requirements, hydrogen price elasticity and the impact of price elasticity on demand.

[46] National Petroleum Council – Harnessing Hydrogen: A Key Element of the U.S. Energy Future: https://harnessinghydrogen.npc.org/downloads.php

AIR PRODUCTS COMMENT 33-5

The study also overstates the reliability of a hydrogen pipeline that, at least at the early stages, will be connected to limited supply as it attempts to scale. A pipeline, especially at the lower range of demand, will not have the same resiliency as, for example trucking, which can immediately access multiple sources of supply and deliver to specific locations. The report also misrepresents the reliability of trucking, especially in the transportation sector. Our current transportation sector relies almost exclusively on trucked fuel for refueling stations. It is also much more scalable than a pipeline. A pipeline must be scaled for the maximum flow at each location; in contrast, trucking can easily serve new locations, and quickly adapt to changes in demand.

SOCALGAS RESPONSE TO COMMENT 33-5

While transporting hydrogen via trucks may be a versatile method for delivering small quantities of hydrogen over shorter distances, large end users with high daily demand need a pipeline for reliability and resiliency and lower cost. For example, DOE has acknowledged that "hydrogen pipelines are the lowest cost-alternative for delivering large volumes of gaseous hydrogen over long distances." DOE, Pathways to Commercial Liftoff: Clean Hydrogen (March 2023), p. 15 available at: https://liftoff.energy.gov/wp-content/uploads/2023/03/20230320-Liftoff-Clean-H2-vPUB.pdf; id. at 16 ("[d]edicated hydrogen pipelines can move large volumes over long distances to achieve economies of scale").

AIR PRODUCTS COMMENT 33-6

In Figure 20,FN6 the study appears to assume that production costs for all scenarios other than localized hub would be identical. Nor does there appear to be a distinction between in-state and out-of-state production costs. Air Products requests that SoCalGas state the basis for these assumptions in the final report.

FN6 – Id. at 84.

SOCALGAS RESPONSE TO COMMENT 33-6

Figure 20 in the Project Options and Alternatives Study utilizes estimated production costs within SoCalGas service territory. The basis for these estimates is described in the Production Study and cost effectiveness analysis from the Cost Effectiveness Study. Section 7.2.2.5. of the Cost Effectiveness Study describes the localized hub as extending outward in a 40 miles radius from the Port of Los Angeles and the Port of Long Beach. Based on this geography, the localized hub delivery alternative assumes a different cost for production than the other hydrogen delivery alternatives, as this is the only hydrogen delivery alternative that would include both the energy generation and production within the LA Basin. As summarized in Section 4.1.1 of the Cost Effectiveness Study, the production cost for the localized hub delivery alternative is high compared to the other hydrogen delivery alternatives because of the higher cost of electricity due to the limited land available within the LA Basin for the development of solar generation capacity at scale.

With regards to out-of-state production costs, the Production Study's scope focused on potential production costs associated with possible production regions within SoCalGas's service territory. SoCalGas acknowledges that an open access clean renewable hydrogen system like Angeles Link could, in the future, also facilitate the transportation of clean renewable hydrogen produced outside of SoCalGas's service territory.

AIR PRODUCTS COMMENT 33-7

The report was limited in its analysis of ammonia as a long-distance carrier for hydrogen, in part, by assuming only shipment from northern and southern California to Southern California ports. The report asserts continuous, reliable power supply as an issue for ammonia production in-state but does not seem to find similar issues with the need for continuous, reliable power need for hydrogen production or compression in the proposed Link project. Overall, the report fails to recognize the long, successful history of producing, transporting and storing ammonia which can be applied to utilizing ammonia as a hydrogen carrier.

SOCALGAS RESPONSE TO COMMENT 33-7

As discussed in the Alternatives Study, ammonia production and shipping from Central and Northern California ports was evaluated as a potential hydrogen delivery alternative based on the potential production areas noted by the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES).

As noted in Section 7.3.1 Ammonia Considerations in the Alternatives Study, non-grid interconnected solar power generation is incompatible with the technical requirements of ammonia production due to the high volume and continuous power need in the Haber-Bosch process. While electrolyzers (for hydrogen production) can be quickly ramped-up or shut down depending on the availability/intermittency of renewable generation, ammonia production necessitates continuous and stable energy supply requirements due to the long start-up (up to several days) to achieve nominal operating conditions, and as a result, the process is not compatible with the intermittent nature of renewables.[47]

[47] How does a resilient, flexible ammonia process look? Robust design optimization of a Haber-Bosch process with optimal dynamic control powered by wind - ScienceDirect, Volume 39, Issue 4, 2023, https://www.sciencedirect.com/science/article/abs/pii/S1540748922000347

AIR PRODUCTS COMMENT 33-8

High-Level Economic Analysis and Cost Effectiveness

The Cost Effectiveness study suffers from a significant flaw in that it appears to analyze only the costs associated with the high-pressure transmission system—it fails to consider the costs associated with distribution or delivery systems needed to deliver hydrogen from the high-pressure transmission system to end users. To the extent such costs were included, the costs and assumptions on which those economics are based should be specifically set out—for example, the number and type of end users. The final study should separately set out the costs for the distribution or delivery systems, and the assumptions that were used to calculate such costs.

SOCALGAS RESPONSE TO COMMENT 33-8

The Alternatives Study defined the hydrogen delivery alternatives each to include approximately 80 miles of in-basin delivery pipeline to support large-scale delivery of clean renewable hydrogen in the LA Basin as part of Phase 1 analysis. The 80 miles of delivery pipeline is based on the looped piping configuration with potential to provide offtake connections to major end-users in the "Central Zone" for Angeles Link. Section 4.5.2 of the Design Study and Section 2.2 of the Routing Analysis provide additional information on the Central Zone. Angeles Link and the hydrogen delivery alternatives also assume some delivery of clean renewable hydrogen to users outside of the LA Basin in Southern California and to Central California. However, for purposes of evaluating the cost effectiveness of Angeles Link and the hydrogen delivery alternatives, the 80 miles of pipeline within the Central Zone was used to provide potential options to connect to distribution networks and last-mile delivery to end-users. Figure 20 in the Alternatives Study shows the separate delivery pipeline and transmission pipeline costs. More detailed analysis of the last mile delivery and distribution network for Angeles Link will be evaluated in future phases as more details on the system and potential end-users becomes available.

AIR PRODUCTS COMMENT 33-9

Although other draft reports do address purity requirements, including for fuel cell use versus other types of uses, that issue is not addressed in the Cost Effectiveness study. For example, SoCalGas is relying on the transportation sector to supply much of the demand for the Link. However, purification systems would be needed at each refueling station in order the meet the purity requirements for fuel cell use. The costs associated with these requirements, as well as the impact on demand, could be significant and should be included in the final report.

SOCALGAS RESPONSE TO COMMENT 33-9

The scope of the Cost Effectiveness analysis for the Phase 1 feasibility study is intended to include material costs in the value chain from production to the end user. For all delivery alternatives, hydrogen production is assumed to occur via PEM electrolyzers that produce hydrogen at a purity of 99.999%. This pure hydrogen is then delivered via the Angeles Link system or other hydrogen delivery alternatives to heavy-duty truck refueling stations, major demand centers and/or an end user. For the Angeles Link system, delivery is expected to occur at high pressures and without blending, which reduces the risk of contamination. In the case of hydrogen volumes stored underground, the cost assessment included a Pressure Swing Adsorption (PSA) system to remove contaminants that may be present after underground storage. Therefore, no additional significant costs related to purification were assumed to be required at refueling stations.

The comparison of hydrogen alternatives for heavy-duty transportation applications includes additional costs to reflect dispensing and distribution expenses. Dispensing costs do not consider any additional purification.

Additional purification requirements may be further considered in future phases when specific end-use requirements are established with customers.

AIR PRODUCTS COMMENT 33-10

As noted above in the discussion of the Project Options and Alternatives study, this study appears to assume that production costs for all scenarios other than localized hub would be identical.FN7 Nor does there appear to be a distinction between in-state and out-of-state production costs. Air Products requests that SoCalGas state the basis for these assumptions in the final report.

FN7 – See, e.g., High Level Economics and Cost Effectiveness report at Figure 5, p. 32.

SOCALGAS RESPONSE TO COMMENT 33-10

Please refer to Response to Comment 33-6.

AIR PRODUCTS COMMENT 33-11

The Cost Effectiveness study also assumes a throughput of 1.5 MMTPY. As noted in the discussion of the Project Options and Alternatives study, this assumption appears unrealistic and inconsistent with CARB's 2022 Scoping Plan. A sensitivity analysis should be done at lower demand levels, to explore the impacts on cost effectiveness in the event the system is substantially oversized.

SOCALGAS RESPONSE TO COMMENT 33-11

With regards to the expected Angeles Link throughput, which is based on demand projections in the Demand Study, please refer to Response to Comment 33-4.

With regards to sizing the system, please refer to Section 7.4.1. of the Cost Effectiveness Study, which includes a sensitivity analysis for the hydrogen delivery alternatives based on the Demand Study Angeles Link throughput levels and Design Study scenarios. The Design Study scenarios used static hydraulic modeling to evaluate how to scale the system to meet demand efficiently. For additional information, please refer to the Design Study, Section 4 for Phase 1 modeling and the Future Considerations section, for discussion of future dynamic modeling.

AIR PRODUCTS COMMENT 33-12

The draft report assumes a cost of approximately $40/MMBtu for hydrogen, which it compares to the cost of natural gas plus the costs associated with carbon capture and storage. However, the cost comparison fails to take into account the difference in energy density between those two fuels. The comparison should be adjusted accordingly. Given the cost disparity, the draft report should also address the assumptions around drivers for fuel switching for large industrial sources, especially for those sources such as petroleum refineries where CARB's 2022 Scoping Plan assumes a 94% reduction in refinery production by 2045.

SOCALGAS RESPONSE TO COMMENT 33-12

The energy density of hydrogen was taken into account in the fuel cost calculation: 142 MJ/kg energy density of hydrogen[48] multiplied by 0.000948 MMBtu/MJ energy unit conversion[49] = 0.135 MMBtu/kg. This factor was divided into the LCOH of $5.50/kg to reach ~$40/MMBtu fuel cost equivalent.

Drivers of potential fuel switching and implications for the amount of clean renewable hydrogen demand for large industrial sources, including refineries, were addressed in the Demand Study and considered part of the estimated Total Addressable Market (TAM). With respect to refineries specifically, please refer to the Demand Study Technical Appendix, "Adoption of clean renewable hydrogen at refineries for direct process usage in petroleum and renewable fuels refining". This section notes that refinery output is expected to reduce over time through 2045. In the Demand Study, refineries were only included in the Ambitious case.

[48] Energy and the Hydrogen Economy – Page 5: https://afdc.energy.gov/files/pdfs/hyd_economy_bossel_eliasson.pdf

[49] US Energy Information Administration – Units and Calculators Explained: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

AIR PRODUCTS COMMENT 33-13

The study also assumes a tax credit pursuant to 26 U.S.C. § 45V for production of clean hydrogen. However, based on current proposed tax guidance, this would require compliance with specific provisions commonly known as the 'three pillars'-- incrementality, regionality and time-matching. Thus far, in public meetings, SoCalGas has been non-committal concerning whether it will require the produced hydrogen to meet those requirements. In fact, SoCalGas has claimed that it has not taken a position with respect to the 3 pillars which is untrue given its membership and even board-level position in trade associations where it has taken a position against the three pillars. To the extent that the hydrogen complies—and thus qualifies for a Section 45V tax credit—the costs of such compliance with the three pillars should be included in the study. To the extent such compliance costs are not included, the Section 45V tax credit should also not be included. Addressing these compliance costs is particularly important given that many prospective producers have claimed that compliance will render their projects uneconomic.

SOCALGAS RESPONSE TO COMMENT 33-13

While the CPUC definition of clean renewable hydrogen does not currently require adherence to the three pillars, SoCalGas is committed to transporting clean renewable hydrogen that meets the applicable regulatory requirements set forth by the CPUC. SoCalGas also notes that, as of the date of the preparation of this response, the Treasury Department has not yet finalized the Section 45V tax credit rules. Nevertheless, to be conservative, the Production Study accounted for the three pillars in the cost estimates for clean renewable hydrogen production, and those costs informed the analysis in the Cost Effectiveness Study (see Section 2.4 – Clean Renewable Hydrogen Standards in the Production Study). The Production Study accounted for time matched hydrogen production (from solar production) across specific regional productions dedicated towards clean renewable hydrogen production and located behind the meter.

AIR PRODUCTS COMMENT 33-14

The Production Planning and Assessment study references battery storage, but no battery storage costs appear to be included in the economic calculation. Those costs should either be included or an explanation provided for why they are not included.

SOCALGAS RESPONSE TO COMMENT 33-14

The production facility design basis used in the Cost Effectiveness Study is described in Chapter 9 of the Production Study and includes the solar-only configuration. Chapter 6 of the Production Study found that for the solar capacity factors in the selected regions and battery costs, the solar-only configuration was the lowest cost option for hydrogen production, so the solar-only configuration was used for further assessment.

AIR PRODUCTS COMMENT 33-15

The use of depleted oil and gas reservoirs for underground hydrogen storage has not been proven, and salt caverns are not an option in the vicinity of the Link. Therefore, the Cost Effectiveness study would include a sensitivity analysis on the cost of above-ground storage, to illustrate cost impacts if depleted oil and gas reservoirs are ultimately not an option.

SOCALGAS RESPONSE TO COMMENT 33-15

Underground hydrogen storage solutions in depleted oil and gas reservoirs or porous rock formations are currently undergoing various stages of development and testing worldwide. These solutions have the potential to achieve commercial viability in the long term as the demand for hydrogen grows over time. The "Underground Sun Storage 2030" project, launched by RAG Austria, which is the largest energy storage company in Austria and a key operator of gas storage facilities in Europe, is conducting a field trial to assess the viability of storing unblended hydrogen produced from solar and wind energy in existing natural gas reservoirs. The Underground Sun Storage project has currently demonstrated the safe injection and withdrawal of hydrogen.[50]

HyStorage, a project by Uniper SE in Germany, has achieved a successful withdrawal of 90% hydrogen following its injection into porous rock formations.[51] This process did not adversely affect the geological reservoir performance, and material testing indicated no significant impact from hydrogen corrosion.

In California, the CEC awarded the LBNL funding for a project that will evaluate the technical and economic feasibility of using existing underground gas storage facilities to store clean renewable hydrogen in California.[52] The CEC noted that site-specific assessments will help to better understand the safety and performance of converting underground gas storage to hydrogen. The project will study existing underground gas storage facilities in California for their potential to store clean renewable hydrogen, and will estimate levelized costs of hydrogen storage, levelized total capital costs, and operations and maintenance costs. Although this effort is outside the scope of the Phase 1 studies, SoCalGas intends to consider any results from the CEC's project in future Angeles Link planning, as appropriate. Above ground hydrogen storage could be potentially used in the initial phases of demand growth for hydrogen or for certain end users, particularly at a smaller scale. As the hydrogen economy matures and scales over the long term, commercially advanced underground options may provide dependable large-scale hydrogen storage solutions. With underground storage, Angeles Link's LCOH is $5.50/kg. Removing underground storage ($.28/kg) and adding aboveground storage ($2.31/kg)

[50] Underground Storage 2030 – First Withdrawal Phase: https://www.uss-2030.at/en/news/detail/article/first-withdrawal-phase-has-started.html

[51] Uniper Energy - HyStorage first test phase successful: https://www.uniper.energy/news/hystorage-first-test-phase-successful--hydrogen-extracted-again-after-injection-into-porous-rock

[52] CEC, GFO-23-503 - Feasibility of Underground Hydrogen Storage in California, Solicitation Status-Results Table: https://www.energy.ca.gov/solicitations/2024-04/gfo-23-503-feasibility-underground-hydrogen-storage-california

increases Angeles Link's LCOH by approximately $2.03 resulting in an LCOH of $7.53/kg, which still remains the lowest cost option when evaluated against the hydrogen delivery alternatives.[53]

[53] The Cost Effectiveness Study will add an additional footnote to reflect this information.

AIR PRODUCTS COMMENT 33-16

The study Assumptions Tables also provides cost assumptions as “discounted total costs”,FN8 but the study does not explain how those discounted costs were calculated, or the discount rate used. Please clarify these calculations in the final study.

Conclusion

Air Products appreciates the opportunity to provide this feedback concerning the Production Planning and Assessment (July 2024 Draft); Project Options and Alternatives Report (July 2024 Draft) and the High-Level Economic Analysis and Cost Effectiveness (July 2024 Draft).

FN8 – *Id*. at Section 7.3 (Assumption Tables).

SOCALGAS RESPONSE TO COMMENT 33-16

The discounted total costs referenced in the tables throughout Section 7.3.1 of the Cost Effectiveness study reflect the total costs considered for each value chain step and each alternative (as defined in each relevant table). The total costs include capital expenditures, fixed and variable operations and maintenance costs, owners’ costs, tax credits, depreciation, and the relevant tax shield effects of depreciation and interest. These total costs are added over a construction period and a 25-year operating period and discounted from nominal to real dollars across all alternatives.

Comment Letter 34 – Communities for a Better Environment

Comment Letter 34

COMMUNITIES FOR A BETTER ENVIRONMENT
established 1978

August 30, 2024

Southern California Gas Company
555 West Fifth Street,
Los Angeles, CA 90013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com.

Feedback for Southern California Gas Company on Environmental Social Justice (ESJ) Draft Engagement Plan and ESJ Screening and Environmental and Social Justice Screening

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the "Environmental Social Justice Draft Engagement Plan and ESJ Screening" (Engagement Plan) and "Environmental and Social Justice Screening" (Screening) provided on July 19, 2024.

SoCalGas references the Equity Principles[1] and even includes them (and SoCalGas' response letter as an attachment) but fails to meet the very clear baseline standards laid out in the principles. In fact, SoCalGas both ignores the Equity Principles core precepts and fails to outline their own path for aligning with the principles. SoCalGas states that "[e]ncouraging that community voices are heard and considered is crucial when it comes to establishing trust with environmental justice communities."[2] Unfortunately, SoCalGas mischaracterizes the Equity Principles in the very same section. While the Equity Principles do encourage that community voices be heard and considered, community self-determination necessarily involves individuals explaining their community vision and how such vision can be realized. However, the environmental justice organizations who created the Equity Principles emphasize that full community protections and environmental justice measures should be a starting point for projects, not things communities must fight for in each project.[3] The principles emphasize that

Comment 34-01

[1] Equity Principles for Hydrogen: Environmental Justice Position on Green Hydrogen in California, COMMUNITIES FOR A BETTER ENV'T (Oct. 10, 2023), https://www.cbecal.org/wp-content/uploads/2024/03/Equity-Hydrogen-Initiative-Shared-Hydrogen-Position-1.pdf.
[2] Engagement Plan at 6.
[3] Equity principles at 2"We insist that new projects protect communities first and do no perpetuate the injustices that polluting infrastructures impose on fence-line communities today."

1

hydrogen should not be combusted for electric power, used in commercial buildings, or relied on for rail or drayage trucking because of these end-uses' impacts in environmental justice communities. Further, the Principles emphasize the importance of community consent to hydrogen delivery projects. Neither the Engagement Plan nor Screening document outline a plan for implementing community protections or environmental justice measures that align with the Principles. The Engagement Plan does not even acknowledge the core principle of community self-determination. Rather, the plan insists that the pipeline will travel through dozens of California's most polluted communities, and that these communities may be engaged with as the project forges ahead.[4]

Comment 34-01

A. *ENVIRONMENTAL SOCIAL JUSTICE (ESJ) COMMUNITY DRAFT ENGAGEMENT PLAN AND ESJ SCREENING*

The draft engagement plan mischaracterizes the Equity Principles for Hydrogen, fails to implement the CPUC's ESJ Action Plan 2.0, and ignores key populations and environmental impacts. Rather, the document defers nearly all engagement to a later, theoretical phase.

I. Lack of Engagement Plan Development

The Equity Principles highlight that "[d]iscussions about building new green hydrogen infrastructure must involve the community and its members should be meaningfully engaged." However, the Engagement Plan pays only nominal lip service to actual engagement because it fails to identify a means of dialogue, or the important topics of concern for discussion. Engagement is a core principle of environmental justice, but engagement alone does not make projects just. The goal of engagement with a project is not to be engaged, but to determine whether a dangerous or polluting project lands in environmental justice communities and what its unique impacts will be. Engagement should be thought of as a commitment to following through on a clear set of principles and practices and should represent the difference between mere words on paper and affirmative dialogue with stakeholders.

Comment 34-02

While it is important that community outreach and implementation is rooted in active dialogue with impacted stakeholders and community members, community engagement should receive the same level of research and development that other significant and essential aspects of project development receive. This means that engagement efforts should be appropriately defined, outlined, and supported with clear strategies for implementation. The Engagement plan does none of this; rather, in a few bulleted sentences it merely identifies engagement plan "strategies" which lack concrete methods of action. SoCalGas has leaned heavily on community partners to develop the bulk of this engagement plan, but it has not followed through in developing robustly researched strategies for meaningful engagement that clearly connect to the

[4] The one attempt at routing the ALP through fewer environmental justice communities, "Route Variation 1" is not even analyzed in phase one environmental analysis.

many important study areas that the CPUC identified in Decision 22-12-055. Failing to understand these strategies adequately will inevitably lead to failures in implementation, as evidenced in the rest of this letter.

In light of the Hydrogen Equity Principles' inclusion in the Engagement Plan, CBE points SoCalGas to the following framework for engagement provided in the Hydrogen Equity Principles:

> Any new potential hydrogen production project must include the formation of a local oversight committee that will be composed of local stakeholders including local environmental justice, public health, labor, and utility representatives to conduct multiple waves of education and engagement to vet the project with the community. The oversight committee will be responsible for coordinating a series of workshops/presentations that will educate the community on sources of energy, emissions projections, job opportunities, and community benefits and risks. Following this process will include the opportunity for the oversight committee consider local resident feedback to either approve, deny, or make modifications to the plan.[5]

Comment 34-02

II. No Implementation Strategy

The "Engagement strategies" section of the Engagement plan is misnamed. These small paragraphs are simply descriptions of engagement mechanisms, but they do not include any strategy for implementing these mechanisms in phase two. Notwithstanding the engagement strategies section, the Engagement Plan contains no plan or strategy for implementing community engagement, nor has SoCalGas completed sufficient community engagement thus far. Communities for a Better Environment first notified SoCalGas that it was critical to engage communities along the pipeline route over 18 months ago in April 2023.[6] Prior to this, the California Environmental Justice Alliance and Sierra Club raised this serious issue to the California Public Utilities Commission in the Angeles Link proceeding. Despite this, the Engagement Plan makes clear that no actual engagement work will be conducted. Rather, such engagement is conditional pending approval of a second phase and millions more public dollars in spending.

Comment 34-03

The Engagement Plan describes a list of actions that SoCalGas intends to take in phase two of the Angeles Link project (ALP) process, improperly deferring and delaying time sensitive matters. With SoCalGas aiming to determine the ALP route in the next phase, should it be approved, it is critical that pipeline communities have the opportunity to understand and respond

[5] Equity Principles at 5.
[6] Feedback for Southern California Gas Company on Angeles Link Project March 15 and March 16 Public Engagement Meetings, April 14, 2023.

to this decision-making process. As the Equity Principles and CBE's previous comments make clear, such an opportunity involves prior education and engagement with accurate information presented in an accessible manner. No such process has taken place, and even accurate information surrounding the ALP has been hard to come by.[7] Proposed future engagement plans in a later, unconfirmed phase are no excuse for a failure to conduct timely engagement and planning. However, the engagement currently outlined for a future phase is incomplete. Even if the actions are taking place in phase two, then the plan should be developed in phase one. Although the Engagement Plan states that it will "serve as a guide for future engagement with ESJ Communities and DACs in Phase 2," it does not provide concrete steps for conducting that engagement. Despite SoCalGas acknowledging that no one strategy is sufficient, there is no commentary or analysis of when and where each engagement strategy will be useful; how they will be implemented; or what information SoCalGas needs to gather to get fruitful results from these engagement strategies. The ramifications of these failures are deeply evident in the shortcomings of the Screening, explored below.

Comment 34-03

The Engagement Plan also does not address how the execution of phase one has been frustrating and dishonest, fostering mistrust between PAG and CBOSG members and SoCalGas. The Engagement Plan, Screening, and several prior draft reports have been marred by generalized misstatements with no attribution or source and blatantly ignore ALP's impacts in environmental justice communities. Despite this, SoCalGas claim the "Phase 1 stakeholder engagement process has played a pivotal role in fostering trust, acquiring valuable insights, and establishing the foundation for a community-centric approach to tackling environmental and social justice concerns within the design framework for Angeles Link."[8] From the vantage point of CBE, this is not the case. It is evident from the state of the Engagement Plan that SoCalGas has much work to do to foster trust and embark on a process that fosters truly meaningful engagement.

B. ENVIRONMENTAL AND SOCIAL JUSTICE SCREENING

I. The Screening Provides Incomplete Data in an Opaque Manner and Without Analysis

Comment 34-04

The Screening draft is a puzzling document. Despite spanning a lengthy 147 pages, it neither assesses existing burdens or conditions nor analyzes environmental impacts of the ALP. Concerningly, it does not identify how close the ALP will be from homes or other sensitive sites. Nor does it identify whether infrastructure (compressor station, intake or offtake point, etc.) will be sited in each "study area."

[7] See for example, CBE's comments on GHG emissions and water, highlighting that the reports ignore key environmental impacts and omit emissions data from analyses.
[8] Engagement Plan at 2.

Furthermore, the Screening does not include any discussion of impacts at pipeline origination or termination points. The Screening draft does not identify key stakeholders or community organizations. The Screening draft also does not integrate the California Public Utilities Commission's Environmental and Social Justice Action Plan 2.0. Nor does the report give environmental justice communities (including some "356 census tracts identified as CalEnvrioScreen or SEJST DAC designations") any sense of what they might expect should the ALP be routed through their neighborhoods. What the Screening draft does is aggregate a small amount of demographic data from public sources and organize it into 13 regional categories. However, this in fact disaggregates the selected demographic from other meaningful and significant data provided in these public tools. Environmental justice communities across California experience impacts from polluting industry neighbors on a daily basis. For example, residents of Wilmington, Los Angeles experience refinery flares, truck traffic, oil spills, powerplant emissions, gas leaks, violent explosions, contaminated land, and more. Residents of Lamont in Kern face the impacts of factory farm pollution, warehouse truck traffic, and drinking water contamination, among other issues. Each of these pollution sources inflicts a unique impact on the community it infiltrates. The Screening report, however, does not clarify how or why areas were segmented, presenting bare numbers without context or analysis. The tools referenced in the Screening utilize census tract numbers for mapping purposes, but they also include the city and county and can be viewed in context of the greater map. Rather than providing a fuller image of ALPs route, the Screening strips the census tracts of their more identifiable markers, such as the city, retaining only census tract numbers for identification. Because census tract numbers are not widely used as an identifying tool, the Screening data cannot be helpful as a rooting point for organizing or community outreach. These failures and omissions must be remedied if the Screening is to be a useful tool for community engagement rather than a summary of basic demographic information.

Comment 34-04

II. Screening Fails to Provide an Adequate Basis for Implementation of Engagement Strategies

Environmental justice communities throughout California experience daily impacts from polluting industry neighbors. These various pollution sources inflict unique impacts on the communities they affect, and residents are harmed and cope with those harms in different ways. The impacts of the ALP are no different, and environmental justice communities subjected to the project will face new, unique risks unlike those which presently exist in their communities. Hydrogen gas is highly leak prone, highly combustible, invisible, and odorless. Hydrogen leak detection technology capable of safely monitoring the ALP does not yet exist. A broad range of hydrogen end-use technology is still in its infancy, and appropriate pollution controls or safety equipment are not widely available either. Hydrogen production can also produce air, water, and climate pollution. Unfortunately, none of these environmental justice community risks; hydrogen explosion risk; pollution from hydrogen production, leakage, end-use; and project construction

Comment 34-05

impacts are analyzed in the Environmental Justice Screening draft. Despite containing lengthy summaries of various demographic indicators, neither report actually defines why the indicators were selected or how they would be relevant to implementing engagement strategies or mitigating ALP impacts. Without an examination of the specific and novel concerns of a high-volume hydrogen pipeline or of any existing risk factors in the communities along the pipeline route, engagement cannot possibly provide clear, accurate information to stakeholders.

The Screening also does not include key language justice details for various communities, or tribal community demographics. Recognizing the language demographics of communities, a readily available statistic on CalEnviroScreen, is essential to community engagement. As highlighted in the Hydrogen Equity Principles, to "[c]enter community input, continue to elevate EJ voices, and ensure meaningful community participation is present for any hydrogen project[.]" project developers must provide "language access such as interpretation and translation services for non-English speakers, depending on the common languages spoken in the particular community." The Screening utterly fails to prepare to meet language needs because it only flags the percentage of census tracts above the county average of limited English-speaking households for each ALP segment, with many segments higher than 60%, including up to 100%. But inexplicably, even with the knowledge of such high need for translation services, the Screening does not discuss the specific language needs for each community and population along the route, or how SoCalGas will approach meeting translation needs.[9] In a similar failure, while the Screening maps denote tribal land in general, the Screening does not identify the particular Tribes whose lands will be impacted by the project, and there is no discussion of how SoCalGas will engage with Tribes in the Engagement Plan.

Comment 34-05

III. Impact and mitigation discussion is inadequate

The Screening does not discuss any ESJ Community impacts, but it merely acknowledges that the ALP will cause impacts and then mischaracterizes what those impacts may be. The "Mitigations Measures" section is over twice as long as the "Impact Discussion," and contains more detail about project impacts (albeit still inexcusably incomplete) than the impacts discussion. The existing Water Resources Evaluation, GHG Emissions Evaluation, Nitrogen Oxide and Other Air Emissions Assessment, Plan for Applicable Safety Requirements, Preliminary Routing-Configuration Analysis, and other documents produced by SoCalGas, as well as CBE's and other organizations' feedback to those documents, indicate a long list of adverse ALP impacts.[10] Almost none of these impacts are touched on in the Screening's "Impacts Discussion." The few impacts that are explicitly mentioned deal with ALP construction. Although construction impacts are relevant, discussion of them does not come close to fully

Comment 34-06

[9] Or each census tract.
[10] These impacts include hydrogen leakage and combustion risk, local emissions from hydrogen production, local emissions from hydrogen use, climate emissions from hydrogen production, etc.

capturing the burden that a multi-billion-dollar hydrogen pipeline will place on environmental justice communities over the coming decades. CBE and other groups have repeatedly requested that SoCalGas identify environmental justice concerns as they relate specifically to these feasibility studies and have frequently flagged them where SoCalGas has not. SoCalGas has even deferred addressing these concerns to the ESJ Engagement Plan and Environmental Report. However, these matters are not addressed or raised at all here in the Screening Report or the Engagement Plan.

It is difficult to plan mitigation measures for impacts which have not been identified. While the "Impacts Discussion" defers any analysis of the ALP's impacts to some hypothetical future point, the "Mitigation Measures" section eagerly explains how SoCalGas will minimize these impacts. The discussion shows that SoCalGas has ignored and continues to ignore stakeholder feedback despite claiming in the very same section that:

> SoCalGas is committed to meaningfully engaging with ESJ communities and DACs, as well as other stakeholders, during all phases of Angeles Link and seeks to identify and address any concerns that are raised by these groups regarding construction and operation of Angeles Link.[11]

As explored at length above, the so-called "EJ analysis" in the Engagement Plan and Screening do not perform adequate analysis at all. These reports do not even mention an array of topics already studied in other feasibility reports and noted by participating stakeholders.

Comment 34-06

IV. Conclusion

CBE appreciates the opportunity to provide feedback. The lack of forward-looking implementation planning or strategic background development in the Engagement Plan and Screening is deeply concerning. For unclear reasons, SoCalGas has emphasized that phase two is when tangible community outreach will happen, but the Engagement plan and Screening do not include adequate planning and development steps to implement any of SoCalGas's ALP engagement strategies. These reports fail to adequately support a comprehensive framework of community engagement efforts related to the ALP. SoCalGas cannot move forward into the next phase with this woefully insufficient degree of planning in place.

Comment 34-07

Respectfully Submitted.

Lauren Gallagher
Lauren Gallagher
Theo Caretto

[11] Screening at 137.

Jay Parepally
Communities for a Better Environment

CC:
Frank Lopez, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group
Angeles Link PAG Service List

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 34-1

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the "Environmental Social Justice Draft Engagement Plan and ESJ Screening" (Engagement Plan) and "Environmental and Social Justice Screening" (Screening) provided on July 19, 2024.

SoCalGas references the Equity Principles1 and even includes them (and SoCalGas' response letter as an attachment) but fails to meet the very clear baseline standards laid out in the principles. In fact, SoCalGas both ignores the Equity Principles core precepts and fails to outline their own path for aligning with the principles. SoCalGas states that "[e]ncouraging that community voices are heard and considered is crucial when it comes to establishing trust with environmental justice communities."FN2 Unfortunately, SoCalGas mischaracterizes the Equity Principles in the very same section. While the Equity Principles do encourage that community voices be heard and considered, community self-determination necessarily involves individuals explaining their community vision and how such vision can be realized. However, the environmental justice organizations who created the Equity Principles emphasize that full community protections and environmental justice measures should be a starting point for projects, not things communities must fight for in each project.FN3 The principles emphasize that hydrogen should not be combusted for electric power, used in commercial buildings, or relied on for rail or drayage trucking because of these end-uses' impacts in environmental justice communities. Further, the Principles emphasize the importance of community consent to hydrogen delivery projects. Neither the Engagement Plan nor Screening document outline a plan for implementing community protections or environmental justice measures that align with the Principles. The Engagement Plan does not even acknowledge the core principle of community self-determination. Rather, the plan insists that the pipeline will travel through dozens of California's most polluted communities, and that these communities may be engaged with as the project forges ahead.FN4

A. ENVIRONMENTAL SOCIAL JUSTICE (ESJ) COMMUNITY DRAFT ENGAGEMENT PLAN AND ESJ SCREENING

The draft engagement plan mischaracterizes the Equity Principles for Hydrogen, fails to implement the CPUC's ESJ Action Plan 2.0, and ignores key populations and environmental impacts. Rather, the document defers nearly all engagement to a later, theoretical phase.

FN1 – Equity Principles for Hydrogen: Environmental Justice Position on Green Hydrogen in California, COMMUNITIES FOR A BETTER ENV'T (Oct. 10, 2023), https://www.cbecal.org/wp-content/uploads/2024/03/Equity-Hydrogen-Initiative-Shared-Hydrogen-Position-1.pdf.

FN2 – Engagement Plan at 6.

FN3 – Equity principles at 2"We insist that new projects protect communities first and do no perpetuate the injustices that polluting infrastructures impose on fence-line communities today."

FN4 – The one attempt at routing the ALP through fewer environmental justice communities, "Route Variation 1" is not even analyzed in phase one environmental analysis.

SOCALGAS RESPONSE TO COMMENT 34-1

Please refer to Global Responses 7 and 9.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 34-2

I. Lack of Engagement Plan Development

The Equity Principles highlight that "[d]iscussions about building new green hydrogen infrastructure must involve the community and its members should be meaningfully engaged." However, the Engagement Plan pays only nominal lip service to actual engagement because it fails to identify a means of dialogue, or the important topics of concern for discussion. Engagement is a core principle of environmental justice, but engagement alone does not make projects just. The goal of engagement with a project is not to be engaged, but to determine whether a dangerous or polluting project lands in environmental justice communities and what its unique impacts will be. Engagement should be thought of as a commitment to following through on a clear set of principles and practices and should represent the difference between mere words on paper and affirmative dialogue with stakeholders.

While it is important that community outreach and implementation is rooted in active dialogue with impacted stakeholders and community members, community engagement should receive the same level of research and development that other significant and essential aspects of project development receive. This means that engagement efforts should be appropriately defined, outlined, and supported with clear strategies for implementation. The Engagement plan does none of this; rather, in a few bulleted sentences it merely identifies engagement plan "strategies" which lack concrete methods of action. SoCalGas has leaned heavily on community partners to develop the bulk of this engagement plan, but it has not followed through in developing robustly researched strategies for meaningful engagement that clearly connect to the many important study areas that the CPUC identified in Decision 22-12-055. Failing to understand these strategies adequately will inevitably lead to failures in implementation, as evidenced in the rest of this letter.

In light of the Hydrogen Equity Principles' inclusion in the Engagement Plan, CBE points SoCalGas to the following framework for engagement provided in the Hydrogen Equity Principles:

Any new potential hydrogen production project must include the formation of a local oversight committee that will be composed of local stakeholders including local environmental justice, public health, labor, and utility representatives to conduct multiple waves of education and engagement to vet the project with the community. The oversight committee will be responsible for coordinating a series of workshops/presentations that will educate the community on sources of energy, emissions projections, job opportunities, and community benefits and risks. Following this process will include the opportunity for the oversight committee consider local resident feedback to either approve, deny, or make modifications to the plan.FN5

FN5 – Equity Principles at 5.

SOCALGAS RESPONSE TO COMMENT 34-2

Please refer to Global Response 8 for information on the limitations of the ESJ Screening analysis and an understanding of the particular impacts certain communities may face at this feasibility stage. Please also refer to Global Response 9.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 34-3

II. No Implementation Strategy

The "Engagement strategies" section of the Engagement plan is misnamed. These small paragraphs are simply descriptions of engagement mechanisms, but they do not include any
strategy for implementing these mechanisms in phase two. Notwithstanding the engagement strategies section, the Engagement Plan contains no plan or strategy for implementing community engagement, nor has SoCalGas completed sufficient community engagement thus far. Communities for a Better Environment first notified SoCalGas that it was critical to engage communities along the pipeline route over 18 months ago in April 2023.FN6 Prior to this, the California Environmental Justice Alliance and Sierra Club raised this serious issue to the California Public Utilities Commission in the Angeles Link proceeding. Despite this, the Engagement Plan makes clear that no actual engagement work will be conducted. Rather, such engagement is conditional pending approval of a second phase and millions more public dollars in spending.

The Engagement Plan describes a list of actions that SoCalGas intends to take in phase two of the Angeles Link project (ALP) process, improperly deferring and delaying time sensitive matters. With SoCalGas aiming to determine the ALP route in the next phase, should it be approved, it is critical that pipeline communities have the opportunity to understand and respond to this decision-making process. As the Equity Principles and CBE's previous comments make clear, such an opportunity involves prior education and engagement with accurate information presented in an accessible manner. No such process has taken place, and even accurate information surrounding the ALP has been hard to come by.FN7 Proposed future engagement plans in a later, unconfirmed phase are no excuse for a failure to conduct timely engagement and planning. However, the engagement currently outlined for a future phase is incomplete. Even if the actions are taking place in phase two, then the plan should be developed in phase one. Although the Engagement Plan states that it will "serve as a guide for future engagement with ESJ Communities and DACs in Phase 2," it does not provide concrete steps for conducting that engagement. Despite SoCalGas acknowledging that no one strategy is sufficient, there is no commentary or analysis of when and where each engagement strategy will be useful; how they will be implemented; or what information SoCalGas needs to gather to get fruitful results from these engagement strategies. The ramifications of these failures are deeply evident in the shortcomings of the Screening, explored below.

The Engagement Plan also does not address how the execution of phase one has been frustrating and dishonest, fostering mistrust between PAG and CBOSG members and SoCalGas. The Engagement Plan, Screening, and several prior draft reports have been marred by generalized misstatements with no attribution or source and blatantly ignore ALP's impacts in environmental justice communities. Despite this, SoCalGas claim the "Phase 1 stakeholder engagement process has played a pivotal role in fostering trust, acquiring valuable insights, and establishing the foundation for a community-centric approach to tackling environmental and social justice concerns within the design framework for Angeles Link."FN8 From the vantage point of CBE, this is not the case. It is evident from the state of the Engagement Plan that SoCalGas has much work to do to foster trust and embark on a process that fosters truly meaningful engagement.

FN6 – Feedback for Southern California Gas Company on Angeles Link Project March 15 and March 16 Public Engagement Meetings, April 14, 2023.

FN7 – Refer to for example, CBE's comments on GHG emissions and water, highlighting that the reports ignore key environmental impacts and omit emissions data from analyses.

FN8 – Engagement Plan at 2.

SOCALGAS RESPONSE TO COMMENT 34-3

SoCalGas will revise Section 8 (Engagement Strategies) of the ESJ Plan to refer to them as "engagement mechanisms." SoCalGas will also revise Section 2 (Background) of the ESJ Plan to remove language misconstrued as misleading (removed "pivotal role in fostering trust"). For remaining comments raised, please refer to Global Responses 7 and 9.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 34-4

B. ENVIRONMENTAL AND SOCIAL JUSTICE SCREENING

I. The Screening Provides Incomplete Data in an Opaque Manner and Without Analysis

The Screening draft is a puzzling document. Despite spanning a lengthy 147 pages, it neither assesses existing burdens or conditions nor analyzes environmental impacts of the ALP. Concerningly, it does not identify how close the ALP will be from homes or other sensitive sites. Nor does it identify whether infrastructure (compressor station, intake or offtake point, etc.) will be sited in each "study area."

Furthermore, the Screening does not include any discussion of impacts at pipeline origination or termination points. The Screening draft does not identify key stakeholders or community organizations. The Screening draft also does not integrate the California Public Utilities Commission's Environmental and Social Justice Action Plan 2.0. Nor does the report give environmental justice communities (including some "356 census tracts identified as CalEnvrioScreen or SEJST DAC designations") any sense of what they might expect should the ALP be routed through their neighborhoods. What the Screening draft does is aggregate a small amount of demographic data from public sources and organize it into 13 regional categories. However, this in fact disaggregates the selected demographic from other meaningful and significant data provided in these public tools. Environmental justice communities across California experience impacts from polluting industry neighbors on a daily basis. For example, residents of Wilmington, Los Angeles experience refinery flares, truck traffic, oil spills, powerplant emissions, gas leaks, violent explosions, contaminated land, and more. Residents of Lamont in Kern face the impacts of factory farm pollution, warehouse truck traffic, and drinking water contamination, among other issues. Each of these pollution sources inflicts a unique impact on the community it infiltrates. The Screening report, however, does not clarify how or why areas were segmented, presenting bare numbers without context or analysis. The tools referenced in the Screening utilize census tract numbers for mapping purposes, but they also include the city and county and can be viewed in context of the greater map. Rather than providing a fuller image of ALPs route, the Screening strips the census tracts of their more identifiable markers, such as the city, retaining only census tract numbers for identification. Because census tract numbers are not widely used as an identifying tool, the Screening data cannot be helpful as a rooting point for organizing or community outreach. These failures and omissions must be remedied if the Screening is to be a useful tool for community engagement rather than a summary of basic demographic information.

SOCALGAS RESPONSE TO COMMENT 34-4

Please refer to Global Response 8.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 34-5

II. Screening Fails to Provide an Adequate Basis for Implementation of Engagement Strategies

Environmental justice communities throughout California experience daily impacts from polluting industry neighbors. These various pollution sources inflict unique impacts on the communities they affect, and residents are harmed and cope with those harms in different ways.
The impacts of the ALP are no different, and environmental justice communities subjected to the project will face new, unique risks unlike those which presently exist in their communities. Hydrogen gas is highly leak prone, highly combustible, invisible, and odorless. Hydrogen leak detection technology capable of safely monitoring the ALP does not yet exist. A broad range of hydrogen end-use technology is still in its infancy, and appropriate pollution controls or safety equipment are not widely available either. Hydrogen production can also produce air, water, and
climate pollution. Unfortunately, none of these environmental justice community risks; hydrogen explosion risk; pollution from hydrogen production, leakage, end-use; and project construction impacts are analyzed in the Environmental Justice Screening draft. Despite containing lengthy summaries of various demographic indicators, neither report actually defines why the indicators were selected or how they would be relevant to implementing engagement strategies or mitigating ALP impacts. Without an examination of the specific and novel concerns of a high-volume hydrogen pipeline or of any existing risk factors in the communities along the pipeline route, engagement cannot possibly provide clear, accurate information to stakeholders.

The Screening also does not include key language justice details for various communities, or tribal community demographics. Recognizing the language demographics of communities, a readily available statistic on CalEnviroScreen, is essential to community engagement. As highlighted in the Hydrogen Equity Principles, to "[c]enter community input, continue to elevate EJ voices, and ensure meaningful community participation is present for any hydrogen project[,]" project developers must provide "language access such as interpretation and translation services for non-English speakers, depending on the common languages spoken in the particular community." The Screening utterly fails to prepare to meet language needs because it only flags the percentage of census tracts above the county average of limited English-speaking households for each ALP segment, with many segments higher than 60%, including up to 100%. But inexplicably, even with the knowledge of such high need for translation services, the Screening does not discuss the specific language needs for each community and population along the route, or how SoCalGas will approach meeting translation needs.FN9 In a similar failure, while the Screening maps denote tribal land in general, the Screening does not identify the particular Tribes whose lands will be impacted by the project, and there is no discussion of how SoCalGas will engage with Tribes in the Engagement Plan.

FN9 – Or each census tract.

SOCALGAS RESPONSE TO COMMENT 34-5

Please refer to Global Response 8 for paragraphs 1-3 of this comment. Please also refer to Global Response 9 for additional information on the Equity Principles.

The ESJ Screening includes the percentage of census tracts that are above the county percentage for limited English speaking per household, which is a key statistic in creating outreach plans for future

phases of Angeles Link. This information will assist in identifying areas that need translation services during subsequent phases of Angeles Link. In response to this comment, Attachment B: Languages Spoken by Census Tract of Disadvantaged Communities will be added to the Final ESJ Screening, which includes census tract, study area, segment crossed, locality (i.e., city or county), population, languages spoken by non-fluent English speakers, and number of individuals that speak any given language. The data presented in Attachment B: Languages Spoken by Census Tract of Disadvantaged Communities can be used in future outreach and engagement activities to determine where and whether translation services are needed.

The indicators used in this ESJ Screening stem from the Executive Orders (EO) issued on Environmental Justice (EOs 12898 and 14096), including Biden's Justice40 initiative (EO 14008). In response to the comment on why certain indicators were selected for the ESJ Screening, reference to these EOs been added to Section 1.1 Approach. SoCalGas intends to use this demographic information to understand the community profile, which will support stakeholder engagement planning efforts for Angeles Link, which is stated in the ESJ Community Engagement Plan.

At this early stage, identifying tribes whose lands could be directly or indirectly impacted by the Angeles Link is not feasible. The routes screened during Phase 1 are too preliminary. SoCalGas will clarify in Section 3 (Goals of this Plan) and Section 8 (Engagement Mechanisms) that federally recognized tribes and tribal organizations will be engaged in Phase 2. SoCalGas will collaborate with these tribes and organizations to develop engagement approaches.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 34-6

III. Impact and mitigation discussion is inadequate

The Screening does not discuss any ESJ Community impacts, but it merely acknowledges that the ALP will cause impacts and then mischaracterizes what those impacts may be. The "Mitigations Measures" section is over twice as long as the "Impact Discussion," and contains more detail about project impacts (albeit still inexcusably incomplete) than the impacts discussion. The existing Water Resources Evaluation, GHG Emissions Evaluation, Nitrogen Oxide and Other Air Emissions Assessment, Plan for Applicable Safety Requirements, Preliminary Routing-Configuration Analysis, and other documents produced by SoCalGas, as well as CBE's and other organizations' feedback to those documents, indicate a long list of adverse ALP impacts.FN10 Almost none of these impacts are touched on in the Screening's "Impacts Discussion." The few impacts that are explicitly mentioned deal with ALP construction. Although construction impacts are relevant, discussion of them does not come close to fully capturing the burden that a multi-billion-dollar hydrogen pipeline will place on environmental justice communities over the coming decades. CBE and other groups have repeatedly requested that SoCalGas identify environmental justice concerns as they relate specifically to these feasibility studies and have frequently flagged them where SoCalGas has not. SoCalGas has even deferred addressing these concerns to the ESJ Engagement Plan and Environmental Report. However, these matters are not addressed or raised at all here in the Screening Report or the Engagement Plan.

It is difficult to plan mitigation measures for impacts which have not been identified. While the "Impacts Discussion" defers any analysis of the ALP's impacts to some hypothetical future point, the "Mitigation Measures" section eagerly explains how SoCalGas will minimize these impacts. The discussion shows that SoCalGas has ignored and continues to ignore stakeholder feedback despite claiming in the very same section that:

SoCalGas is committed to meaningfully engaging with ESJ communities and DACs, as well as other stakeholders, during all phases of Angeles Link and seeks to identify and address any concerns that are raised by these groups regarding construction and operation of Angeles Link.FN11

As explored at length above, the so-called "EJ analysis" in the Engagement Plan and Screening do not perform adequate analysis at all. These reports do not even mention an array of topics already studied in other feasibility reports and noted by participating stakeholders.

FN10 – These impacts include hydrogen leakage and combustion risk, local emissions from hydrogen production, local emissions from hydrogen use, climate emissions from hydrogen production, etc.

FN11 – Screening at 137.

SOCALGAS RESPONSE TO COMMENT 34-6

Please refer to Global Response 8.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 34-7

IV. Conclusion

CBE appreciates the opportunity to provide feedback. The lack of forward-looking implementation planning or strategic background development in the Engagement Plan and Screening is deeply concerning. For unclear reasons, SoCalGas has emphasized that phase two is when tangible community outreach will happen, but the Engagement plan and Screening do not include adequate planning and development steps to implement any of SoCalGas's ALP engagement strategies. These reports fail to adequately support a comprehensive framework of community engagement efforts related to the ALP. SoCalGas cannot move forward into the next phase with this woefully insufficient degree of planning in place.

SOCALGAS RESPONSE TO COMMENT 34-7

Please refer to Global Response 7 and 8.

Comment Letter 35 – Communities for a Better Environment

Comment Letter 35

August 30, 2024

COMMUNITIES FOR A BETTER ENVIRONMENT
40 years | established 1978

Southern California Gas Company
555 West Fifth Street
Los Angeles, CA 90 013

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback for Southern California Gas Company on the Preliminary Routing/Configuration Analysis Draft Report

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Preliminary Routing/Configuration Analysis Draft Report (the "Report" or "Study") provided on July 19, 2024. While the Report incorporates some environmental justice ("EJ") principles for portions of its analysis, it still subordinates equity to maximizing hydrogen transmission from production to offtake sites and capitalizing on connections between the Angeles Link Project (ALP) and the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) infrastructure. In addition, regardless of whether hydrogen pipelines are aboveground or underground as they cross through disadvantaged or environmental justice communities, CBE raised numerous, serious safety-related concerns in our feedback to the Safety Study that SoCalGas needs to address in tandem with any routing/configuration planning. This letter describes flaws in the current study and outlines areas in which Preliminary Routing/Configuration Analysis can be improved. Particularly, the Study:

Comment 35-01

- Should Classify Route Variation 1 as a "Preferred Route" and Explore Additional Opportunities to Minimize Hydrogen Transmission Through DACs/EJ Communities
- Should Prioritize the Combination of Route Variation 1 with Route D and Include a Map of Route Variation 1 with Preferred Route D Only
- Lacks Meaningful Discussion about Informed Consultation with Indigenous Tribes Throughout Potential ALP Routing Areas

I. The Study Should Classify Route Variation 1 as a "Preferred Route" and Explore Additional Opportunities to Minimize Hydrogen Transmission Through DACs/EJ Communities

The Report notes that SoCalGas "considered evaluating hydrogen corridors that would avoid DAC [disadvantaged communities] and ESJ [environmental and social justice] communities entirely."[1] However, according to the Report, geological constraints between the San Joaquin Valley and LA Basin, such as mountain ranges and protected national forests, limit

[1] Report at 45.

1

the possible pathways.[2] The Report rejects the promising concept of not adding pollution burdens to DACs and EJ communities by stating: "Routing completely out of DACs may not be feasible due to various factors including technical challenges and operational considerations that may compromise system efficiency, safety, affordability, and reliability."[3] More specifically, the Study explains that the preferred route alignment for Angeles Link is along the Interstate 5 corridor because of its location "closer to potential offtake facilities" and because it would traverse "more level terrain."[4]

If Angeles Link will need to cross through environmental justice communities to some extent and track Interstate 5 for some distance, the goal should be to minimize the percentage of routes traversing such communities, given the disproportionate burden of environmental harms placed on DACs/EJ communities over the course of many decades. Route Variation ("RV") 1 provides a step in the right direction, showing that SoCalGas can reduce main pipeline route mileage traversing DACs in the LA Basin.[5] Whereas 76-81% of Preferred Routes A, B, and C would cross through DACs, Route Variation 1 could possibly "reduce the distance that traverses DACs to approximately 67-73% of the total route distance, a decrease of approximately 8% by route and overall decreases the percentage of pipeline traversing DACs within LA Basin for these routes by approximately 20%."[6] This RV is laudable but ultimately just a first step towards limiting environmental injustice.

The Report classifies routes that pass through all three zones ("Central," "Collection," and "Connection") and include connections to two ARCHES segments as "Preferred Routes."[7] Even if RV 1 itself is located entirely within the Central Zone/LA Basin, the limitation of the preferred route designation as needing to pass through all three zones is simply a discretionary choice made by SoCalGas. Since Route Variation 1 still connects to ALP segments that do cross all three zones and both ARCHES segments, SoCalGas should include RV 1 under the preferred route umbrella. Accordingly, Table 4 ("Preferred Routes A, B, C, D Segments and Zones")[8] in the Report should be revised to include Route Variation 1; this route variation should not be treated as less serious than the currently designated "Preferred Routes."

Comment 35-01

[2] Report at 45.
[3] Id. at 46.
[4] Id. at 60-61.
[5] Id. at 46.
[6] Id.
[7] Id. at 16, 42.
[8] Id. at 50.

II. The Study Should Prioritize the Combination of Route Variation 1 with Route D and Include a Map of Route Variation 1 with Preferred Route D Only

The Report considers Route Variation 1 and Route D as separate configurations. It refers to RV 1 as "an alternative routing for the pipeline segment that runs parallel to the Interstate 5 (I-5) in the LA Basin"[9] that would exist as "a continuation of Preferred Routes A, B, and C, and replaces a portion of 42 miles of segment Y in the previously identified routes."[10] The Report explains that unlike Routes A, B, and C, "Route D does not contain pipeline segments in LA Basin parallel to the I-5[.]"[11] The Report confirms the distinction when it explains that RV 1 serves as "a potential pipeline pathway for Preferred Routes A, B, and C that would potentially reduce main pipeline route mileage traversing DACs in the LA Basin."[12] Although the Study deems Route Variation 1 and Route D as distinct from one another, these routes could be considered in combination with one another. Preferred Route D reduces the percentage of pipeline distance crossing through DACs to "approximately 69%, which is within the potential Route Variation 1 range."[13] In contrast, the distance percentage with respect to traversing DACs for Routes A, B, and C is 76% to 81%.[14] Therefore, if Route Variation 1 and Route D were to be combined, ALP could reduce the overall distance traveled through DACs/EJ communities.

SoCalGas should also provide a map displaying only Route Variation 1 with Preferred Route D. The Report contains a map of RV 1 with Preferred Routes A, B, C (Figure 36)[15] and a map of Route Variation 1 with all four of the preferred routes (Figure 24).[16] Since the Report lacks an illustration focused entirely on Route Variation 1 and Route D, SoCalGas should include such a map in the final report and seriously consider the adoption of Route Variation 1 paired with Route D.

Comment 35-01

III. The Study Lacks Meaningful Discussion Regarding Informed Consultation with Indigenous Tribes about Potential ALP Routing

The Report is insufficient regarding discussion of impacts to tribal communities and Indigenous peoples' land. SoCalGas notes it currently has "three members of its CBOSG who represent tribal communities" and that its phase one environmental analysis study "evaluates cultural and tribal cultural resources based on a records search and desktop information."[17]

Comment 35-02

[9] Id. at 46 ("Figure 24…illustrates LA Basin and includes Routes A, B, and C…Route Variation 1 would be a part of these routes in their entirety[.]")
[10] Id. at 59.
[11] Id. at 46.
[12] Id.
[13] Id.
[14] Id.
[15] Id. at 59.
[16] Id. at 44.
[17] Id. at 64.

3

While these are positive qualities of the ALP process, SoCalGas needs to do significantly more regarding meaningful, active engagement with the many native nations whose ancestral territories could be harmed by the construction and operation of Angeles Link. The potential routes of the ALP will likely cross through many tribes' lands, including those of the Gabrielino/Tongva Nation of the Greater Los Angeles Basin. The Report notes that in future phases of the ALP process, SoCalGas "will also perform a detailed cultural and tribal cultural resources assessment, including field surveys, to identify locations of sensitivity along the preferred pipeline routes."[18] Mere compliance with state and federal permitting requirements is no substitution for early project stage consultation and feedback. The longer that engagement is delayed to future ALP phases, the greater the risk that critical land considerations from tribal communities and governments will be missed or ignored.

Comment 35-02

IV. Conclusion

Communities for a Better Environment appreciates the opportunity to provide feedback on the Report. The Report's conclusion states that "route alignments will be refined in subsequent phases to reduce disruptions to communities and ecosystems....." [19] To better ensure that stated goal, SoCalGas should rectify all issues raised in this letter before issuing a final report to provide sufficient information for stakeholders to properly assess the ALP.

Comment 35-03

Sincerely,

Jay Parepally
Lauren Gallagher
Theo Caretto

Communities for a Better Environment

CC:
Frank Lopez, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group
Angeles Link service list

[18] Id.
[19] Id. at 65.

4

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 35-1

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- Lacks Meaningful Discussion about Informed Consultation with Indigenous Tribes Throughout Potential ALP Routing Areas

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If Angeles Link will need to cross through environmental justice communities to some extent and track Interstate 5 for some distance, the goal should be to minimize the percentage of routes traversing such communities, given the disproportionate burden of environmental harms placed on DACs/EJ communities over the course of many decades. Route Variation ("RV") 1 provides a step in the right direction, showing that SoCalGas can reduce main pipeline route mileage traversing DACs in the LA Basin.FN5 Whereas 76-81% of Preferred Routes A, B, and C would cross through DACs, Route Variation 1 could possibly "reduce the distance that traverses DACs to approximately 67-73% of the total route distance, a decrease of approximately 8% by route and overall decreases the percentage of pipeline traversing DACs within LA Basin for these routes by approximately 20%."FN6 This RV is laudable but ultimately just a first step towards limiting environmental injustice.

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The Report considers Route Variation 1 and Route D as separate configurations. It refers to RV 1 as "an alternative routing for the pipeline segment that runs parallel to the Interstate 5 (I5) in the LA Basin"FN9 that would exist as "a continuation of Preferred Routes A, B, and C, and replaces a portion of 42 miles of segment Y in the previously identified routes."FN10 The Report explains that unlike Routes A, B, and C, "Route D does not contain pipeline segments in LA Basin parallel to the I-5[.]"FN11 The Report confirms the distinction when it explains that RV 1 serves as "a potential pipeline pathway for Preferred Routes A, B, and C that would potentially reduce main pipeline route mileage traversing DACs in the LA Basin."FN12 Although the Study deems Route Variation 1 and Route D as distinct from one another, these routes could be considered in combination with one another. Preferred Route D reduces the percentage of pipeline distance crossing through DACs to "approximately 69%, which is within the potential Route Variation 1 range."FN13 In contrast, the distance percentage with respect to traversing DACs for Routes A, B, and C is 76% to 81%.FN14 Therefore, if Route Variation 1 and Route D were to be combined, ALP could reduce the overall distance traveled through DACs/EJ communities.

SoCalGas should also provide a map displaying only Route Variation 1 with Preferred Route D. The Report contains a map of RV 1 with Preferred Routes A, B, C (Figure 36)FN15 and a map of Route Variation 1 with all four of the preferred routes (Figure 24).FN16 Since the Report lacks an illustration focused entirely on Route Variation 1 and Route D, SoCalGas should include such a map in the final report and seriously consider the adoption of Route Variation 1 paired with Route D.

FN1 – Report at 45.
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FN3 – Id. at 46.
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FN10 – Id. at 59.
FN11 – Id. at 46.
FN12 – Id.
FN13 – Id.
FN14 – Id.

FN15 – Id. at 59.
FN16 – Id. at 44.

SOCALGAS RESPONSE TO COMMENT 35-1

Please refer to Global Response 5.

Route Variation 1 includes Routes A, B, and C and would be a part of these routes in their entirety. SoCalGas clarifies that combining Preferred Route D and Route Variation 1 will increase the total route mileage to approximately 525 miles. For purposes of the Phase 1 feasibility analysis, one of the objectives of the preferred routes is to transverse less than 500 miles; therefore, options that exceeded that mileage were not evaluated at this feasibility stage. Furthermore, combining Preferred Route D and Route Variation 1 could result in approximately 343 miles traversing DAC communities, which may decrease the percentage of the route in DACs to approximately 65% but will not decrease the overall mileage in DAC communities due to the overall increase in route mileage. Preferred Routes A and B have approximately 296 miles and 332 miles traversing DAC communities respectively, representative of approximately 76% and 81% of the respective route milage.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 35-2

III. The Study Lacks Meaningful Discussion Regarding Informed Consultation with Indigenous Tribes about Potential ALP Routing

The Report is insufficient regarding discussion of impacts to tribal communities and Indigenous peoples' land. SoCalGas notes it currently has "three members of its CBOSG who represent tribal communities" and that its phase one environmental analysis study "evaluates cultural and tribal cultural resources based on a records search and desktop information."FN17 While these are positive qualities of the ALP process, SoCalGas needs to do significantly more regarding meaningful, active engagement with the many native nations whose ancestral territories could be harmed by the construction and operation of Angeles Link. The potential routes of the ALP will likely cross through many tribes' lands, including those of the Gabrielino/Tongva Nation of the Greater Los Angeles Basin. The Report notes that in future phases of the ALP process, SoCalGas "will also perform a detailed cultural and tribal cultural resources assessment, including field surveys, to identify locations of sensitivity along the preferred pipeline routes."FN18 Mere compliance with state and federal permitting requirements is no substitution for early project stage consultation and feedback. The longer that engagement is delayed to future ALP phases, the greater the risk that critical land considerations from tribal communities and governments will be missed or ignored.

FN17 – Id. At 64.
FN18 – Id.

SOCALGAS RESPONSE TO COMMENT 35-2

Please refer to Q2 2024 Quarterly Report, Response to Comment 4-3 for information related to SoCalGas's plans for future engagement with tribal governments and other organizations who represent tribal interests. SoCalGas also notes that Angeles Link will undergo formal tribal consultation under AB 52 as part of the CEQA process.

Please also refer to Global Response 7 for additional information related to SoCalGas's plan for future engagement with potentially impacted communities.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 35-3

IV. Conclusion

Communities for a Better Environment appreciates the opportunity to provide feedback on the Report. The Report's conclusion states that "route alignments will be refined in subsequent phases to reduce disruptions to communities and ecosystems . . . ."FN19 To better ensure that stated goal, SoCalGas should rectify all issues raised in this letter before issuing a final report to provide sufficient information for stakeholders to properly assess the ALP.

FN19 – Id. at 65.

SOCALGAS RESPONSE TO COMMENT 35-3

SoCalGas acknowledges CBE's feedback on this study. Stakeholder engagement will continue to be part of Phase 2 and feedback will be considered and incorporated into future evaluations where feasible.

Comment Letter 36 – California Hydrogen Business Council

Comment Letter 36

California Hydrogen Business Council

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CALIFORNIA HYDROGEN BUSINESS COUNCIL
COMMENTS ON ANGELES LINK PHASE I
DRAFT PRODUCTION PLANNING & ASSESSMENT AND
DRAFT PRELIMINARY ROUTING/CONFIGURATION ANALYSIS

August 30, 2024

Submitted via Email to: ALP1_STUDY_PAG_FEEDBACK@INSIGNIAENV.COM

The California Hydrogen Business Council ("CHBC") respectfully comments on the following Angeles Link Phase 1 draft reports posted by the Southern California Gas Company ("SoCalGas") in the Angeles Link Living Library:

1. **Production Planning & Assessment (July 19, 2024)**
2. **Preliminary Routing/Configuration Analysis ("Draft Routing Analysis") (July 19, 2024)**

Comment 36-01

1. Comments on the Production Planning & Assessment Draft Report

The definition of clean renewable hydrogen in the report is appropriate and current. This definition has not changed during the 2024 California legislative session.

Treasury guidance on the Section 45V tax credit from the Inflation Reduction Act is not yet final. While the three pillars are mentioned in the report as possible criteria for electrolytic hydrogen, they are still an undefined concept and not in statute, and until Treasury releases final guidance it is premature to use these as standard.

Comment 36-02

Even if some form of the three pillars, or a phased in approach to such, is included in final Treasury Guidance, the recent Supreme Court ruling overturning Chevron deference (Loper Bright Enterprises vs. Raimondo) ends a principle of administrative law that required courts to defer to interpretation of statutes made by government agencies. This decision could limit broad regulatory

Comment 36-03

authority of federal agencies to change legislative intent due to an unreasonably restrictive definition of renewable hydrogen, based on subjective criteria, rather than the objective carbon intensity standard that is already in statute. In the case of the proposed guidance for 45V and other tax credits, Treasury's proposed approach does not reflect a reasonable interpretation, nor the best reading of the statute and therefore should not be included in any Angeles Link plans until such time as final guidance is settled. California RPS standards already exceed federal standards, so the clean renewable hydrogen standard used in the draft report is appropriate. Additionally, the guardrails provided by use of the GREET model to calculate carbon intensity can ensure decarbonization targets are met for all hydrogen, not just electrolytic hydrogen. The CHBC supports the approach proposed in the report to continue this discussion as policy and practice around hydrogen standards evolves. **Comment 36-03**

It is also appropriate that SoCalGas follow the evolution of hydrogen certification standards, which are currently being developed globally, and as these standards evolve, they will inform Angeles Link plans in the coming years and should be updated in Phase 2. **Comment 36-04**

In Section 7.2.2. Mobility Sector Demand, the mobility sector should be broadly defined and consider current sales of diesel fuel, in addition to gasoline. CARB has mandated the transition to zero-emission vehicles through 2045 across transportation sectors including light- and medium-duty vehicles, heavy-duty trucks and buses, forklifts, maritime, and rail. This transition therefore requires replacement of both gasoline and diesel fueled vehicles and the next analysis should account for this. **Comment 36-05**

2. Comments on the Preliminary Routing/Configuration Analysis Draft

The report rightly stresses the importance of proposing potential routes connect hydrogen supply to hydrogen demand centers, while considering impacts on communities and land. In connecting hydrogen production to offtake, there are additional benefits from a common carrier pipeline route that **Comment 36-06**

Page 2 of 4

increases access to decarbonized molecules in local communities, as many of the communities with the worst air quality are located on freight and rail corridors.

The connection of potential routes to the ARCHES hydrogen hub projects is critical because ARCHES has already secured offtake in these project regions upon which most proposed routes are overlaid. Additionally, a significant requirement of the U.S. Department of Energy $1.2 billion funding for ARCHES projects is measurable community benefits. The offtake provided by ARCHES projects already represents potential incremental benefits to disadvantaged communities.

Comment 36-06

That said, this Phase 1 route analysis should be considered a framework, not a final plan. The ARCHES projects are still in the subcontracting phase and until there is assurance on which projects will come to fruition.

As mentioned in previous comments on the draft Production Planning and Assessment report, there is currently uncertainty around hydrogen production incentives. This means that until hydrogen production projects reach a financial investment decision, and begin the build phase, plans for Angeles Link should remain fluid. Options presented in Phase 1 should be further examined in Phase 2 as the hydrogen industry in California continues to evolve and projects break ground. The route should ultimately be where the production plants come online, and demand centers grow.

The CHBC supports routes that can maximize immediate air quality improvements by increasing offtake of hydrogen to reduce criteria air pollutants and diesel, such as in transportation corridors and transit routes. Variation 1 that generally follows the I-405 corridor should not be considered as this route misses municipal load centers and large-scale electrical generation in the LA basin.

Comment 36-07

One must also consider the importance of aligning access points to follow key transportation corridors, from the ports to the Inland Empire. Some consideration should thus be given to Route D that runs through the Riverside area, while potentially having lower impact than other options on disadvantaged communities according to the draft report. It is justified for the route to follow the I-710

Page 3 of 4

corridor to serve bus and truck fleets, and to address routes where there is known load and offtake to decarbonize in the communities along those corridors. The I-405 corridor in Variation 1 does not represent a major transportation corridor with significant municipal loads like other proposed routes and variations.

Comment 36-07

The CHBC emphasizes that while these initial routes represent production and demand centers that are planned today, these plans could change based on a number of factors, such as project viability and policy changes. It is therefore advisable that the Phase 2 work reevaluate the status of hydrogen production and offtake projects and fleets at that future time.

Comment 36-08

Respectfully submitted,

/s/ Katrina M. Fritz
Katrina M. Fritz
President & Chief Executive Officer
CALIFORNIA HYDROGEN BUSINESS COUNCIL
901 H St, Ste 120, #74
Sacramento, CA 95814
Phone: 310-455-6095
Email: kmfritz@californiahydrogen.org

Dated: August 30, 2024

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 36-1

The California Hydrogen Business Council ("CHBC") respectfully comments on the following Angeles Link Phase 1 draft reports posted by the Southern California Gas Company ("SoCalGas") in the Angeles Link Living Library:

1. Production Planning & Assessment (July 19, 2024)

2. Preliminary Routing/Configuration Analysis ("Draft Routing Analysis") (July 19, 2024)

1. Comments on the Production Planning & Assessment Draft Report

The definition of clean renewable hydrogen in the report is appropriate and current. This definition has not changed during the 2024 California legislative session.

SOCALGAS RESPONSE TO COMMENT 36-1

SoCalGas acknowledges the feedback regarding the definition of clean renewable hydrogen. SoCalGas is committed to transporting clean renewable hydrogen that meets regulatory requirements set forth by the CPUC. Per D.22-12-055, "clean renewable hydrogen" is defined as hydrogen produced with a carbon intensity equal to or less than four kilograms of carbon dioxide-equivalent produced on a lifecycle basis per kilogram and does not use any fossil fuel in its production process.

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 36-2

Treasury guidance on the Section 45V tax credit from the Inflation Reduction Act is not yet final. While the three pillars are mentioned in the report as possible criteria for electrolytic hydrogen, they are still an undefined concept and not in statute, and until Treasury releases final guidance it is premature to use these as standard.

SOCALGAS RESPONSE TO COMMENT 36-2

SoCalGas acknowledges this comment. SoCalGas also notes that, as of the date of the preparation of this response, the Treasury Department has not yet finalized the Section 45V tax credit rules.

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 36-3

Even if some form of the three pillars, or a phased in approach to such, is included in final Treasury Guidance, the recent Supreme Court ruling overturning Chevron deference (Loper Bright Enterprises vs. Raimondo) ends a principle of administrative law that required courts to defer to interpretation of statutes made by government agencies. This decision could limit broad regulatory authority of federal agencies to change legislative intent due to an unreasonably restrictive definition of renewable hydrogen, based on subjective criteria, rather than the objective carbon intensity standard that is already in statute. In the case of the proposed guidance for 45V and other tax credits, Treasury's proposed approach does not reflect a reasonable interpretation, nor the best reading of the statute and therefore should not be included in any Angeles Link plans until such time as final guidance is settled. California RPS standards already exceed federal standards, so the clean renewable hydrogen standard used in the draft report is appropriate. Additionally, the guardrails provided by use of the GREET model to calculate carbon intensity can ensure decarbonization targets are met for all hydrogen, not just electrolytic hydrogen. The CHBC supports the approach proposed in the report to continue this discussion as policy and practice around hydrogen standards evolves.

SOCALGAS RESPONSE TO COMMENT 36-3

SoCalGas acknowledges this comment regarding final Treasury guidance on 45V and other tax credits. SoCalGas is committed to transporting clean renewable hydrogen that meets regulatory requirements set forth by the CPUC D.22.12.055.

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 36-4

It is also appropriate that SoCalGas follow the evolution of hydrogen certification standards, which are currently being developed globally, and as these standards evolve, they will inform Angeles Link plans in the coming years and should be updated in Phase 2.

SOCALGAS RESPONSE TO COMMENT 36-4

SoCalGas acknowledges this comment and will continue to monitor the development of certification standards for clean renewable hydrogen.

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 36-5

In Section 7.2.2. Mobility Sector Demand, the mobility sector should be broadly defined and consider current sales of diesel fuel, in addition to gasoline. CARB has mandated the transition to zero-emission vehicles through 2045 across transportation sectors including light- and medium-duty vehicles, heavy-duty trucks and buses, forklifts, maritime, and rail. This transition therefore requires replacement of both gasoline and diesel fueled vehicles and the next analysis should account for this.

SOCALGAS RESPONSE TO COMMENT 36-5

For clarity, the Demand Study does include a wide range of both gasoline and diesel vehicles in its analysis of potential hydrogen demand. Specifically, vehicle classes across the transportation sector that could adopt zero-emission hydrogen vehicles through 2045 are included in the Demand Study. For purposes of the Demand Study, SoCalGas extrapolated gasoline sales as a reference and since the month-to-month variability was relatively flat, overall mobility demand was assumed to be constant throughout the year. In addition, please note hydrogen demand projections for light duty vehicles were not included in the Demand Study. Please refer to the Demand Study, section “Light-Duty Vehicles” (LDVs) for more discussion on the potential demand upside related LDVs.

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 36-6

2. Comments on the Preliminary Routing/Configuration Analysis Draft

The report rightly stresses the importance of proposing potential routes connect hydrogen supply to hydrogen demand centers, while considering impacts on communities and land. In connecting hydrogen production to offtake, there are additional benefits from a common carrier pipeline route that increases access to decarbonized molecules in local communities, as many of the communities with the worst air quality are located on freight and rail corridors.

The connection of potential routes to the ARCHES hydrogen hub projects is critical because ARCHES has already secured offtake in these project regions upon which most proposed routes are overlaid. Additionally, a significant requirement of the U.S. Department of Energy $1.2 billion funding for ARCHES projects is measurable community benefits. The offtake provided by ARCHES projects already represents potential incremental benefits to disadvantaged communities.

That said, this Phase 1 route analysis should be considered a framework, not a final plan. The ARCHES projects are still in the subcontracting phase and until there is assurance on which projects will come to fruition.

As mentioned in previous comments on the draft Production Planning and Assessment report, there is currently uncertainty around hydrogen production incentives. This means that until hydrogen production projects reach a financial investment decision, and begin the build phase, plans for Angeles Link should remain fluid. Options presented in Phase 1 should be further examined in Phase 2 as the hydrogen industry in California continues to evolve and projects break ground. The route should ultimately be where the production plants come online, and demand centers grow.

SOCALGAS RESPONSE TO COMMENT 36-6

SoCalGas acknowledges this comment. The Design Study will include a new Future Considerations section (Section 8.1.3) of the Design Study that will address scalability and meeting current and near-term energy needs will be considered during route optimization and future siting analyses. Connections to potential clean renewable hydrogen producers and end-users will be evaluated and considered in the preferred route selection process in Phase 2.

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 36-7

The CHBC supports routes that can maximize immediate air quality improvements by increasing offtake of hydrogen to reduce criteria air pollutants and diesel, such as in transportation corridors and transit routes. Variation 1 that generally follows the I-405 corridor should not be considered as this route misses municipal load centers and large-scale electrical generation in the LA Basin.

One must also consider the importance of aligning access points to follow key transportation corridors, from the ports to the Inland Empire. Some consideration should thus be given to Route D that runs through the Riverside area, while potentially having lower impact than other options on disadvantaged communities according to the draft report. It is justified for the route to follow the I-710 corridor to serve bus and truck fleets, and to address routes where there is known load and offtake to decarbonize in the communities along those corridors. The I-405 corridor in Variation 1 does not represent a major transportation corridor with significant municipal loads like other proposed routes and variations.

SOCALGAS RESPONSE TO COMMENT 36-7

Please refer to Global Response 5.

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 36-8

The CHBC emphasizes that while these initial routes represent production and demand centers that are planned today, these plans could change based on a number of factors, such as project viability and policy changes. It is therefore advisable that the Phase 2 work reevaluate the status of hydrogen production and offtake projects and fleets at that future time.

SOCALGAS RESPONSE TO COMMENT 36-8

Please refer to Response to Comment 36-6.

Comment Letter 37 – Reimagine LA

Comment Letter 37

From: Rashad Rucker-Trapp
Sent: Sunday, September 1, 2024 4:08 PM
To: ALP1 Study PAG Feedback
Subject: Review on Nitrogen Oxide (NOx) and Other Air Emissions Assessment

Follow Up Flag: Follow up
Flag Status: Flagged

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Good afternoon My Apologies on the late response

This comprehensive and well-structured report provides a thorough analysis of the potential air quality impacts associated with the proposed Angeles Link project. The study's meticulous approach in evaluating both potential emissions increases from new hydrogen infrastructure and reductions from end-users offers a balanced and realistic assessment of the project's environmental implications.

One of the report's most compelling strengths is its rigorous methodology. The authors have carefully considered a wide range of factors, including various demand scenarios, different hydrogen production methods, and diverse end-use applications. This multi-faceted approach lends credibility to the findings and demonstrates a commitment to thorough scientific analysis.

The study's projection of significant overall NOx reductions is particularly encouraging. The estimated reductions of 5,240 tons/year by 2030 and 20,529 tons/year by 2045 in the Ambitious Demand Scenario highlight the project's potential to make a substantial positive impact on air quality in the region. These projections are especially noteworthy given that they account for potential emissions from new infrastructure.

The report's detailed breakdown of emissions reductions by sector provides valuable insights into where the greatest air quality benefits can be expected. The finding that the mobility sector accounts for over 99% of NOx reductions in the ambitious scenario is a crucial point, underscoring the significant environmental benefits of transitioning to hydrogen fuel cell vehicles, particularly in heavy-duty transportation.

Another commendable aspect of the study is its consideration of other air pollutants beyond NOx. The projected reductions in PM2.5, PM10, and VOC emissions offer a more comprehensive picture of the potential air quality improvements. This broader focus on multiple pollutants strengthens the overall environmental case for the project.

Comment 37-01

The authors' transparency regarding areas of uncertainty and limitations in current data is praiseworthy. By acknowledging these gaps and suggesting areas for future refinement, the report maintains scientific integrity while providing a solid foundation for decision-making.

The inclusion of NOx minimization opportunities through equipment design and post-combustion treatment technologies demonstrates a proactive approach to environmental management. This forward-thinking consideration of mitigation strategies adds practical value to the report.

The study's use of multiple data sources, including CARB models, local air district regulations, and scientific literature, enhances the reliability of its findings. The detailed explanations of calculation methodologies in the appendices provide transparency and allow for thorough review of the analysis.

In conclusion, this draft report presents a compelling case for the potential air quality benefits of the Angeles Link project. Its comprehensive scope, rigorous methodology, and balanced consideration of both emissions increases and reductions make it a valuable resource for policymakers, environmental planners, and stakeholders. While acknowledging areas for future refinement, the study provides strong evidence that the project could contribute significantly to improving air quality in the region, particularly through transformative changes in the transportation sector.

Comment 37-01

REIMAGINE LA COMMENT 37-1

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SOCALGAS RESPONSE TO COMMENT 37-1

Please refer to Global Response 3.

Comment Letter 38 – Reimagine LA

Comment Letter 38

From: Rashad Rucker-Trapp
Sent: Sunday, September 1, 2024 4:12 PM
To: ALP1 Study PAG Feedback
Subject: High-Level Feasibility Assessment and Permitting Analysis:

Follow Up Flag: Follow up
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Good afternoon apologies for the late submission just a lot to review however

This report excels in its comprehensive approach to analyzing the permitting landscape for Angeles Link. The study's systematic evaluation of federal, state, and local jurisdictions demonstrates a deep understanding of the complex regulatory environment surrounding large-scale infrastructure projects. Particularly noteworthy is the detailed breakdown of potential permits required from various agencies, including the Bureau of Land Management, U.S. Forest Service, and California Public Utilities Commission.

The report's consideration of environmental aspects is thorough, addressing both general environmental review processes (NEPA and CEQA) and specific concerns such as impacts on protected species and habitats. The inclusion of estimated timelines for various permits is extremely valuable for project planning and risk assessment. The acknowledgment of potential streamlining legislation for clean hydrogen projects shows foresight and adaptability in the planning process.

The study's approach to analyzing biological and aquatic resources, including the use of multiple databases and a defined biological study area, is methodologically sound. The consideration of both direct impacts and buffer zones demonstrates a nuanced understanding of environmental assessment practices.

The report's discussion of land rights and jurisdictional issues is particularly detailed and helpful, providing a clear picture of the complex land use considerations involved in the project. The inclusion of tribal consultation requirements and cultural resource considerations further enhances the report's comprehensiveness.

Comment 38-01

REIMAGINE LA COMMENT 38-1

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SOCALGAS RESPONSE TO COMMENT 38-1

Please refer to Global Response 3.

Comment Letter 39 – Reimagine LA

Comment Letter 39

From: Rashad Rucker-Trapp
Sent: Sunday, September 1, 2024 4:14 PM
To: ALP1 Study PAG Feedback
Subject: Southern California Gas Company: Angeles Link Employment Impact Analysis

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Good afternoon

This analysis provides an exceptionally detailed and rigorous assessment of the potential economic and employment impacts of Angeles Link. The use of the IMPLAN input-output model lends significant credibility to the projections, as it's a widely accepted tool in economic impact analysis. The report's breakdown of impacts into direct, indirect, and induced effects offers a comprehensive view of the project's potential economic reach, going beyond simple job creation numbers to show the ripple effects throughout the economy.

The analysis's consideration of both the construction phase and ongoing operations gives a full picture of the project's long-term economic effects. The detailed job creation estimates, breaking down figures for each phase and including indirect and induced effects, provide valuable insights for policymakers and stakeholders.

The inclusion of Diverse Business Enterprise participation projections is a particularly positive aspect, demonstrating a commitment to inclusive economic development and aligning with broader social equity goals. The detailed tax revenue projections, broken down by type (property, payroll, sales) and jurisdiction, add significant value for local and state government stakeholders.

The report's methodology is clearly explained, and the use of multiple scenarios (e.g., different pipeline lengths) shows a thoughtful approach to dealing with uncertainty in project planning.The inclusion of county-level breakdowns of economic impacts provides useful granularity for local stakeholders.

Comment 39-01

REIMAGINE LA COMMENT 39-1

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SOCALGAS RESPONSE TO COMMENT 39-1

Please refer to Global Response 3.

Comment Letter 40 – Reimagine LA

Comment Letter 40

From: Rashad Rucker-Trapp
Sent: Sunday, September 1, 2024 4:16 PM
To: ALP1 Study PAG Feedback
Subject: Preliminary Routing/Configuration Analysis

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Good afternoon

This report demonstrates an impressive depth of analysis in identifying and evaluating potential routes for Angeles Link. The systematic approach, including the development of Connection, Collection, and Central Zones, shows strategic thinking in system design that goes beyond simple point-to-point routing. The integration of data from other feasibility studies, such as the Production and Demand studies, indicates a holistic approach to planning that considers the entire hydrogen ecosystem.

The consideration of multiple factors in route selection, including environmental, social, and engineering aspects, is particularly commendable. The use of GIS tools and the Pivvot software for detailed attribute analysis of potential routes shows a sophisticated approach to spatial analysis. The report's detailed matrices for each pipeline segment provide a wealth of information for further analysis and decision-making.

The alignment with existing infrastructure, including the consideration of Alternative Fuel Corridors and existing pipeline rights-of-way, demonstrates a practical approach to minimizing new disturbances. The report's consideration of land rights and jurisdictional issues is thorough and provides valuable insights into potential challenges and opportunities in route selection.

The inclusion of Route Variation 1 in response to stakeholder feedback about disadvantaged communities demonstrates responsiveness and adaptability in the planning process. This shows a commitment to environmental justice considerations and community engagement.

Comment 40-01

The detailed characterization of preferred routes, including their composition by land type, class location, and proximity to existing infrastructure, provides valuable insights for further development. The consideration of future large-scale infrastructure initiatives in the planning process shows foresight and a long-term perspective on regional development.

Overall, this report provides a solid foundation for more detailed route optimization and stakeholder engagement in future phases of the project. Its comprehensive approach and attention to detail set a high standard for infrastructure planning studies.

Best
Rashad Rucker Trapp and Raul Claros
Founders
Reimagine LA Foundation

Comment 40-01

REIMAGINE LA COMMENT 40-1

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SOCALGAS RESPONSE TO COMMENT 40-1

Please refer to Global Response 3.

Comment Letter 41 – Reimagine LA

Comment Letter 41

From: Rashad Rucker-Trapp
Sent: Sunday, September 1, 2024 4:21 PM
To: ALP1 Study PAG Feedback
Subject: Message from Raul Claros

Follow Up Flag: Follow up
Flag Status: Flagged

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To Whom It May Concern:

I write to you today to share my gratitude and appreciation for and to SoCal Gas, for their inclusivity of our black, brown, and indigenous communities in the inner-city of Los Angeles! Through hard earned established relationships that took dedicated time from senior leaders in SoCal Gas like Andy Carrasco, Frank Lopez and Ozzie Peña; SoCal Gas has earned their stripes within our communities of color. Their genuine care for our people in ensuring that we can be respected, invited and taken serious at the social justice table when it comes to environmental justice is second to none! Actually, SoCal Gas is the ONLY utility company or entity who has ever provided this opportunity.

Through longstanding and impactful partnerships, SoCal Gas has earned the respect and license to operate in and with our vulnerable communities. We thank the leadership team for always being transparent and accountable to our households and families. Please accept this note as a testimonial on behalf of the thousands of families that SoCal Gas has helped us serve over the past 4 years via Reimagine LA Foundation.

Warmly,
Raúl Claros, Co-Founder
Reimagine LA Foundation
329 844-5591 cell

Comment 41-01

REIMAGINE LA COMMENT 41-1

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SOCALGAS RESPONSE TO COMMENT 41-1

Please refer to Global Response 3.

Comment Letter 42 – UC Davis

Comment Letter 42

From: Lewis M Fulton <lmfulton@ucdavis.edu>
Sent: Wednesday, September 4, 2024 4:35 PM
To: Angeles Link Outreach <angeleslinkoutreach@arellanoassociates.com>
Cc: Lopez, Frank <flopez5@socalgas.com>; Chester Britt <CBritt@arellanoassociates.com>
Subject: RE: SoCalGas Angeles Link – Draft Reports Feedback due this Friday

Hello all, here are our (UC Davis Hydrogen group) comments and questions on selected draft reports. For the various questions, you can think of these as suggestions for things to address in the report. But we're also happy to discuss anything that you feel arises from these that you'd like to discuss.

Lew Fulton

Pipeline Sizing & Design Criteria Draft Report:

- How will the risk of hydrogen embrittlement be mitigated? Are there more specific details, including material testing protocols and how things will be continually monitored to ensure optimal performance? **Comment 42-01**
- The report discussed further transient hydraulic analysis that addresses how the system will respond to dynamic conditions (i.e. , changes in production and demand). Can you provide more detailed plans for these in the future? **Comment 42-02**
- The cost assumptions and estimates are unclear (specifically materials, labor, and contingencies). Will more specific details be outlined, and how are cost uncertainties **Comment 42-03**

managed?

- Are there further plans on how to design pipelines to scale and adapt to long-term growth projections? How will the system grow as more production sites are added?
- What were the criteria for selecting the pipeline routes? Could there be more explanations of how the route decisions were made?
- It seems like storage considerations were shortly acknowledged. Will there be further analysis into how this is crucial to controlling demand fluctuations?

Preliminary Routing-Configuration Analysis Draft Report:

- It appears that the only factor for the forecast of hydrogen demand in Southern and Central Valley, California, is the population of the respective counties. The population might not reflect the true demand of a place. The preliminary study should consider other factors like 'the number of registered AFVs, land-use policies, and the number of planned infrastructure'.
- Northern California might also share the same hydrogen production facilities located at Central Valley. In that case, the supply-demand study and projection of hydrogen production capacities might fail to reflect the real-world numbers. The study should clarify if Northern California would share any resources from this project, and should leave room for the optimal routing of pipelines for any upcoming projects from the northern region.

Economic Analysis & Cost Effectiveness Draft Report:

The mobility section of the reports calculates the 2030 total cost of ownership (TCO) of fuel cell and battery electric trucks for four applications – sleeper cab, day cab, drayage and transit bus. Assumptions for the TCO analysis have been sourced mainly from Argonne National Lab. The following table offers some suggestions on the assumptions made:

	Current Assumption	Suggestion	Source
Operational characteristics	Operational distance of 100,000 miles a year irrespective of the application	Sleeper cab – 120,000 miles per year (300 to 800 miles per day) Day cab – 90,000 miles per year (200 to 300 miles per day) Drayage – 45,000 miles per year Transit bus – 40,000 miles per year	Burke, A. F., J. Zhao, M. R. Miller, A. Sinha, and L. M. Fulton. Projections of the Costs of Medium- and Heavy-Duty Battery-Electric and Fuel Cell Vehicles (2020-2040) and Related Economic Issues. *Energy for Sustainable Development*, Vol. 77, 2023, p. 101343. Link . Fleming, K. L., A. L. Brown, L. Fulton, and M. Miller. Electrification of Medium- and Heavy-Duty Ground Transportation: Status Report. *Current Sustainable/Renewable*

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Comment 42-05
Comment 42-06
Comment 42-07
Comment 42-08
Comment 42-09

			Energy Reports, Vol. 8, No. 3, 2021, pp. 180–188. Link.
Range improvements	The 2030 range of battery-electric trucks is same as current models	Batteries are expected to have better energy density and efficiency than the current models. Assumptions vary by study, but for example, an ICCT study assumes a 2.1% improvement in efficiency per year. If the range improvements are not considered, better batteries will lead to lower payload penalty and lower dwell cost.	For a review of various studies, please see: Wang, G., L. Fulton, and M. Miller. The Current and Future Performance and Costs of Battery Electric Trucks: Review of Key Studies and A Detailed Comparison of Their Cost Modeling Scope and Coverage. 2022. Link.

Comment 42-09

Review of Angeles Link – H2 Leakage Assessment Draft Report

This assessment does not evaluate potential leakage at end users' equipment, focusing solely on the proposed infrastructure components.

The study identifies potential sources of hydrogen leakage, estimation methodologies, and mitigation opportunities. Literature from the past two decades shows significant variation in hydrogen leakage estimates, highlighting the need for further research to achieve more accurate predictions. Improved sensor detection and direct measurement technologies are essential for better quantification of hydrogen leaks and for assessing the effectiveness of mitigation strategies, which could potentially reduce leakage by over 90%.

However, the study acknowledges a lack of sufficient data to provide detailed leakage estimates specifically for the Angeles Link project, including third-party production and storage. A high-level preliminary estimate was made, but more refined data and detailed infrastructure design are required for more precise predictions. The study also notes the concerns of stakeholders regarding the absence of detailed volumetric leakage estimates and addresses this by incorporating a preliminary estimate based on available literature.

The study's findings on potential leakage and mitigation opportunities related to the Angeles Link project, including production and storage, are intended for Phase 1 and may be refined as hydrogen infrastructure research progresses and in response to feedback from stakeholders. The study identifies potential leakage sources, such as electrolyzers, compressors, storage vessels, and pipelines. Due to insufficient direct measurement data, the total value chain (top-down) approach was chosen as the preferred leakage estimation methodology. Future evaluations could incorporate a component-level approach as more detailed data becomes available.

Comment 42-10

The study acknowledges the current limitations in hydrogen leak measurement data but anticipates advancements in measurement technologies and methodologies, similar to the progress made in natural gas leak detection. As the design of the Angeles Link infrastructure advances, further refinements in evaluating and minimizing hydrogen leakage are expected.

Conclusions:

We consider this an important issue and look forward to further texting and evaluation results from SoCalGas and its partners to help us better understand the leakage characteristics of different systems and how leakage can be minimized.

We are also concerned about leakage from liquid systems (that could be connected to pipelines with a liquefier after delivery) and would be happy to be part of a broader evaluation of entire supply chains, if SoCalGas were interested in involvement in such a project.

Comment 42-10

UC DAVIS COMMENT 42-1

Hello all, here are our (UC Davis Hydrogen group) comments and questions on selected draft reports. For the various questions, you can think of these as suggestions for things to address in the report. But we're also happy to discuss anything that you feel arises from these that you'd like to discuss.

Lew Fulton

Pipeline Sizing & Design Criteria Draft Report:

How will the risk of hydrogen embrittlement be mitigated? Are there more specific details, including material testing protocols and how things will be continually monitored to ensure optimal performance?

SOCALGAS RESPONSE TO COMMENT 42-1

The Design Study explored a range of potential material specifications based on preliminary hydraulic analyses, addressing key aspects such as pipeline wall thickness and pipe composition and physical properties (pipe grade) comparison. A comprehensive material selection evaluation will be performed in Phase 2 after a preferred route is selected for engineering and design, which will consider the mitigation of embrittlement as part of the primary design, monitoring, and development of future operations and maintenance procedures.

UC DAVIS COMMENT 42-2

The report discussed further transient hydraulic analysis that addresses how the system will respond to dynamic conditions (i.e., changes in production and demand). Can you provide more detailed plans for these in the future?

SOCALGAS RESPONSE TO COMMENT 42-2

In Phase 1 a steady-state model was performed using average annual flow rates and was used to determine the preliminary design and evaluate overall system feasibility. The variability in the production and demand profiles in Phase 1 will require further transient hydraulic modeling to understand the time-dependent system response in Phase 2. Transient modeling will require input and information that is currently unknown in Angeles Link Phase 1 such as definitive initial and final operating conditions (flow rates, pressures, and temperatures), detailed pipeline routing and geometry, and distinct location of customers, third-party producers, and third-party storage operators. Transient modeling should be considered in the future, upon further determination of storage site(s), demand sector locations, and pipeline routing selection. The additional modeling will reflect both high-demand/low-production and low-demand/high-production scenarios to fully assess system sizing requirements.

SoCalGas will continue to work with UC Davis in the future regarding engineering design.

UC DAVIS COMMENT 42-3

The cost assumptions and estimates are unclear (specifically materials, labor, and contingencies). Will more specific details be outlined, and how are cost uncertainties managed?

SOCALGAS RESPONSE TO COMMENT 42-3

Section 6.1 in the Design Study ("Basis of Estimate") outlines the methodology, and Section 6.3.1 ("Results/Discussion") provides the materials, land, and ancillary pipeline facility assumptions used to calculate the cost estimates. Please refer to Response to Comment 18-1 for cost estimate uncertainty and accuracy ranges.

UC DAVIS COMMENT 42-4

Are there further plans on how to design pipelines to scale and adapt to long-term growth projections? How will the system grow as more production sites are added?

SOCALGAS RESPONSE TO COMMENT 42-4

Please refer to Response to Comment 36-6 for information around scalability and third-party production and end-user connection considerations.

UC DAVIS COMMENT 42-5

What were the criteria for selecting the pipeline routes? Could there be more explanations of how the route decisions were made?

SOCALGAS RESPONSE TO COMMENT 42-5

Refer to “System Evaluation” and “Route Evaluation” chapters of the Routing Analysis for details on the preferred route identification methodology. A single preferred route will be selected in Phase 2 of Angeles Link with stakeholder feedback incorporated and key elements of route optimization considered, which include, but are not limited to, safety, engineering, environmental, social, and environmental justice.

UC DAVIS COMMENT 42-6

It seems like storage considerations were shortly acknowledged. Will there be further analysis into how this is crucial to controlling demand fluctuations?

SOCALGAS RESPONSE TO COMMENT 42-6

Please refer to Responses to Comments 16-1, 16-2, 16-3 and 16-5.

UC DAVIS COMMENT 42-7

Preliminary Routing-Configuration Analysis Draft Report:

It appears that the only factor for the forecast of hydrogen demand in Southern and Central Valley, California, is the population of the respective counties. The population might not reflect the true demand of a place. The preliminary study should consider other factors like 'the number of registered AFVs, land-use policies, and the number of planned infrastructure'.

SOCALGAS RESPONSE TO COMMENT 42-7

The Demand Study does not identify only one factor to project hydrogen demand in Southern and Central Valley. Numerous factors are considered such as the total vehicle counts, types of vehicles, the number of actual peaker and baseload power plants, as well as the number of and expected equipment at industrial facilities. Applicable policy and legislation, commercial readiness, technical feasibility, business readiness, and timing considerations are additional factors that drove adoption percentages and impacted the projected demand.

Please refer to Scope and Methodology sections in the Introduction of the Demand Study. Additionally, the Demand Study contains further details for each separate sector (power generation, mobility, and industrial) in the Model Scope and Key Assumptions sections. These details underpin the analysis and projected hydrogen demand.

UC DAVIS COMMENT 42-8

Northern California might also share the same hydrogen production facilities located at Central Valley. In that case, the supply-demand study and projection of hydrogen production capacities might fail to reflect the real-world numbers. The study should clarify if Northern California would share any resources from this project, and should leave room for the optimal routing of pipelines for any upcoming projects from the northern region.

SOCALGAS RESPONSE TO COMMENT 42-8

SoCalGas acknowledges UC Davis's comment and will note this for future phases. SoCalGas notes that Angeles Link is intended to deliver clean renewable hydrogen into the LA Basin and broader Southern/Central California region. SoCalGas acknowledges that an open access clean renewable hydrogen system like Angeles Link could, in the future, also facilitate the transportation of clean renewable hydrogen produced outside of SoCalGas's service territory.

UC DAVIS COMMENT 42-9

Economic Analysis & Cost Effectiveness Draft Report:

The mobility section of the reports calculates the 2030 total cost of ownership (TCO) of fuel cell and battery electric trucks for four applications – sleeper cab, day cab, drayage and transit bus. Assumptions for the TCO analysis have been sourced mainly from Argonne National Lab. The following table offers some suggestions on the assumptions made:

	Current Assumption	Suggestion	Source
Operational characteristics	Operational distance of 100,000 miles a year irrespective of the application	Sleeper cab – 120,000 miles per year (300 to 800 miles per day) Day cab – 90,000 miles per year (200 to 300 miles per day) Drayage – 45,000 miles per year Transit bus – 40,000 miles per year	Burke, A. F., J. Zhao, M. R. Miller, A. Sinha, and L. M. Fulton. Projections of the Costs of Medium- and Heavy-Duty Battery-Electric and Fuel Cell Vehicles (2020-2040) and Related Economic Issues. *Energy for Sustainable Development*, Vol. 77, 2023, p. 101343. Link [doi.org]. Fleming, K. L., A. L. Brown, L. Fulton, and M. Miller. Electrification of Medium- and Heavy-Duty Ground Transportation: Status Report. *Current Sustainable/Renewable Energy Reports*, Vol. 8, No. 3, 2021, pp. 180–188. Link [doi.org].
Range Improvements	The 2030 range of battery-electric trucks is same as current models.	Batteries are expected to have better energy density and efficiency than the current models. Assumptions vary by study, but for example, an ICCT study assumes a	For a review of various studies, please see: Wang, G., L. Fulton, and M. Miller. The Current and Future Performance and Costs of Battery Electric

		2.1% improvement in efficiency per year. If the range improvements are not considered, better batteries will lead to lower payload penalty and lower dwell cost.	Trucks: Review of Key Studies and A Detailed Comparison of Their Cost Modeling Scope and Coverage. 2022. Link [doi.org].

SOCALGAS RESPONSE TO COMMENT 42-9

SoCalGas acknowledges UC Davis comment and notes that the study's approach was to use a simplifying assumption for Phase 1, based on information from Argonne labs, and use a consistent miles per year to facilitate comparisons between vehicles on a like for like basis. More granular detail and assumptions on demand and mobility may be considered in future phases.

UC DAVIS COMMENT 42-10

Review of Angeles Link – H2 Leakage Assessment Draft Report

This assessment does not evaluate potential leakage at end users' equipment, focusing solely on the proposed infrastructure components.

The study identifies potential sources of hydrogen leakage, estimation methodologies, and mitigation opportunities. Literature from the past two decades shows significant variation in hydrogen leakage estimates, highlighting the need for further research to achieve more accurate predictions. Improved sensor detection and direct measurement technologies are essential for better quantification of hydrogen leaks and for assessing the effectiveness of mitigation strategies, which could potentially reduce leakage by over 90%.

However, the study acknowledges a lack of sufficient data to provide detailed leakage estimates specifically for the Angeles Link project, including third-party production and storage. A high-level preliminary estimate was made, but more refined data and detailed infrastructure design are required for more precise predictions. The study also notes the concerns of stakeholders regarding the absence of detailed volumetric leakage estimates and addresses this by incorporating a preliminary estimate based on available literature.

The study’s findings on potential leakage and mitigation opportunities related to the Angeles Link project, including production and storage, are intended for Phase 1 and may be refined as hydrogen infrastructure research progresses and in response to feedback from stakeholders. The study identifies potential leakage sources, such as electrolyzers, compressors, storage vessels, and pipelines. Due to insufficient direct measurement data, the total value chain (top-down) approach was chosen as the preferred leakage estimation methodology. Future evaluations could incorporate a component-level approach as more detailed data becomes available.

The study acknowledges the current limitations in hydrogen leak measurement data but anticipates advancements in measurement technologies and methodologies, similar to the progress made in natural gas leak detection. As the design of the Angeles Link infrastructure advances, further refinements in evaluating and minimizing hydrogen leakage are expected.

Conclusions:

We consider this an important issue and look forward to further texting and evaluation results from SoCalGas and its partners to help us better understand the leakage characteristics of different systems and how leakage can be minimized.

We are also concerned about leakage from liquid systems (that could be connected to pipelines with a liquefier after delivery) and would be happy to be part of a broader evaluation of entire supply chains, if SoCalGas were interested in involvement in such a project.

SOCALGAS RESPONSE TO COMMENT 42-10

In response to the comment on the Leakage Study concerning identifying potential leakage at end users' equipment, please refer to Response to Comment 8-1.

In response to the comment concerning further research to estimate leakage and mitigation opportunities, as noted by this comment, the Leakage Study acknowledges the limitations in existing data and that further research and design details of Angeles Link will allow for future refinements of the evaluation for potential leakage and opportunities to minimize leakage as Angeles Link advances.

SoCalGas acknowledges UC Davis's willingness to partner to better understand hydrogen leakage characteristics, how leakage can be minimized and evaluation of potential leakage from liquid systems. We will continue to engage with UC Davis as Angeles Link evolves.

Comment Letter 43 – Southern California Generation Coalition

Comment Letter 43

From: Norman Pedersen
Sent: Thursday, September 5, 2024 5:17 PM
To: Chester Britt - Arellano Associates (cbritt@arellanoassociates.com); Emily Grant; ALP1 Study PAG Feedback
Cc: 'mboccadoro@westcoastadvisors.com'; 'gunnjp@airproducts.com'; 'pasketl@airproducts.com'; 'sdhilton@stoel.com'; 'hellermt@airproducts.com'; 'wiraatv@airproducts.com'; 'galiteva@neoptions.com'; 'Tyson.Eckerle@gobiz.ca.gov'; 'sarah.wiltfong@bizfed.org'; 'christina.tan@bloomenergy.com'; 'steve.cliff@arb.ca.gov'; 'Rizaldo.Aldas@energy.ca.gov'; 'kmfritz@californiahydrogen.org'; 'lhastings@cmta.net'; 'rspiegel@cmta.net'; 'arthur.fisher@cpuc.ca.gov'; 'christopher.arroyo@cpuc.ca.gov'; 'christopher.myers@cpuc.ca.gov'; 'matthew.taul@cpuc.ca.gov'; 'jack.chang@cpuc.ca.gov'; 'Alexander.Cole@cpuc.ca.gov'; 'nick.zanjani@cpuc.ca.gov'; 'nathaniel.skinner@cpuc.ca.gov'; 'kaj.peterson@cpuc.ca.gov'; 'Benjamin.Tang@cpuc.ca.gov'; 'dupadhyay@mwdh2o.com'; 'adaquila@burbankca.gov'; 'diana.tang@lbwater.org'; 'tony.foster@longbeach.gov'; 'dennis.burke@longbeach.gov'; 'mario.cordero@polb.com'; 'nsheriff@buchalter.com'; 'tyson@cleanstrat.com'; 'theodore@cbecal.org'; 'shara@cbecal.org'; 'rcabrales@cbecal.org'; 'jparepally@cbecal.org'; 'LGallagher@cbecal.org'; 'sgersen@earthjustice.org'; 'brian@einow.org'; 'jseong@edf.org'; 'mcolvin@edf.org'; 'Russell@highviewstrat.com'; 'rsalas@pasekicorp.com'; 'deedee.myers@gobiz.ca.gov'; 'sduenas@strategen.com'; 'jlin@strategen.com'; 'karla@harbortruckers.org'; 'matt@harbortrucker.com'; 'smutny@iepa.com'; 'sara@iepa.com'; 'sal.dicostanzo@ilwu13.org'; 'mark.jurisic@ilwu13.org'; 'so10duby@gmail.com'; 'nat.williams@ua250.org'; 'hector.carbajal@ua250.org'; 'aaron.guthrey@ladwp.com'; 'martin.adams@ladwp.com'; 'paul.habib@ladwp.com'; 'nermina.rucic@ladwp.com'; 'jesse.vismonte@ladwp.com'; 'xinhe.li@ladwp.com'; 'eric.hill@ladwp.com'; 'dupadhyay@mwdh2o.com'; 'pbudden@nrdc.org'; 'ejohnson@cityofpasadena.net'; 'mgalvin@portla.org'; 'tdemoss@portla.org'; 'malinda@protectourcommunities.org'; 'rashad.ruckertrapp@reimaginelafoundation.org'; 'raulclaros@ymail.com'; 'monica.embrey@sierraclub.org'; 'julia.dowell@sierraclub.org'; 'teresa.cheng@sierraclub.org'; 'mhajbabaei@aqmd.gov'; 'scao@aqmd.gov'; 'akatzenstein@aqmd.gov'; 'cwilson@socalwater.org'; 'ajise@scag.ca.gov'; Norman Pedersen; 'rlambros@southerncaliforniagroup.com'; 'rcobos@socalpipe.org'; 'cguss@scppa.org'; 'astockwell@uanet.org'; 'Lwernert@ucdavis.edu';

'lmfulton@ucdavis.edu'; 'jbrouwer@uci.edu'; 'arun@engr.ucr.edu'; 'marcel@turn.org'; 'mpanning@turn.org'; 'ernie.shaw@yahoo.com'; 'joejmoreno@uwua132.org'

Subject: SCGC Comment on Angeles Link High Level Economic Analysis & Cost Effectiveness Draft Report

Attachments: 2024-07-26 High-Level Economics & Cost Effectiveness Draft Report (1).pdf; SCGC Angeles Link Draft Production Planning & Assessment.pdf; SCGC Angeles Link Draft Pipeline Sizing & Design Criteria.pdf

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Follow Up Flag: Follow up
Flag Status: Flagged

Chester, Emily,

Thank you for the opportunity for SCGC to comment on the attached 7/26/24 Angeles Link High Level Economic Analysis & Cost Effectiveness Draft Report ("Report"). SCGC's first comment is to reiterate the point raised in SCGC's 8/21/24 Comment (also attached) on the Draft Production Planning & Assessment Report: storage will be essential to provide for the projected power sector ramp requirements. Additionally, the location of the storage is critical. Stored hydrogen will behave hydraulically in a pipeline similarly to natural gas. The fuel will travel at around 20 miles an hour. Consequently, the storage should be located as close to the ramping demand as possible. The storage should be located in or near the Los Angeles Basin to be useful to fast ramping LA Basin power plants.

Comment 43-01

SCGC's second comment is on the projected capital expenditure on the hydrogen transmission, storage, and delivery system. Table 40 (p. 107) in the Report projects capital expenditures of $11.243 billion for the 310 mile Scenario 7 transmission system, $1.419 billion for the 80 mile delivery system, and $4.603 billion for storage, resulting is a total system cost of $17.265 billion, excluding any O&M costs or loaders. That exceeds the $13.4 billion rate base projected in the Test Year 2024 General Rate Case for the entire SoCalGas system. Using the same methodology used in calculating the estimated rate for the $9 billion transmission and delivery system in SCGC's 8/21/24 Comment (also attached) on the Angeles Link Phase 1 Pipeline Sizing & Design Criteria Draft Report, the estimated rate for the $17.265 billion system would be $10.13/Dth. The cost of the system should be reduced to make the project economical.

Comment 43-02

Best Regards,

Norman

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SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 43-1

Thank you for the opportunity for SCGC to comment on the attached 7/26/24 Angeles Link High Level Economic Analysis & Cost Effectiveness Draft Report ("Report"). SCGC's first comment is to reiterate the point raised in SCGC's 8/21/24 Comment (also attached) on the Draft Production Planning & Assessment Report: storage will be essential to provide for the projected power sector ramp requirements. Additionally, the location of the storage is critical. Stored hydrogen will behave hydraulically in a pipeline similarly to natural gas. The fuel will travel at around 20 miles an hour. Consequently, the storage should be located as close to the ramping demand as possible. The storage should be located in or near the Los Angeles Basin to be useful to fast ramping LA Basin power plants.

SOCALGAS RESPONSE TO COMMENT 43-1

SoCalGas acknowledges SCGC's comment. Please refer to Responses to Comments 16-1 and 16-2.

SOUTHERN CALIFORNIA GENERATION COALITION COMMENT 43-2

SCGC's second comment is on the projected capital expenditure on the hydrogen transmission, storage, and delivery system. Table 40 (p. 107) in the Report projects capital expenditures of $11.243 billion for the 310 mile Scenario 7 transmission system, $1.419 billion for the 80 mile delivery system, and $4.603 billion for storage, resulting is a total system cost of $17.265 billion, excluding any O&M costs or loaders. That exceeds the $13.4 billion rate base projected in the Test Year 2024 General Rate Case for the entire SoCalGas system. Using the same methodology used in calculating the estimated rate for the $9 billion transmission and delivery system in SCGC's 8/21/24 Comment (also attached) on the Angeles Link Phase 1 Pipeline Sizing & Design Criteria Draft Report, the estimated rate for the $17.265 billion system would be $10.13/Dth. The cost of the system should be reduced to make the project economical.

SOCALGAS RESPONSE TO COMMENT 43-2

SoCalGas acknowledges this comment and remains committed to safely delivering energy at affordable rates while recognizing the challenge to decarbonize California in an affordable manner. SoCalGas's feasibility analysis performed in Phase 1 provides an initial evaluation of the cost effectiveness of Angeles Link related to potential alternatives. For example, the Cost Effectiveness Study found that, for Phase 1 purposes (e.g., in evaluating the feasibility of developing a project like Angeles Link), a pipeline system like Angeles Link offers the most cost-effective solution to transport clean renewable hydrogen to serve Central and Southern California, including the LA Basin, at scale. The Cost Effectiveness Study also determined that clean renewable hydrogen delivered by Angeles Link would be cost effective relative to electrification and CCS as alternative decarbonization pathways for certain hard-to-electrify sectors, dispatchable power generation, and heavy-duty transportation.

For additional information on the costs of decarbonization efforts, including the role of clean renewable hydrogen, please refer to SoCalGas's Draft Affordability Framework. As discussed therein, California has set ambitious decarbonization goals to achieve by 2045, including carbon neutrality and supplying 100% of electric retail sales from renewable and zero-carbon sources. There is a growing consensus that fully decarbonizing the State's economy will require increasing electrification and, for some end users, clean alternative fuels, such as clean renewable hydrogen. Achieving the State's goals will require significant investment, and, as discussed in the Draft Framework for Affordability Considerations, various studies indicate that the development and integration of clean firm power technologies – including clean renewable hydrogen – is the most cost-effective option for achieving the State's goals at scale.

As noted in the Design Study, SoCalGas is in the early stages of developing preliminary (Class 5) cost estimates for various potential Angeles Link configurations. Additional cost evaluation will occur in future phases of Angeles Link. As discussed in the Draft Framework for Affordability Considerations, as the project work progresses, SoCalGas will seek to maximize opportunities to reduce project costs, including with respect to project siting and design, while maintaining reliability and safety and minimizing environmental impacts.

Comment Letter 44 – California Hydrogen Business Council

Comment Letter 44

California Hydrogen Business Council

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CALIFORNIA HYDROGEN BUSINESS COUNCIL
COMMENTS ON ANGELES LINK PHASE I
DRAFT HIGH-LEVEL ECONOMIC ANALYSIS AND COST EFFECTIVENESS REPORT

September 6, 2024

Submitted via Email to: ALP1_STUDY_PAG_FEEDBACK@INSIGNIAENV.COM

The California Hydrogen Business Council ("CHBC") respectfully comments on the following Angeles Link Phase 1 draft High-Level Economic Analysis and Cost Effectiveness Report ("Report") posted by the Southern California Gas Company in the Angeles Link Living Library on July 26, 2024.

1. Comments on the High-Level Economic Analysis and Cost Effectiveness Draft Report

The basis for the draft Report reflects the best information available today. As noted in the CHBC comments on the Hydrogen Production Planning & Assessment draft report, there are many uncertainties that will inform more refined analyses in Phase 2 studies, including cost effectiveness. These include: 1) final hydrogen production (and other) tax credit guidance from Treasury; 2) which of the currently planned hydrogen production projects in California will proceed through a final investment decision; and 3) to be established hydrogen certification requirements.

Comment 44-01

With respect to the identified Hydrogen Delivery Alternatives, the CHBC agrees with the approach of the Report. While hydrogen prices are high today, the Report findings are consistent with industry knowledge that it is cost-effective to deliver hydrogen by pipeline and that hydrogen can also be a cost-effective decarbonization pathway for hard-to-decarbonize and hard-to-electrify sectors. It is important to consider that two-thirds of energy consumed in California today comes from molecules. The projected costs and affordability of decarbonizing molecules are relatively less than the current

Comment 44-02

costs projected for electric transmission upgrades and decarbonization efforts, and this has been contemplated in the Report.

The Report represents an initial economic and cost analysis with assumptions and variables based on what is known or predicted today. Validation of many of these assumptions comes from the U.S. Department of Energy ("DOE") National Clean Hydrogen Strategy and Roadmap. Legislative language set forth in Section 40314 of the Infrastructure Investment and Jobs Act (Public Law 117-58), also known as the Bipartisan Infrastructure Law ("BIL"), specifically amends Title VIII of the Energy Policy Act of 2005 (EPACT-2005) by adding Section 814 - National Clean Hydrogen Strategy and Roadmap ("Roadmap"). Section 814 states that carrying out the programs in the BIL includes transportation corridors and modes of transportation, including transportation of clean hydrogen by pipeline and rail and through ports. The Roadmap includes milestones for hydrogen delivery at scale today and that in the future "gaseous pipelines are commonly used when demand is predictable for decades and at a regional scale of thousands of tonnes per day." This regional scale in part refers to the economies of scale predicted to be engendered by the hydrogen hubs, including the California ARCHES hub. The ultimate hydrogen production capacity and locations in ARCHES will further inform updates to costs, in addition to design and routing, in Phase 2 of Angeles Link.

Comment 44-02

According to the Roadmap, in the 2030-2035 timeframe the DOE intends to collect data, including emissions data, from demonstrations of bulk hydrogen distribution (e.g., through pipelines or carriers) in real-world environments to inform research, development, demonstration, and deployment that reduces cost.

The DOE Hydrogen Shot, launched June 7, 2021, seeks to reduce the cost of clean hydrogen by 80% to $1 per one kilogram in one decade. The 2023 DOE Pathways to Commercial Liftoff: Clean Hydrogen report predicts that if state-of-the-art advances in hydrogen distribution and storage technology

Comment 44-03

are commercialized and potential end uses come to fruition, 2030 midstream costs could be at $0.1/kg at 600 tpd, 300 km, 12" OD or $0.1/kg at ~5000 tpd, 1000 km, 42" OD.

With the significant strategies for cost reduction of hydrogen planned by the DOE, and research, development, and demonstration underway at national laboratories and private industry, the approach laid out in the Report is justified. The CHBC therefore recommends that Angeles Link proceed with the proposed design and then review costs again in Phase 2 based on outcomes of the current uncertainties outlined above and updated forecasts at that time. With this updated information, Phase 2 would also be the appropriate juncture to review affordability and cost allocation, when there is a better sense of viability and location of hydrogen production facilities, assured end user demand of ARCHES projects, and certainty of tax credit guidance.

Comment 44-03

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Respectfully submitted,

/s/ Katrina M. Fritz
Katrina M. Fritz
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CALIFORNIA HYDROGEN BUSINESS COUNCIL
901 H St, Ste 120, #74
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Dated: September 6, 2024

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CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 44-1

The California Hydrogen Business Council ("CHBC") respectfully comments on the following Angeles Link Phase 1 draft High-Level Economic Analysis and Cost Effectiveness Report ("Report") posted by the Southern California Gas Company in the Angeles Link Living Library on July 26, 2024.

1. Comments on the High-Level Economic Analysis and Cost Effectiveness Draft Report

The basis for the draft Report reflects the best information available today. As noted in the CHBC comments on the Hydrogen Production Planning & Assessment draft report, there are many uncertainties that will inform more refined analyses in Phase 2 studies, including cost effectiveness. These include: 1) final hydrogen production (and other) tax credit guidance from Treasury; 2) which of the currently planned hydrogen production projects in California will proceed through a final investment decision; and 3) to be established hydrogen certification requirements.

SOCALGAS RESPONSE TO COMMENT 44-1

SoCalGas concurs that future analysis of Angeles Link will be informed by additional available information as the project progresses. SoCalGas will continue to monitor production costs, the continued planning and development of third-party clean renewable hydrogen production projects, and hydrogen certification requirements.

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 44-2

With respect to the identified Hydrogen Delivery Alternatives, the CHBC agrees with the approach of the Report. While hydrogen prices are high today, the Report findings are consistent with industry knowledge that it is cost-effective to deliver hydrogen by pipeline and that hydrogen can also be a cost-effective decarbonization pathway for hard-to-decarbonize and hard-to-electrify sectors. It is important to consider that two-thirds of energy consumed in California today comes from molecules. The projected costs and affordability of decarbonizing molecules are relatively less than the current costs projected for electric transmission upgrades and decarbonization efforts, and this has been contemplated in the Report.

The Report represents an initial economic and cost analysis with assumptions and variables based on what is known or predicted today. Validation of many of these assumptions comes from the U.S. Department of Energy ("DOE") National Clean Hydrogen Strategy and Roadmap. Legislative language set forth in Section 40314 of the Infrastructure Investment and Jobs Act (Public Law 117-58), also known as the Bipartisan Infrastructure Law ("BIL"), specifically amends Title VIII of the Energy Policy Act of 2005 (EPACT-2005) by adding Section 814 - National Clean Hydrogen Strategy and Roadmap ("Roadmap"). Section 814 states that carrying out the programs in the BIL includes transportation corridors and modes of transportation, including transportation of clean hydrogen by pipeline and rail and through ports. The Roadmap includes milestones for hydrogen delivery at scale today and that in the future "gaseous pipelines are commonly used when demand is predictable for decades and at a regional scale of thousands of tonnes per day." This regional scale in part refers to the economies of scale predicted to be engendered by the hydrogen hubs, including the California ARCHES hub. The ultimate hydrogen production capacity and locations in ARCHES will further inform updates to costs, in addition to design and routing, in Phase 2 of Angeles Link.

SOCALGAS RESPONSE TO COMMENT 44-2

SoCalGas acknowledges CHBC's comment.

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 44-3

According to the Roadmap, in the 2030-2035 timeframe the DOE intends to collect data, including emissions data, from demonstrations of bulk hydrogen distribution (e.g., through pipelines or carriers) in real-world environments to inform research, development, demonstration, and deployment that reduces cost.

The DOE Hydrogen Shot, launched June 7, 2021, seeks to reduce the cost of clean hydrogen by 80% to $1 per one kilogram in one decade. The 2023 DOE Pathways to Commercial Liftoff: Clean Hydrogen report predicts that if state-of-the-art advances in hydrogen distribution and storage technology are commercialized and potential end uses come to fruition, 2030 midstream costs could be at $0.1/kg at 600 tpd, 300 km, 12” OD or $0.1/kg at ~5000 tpd, 1000 km, 42” OD.

With the significant strategies for cost reduction of hydrogen planned by the DOE, and research, development, and demonstration underway at national laboratories and private industry, the approach laid out in the Report is justified. The CHBC therefore recommends that Angeles Link proceed with the proposed design and then review costs again in Phase 2 based on outcomes of the current uncertainties outlined above and updated forecasts at that time. With this updated information, Phase 2 would also be the appropriate juncture to review affordability and cost allocation, when there is a better sense of viability and location of hydrogen production facilities, assured end user demand of ARCHES projects, and certainty of tax credit guidance.

SOCALGAS RESPONSE TO COMMENT 44-3

SoCalGas acknowledges CHBC’s comment.

Comment Letter 45 – Cal Advocates

Comment Letter 45

The Public ADVOCATES OFFICE

September 6, 2024

Comments of the Public Advocates Office on Southern California Gas Company's Angeles Link High-Level Economic Analysis and Cost Effectiveness Draft Report

The Public Advocates Office at the California Public Utilities Commission (Cal Advocates) provides these comments on Southern California Gas Company's (SoCalGas) *Angeles Link High-Level Economic Analysis and Cost Effectiveness* (Cost Effectiveness Draft Report), which was issued on July 26, 2024.

SoCalGas must prove Sufficient, Safe Underground Hydrogen Storage Exists for its Levelized Cost of Hydrogen Storage Cost Assumption

Comment 45-01

The Cost Effectiveness Draft Report provides an updated comparison of the Levelized Cost of Hydrogen Analysis for the Angeles Link and several non-pipeline alternatives.[1] In the Cost Effectiveness Draft Report, SoCalGas continues to assume that the 'Angeles Link Pipeline System', as well as 'Gaseous' and 'Liquid Trucking' alternatives, will benefit from being able to use underground hydrogen storage (UHS) whereas the other alternatives must rely upon much more expensive above-ground storage (*see* Figure 1).[2,3] This assumption plays a substantial part in making the Angeles Link the "the most cost-effective delivery method when compared to the identified Hydrogen Delivery Alternatives for Phase 1 purposes."[4] Significantly, without this assumption, the Angeles Link Pipeline System would rank only slightly more cost-efficient than 'Liquid

[1] The 'Angeles Link Pipeline System' is compared against the Hydrogen Delivery Alternatives of 'Liquid Hydrogen Shipping', 'In-Basin Production w/ Power T&D', 'Methanol Shipping', 'Gaseous Trucking', 'Localized Hub', and 'Liquid Trucking'. *Angeles Link High-Level Economic Analysis and Cost Effectiveness* (Cost Effectiveness Draft Report), Figure 2 at 13.
[2] "For Angeles Link and the trucking alternatives (gaseous and liquid), identified routes allowed for access to underground storage sites, therefore, underground storage costs were assumed. Delivery alternatives with production sites that did not overlap with the identified geological storage sites, were assumed to rely on above ground storage." Cost Effectiveness Draft Report, at 13
[3] Table 41 shows Depleted Oil Field UHS costs $3,968 (US$MM) compared to Above Ground Liquid Storage cost of $28,013 (US$MM). This means the levelized cost of UHS is estimated at over six times less expensive than above-ground storage solutions. Cost Effectiveness Draft Report, at 110.
[4] Cost Effectiveness Draft Report, at 14.

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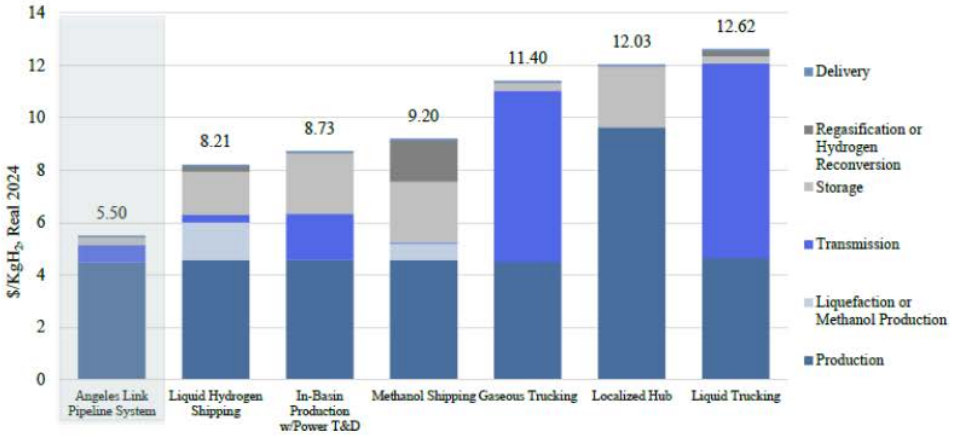
Hydrogen Shipping' and 'In-Basin Production w/ Power T&D'.[5] As Cal Advocates stated in previous comments,[6] SoCalGas's cost assumptions for the Angeles Link are optimistic as they rely on two as yet unproven facts: 1) that there is sufficient UHS available and 2) that the UHS is safe to operate.

Figure 1 - Cost Effectiveness of Angeles Link vs Hydrogen Delivery Alternatives, taken from the Cost Effectiveness Draft Report, at 32



Comment 45-01

SoCalGas' own analysis highlights the knowledge gaps that are inherent to UHS. Analysis in the *Angeles Link Production Planning & Assessment Draft Report* (Production Draft Report) catalogued the availability of underground hydrogen storage in a region spanning Southern California, Arizona, Nevada, and Utah[7] and calculated a composite value to rank the feasibility of UHS in each oil and gas field in California.[8] While this research is helpful to show availability of storage locations, it does not address the fact that conversion of oil and gas fields to hydrogen storage is both an unproven technology and without precedent in a commercial setting. The Production Draft Report stated:

> There are currently no permitted examples of UHS in depleted reservoirs, and engineering and geological requirements for UHS are currently not defined. The lack of a regulatory framework may result in delays and challenges to implementation.[9]

[5] Cost Effectiveness Draft Report, Figure 2 at 13.
[6] Cal Advocates' Informal Comments on *SoCalGas Angeles Link Pipeline Sizing Preliminary Findings*, at 3-5.
[7] *Angeles Link Production Planning & Assessment Draft Report* (Production Draft Report), at 87.
[8] Production Draft Report, Appendix C, at 87-111.
[9] Production Draft Report, at 77.

2

The Production Report later identifies seven concerns for bringing UHS depleted oil and gas fields to commercial success. These concerns include the lack of commercially operable projects to properly estimate capital and operational costs.[10] Given the skepticism evident in SoCalGas's own Production Report, SoCalGas needs to explain and provide support for why it believes the operation of UHS using depleted oil fields is a viable option, that will be commercially available and feasible in the timeline proposed in the Cost Effectiveness Draft Report.

Most critical to the issue of utilizing depleted oil and gas fields for UHS are the many unanswered safety questions that need to be resolved before such facilities can be deemed safe to operate. In its Informal Comments on Pipeline Sizing Preliminary Findings, Cal Advocates cites the UCR Study commissioned by the CPUC which notes twenty major safety issues related to storing hydrogen inside of depleted oil and gas fields.[11] Rather than provide answers to these questions, SoCalGas's Production Draft Report either repeats or raises new safety concerns: these unaddressed safety concerns include hydrogen losses due to microbial activity,[12] leakage of hydrogen due to penetration through sealing rocks or wellbores,[13] and embrittlement of casings and tubing of existing storage field infrastructure.[14] These safety concerns must be addressed before SoCalGas can assume that UHS is feasible in depleted oil and gas reservoirs in California.

Comment 45-01

Conclusion

If SoCalGas insists on relying on UHS to make the case for the cost effectiveness of the Angeles Link, then it must provide substantial evidence to support its assertion that its pipeline project will be able to leverage safe underground storage at a levelized cost that is six times less expensive than its above-ground storage counterparts.[15] If no additional evidence related to the suitability and safety of the depleted gas and oil fields is

[10] Production Draft Report, at 73.
[11] "Hydrogen is known to have serious detrimental effects on underground porous reservoirs. Twenty different hydrogen related phenomena have been observed that have negative effects on porous reservoirs' performance as storage facilities for methane-hydrogen gas blends. The most serious of these is bacterial growth and activity, resulting in loss of gas volume, potential for H_2S production and damage to reservoir itself [44]." UCR Study, at 15.
[12] One of the seven listed concerns for commercial application of depleted oil and gas reservoirs for UHS includes "Potential for loss of hydrogen by microbial activity." Production Draft Report, at 73.
[13] "However, due to the unique properties of hydrogen gas, there remain uncertainties with respect to the movement and recoverability of hydrogen injected for storage in depleted reservoirs, primarily relating to loss of hydrogen via biological and geochemical activity, and leakage through sealing rocks and improperly sealed wellbores." Production Draft Report, at 77.
[14] "Additionally, interaction of hydrogen with existing field infrastructure originally implemented for oil and gas storage and extraction may cause adverse effects such as embrittlement of casing and tubing, which has the potential to lead to well integrity issues and potential leak pathways." Production Draft Report, at 77.
[15] Table 41 shows Depleted Oil Field UHS costs $3,968 (US$MM) compared to Above Ground Liquid Storage cost of $28,013 (US$MM). This means the levelized cost of UHS is estimated at over six times less expensive than above-ground storage solutions. Cost Effectiveness Draft Report, at 110.

provided, then SoCalGas should make the safe and prudent assumption that only aboveground storage would be available to operate with the Angeles Link.

Comment 45-01

CAL ADVOCATES COMMENT 45-1

The Public Advocates Office at the California Public Utilities Commission (Cal Advocates) provides these comments on Southern California Gas Company's (SoCalGas) Angeles Link High-Level Economic Analysis and Cost Effectiveness (Cost Effectiveness Draft Report), which was issued on July 26, 2024.

SoCalGas must prove Sufficient, Safe Underground Hydrogen Storage Exists for its Levelized Cost of Hydrogen Storage Cost Assumption

The Cost Effectiveness Draft Report provides an updated comparison of the Levelized Cost of Hydrogen Analysis for the Angeles Link and several non-pipeline alternatives.FN1 In the Cost Effectiveness Draft Report, SoCalGas continues to assume that the 'Angeles Link Pipeline System', as well as 'Gaseous' and 'Liquid Trucking' alternatives, will benefit from being able to use underground hydrogen storage (UHS) whereas the other alternatives must rely upon much more expensive above-ground storage (see Figure 1).FN2,3 This assumption plays a substantial part in making the Angeles Link the "the most cost-effective delivery method when compared to the identified Hydrogen Delivery Alternatives for Phase 1 purposes."FN4 Significantly, without this assumption, the Angeles Link Pipeline System would rank only slightly more cost-efficient than 'Liquid Hydrogen Shipping' and 'In-Basin Production w/ Power T&D'.FN5 As Cal Advocates stated in previous comments,FN6 SoCalGas's cost assumptions for the Angeles Link are optimistic as they rely on two as yet unproven facts: 1) that there is sufficient UHS available and 2) that the UHS is safe to operate.

SoCalGas' own analysis highlights the knowledge gaps that are inherent to UHS. Analysis in the Angeles Link Production Planning & Assessment Draft Report (Production Draft Report) catalogued the availability of underground hydrogen storage in a region spanning Southern California, Arizona, Nevada, and UtahFN7 and calculated a composite value to rank the feasibility of UHS in each oil and gas field in California.FN8 While this research is helpful to show availability of storage locations, it does not address the fact that conversion of oil and gas fields to hydrogen storage is both an unproven technology and without precedent in a commercial setting. The Production Draft Report stated:

There are currently no permitted examples of UHS in depleted reservoirs, and engineering and geological requirements for UHS are currently not defined. The lack of a regulatory framework may result in delays and challenges to implementation.FN9

The Production Report later identifies seven concerns for bringing UHS depleted oil and gas fields to commercial success. These concerns include the lack of commercially operable projects to properly estimate capital and operational costs. FN10 Given the skepticism evident in SoCalGas's own Production Report, SoCalGas needs to explain and provide support for why it believes the operation of UHS using depleted oil fields is a viable option, that will be commercially available and feasible in the timeline proposed in the Cost Effectiveness Draft Report.

Most critical to the issue of utilizing depleted oil and gas fields for UHS are the many unanswered safety questions that need to be resolved before such facilities can be deemed safe to operate. In its Informal Comments on Pipeline Sizing Preliminary Findings, Cal Advocates cites the UCR Study commissioned by the CPUC which notes twenty major safety issues related to storing hydrogen inside of depleted oil and gas fields.FN11 Rather than provide answers to these questions, SoCalGas's Production Draft Report either repeats or raises new safety concerns: these unaddressed safety concerns include hydrogen losses due to microbial activity,FN12 leakage of hydrogen due to penetration through sealing rocks or wellbores,FN13 and embrittlement of casings and tubing of existing storage field infrastructure.FN14

These safety concerns must be addressed before SoCalGas can assume that UHS is feasible in depleted oil and gas reservoirs in California.

Conclusion

If SoCalGas insists on relying on UHS to make the case for the cost effectiveness of the Angeles Link, then it must provide substantial evidence to support its assertion that its pipeline project will be able to leverage safe underground storage at a levelized cost that is six times less expensive than its above-ground storage counterparts.FN15 If no additional evidence related to the suitability and safety of the depleted gas and oil fields is provided, then SoCalGas should make the safe and prudent assumption that only aboveground storage would be available to operate with the Angeles Link.

FN1 – The 'Angeles Link Pipeline System' is compared against the Hydrogen Delivery Alternatives of 'Liquid Hydrogen Shipping', 'In-Basin Production w/ Power T&D', 'Methanol Shipping', 'Gaseous Trucking', 'Localized Hub', and 'Liquid Trucking'. Angeles Link High-Level Economic Analysis and Cost Effectiveness (Cost Effectiveness Draft Report), Figure 2 at 13.

FN2 – "For Angeles Link and the trucking alternatives (gaseous and liquid), identified routes allowed for access to underground storage sites, therefore, underground storage costs were assumed. Delivery alternatives with production sites that did not overlap with the identified geological storage sites, were assumed to rely on above ground storage." Cost Effectiveness Draft Report, at 13

FN3 – Table 41 shows Depleted Oil Field UHS costs $3,968 (US$MM) compared to Above Ground Liquid Storage cost of $28,013 (US$MM). This means the levelized cost of UHS is estimated at over six times less expensive than above-ground storage solutions. Cost Effectiveness Draft Report, at 110.

FN4 – Cost Effectiveness Draft Report, at 14.
FN5 – Cost Effectiveness Draft Report, Figure 2 at 13.

FN6 – Cal Advocates' Informal Comments on SoCalGas Angeles Link Pipeline Sizing Preliminary Findings, at 3-5.

FN7 – Angeles Link Production Planning & Assessment Draft Report (Production Draft Report), at 87.
FN8 – Production Draft Report, Appendix C, at 87-111.
FN9 – Production Draft Report, at 77.
FN10 – Production Draft Report, at 73.

FN11 –"Hydrogen is known to have serious detrimental effects on underground porous reservoirs. Twenty different hydrogen related phenomena have been observed that have negative effects on porous reservoirs' performance as storage facilities for methane-hydrogen gas blends. The most serious of these is bacterial growth and activity, resulting in loss of gas volume, potential for H2S production and damage to reservoir itself [44]." UCR Study, at 15.

FN12 – One of the seven listed concerns for commercial application of depleted oil and gas reservoirs for UHS includes "Potential for loss of hydrogen by microbial activity." Production Draft Report, at 73.

FN13 – "However, due to the unique properties of hydrogen gas, there remain uncertainties with respect to the movement and recoverability of hydrogen injected for storage in depleted reservoirs, primarily relating to loss of hydrogen via biological and geochemical activity, and leakage through sealing rocks and improperly sealed wellbores." Production Draft Report, at 77.

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SOCALGAS RESPONSE TO COMMENT 45-1

As noted in the Production Study, Section 8.0, aboveground and underground storage are not currently part of Angeles Link. As Angeles Link is further designed and, in alignment with the development of system requirements, the role of storage to support regional hydrogen producers and end users should be considered. Distributed storage equipment located at third-party production and end user sites, along with system line-pack, can provide storage capacity while scale storage technologies are developed over time to support regional hydrogen hub requirements.

Storage methods for each delivery alternative are location-bound, meaning the type of storage assumed depends on availability (or lack thereof) near the delivery alternative's value chain. Angeles Link would pass through third-party production regions, such as SJV and Lancaster, and there is potential to use depleted oil/gas reservoirs near Bakersfield. Like pipelines, gas and liquid trucking can move hydrogen from production to underground storage to demand and were modeled as such. To accommodate production near the LA Basin, specifically in-basin production, it was assumed it would be necessary to construct above-ground storage facilities due to the limited availability of underground storage options within the LA Basin.[54] Please see Section 4.3.1. Evaluation of Hydrogen Delivery Alternatives in the Alternatives Study for more information.

Please also refer to Response to Comment 33-15.

[54] Section 7.5.1. (Storage) in the Cost Effectiveness Study

Comment Letter 46 – Environmental Defense Fund

Comment Letter 46

Environmental Defense Fund

September 6, 2024

Chester Britt
Planning Advisory Group Facilitator

Emily Grant
Angeles Link Senior Public Affairs Representative
Southern California Gas Company

Alisa Lykens
Director
Insignia Environmental

Subject: Environmental Defense Fund Comments on Planning Advisory Group Draft Reports

Environmental Defense Fund (EDF) shares the following comments on draft reports from the Angeles Link Planning Advisory Group Facilitator team on the topics of high-level economic analysis and cost-effectiveness; project options and alternatives; and environmental analysis. Overall, EDF believes it is important to **compare the full range of alternatives and their impacts**—especially in areas where there are acknowledged gaps in the reports—if SoCalGas were to proceed in requesting regulatory approval for this project. Additionally, EDF expresses concern that certain **assumptions around the economic analysis of a potential hydrogen pipeline and alternatives appear overly generous** towards hydrogen applications.

Comment 46-01

The purpose of the Phase 1 studies is to gain insight into whether the potential Angeles Link project would be a cost- and climate-effective decarbonization pathway for end-users in the Los Angeles basin; and, in turn, would be a just and reasonable use of ratepayer funds if SoCalGas decides to proceed with the project. To make this determination, the full range of alternatives and impacts must be accurately compared. The draft reports, however, fall short in taking a comprehensive comparison of alternatives and their impacts. For example, the High-level Economic Analysis and Cost-Effectiveness Report compares hydrogen retrofit generation with 12-hour lithium-ion long-duration energy storage to examine the cost-effectiveness of various alternatives for electricity supply.[1] Other long-duration energy storage options such as pumped

[1] High-level Economic Analysis and Cost-effectiveness Report at 19.

hydro, thermal, or iron-air technology—some of which may be more technologically mature, cost-effective, or more suitable for the expected end-use cases than lithium-ion battery storage—are not considered. The draft report and the analysis should be expanded to cover the full range of potential alternatives for the various end-uses examined; or at a minimum, provide detailed justification of why certain alternatives were chosen for comparison over others. The current draft report, however, does neither.

Comment 46-01

Similarly, while the Environmental Analysis Report lists out various alternative decarbonization pathways and their respective potential environmental impacts, their magnitude or comparative impacts are not included. [2] EDF acknowledges that at this preliminary stage, providing an exact comparative analysis may be difficult. However, detailed analysis would be necessary if SoCalGas decides to move forward with requesting regulatory approval for the Angeles Link project—and as such, represents a critical knowledge gap in the reports.

Comment 46-02

Moreover, the comparative cost-effectiveness of the hydrogen pipeline and other alternatives as claimed in the report must be understood within the broader context of their climate- and environmental impacts. For example, the High-level Economic Analysis and Cost-Effectiveness Report finds that hydrogen-fueled kilns are more cost-effective than to electrification alternatives.[3] While cost-effectiveness is a key factor, it is also important to keep other factors in mind—including environmental impacts, technological maturity, end-user preferences, and the impact on local communities. Whether hydrogen is the most suitable decarbonization pathway for a specific end-use is a decision that must be made comprehensively, taking into account various factors including, but not limited to, cost-effectiveness. Similarly, the High-level Economic Analysis and Cost-Effectiveness Report finds that clean renewable hydrogen is a less cost-effective option for refinery use than hydrogen abated through CCS.[4] However, EDF studies have shown that such "blue" hydrogen (*i.e.*, hydrogen from fossil fuel reformation coupled with CCS) applications can be an ineffective climate solution, due to concerns around leakage and the role of

Comment 46-03

[2] Environmental Analysis Report at ES-9.
[3] High-level Economic Analysis and Cost Effectiveness Report at 19.
[4] Ibid, at 21-22.

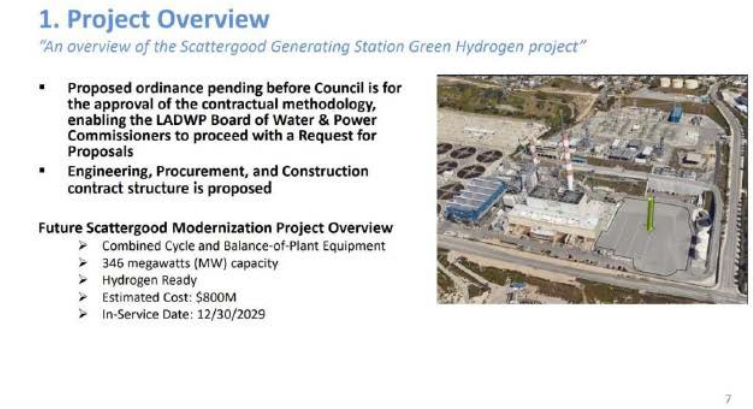
hydrogen as an indirect gas.[5] It is important not to conflate "cost-effective" with "lowest-cost" to justify less environmentally and climate-robust options.

Comment 46-03

In addition to the broader comments above, EDF highlights specific concerns around the assumptions and parameters used in the High-Level Economic Analysis and Cost-Effectiveness Report. Certain assumptions appear overly generous in favor of hydrogen use-cases over other decarbonization pathways; and granular details are unavailable due to the use of a proprietary modeling tool.

For example, the report finds that the capital expenditure costs (CAPEX) for hydrogen combustion turbine retrofit would range from $156/kw to $260/kw; it also assumes that the net capacity factor for a retrofit hydrogen turbine would be around 9-11% when used to meet peak demand.[6] Such figures, however, are at odds with details shared by some planned or realized retrofit projects. In 2023, the LA City Council approved a $800 million dollar project to retrofit the existing gas-fired power plants located at Scattergood Generation Station.[7]

Comment 46-04



[5] Ocko, I. B. and Hamburg, S. P.: Climate consequences of hydrogen emissions, Atmos. Chem. Phys., 22, 9349–9368, https://doi.org/10.5194/acp-22-9349-2022, 2022.
[6] High-level Economic Analysis and Cost Effectiveness Report at 101.
[7] Roth, Sammy, "L.A. is shutting down its largest gas plant — and replacing it with an unproven hydrogen project", *The Los Angeles Times*, Feb. 8, 2023. Accessible at: https://www.latimes.com/business/story/2023-02-08/l-a-is-shutting-down-a-coastal-gas-plant-and-replacing-it-with-hydrogen

The project would replace exist units 1 and 2 with an overall capacity of 346 MW—or *$2,300/kw*—and is expected to be operational extremely infrequently with a capacity factor closer to 1-5%.[8] The details from the planned Scattergood project, in comparison with figures provided in the draft report, raises the concern that the economic assumptions behind the report may be too generous. Furthermore, many of the specific figures in the report cite a model used by WoodMackenzie and studies from the National Petroleum Council.[9] Without having access to the model used by the consultants, it is impossible for PAG members to accurately understand the assumptions behind the report or the engage with them. EDF strongly urges that steps be taken to provide access to the model and its assumptions, in order for PAG members to engage with the Phase 1 feasibility study process more constructively.

Comment 46-04

Respectfully,

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[8] LADWP, "Scattergood Modernization Project", February 3, 2023. Accessible at: https://clkrep.lacity.org/onlinedocs/2023/23-0039_rpt_DWP_02-03-2023.pdf. See also, LADWP Presentation to the Board of Commissioners; record accessible here: https://ladwp.granicus.com/MediaPlayer.php?view_id=2&clip_id=1960.
[9] High-level Economic Analysis and Cost Effectiveness Report at 101.

ENVIRONMENTAL DEFENSE FUND COMMENT 46-1

Environmental Defense Fund (EDF) shares the following comments on draft reports from the Angeles Link Planning Advisory Group Facilitator team on the topics of high-level economic analysis and cost-effectiveness; project options and alternatives; and environmental analysis. Overall, EDF believes it is important to compare the full range of alternatives and their impacts—especially in areas where there are acknowledged gaps in the reports—if SoCalGas were to proceed in requesting regulatory approval for this project. Additionally, EDF expresses concern that certain assumptions around the economic analysis of a potential hydrogen pipeline and alternatives appear overly generous towards hydrogen applications.

The purpose of the Phase 1 studies is to gain insight into whether the potential Angeles Link project would be a cost- and climate-effective decarbonization pathway for end-users in the Los Angeles basin; and, in turn, would be a just and reasonable use of ratepayer funds if SoCalGas decides to proceed with the project. To make this determination, the full range of alternatives and impacts must be accurately compared. The draft reports, however, fall short in taking a comprehensive comparison of alternatives and their impacts. For example, the High-level Economic Analysis and Cost-Effectiveness Report compares hydrogen retrofit generation with 12-hour lithium-ion long-duration energy storage to examine the cost-effectiveness of various alternatives for electricity supply.FN1 Other long-duration energy storage options such as pumped hydro, thermal, or iron-air technology—some of which may be more technologically mature, cost-effective, or more suitable for the expected end-use cases than lithium-ion battery storage—are not considered. The draft report and the analysis should be expanded to cover the full range of potential alternatives for the various end-uses examined; or at a minimum, provide detailed justification of why certain alternatives were chosen for comparison over others. The current draft report, however, does neither.

FN1 – High-level Economic Analysis and Cost-effectiveness Report at 19.

SOCALGAS RESPONSE TO COMMENT 46-1

In response to the general comment concerning the consideration of various decarbonization pathways in the Alternatives Study, Section 1.2 of the study provides a summary of how SoCalGas developed the initial list of alternatives for consideration. SoCalGas initially considered a wide range of hydrogen delivery alternatives and non-hydrogen delivery alternatives. Alternatives that could not meet the equivalent energy demand serviced by Angeles Link or could not meet the defined set of scoring criteria were not carried forward for further evaluation.

In response to the specific comment requesting more analysis of other potential non-hydrogen alternatives, Section 4.1 of the Alternatives Study provides a summary of the hydrogen delivery alternatives that were considered. The non-hydrogen alternatives were defined to address specific use cases within the priority sectors identified in the Demand Study across the mobility, power, and industrial sectors. Non-hydrogen alternatives comprised alternative decarbonization technologies, including electrification and carbon capture and sequestration (CCS). Other potential non-hydrogen alternatives were considered but not selected for further evaluation, including renewable natural gas (RNG), energy efficiency, nuclear power generation, hydro power generation, geothermal power generation, plug-in hybrid vehicles, bio-fuels, and ethanol vehicles. Section 4.2.2.2 of the Alternatives Study provides a summary of why certain non-hydrogen alternatives were screened out from further

analysis. For example, due to limited new capacity additions expected in the 2022 CARB Scoping Plan, hydro power generation (including pumped hydro storage) and geothermal power generation were screened out from further consideration.

In addition, Section 7.3.4 of the Alternatives Study explains that for a comparison of Angeles Link to non-hydrogen alternatives, Angeles Link was assessed for the power sector based on hydrogen-fueled combustion turbines (hydrogen turbines), and electrification was evaluated based on a 12-hour lithium-ion battery energy storage facility. This sections also includes an assessment of the rationale for the selection of 12-hour Lithium-ion battery storage rather than other Long Duration Energy Storage (LDES) technologies, including pumped hydro and thermal storage, which were not selected for further evaluation primarily because they are not yet mature enough to be deployed at scale. For Phase 1, clean renewable hydrogen storage was compared directly to the most widely available and commercially scalable energy storage technology -- Lithium-ion -- while acknowledging that Lithium-ion and hydrogen storage are best suited for different roles in the energy system. SoCalGas recognizes that emergent LDES technologies are currently in development and near commercial pilot stage, including iron-air storage[55] and thermal storage.[56]

[55] Canary Media - Xcel to install Form's long-duration batteries at retiring coal plants: https://www.canarymedia.com/articles/long-duration-energy-storage/xcel-to-install-forms-long-duration-batteries-at-retiring-coal-plants

[56] Rondo Energy - Combining molecular recycling with groundbreaking clean energy: https://rondo.com/press-releases/rondo-energy-announces-75m-project-funding-with-breakthrough-energy-catalyst-and-the-european-investment-bank-g43w2

ENVIRONMENTAL DEFENSE FUND COMMENT 46-2

Similarly, while the Environmental Analysis Report lists out various alternative decarbonization pathways and their respective potential environmental impacts, their magnitude or comparative impacts are not included.FN2 EDF acknowledges that at this preliminary stage, providing an exact comparative analysis may be difficult. However, detailed analysis would be necessary if SoCalGas decides to move forward with requesting regulatory approval for the Angeles Link project—and as such, represents a critical knowledge gap in the reports.

FN2 – Environmental Analysis Report at ES-9.

SOCALGAS RESPONSE TO COMMENT 46-2

SoCalGas acknowledges this comment concerning a future comparative analysis of Angeles Link to potential alternatives, including the magnitude of potential environmental impacts. As Angeles Link engineering progresses and a preferred route is selected, SoCalGas will continue to further evaluate potential environmental impacts. SoCalGas anticipates that a detailed comparative analysis of Angeles Link and feasible alternatives that would allow SoCalGas to achieve most of its objectives while also reducing or eliminating environmental impacts, would be performed during the environmental review process as required by CEQA/NEPA a in future phases.

ENVIRONMENTAL DEFENSE FUND COMMENT 46-3

Moreover, the comparative cost-effectiveness of the hydrogen pipeline and other alternatives as claimed in the report must be understood within the broader context of their climate-and environmental impacts. For example, the High-level Economic Analysis and Cost-Effectiveness Report finds that hydrogen-fueled kilns are more cost-effective than to electrification alternatives.FN3 While cost-effectiveness is a key factor, it is also important to keep other factors in mind—including environmental impacts, technological maturity, end-user preferences, and the impact on local communities. Whether hydrogen is the most suitable decarbonization pathway for a specific end-use is a decision that must be made comprehensively, taking into account various factors including, but not limited to, cost-effectiveness. Similarly, the High-level Economic Analysis and Cost-Effectiveness Report finds that clean renewable hydrogen is a less cost-effective option for refinery use than hydrogen abated through CCS.FN4 However, EDF studies have shown that such "blue" hydrogen (i.e., hydrogen from fossil fuel reformation coupled with CCS) applications can be an ineffective climate solution, due to concerns around leakage and the role of hydrogen as an indirect gas.FN5 It is important not to conflate "cost-effective" with "lowest-cost" to justify less environmentally and climate-robust options.

FN3 – High-level Economic Analysis and Cost Effectiveness Report at 19.
FN4 – Ibid, at 21-22.

FN5 – Ocko, I. B. and Hamburg, S. P.: Climate consequences of hydrogen emissions, Atmos. Chem. Phys., 22, 9349–9368, https://doi.org/10.5194/acp-22-9349-2022, 2022.

SOCALGAS RESPONSE TO COMMENT 46-3

The Alternatives Study utilized a six-step process to assess potential alternatives and compare them against additional factors, noted as criteria in the study, including state policy, technical maturity, reliability & resiliency, scalability and end user requirements. Alternatives that met these criteria were then carried forward to a cost effectiveness and high-level environmental evaluation. The findings from these studies were then integrated in the Alternatives Study to provide a more holistic view of each alternative. See Section 4.3 of the Alternatives Study for the evaluation of alternatives relative to the criteria. See Section 4.4 and 7.4.3 for the integration of findings from the Cost Effectiveness study and the Environmental Analysis. Also see Section 4.4.3 for a high-level assessment of alternatives relative to the Purpose and Need of Angeles Link, which includes the objectives of decarbonization, open access, air quality, reliability, long-duration storage, cost, and safety.

SoCalGas also acknowledges the reference to the Climate Consequences of Hydrogen Emissions study cited in this comment (footnote 5). More specific analysis related to blue hydrogen leakage is outside the scope of this study.

As noted in SoCalGas's Q2 2024 quarterly report regarding hydrogen demand, there is consensus among agencies and researchers that projected hydrogen demand exists in the power, mobility, and industrial sectors to provide a low carbon solution for hard-to-electrify sectors. Demonstratively, the ARCHES and the DOE signed a landmark $12.6 billion agreement, including up to $1.2 billion from the DOE and $11.4 billion in public and private matching funds, to build and expand clean energy infrastructure across

California in July 2024.[57] Also notable, Governor Gavin Newsom stated that "California is all in on clean, renewable hydrogen – an essential aspect of how we'll power our future and cut pollution. This strategy will lay out the pathway for building a robust hydrogen market to help us fully embrace this source of clean energy."[58]

[57] California's renewable hydrogen hub officially launches. - Arches H2: https://archesh2.org/arches-officially-launches/

[58] Governor Newsom Announces New Strategy to Develop a Hydrogen Economy of the Future | Governor of California: https://www.gov.ca.gov/2023/08/08/governor-newsom-announces-new-strategy-to-develop-a-hydrogen-economy-of-the-future/

ENVIRONMENTAL DEFENSE FUND COMMENT 46-4

In addition to the broader comments above, EDF highlights specific concerns around the assumptions and parameters used in the High-Level Economic Analysis and Cost-Effectiveness Report. Certain assumptions appear overly generous in favor of hydrogen use-cases over other decarbonization pathways; and granular details are unavailable due to the use of a proprietary modeling tool.

For example, the report finds that the capital expenditure costs (CAPEX) for hydrogen combustion turbine retrofit would range from $156/kw to $260/kw; it also assumes that the net capacity factor for a retrofit hydrogen turbine would be around 9-11% when used to meet peak demand.FN6 Such figures, however, are at odds with details shared by some planned or realized retrofit projects. In 2023, the LA City Council approved a $800 million dollar project to retrofit the existing gas-fired power plants located at Scattergood Generation Station.FN7

The project would replace exist units 1 and 2 with an overall capacity of 346 MW—or $2,300/kw—and is expected to be operational extremely infrequently with a capacity factor closer to 1-5%.FN8 The details from the planned Scattergood project, in comparison with figures provided in the draft report, raises the concern that the economic assumptions behind the report may be too generous. Furthermore, many of the specific figures in the report cite a model used by Wood Mackenzie and studies from the National Petroleum Council.FN9 Without having access to the model used by the consultants, it is impossible for PAG members to accurately understand the assumptions behind the report or the engage with them. EDF strongly urges that steps be taken to provide access to the model and its assumptions, in order for PAG members to engage with the Phase 1 feasibility study process more constructively.

FN6 – High-level Economic Analysis and Cost Effectiveness Report at 101.

FN7 – Roth, Sammy, “L.A. is shutting down its largest gas plant — and replacing it with an unproven hydrogen project”, The Los Angeles Times, Feb. 8, 2023. Accessible at: https://www.latimes.com/business/story/2023-02-08/l-a-is-shutting-down-a-coastal-gas-plant -and replacing-it-with-hydrogen

FN8 – LADWP, “Scattergood Modernization Project”, February 3, 2023. Accessible at: https://clkrep.lacity.org/onlinedocs/2023/23-0039_rpt_DWP_02-03-2023.pdf. See also, LADWP Presentation to the Board of Commissioners; record accessible here: https://ladwp.granicus.com/MediaPlayer.php?view_id=2&clip_id=1960.

FN9 – High-level Economic Analysis and Cost Effectiveness Report at 101.

SOCALGAS RESPONSE TO COMMENT 46-4

The Scattergood Green Hydrogen -Ready Project is envisioned as a modernization project more so than a traditional turbine retrofit (as described in the LADWP’s Initial Study Assessment Report)[59] due to the expansive scope of work needed to fully modernize the Scattergood Power Generation facility. The

[59] Scattergood Generating Station Units 1 and 2 Green Hydrogen-Ready Modernization Project, LADWP: Initial Study - Scattergood Generating Station Units 1 and 2 Green Hydrogen-Ready Modernization Project (ladwp.com)

proposed modernization project involves extensive infrastructure buildout, including removal of existing facilities, upgrading balance of plant assets such as once through cooling systems, water and wastewater facilities, and modernizing electric system components etc. In other words, the Scattergood Green Hydrogen Ready Project scope of work is much broader than a turbine retrofit/replacement.

For the Cost-Effectiveness Study, retrofitted hydrogen turbines involve replacing existing natural gas turbines with hydrogen-capable turbines. For additional detail on the Cost Effectiveness Study turbine assumptions, please refer to Section 7.3.2.2. Power of the study. These simplifying assumptions note that the analysis was completed for a turbine retrofit and does not include any balance of plant upgrades.

Comment Letter 47 – Communities for a Better Environment

Comment Letter 47

September 6, 2024

Southern California Gas Company
555 West Fifth Street
Los Angeles, CA 90 013

COMMUNITIES FOR A BETTER ENVIRONMENT
40 years | established 1978

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com

Feedback for Southern California Gas Company on the Environmental Analysis Draft Report

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Environmental Analysis Draft Report (the "Draft Report") provided on July 26, 2024. This letter raises several concerns with the Draft Report's scope and content.

The Draft Report notes that the study was prepared pursuant to California Public Utilities Commission Decision 22-12-055 ordering paragraphs 5(e), (6i), and 6(n). In addition to the Draft Report, SoCalGas has produced a Preliminary Routing-Configuration Analysis Draft Report, a Project Options and Alternatives Draft Report, and a High-Level Feasibility Assessment and Permitting Analysis Draft Report. SoCalGas also produced reports on Angeles Link project (ALP) air pollution emissions, water resource requirements, safety, routing, and more. Yet, the Draft Report does not offer a clear explanation of why critical aspects of project planning were left out of the most detailed report on existing conditions and ALP impacts at regional and local levels. Given the Phase 1 feasibility study and feedback process' high volume of lengthy documents, SoCalGas should have organized a much more streamlined and comprehensive review process.[1]

Comment 47-01

The Draft Report omits key details and study topics, in addition to its curtailed scope, which SoCalGas must remedy. Particularly, the Report:

- Does Not Include Topics Necessary to Analyze ALP Environmental Impacts and Downplays the Environmental Hazards of Transporting 100% Hydrogen by Pipeline
- Omits Extant Conditions in Multiple Study Areas by Paraphrasing Inapposite Descriptions of Project Impacts and Available Mitigation Measures from Disparate Study Areas

[1] CBE appreciates the two-week extension SoCalGas granted for stakeholders to provide feedback on eight feasibility study reports but emphasizes the substantial amount of staff time required by CBOs and other parties to review reports and offer critical feedback.

1

- Does Not Evaluate the Environmental Impacts of a Major Route Variation Designed to Reduce the Impact of ALP on Disadvantaged and Environmental Justice Communities

Comment 47-02

I. *The Draft Report Does Not Include Topics Necessary to Analyze ALP Environmental Impacts and Downplays the Environmental Hazards of Transporting 100% Hydrogen by Pipeline*

The Draft Report does not analyze hydrogen production impacts on energy demand, water, or air quality; hydrogen usage impacts; or hydrogen safety impacts, which cannot be severed from ALP construction or operation and maintenance. The explanation that the Draft Report is simply a high-level desktop study does not excuse the omission. The report's analysis and discussion are succinct, and do not go into great detail regarding impacts. Rather, the Draft Report simply classifies studied potential impacts as "No Impact" or "Potential Impact" with a brief description of the Study Area's existing conditions. The report suggests that more detailed analysis would occur in formal CEQA and/or NEPA environmental review in the future.[2]

Hydrogen production and end-use facilities are not severable from the ALP transmission pipeline. Nor are the direct and novel safety risks of transporting high volumes of pure hydrogen through crowded urban areas. Without hydrogen production at the pipeline's starting point and end-use in the Los Angeles basin, the ALP as proposed cannot be constructed. The ALP cannot reach its endpoint without transporting high volumes of pure hydrogen into crowded urban areas. Likewise, without inclusion of these features in the environmental analysis, the analysis is not complete. The ALP study process has already netted sufficient data to include hydrogen production, end-use, and safety-impacts in the Draft Report. It is simply that this information is left out of this report.

Comment 47-03

a. The Impacts of Hydrogen Production and End-Uses are Identifiable but Omitted

SoCalGas must revise each impacts section to include each of these considerations in order to accurately analyze the ALP's environmental impacts. Specifically, the Draft Report should analyze whether hydrogen production or end-use facilities will be located in each Study Area. If such siting is potentially the case, then the Draft Report should include the impacts of that essential infrastructure in the Study Area discussion. While "the location of production facilities, storage areas, appurtenances, and end users are not known"[3] with certainty, neither is the route of ALP which the Draft Report examines. Nonetheless, the Draft Report examines impacts of the pipeline based on proposed routing. Surely, SoCalGas can project where hydrogen

[2] Draft Report at ES-4.
[3] *Id.* at 1-3.

production and use may be located given that the ALP's production needs, throughput volume, and possible hydrogen demand have all been calculated in other ALP Phase 1 studies.

Comment 47-03

b. Hydrogen is a Hazardous Material

The Draft Report does not incorporate adequate discussion of hydrogen safety risks and safety measures. As CBE raised previously, hydrogen is a hazardous material which has unique characteristics distinct from natural gas.[4] It is more leak prone and more easily combusted than natural gas, current leak detection and safety technology are not adequate to protect communities from the risks of hydrogen, and the repeated guarantee that the ALP will be "subject to the same safety considerations as a natural gas pipeline," is no solace for environmental justice communities.[5] The Draft Report itself notes: "The transportation of hydrogen gas carries an inherent risk of upset that could result from an inadvertent strike or dig-in by a third party, a leak, or other release of hydrogen."[6] While natural gas pipelines also pose leakage risks from strikes or dig-ins, as CBE described in our feedback to the Safety Study,[7] hydrogen poses different dangers than natural gas and requires *additional* safety considerations. Therefore, SoCalGas's conclusion in the Draft Report that the Angeles Link "hydrogen pipeline would be subject to the same safety considerations as a natural gas pipeline"[8] is inaccurate and insufficient. Regardless of whether hydrogen pipelines are aboveground or underground as they cross through disadvantaged or environmental justice communities, the Draft Report must analyze hydrogen specific risks in greater detail and care toward each Study Area's unique characteristics to accurately analyze the existing conditions and environmental impacts of the ALP.

Comment 47-04

II. The Draft Report Omits Extant Conditions in Multiple Study Areas by Paraphrasing Inapposite Descriptions of Project Impacts and Available Mitigation Measures from Disparate Study Areas

SoCalGas dismisses regional differences in Study Areas which artificially minimizes the studied ALP impacts. Study Area 1A is entirely within the largely rural San Joaquin Valley and includes sparsely populated portions of Fresno, Kings, and Kern counties.[9] Study Area 1A is centered around potential ALP Segment C, which does not cross through any major population center. The Draft Report notes there are "[n]o schools, day-care centers, or preschools located

Comment 47-05

[4] CBE, Feedback for Southern California Gas Company on the Plan for Applicable Safety Requirements Draft Report, Jul. 19, 2024.
[5] Draft Report at ES-7, 3-36.
[6] *Id.* at ES-7.
[7] CBE, Feedback for Southern California Gas Company on the Plan for Applicable Safety Requirements Draft Report, Jul. 19, 2024.
[8] Draft Report at ES-7.
[9] *Id.* at 3-3.

3

within" 0.25 mile[10] or 0.5 mile[11] of Segment C in Study Area 1A. Study Area 1B covers relatively less populated (compared with Study Areas 2, 3A, 3F, and others) portions of northern and northeastern Los Angeles County, including the cities of Lancaster, Palmdale, and Santa Clarita.[12] Per Table 3.2-19,[13] there are 23 schools and 25 day-care centers within 0.5 mile of Study Area 1B's Segment B.

Study Area 2 includes urban, densely populated portions of Los Angeles and Orange counties and cities like Los Angeles, Carson, Inglewood, Long Beach, South Gate, and Torrance.[14] Study Area 3F includes portions of the City of Los Angeles, Bell, Huntington Park, Lynwood, Maywood, South Gate, Vernon, and more.[15] The Draft Report notes that 137 schools and 168 day-care centers are located within 0.5 mile of the six possible segments of ALP in Study Area 2.[16] Similarly, there are 159 schools and 133 day-care centers within 0.5 mile of Segment Y in Study Area 3F.[17]

Comment 47-05

Clearly, there are many more sensitive receptors near ALP segments in Study Areas 2 and 3F than in Study Area 1B and Study Area 1A. The Draft Report states that potential hazardous material emissions or impacts near these many sensitive receptors could be avoided or mitigated as detailed in Section 3.3.6.3 for Study Area 2 and 3.9.6.3 for Study Area 3F. With respect to hazardous material transport, use, or disposal in Study Area 2 more generally, the Draft Report states:

> [C]onstruction and O&M activities would be anticipated to have a potential for temporary or permanent impact to the public or the environment in the event of an accident or spill during the routine transport, use, and/or disposal of hazardous materials during construction and O&M activities. Most of the Potential impacts could be reduced through the implementation of the AMMs detailed in Section 3.3.6.3 Potential Avoidance and Minimization Measures.[18]

Yet, Section 3.3.6.3 tells the reader to refer to the Potential Avoidance and Minimization Measures (PAMMs) for Study Area 1A and Study Area 1B which are significantly less populous than Study Areas 2 and 3F and contain significantly fewer co-hazards.[19] By avoiding accurate,

[10] *Id.* at 3-36
[11] *Id.* at 3-33.
[12] *Id.* at 3-51.
[13] *Id.* at 3-76.
[14] *Id.* at 3-93.
[15] *Id.* at 3-365.
[16] *Id.* at 3-135.
[17] *Id.* at 3-394.
[18] *Id.* at 3-134 to 3-135.
[19] *Id.* at 3-137 to 3-138. For a description of those proposed PAMMs, *see* Draft Report at 3-38, 3-81.

region-specific analysis, the Draft Report fails to identify necessary, location-specific safety measures.

Not only are the PAMMs not tailored to the unique characteristics of each study area, but they are also not tailored to the unique hazardous properties of characteristics of hydrogen. Without any justification for making such a claim, the Draft Report states that "impacts that could be anticipated within Study Area 2 would not be expected to differ from those identified within Study Areas 1A and 1B."[20] According to SoCalGas for Study Area 3F, likewise, the "impacts that could be anticipated within Study Area 3F would not be expected to differ from those within Study Areas 1A and 1B."[21] These are just a few instances of numerous, similar conclusory statements made throughout the Draft Report that lump together extremely different locations and sets of conditions.

Comment 47-05

The hazardous materials PAMMs for Study Area 1A do not include any measures related to schools since there are no such sensitive receptors in that Study Area. For schools and daycare centers in Study Area 1B, the hazardous materials PAMMs for are: (1) "Transportation and disposal routes could be sited at locations well outside of schools or day-care centers" and (2) "Pipeline segments could be sited away from schools or day-care centers." So, the PAMMs for these more sparsely populated study areas suggest that potential ALP-related dangers could be sited further away from the sensitive receptors. SoCalGas must explain how it is that the abovementioned siting-related PAMMs, which could possibly suffice in low density Study Area 1B, could plausibly apply to the extremely high densities of Study Areas 2 and 3F. Otherwise, it must identify additional safety measures tailored for densely developed areas.

III. The Draft Report Fails to Evaluate the Environmental Impacts of a Major Route Variation Designed to Reduce the Impact of ALP on Disadvantaged and Environmental Justice Communities

SoCalGas' Preliminary Routing-Configuration Analysis Draft Report identified a routing scenario, "Route Variation 1," which limited the ALP's traversal of disadvantaged communities in the Los Angeles area. Unfortunately, the Draft Report claims SoCalGas did not have enough time to analyze this fifth scenario because it "was identified late in the Phase 1 analysis." CBE raised the need to plan pipelines routes around, not through, environmental justice communities in response to SoCalGas' Preliminary Routing & Configuration Assessment study description at the earliest available opportunity provided by the ALP's community engagement process.[22] CEJA and Sierra Club raised the very same issue to the CPUC in 2022, *over a year before phase*

Comment 47-06

[20] Draft Report at 3-138.
[21] *Id.* at 3-397.
[22] CBE, Additional Feedback for Southern California Gas Company on Angeles Link Project Phase One Technical Approaches, at 2, Nov. 3, 2023.

5

1 study descriptions were released.[23] The Equity Principles for Hydrogen document, which SoCalGas has reviewed and responded to, raises the need to site dangerous energy infrastructure outside of environmental justice communities. The Routing Study itself did evaluate Route Variation 1 in a fair amount of detail, and CBE provided detailed feedback about that route variation.[24] It is not clear why SoCalGas and its contractors did not have enough time to evaluate Route Variation 1 in the Environmental Analysis when the Routing Study was released to ALP process participants a week before the Environmental Analysis Draft Report.

The claim at this late stage that SoCalGas lacked time to evaluate the alternative route is not excusable. Pipeline routes that avoid further burdening environmental justice communities should have been planned from the outset. Instead, the single "variation" of the ALP that does so is not incorporated in the Environmental Analysis or Environmental Justice Analysis draft studies. As SoCalGas was informed over two years ago:

> The community in Wilmington is 90% Latinx and is rated in the top 90% most polluted and vulnerable to health impacts.[a]
>
> The life expectancy in Wilmington is the sixth lowest of the 35 community plan areas in Los Angeles.[b] These impacts are not accidental. The history of redlining and white flight in Los Angeles is intertwined with the racially discriminatory siting of fossil fuel infrastructure and other polluting facilities.[c]
>
> The Wilmington community fights for environmental and climate justice, a phrase that bears far more weight for the families living in the shadows of refineries. Community members have been seeking to phase out oil extraction, refining and transportation for decades. By following SoCalGas' existing rights-of-way through Los Angeles, the Angeles Link Project could exacerbate existing environmental injustices. It is absolutely imperative that the clean energy future does not replicate the injustices of the past by giving new life to pipelines and polluting these communities anew.[25]

Comment 47-06

[23] A. 22-02-007, Opening Brief of Sierra Club and the California Environmental Justice Alliance, at 37-38, July 29, 2022.
[24] CBE, Feedback for Southern California Gas Company on the Preliminary Routing/Configuration Analysis Draft Report, Aug. 30, 2024.
[25] A. 22-02-007, Opening Brief of Sierra Club and the California Environmental Justice Alliance, at 37-38, July 29, 2022. (Internal citations reproduced here:

a. Yvette Cabrera, This Young Environmental Activist Lives 500 Feet from a Drilling Site, HuffPost, (Apr. 19, 2018), https://www.huffpost.com/entry/ashley-hernandez-environmentaljustice_n_5ad7ad3fe4b03c426daaeab3.
b. Adam Mahoney, Deaths Have Spiked in This Polluted Port Community. Grist, (Mar. 31, 2022), https://grist.org/health/excess-deaths-wilmington-california-covid-pollution/.
c. CalEPA, Pollution and Prejudice: Redlining and Environmental Injustice in California, (Aug. 16, 2021), https://storymaps.arcgis.com/stories/f167b251809c43778a2f9f040f43d2f5.).

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IV. Conclusion

CBE appreciates the opportunity to provide feedback on the Draft Report.[26] While the Draft Report begins to identify key issues for environmental analysis, its lack of discussion on serious areas of concern mean that the identified ALP impacts and proposed mitigation measures provide only a fraction of the whole picture. CBE encourages SoCalGas to seriously address the issues identified here before issuing a final Environmental Analysis report.

Comment 47-07

Sincerely,

Jay Parepally
Theo Caretto

Communities for a Better Environment

CC:
Frank Lopez, SoCalGas
Chester Britt, Arellano Associates
Alma Marquez, Lee Andrews Group
Angeles Link service list

[26] At this time, CBE reserves comment on the Draft Report's hydrogen delivery and non-hydrogen options/alternatives analysis and refers SoCalGas to CBE's prior feedback on alternatives as well as the Equity Principles for Hydrogen.

7

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 47-1

Communities for a Better Environment (CBE) submits this letter of feedback to Southern California Gas Company (SoCalGas) on the Environmental Analysis Draft Report (the "Draft Report") provided on July 26, 2024. This letter raises several concerns with the Draft Report's scope and content.

The Draft Report notes that the study was prepared pursuant to California Public Utilities Commission Decision 22-12-055 ordering paragraphs 5(e), (6i), and 6(n). In addition to the Draft Report, SoCalGas has produced a Preliminary Routing-Configuration Analysis Draft Report, a Project Options and Alternatives Draft Report, and a High-Level Feasibility Assessment and Permitting Analysis Draft Report. SoCalGas also produced reports on Angeles Link project (ALP) air pollution emissions, water resource requirements, safety, routing, and more. Yet, the Draft Report does not offer a clear explanation of why critical aspects of project planning were left out of the most detailed report on existing conditions and ALP impacts at regional and local levels. Given the Phase 1 feasibility study and feedback process' high volume of lengthy documents, SoCalGas should have organized a much more streamlined and comprehensive review process.FN1

The Draft Report omits key details and study topics, in addition to its curtailed scope, which SoCalGas must remedy. Particularly, the Report:

- Does Not Include Topics Necessary to Analyze ALP Environmental Impacts and Downplays the Environmental Hazards of Transporting 100% Hydrogen by Pipeline

- Omits Extant Conditions in Multiple Study Areas by Paraphrasing Inapposite Descriptions of Project Impacts and Available Mitigation Measures from Disparate Study Areas

FN1 – CBE appreciates the two-week extension SoCalGas granted for stakeholders to provide feedback on eight feasibility study reports but emphasizes the substantial amount of staff time required by CBOs and other parties to review reports and offer critical feedback.

SOCALGAS RESPONSE TO COMMENT 47-1

SoCalGas acknowledges that stakeholders committed a significant amount of time to provide input on the various studies, including the Environmental Analysis, and we acknowledge the time and effort. We also acknowledge that there is always room for improvement on the review process. Please also refer to Global Response 2. Detailed responses to the bullet points are provided in the following responses.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 47-2

The Draft Report omits key details and study topics, in addition to its curtailed scope, which SoCalGas must remedy. Particularly, the Report:

- Does Not Evaluate the Environmental Impacts of a Major Route Variation Designed to Reduce the Impact of ALP on Disadvantaged and Environmental Justice Communities

SOCALGAS RESPONSE TO COMMENT 47-2

To evaluate the potential environmental impacts of Angeles Link and the identified alternatives, the Environmental Analysis used the CEQA Guidelines Appendix G checklist as a framework and focused on the following environmental factors: air quality and GHG emissions; biological resources; cultural resources and tribal cultural resources; energy; hazards and hazardous materials; hydrology and water quality; and land use and planning.[60] These resource areas were selected based on the resources that could most reasonably be evaluated given the preliminary design of the potential pipeline routes (e.g., no final alignment or construction methods) and based on the environmental factors for which the Evaluated Segments are more likely to have impacts.

The Environmental Analysis evaluated the potential pipeline routes and grouped them into 13 study areas based on geography, common natural resources, and topographical features. Because at this early stage the location of production facilities, storage areas, appurtenances, and end users are not known, the pipeline segments will inevitably change as engineering progresses. The data collected for each study area will assist with future routing, feasibility, and constructability considerations.

As described further in the Routing Study, Route Variation 1 was added to potentially minimize traversing disadvantaged communities in the LA Basin. Route Variation 1 is not analyzed in the Environmental Analysis because that scenario was identified late in the Phase 1 analyses in response to stakeholder input. Route Variation 1 will be explored in more detail in Phase 2 along with the four identified preferred routes.

Please also refer to Global Responses 7, 8 and 9 for more detail regarding environmental justice considerations and community engagement.

[60] An evaluation of aesthetics, agriculture/forestry resources, geology/soils, mineral resources, noise, population/housing, public services, recreation, transportation, utilities/service systems, and wildfire was not conducted given the level of project detail for Angeles Link available at this time and the more detailed environmental review that would occur in future phases of Angeles Link.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 47-3

I. The Draft Report Does Not Include Topics Necessary to Analyze ALP Environmental Impacts and Downplays the Environmental Hazards of Transporting 100% Hydrogen by Pipeline

The Draft Report does not analyze hydrogen production impacts on energy demand, water, or air quality; hydrogen usage impacts; or hydrogen safety impacts, which cannot be severed from ALP construction or operation and maintenance. The explanation that the Draft Report is simply a high-level desktop study does not excuse the omission. The report's analysis and discussion are succinct, and do not go into great detail regarding impacts. Rather, the Draft Report simply classifies studied potential impacts as "No Impact" or "Potential Impact" with a brief description of the Study Area's existing conditions. The report suggests that more detailed analysis would occur in formal CEQA and/or NEPA environmental review in the future.FN2

Hydrogen production and end-use facilities are not severable from the ALP transmission pipeline. Nor are the direct and novel safety risks of transporting high volumes of pure hydrogen through crowded urban areas. Without hydrogen production at the pipeline's starting point and end-use in the Los Angeles basin, the ALP as proposed cannot be constructed. The ALP cannot reach its endpoint without transporting high volumes of pure hydrogen into crowded urban areas. Likewise, without inclusion of these features in the environmental analysis, the analysis is not complete. The ALP study process has already netted sufficient data to include hydrogen production, end-use, and safety-impacts in the Draft Report. It is simply that this information is left out of this report.

a. The Impacts of Hydrogen Production and End-Uses are Identifiable but Omitted

SoCalGas must revise each impacts section to include each of these considerations in order to accurately analyze the ALP's environmental impacts. Specifically, the Draft Report should analyze whether hydrogen production or end-use facilities will be located in each Study Area. If such siting is potentially the case, then the Draft Report should include the impacts of that essential infrastructure in the Study Area discussion. While "the location of production facilities, storage areas, appurtenances, and end users are not known"FN3 with certainty, neither is the route of ALP which the Draft Report examines. Nonetheless, the Draft Report examines impacts of the pipeline based on proposed routing. Surely, SoCalGas can project where hydrogen production and use may be located given that the ALP's production needs, throughput volume, and possible hydrogen demand have all been calculated in other ALP Phase 1 studies.

FN2 – Draft Report at ES-4.
FN3 – Id. at 1-3.

SOCALGAS RESPONSE TO COMMENT 47-3

This Environmental Analysis does not include an analysis of the potential environmental impacts associated with third-party clean renewable production locations and the potential third-party storage of the clean renewable hydrogen that Angeles Link may transport. As an open-access pipeline, Angeles Link must serve all hydrogen producers and end users. Angeles Link will be technically designed in accordance with its open-access nature and can become operational and serve current production

projects and end users regardless of whether any specific production, offtake, or transportation projects are developed in the future.

The separate Phase 1 feasibility study—Production Study—provides a high-level feasibility analysis related to the production and storage of hydrogen. For production, the Production Study identifies potential geographic regions that may be used for production projects such as the San Joaquin Valley, areas surrounding the City of Lancaster, and areas surrounding the City of Blythe. Within those potential production regions, the Production Study identified the acres that may be available for clean renewable production, covering a span of approximately 836 square miles in the San Joaquin Valley, 1,756 square miles in Lancaster, and 427 square miles in Blythe (see Production Study, Section 10.3). Analysis of specific third-party production projects that require discretionary permits will be conducted by the applicable lead agency. For storage, the Production Study also evaluated potential underground storage areas within an area of interest that included SoCalGas's service territory, as well as potential storage resources in Nevada, Utah, and Arizona (see Production Study, Appendix C). Actual storage sites were not identified. Similar to third-party production, analysis of specific third-party storage projects that will require discretionary permits will be conducted by the applicable lead agency.

This Environmental Analysis also does not include an analysis of the potential environmental impacts associated with end uses of the clean renewable hydrogen that Angeles Link may transport. Those end uses are not part of Angeles Link, and as summarized above, Angeles Link will be designed as an open-access pipeline system.

Future detailed analysis of the facilities that will be part of the Angeles Link system, including two or more compressor stations, will occur once a specific pipeline route and engineering design are developed during a future phase of Angeles Link.

Other Angeles Link Phase 1 feasibility studies address some of the environmental topic areas related to third-party production, third-party storage, and end users where the high-level analysis was not dependent on location-specific information on such third-party facilities, including the following studies:

Air Quality/GHG

Greenhouse Gas Emissions Evaluation: this study evaluates GHG emissions[61] associated with hydrogen combustion associated with new infrastructure (i.e., third-party production, third-party storage, and transmission of hydrogen),[62] as well as GHG emission reductions associated with displaced fossil fuels by end users in the mobility, power generation, and hard-to-electrify industrial sectors.

Hydrogen Leakage Assessment: this study evaluates the potential for hydrogen leakage associated with new hydrogen infrastructure (i.e., clean renewable hydrogen transportation and compression, in

[61] In the Greenhouse Gas Emissions Evaluation, direct GHG emissions refer to GHG emissions from combustion, and indirect GHG emissions refer to the estimated effect of potential hydrogen leakage on GHG in the atmosphere.

[62] The terms "new infrastructure" and "hydrogen infrastructure" refer to general hydrogen infrastructure comprised of third-party production, third-party storage, and transmission. The term "Angeles Link infrastructure" refers to transmission via pipelines including compression which supports transmission of hydrogen.

addition to third-party production and third-party storage), as well as opportunities to minimize the potential for hydrogen leakage.

NOx and Other Air Emissions Assessment: this study evaluates potential NOx and other air emissions associated with new hydrogen infrastructure (i.e., third-party production, third-party storage, and transmission), as well as potential NOx emission reductions associated with end users in the mobility, power generation, and hard-to-electrify industrial sectors. The study also identified minimization opportunities to reduce potential NOx emissions.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 47-4

b. Hydrogen is a Hazardous Material

The Draft Report does not incorporate adequate discussion of hydrogen safety risks and safety measures. As CBE raised previously, hydrogen is a hazardous material which has unique characteristics distinct from natural gas.FN4 It is more leak prone and more easily combusted than natural gas, current leak detection and safety technology are not adequate to protect communities from the risks of hydrogen, and the repeated guarantee that the ALP will be "subject to the same safety considerations as a natural gas pipeline," is no solace for environmental justice communities.FN5 The Draft Report itself notes: "The transportation of hydrogen gas carries an inherent risk of upset that could result from an inadvertent strike or dig-in by a third party, a leak, or other release of hydrogen."FN6 While natural gas pipelines also pose leakage risks from strikes or dig-ins, as CBE described in our feedback to the Safety Study,FN7 hydrogen poses different dangers than natural gas and requires additional safety considerations. Therefore, SoCalGas's conclusion in the Draft Report that the Angeles Link "hydrogen pipeline would be subject to the same safety considerations as a natural gas pipeline"FN8 is inaccurate and insufficient. Regardless of whether hydrogen pipelines are aboveground or underground as they cross through disadvantaged or environmental justice communities, the Draft Report must analyze hydrogen specific risks in greater detail and care toward each Study Area's unique characteristics to accurately analyze the existing conditions and environmental impacts of the ALP.

FN4 – CBE, Feedback for Southern California Gas Company on the Plan for Applicable Safety Requirements Draft Report, Jul. 19, 2024.

FN5 – Draft Report at ES-7, 3-36.
FN6 – Id. at ES-7.

FN7 – CBE, Feedback for Southern California Gas Company on the Plan for Applicable Safety Requirements Draft Report, Jul. 19, 2024.

FN8 – Draft Report at ES-7.

SOCALGAS RESPONSE TO COMMENT 47-4

Please refer to Global Response 4.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 47-5

II. The Draft Report Omits Extant Conditions in Multiple Study Areas by Paraphrasing Inapposite Descriptions of Project Impacts and Available Mitigation Measures from Disparate Study Areas

SoCalGas dismisses regional differences in Study Areas which artificially minimizes the studied ALP impacts. Study Area 1A is entirely within the largely rural San Joaquin Valley and includes sparsely populated portions of Fresno, Kings, and Kern counties.FN9 Study Area 1A is centered around potential ALP Segment C, which does not cross through any major population center. The Draft Report notes there are "[n]o schools, day-care centers, or preschools located within" 0.25 mileFN10 or 0.5 mileFN11 of Segment C in Study Area 1A. Study Area 1B covers relatively less populated (compared with Study Areas 2, 3A, 3F, and others) portions of northern and northeastern Los Angeles County, including the cities of Lancaster, Palmdale, and Santa Clarita.FN12 Per Table 3.2-19,FN13 there are 23 schools and 25 day-care centers within 0.5 mile of Study Area 1B's Segment B.

Study Area 2 includes urban, densely populated portions of Los Angeles and Orange counties and cities like Los Angeles, Carson, Inglewood, Long Beach, South Gate, and Torrance.FN14 Study Area 3F includes portions of the City of Los Angeles, Bell, Huntington Park, Lynwood, Maywood, South Gate, Vernon, and more.FN15 The Draft Report notes that 137 schools and 168 day-care centers are located within 0.5 mile of the six possible segments of ALP in Study Area 2.FN16 Similarly, there are 159 schools and 133 day-care centers within 0.5 mile of Segment Y in Study Area 3F.FN17

Clearly, there are many more sensitive receptors near ALP segments in Study Areas 2 and 3F than in Study Area 1B and Study Area 1A. The Draft Report states that potential hazardous material emissions or impacts near these many sensitive receptors could be avoided or mitigated as detailed in Section 3.3.6.3 for Study Area 2 and 3.9.6.3 for Study Area 3F. With respect to hazardous material transport, use, or disposal in Study Area 2 more generally, the Draft Report states:

[C]onstruction and O&M activities would be anticipated to have a potential for temporary or permanent impact to the public or the environment in the event of an accident or spill during the routine transport, use, and/or disposal of hazardous materials during construction and O&M activities. Most of the Potential impacts could be reduced through the implementation of the AMMs detailed in Section 3.3.6.3 Potential Avoidance and Minimization Measures.FN18

Yet, Section 3.3.6.3 tells the reader to refer to the Potential Avoidance and Minimization Measures (PAMMs) for Study Area 1A and Study Area 1B which are significantly less populous than Study Areas 2 and 3F and contain significantly fewer co-hazards.FN19 By avoiding accurate, region-specific analysis, the Draft Report fails to identify necessary, location-specific safety measures.

Not only are the PAMMs not tailored to the unique characteristics of each study area, but they are also not tailored to the unique hazardous properties of characteristics of hydrogen. Without any justification for making such a claim, the Draft Report states that "impacts that could be anticipated within Study Area 2 would not be expected to differ from those identified within Study Areas 1A and 1B."FN20 According to SoCalGas for Study Area 3F, likewise, the "impacts that could be anticipated within Study Area 3F would not be expected to differ from those within Study Areas 1A and 1B."FN21 These are just a few instances of numerous, similar conclusory statements made throughout the Draft Report that lump together extremely different locations and sets of conditions.

The hazardous materials PAMMs for Study Area 1A do not include any measures related to schools since there are no such sensitive receptors in that Study Area. For schools and daycare centers in Study Area 1B, the hazardous materials PAMMs for are: (1) "Transportation and disposal routes could be sited at locations well outside of schools or day-care centers" and (2) "Pipeline segments could be sited away from schools or day-care centers." So, the PAMMs for these more sparsely populated study areas suggest that potential ALP-related dangers could be sited further away from the sensitive receptors. SoCalGas must explain how it is that the abovementioned siting-related PAMMs, which could possibly suffice in low density Study Area 1B, could plausibly apply to the extremely high densities of Study Areas 2 and 3F. Otherwise, it must identify additional safety measures tailored for densely developed areas.

FN13 – Id. at 3-76.
FN14 – Id. at 3-93.
FN15 – Id. at 3-365.
FN16 – Id. at 3-135.
FN17 – Id. at 3-394.
FN18 – Id. at 3-134 to 3-135.

FN19 – Id. at 3-137 to 3-138. For a description of those proposed PAMMs, see Draft Report at 3-38, 3-81.

FN20 – Draft Report at 3-138.
FN21 – Id. at 3-397.

SOCALGAS RESPONSE TO COMMENT 47-5

In response to the comment concerning the applicability of the list of AMMs throughout the report to different Study Areas with different characteristics, SoCalGas acknowledges this comment and in response will add a new Section 2.1.1 Potential Avoidance and Minimization Measures (AMM) to the Environmental Analysis. This new section will further clarify that an AMM is proposed to address an identified potential impact. However, an individual AMM may not fully minimize an impact and therefore additional AMMs may be warranted, including potential AMMs that may need to be tailored or enhanced to address specific geographic considerations such as densely-populated areas. Additionally, when impacts were identified in one Study Area, but did not apply to other regions analyzed, such as impacts to endemic species or regional land use plans, region-specific potential AMMs were suggested and included for each Study Area. Potential AMMs that were determined to apply universally were only included in Study Area 1A with a reference to those potential AMMs included in the other study areas.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 47-6

III. The Draft Report Fails to Evaluate the Environmental Impacts of a Major Route Variation Designed to Reduce the Impact of ALP on Disadvantaged and Environmental Justice Communities

SoCalGas' Preliminary Routing-Configuration Analysis Draft Report identified a routing scenario, "Route Variation 1," which limited the ALP's traversal of disadvantaged communities in the Los Angeles area. Unfortunately, the Draft Report claims SoCalGas did not have enough time to analyze this fifth scenario because it "was identified late in the Phase 1 analysis." CBE raised the need to plan pipelines routes around, not through, environmental justice communities in response to SoCalGas' Preliminary Routing & Configuration Assessment study description at the earliest available opportunity provided by the ALP's community engagement process.FN22 CEJA and Sierra Club raised the very same issue to the CPUC in 2022, over a year before phase 1 study descriptions were released.FN23 The Equity Principles for Hydrogen document, which SoCalGas has reviewed and responded to, raises the need to site dangerous energy infrastructure outside of environmental justice communities. The Routing Study itself did evaluate Route Variation 1 in a fair amount of detail, and CBE provided detailed feedback about that route variation.FN24 It is not clear why SoCalGas and its contractors did not have enough time to evaluate Route Variation 1 in the Environmental Analysis when the Routing Study was released to ALP process participants a week before the Environmental Analysis Draft Report.

The claim at this late stage that SoCalGas lacked time to evaluate the alternative route is not excusable. Pipeline routes that avoid further burdening environmental justice communities should have been planned from the outset. Instead, the single "variation" of the ALP that does so is not incorporated in the Environmental Analysis or Environmental Justice Analysis draft studies. As SoCalGas was informed over two years ago:

The community in Wilmington is 90% Latinx and is rated in the top 90% most polluted and vulnerable to health impacts.FNa

The life expectancy in Wilmington is the sixth lowest of the 35 community plan areas in Los Angeles.FNb

These impacts are not accidental. The history of redlining and white flight in Los Angeles is intertwined with the racially discriminatory siting of fossil fuel infrastructure and other polluting facilities.FNc

The Wilmington community fights for environmental and climate justice, a phrase that bears far more weight for the families living in the shadows of refineries. Community members have been seeking to phase out oil extraction, refining and transportation for decades. By following SoCalGas' existing rights-of-way through Los Angeles, the Angeles Link Project could exacerbate existing environmental injustices. It is absolutely imperative that the clean energy future does not replicate the injustices of the past by giving new life to pipelines and polluting these communities anew.FN25

FN22 – CBE, Additional Feedback for Southern California Gas Company on Angeles Link Project Phase One Technical Approaches, at 2, Nov. 3, 2023.

FN23 – A. 22-02-007, Opening Brief of Sierra Club and the California Environmental Justice Alliance, at 37-38, July 29, 2022.

FN24 – CBE, Feedback for Southern California Gas Company on the Preliminary Routing/Configuration Analysis Draft Report, Aug. 30, 2024.

FN25 – A. 22-02-007, Opening Brief of Sierra Club and the California Environmental Justice Alliance, at 37-38, July 29, 2022. (Internal citations reproduced here:

FNa – Yvette Cabrera, This Young Environmental Activist Lives 500 Feet from a Drilling Site, HuffPost, (Apr.19, 2018), https://www.huffpost.com/entry/ashley-hernandez-environmentaljustice_n_5ad7ad3fe4b03c426daaeab3.

FNb – Adam Mahoney, Deaths Have Spiked in This Polluted Port Community. Grist, (Mar. 31, 2022), https://grist.org/health/excess-deaths-wilmington-california-covid-pollution/.

FNc – CalEPA, Pollution and Prejudice: Redlining and Environmental Injustice in California, (Aug. 16, 2021), https://storymaps.arcgis.com/stories/f167b251809c43778a2f9f040f43d2f5.).

SOCALGAS RESPONSE TO COMMENT 47-6

Please refer to Response to Comment 47-2.

COMMUNITIES FOR A BETTER ENVIRONMENT COMMENT 47-7

IV. Conclusion

CBE appreciates the opportunity to provide feedback on the Draft Report.FN26 While the Draft Report begins to identify key issues for environmental analysis, its lack of discussion on serious areas of concern mean that the identified ALP impacts and proposed mitigation measures provide only a fraction of the whole picture. CBE encourages SoCalGas to seriously address the issues identified here before issuing a final Environmental Analysis report.

FN26 – At this time, CBE reserves comment on the Draft Report's hydrogen delivery and non-hydrogen options/alternatives analysis and refers SoCalGas to CBE's prior feedback on alternatives as well as the Equity Principles for Hydrogen.

SOCALGAS RESPONSE TO COMMENT 47-7

At this feasibility stage of analysis, a full evaluation of potential environmental impacts cannot be performed. The Environmental Analysis uses the information available to provide a reasonable assessment at this time of the study. Additional environmental analysis will occur during future phases of Angeles Link.

Comment Letter 48 – Food & Water Watch

Comment Letter 48

September 9, 2024

Submitted via email to ALP1_Study_PAG_Feedback@insigniaenv.com.

RE: Feedback on Draft Reports of the Angeles Link Project and CBOSG Process

Food & Water Watch, as part of the Community Based Organization Stakeholder Group (CBOSG), submits this letter of feedback regarding the preliminary data and findings of the Angeles Link Project by the Southern California Gas Company (SoCalGas) and the CBOSG process. Concerns relating to the preliminary data and findings and the CBOSG process are as follows:

Draft Reports:

High-level Economic Analysis and Cost Effectiveness:

The report fails to adequately address the cost impact the Angeles Link Project would have on SoCalGas ratepayers. Despite SoCalGas' claims that a hydrogen buildout would be cost-effective, there is no clarity on how this would actually benefit ratepayers. The cost and scale of building these hydrogen pipelines would be substantial. Given that California currently has only 27 miles of hydrogen pipeline, Angeles Link would require substantial expansion of pipeline and compressor station networks. Depending on the routing choice, Angeles Link could ultimately cost billions of dollars.

Additionally, as hydrogen is currently not regulated as a public service utility, cost recovery for Angeles Link would depend on how California law treats hydrogen. And given how SoCalGas recently filed a petition with the California Public Utilities Commission to approve rate hikes on their customers to fund hydrogen pilot programs, it is likely that SoCalGas will have ratepayers face increased rates to cover the cost for their hydrogen buildout. This would be an unnecessary burden on ratepayers. At a time when ratepayers throughout California are facing constant rate hikes and struggling financially, it is irresponsible to pursue hydrogen while not taking into account how it will affect working class Californians.

Comment 48-01

Project Options and Alternatives:

Although the report accurately identifies electrification as an alternative to the Angeles Link Project, it severely overlooks the benefits of electrification. This is likely due to how electrification would impact SoCalGas' profits, rather than a good faith analysis of electrification. While SoCalGas claims that the hydrogen in the Angeles Link Project will

Comment 48-02

be used for "hard to electrify" sectors, " in reality the industrial sector accounts for a small percentage of SoCalGas's forecasted demand for the project. Even when it comes to trucking, there are numerous alternatives to hydrogen fuel such as overhead charging by connecting directly to power lines for longer trips.

Comment 48-02

Electrification would also have a significantly smaller water footprint. In the February 2024 water report commissioned by SoCalGas, it claimed that water requirements to produce the hydrogen transported in the project would range from 5,608 to 16,824 acre feet per year. That's equivalent to the amount of water that between 104,000 and 313,000 average Californians use in their homes annually.

Comment 48-03

Environmental Analysis:

The report fails to adequately address how the construction and implementation of hydrogen infrastructure would impact water resources and air quality. Given that at this time the exact pipeline routes of the Angeles Link Project have not been determined, nor have other key factors such as production facilities and storage areas, then we are not being presented with an accurate representation of the environmental impacts.

Although the report does acknowledge that the transportation of hydrogen has safety risks, particularly due to leakage, this is not reflected in the safety considerations. Given that hydrogen is more volatile than natural gas and more prone to leakage, it does not make sense that SoCalGas is considering applying the same safety considerations to hydrogen pipelines as it does for their potential hydrogen ones. At minimum, different safety considerations would need to be implemented. At the same time, current leak detection and safety technology for hydrogen does not adequately protect frontline communities. SoCalGas does not account for this lack of technology.

Comment 48-04

As Food & Water Watch has stressed throughout Phase 1 of the Angeles Link Project, SoCalGas' plans for the transportation and use of hydrogen is not in the best interest of ratepayers, frontline communities, nor our climate. We strongly believe that the California Public Utilities Commission should not approve this Project entering Phase 2. Electrification should be the path forward for California's energy future.

Sincerely,

Andrea Vega
Southern California Senior Organizer
Food & Water Watch

FOOD & WATER WATCH COMMENT 48-1

Food & Water Watch, as part of the Community Based Organization Stakeholder Group (CBOSG), submits this letter of feedback regarding the preliminary data and findings of the Angeles Link Project by the Southern California Gas Company (SoCalGas) and the CBOSG process. Concerns relating to the preliminary data and findings and the CBOSG process are as follows:

Draft Reports:

High-level Economic Analysis and Cost Effectiveness:

The report fails to adequately address the cost impact the Angeles Link Project would have on SoCalGas ratepayers. Despite SoCalGas' claims that a hydrogen buildout would be cost-effective, there is no clarity on how this would actually benefit ratepayers. The cost and scale of building these hydrogen pipelines would be substantial. Given that California currently has only 27 miles of hydrogen pipeline, Angeles Link would require substantial expansion of pipeline and compressor station networks. Depending on the routing choice, Angeles Link could ultimately cost billions of dollars.

Additionally, as hydrogen is currently not regulated as a public service utility, cost recovery for Angeles Link would depend on how California law treats hydrogen. And given how SoCalGas recently filed a petition with the California Public Utilities Commission to approve rate hikes on their customers to fund hydrogen pilot programs, it is likely that SoCalGas will have ratepayers face increased rates to cover the cost for their hydrogen buildout. This would be an unnecessary burden on ratepayers. At a time when ratepayers throughout California are facing constant rate hikes and struggling financially, it is irresponsible to pursue hydrogen while not taking into account how it will affect working class Californians.

SOCALGAS RESPONSE TO COMMENT 48-1

SoCalGas acknowledges the commenter's concern for delivering affordable energy. SoCalGas also recognizes the challenge to decarbonize California while also providing affordable energy solutions. Multiple analyses indicate that clean molecules will be needed to help decarbonize California, including the CARB 2022 Scoping Plan[63]. The Angeles Link Phase 1 Draft Framework for Affordability Considerations describes how Angeles Link's planning process has considered and identified opportunities to address affordability concerns. The plan describes the CPUC's framework for evaluating affordability; discusses projected costs of decarbonization more broadly to provide context for the potential investment in Angeles Link; summarizes the work SoCalGas has conducted to date to consider the affordability of Angeles Link and address stakeholder feedback about affordability concerns received to date; and identifies potential strategies for addressing affordability in the development of Angeles Link during Phase 2 and beyond.

The economies of scale provided by an open access hydrogen pipeline system, such as Angeles Link, support clean renewable hydrogen as a viable alternative to other fuels and decarbonization pathways. Additionally, clean renewable hydrogen can work synergistically with electrification to support the

[63] CARB 2022 Scoping Plan Documents available at: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents

State's decarbonization goals. SoCalGas acknowledges that there will be a considerable investment required for any decarbonization solutions, and this topic is discussed further in the Draft Framework for Affordability Considerations. Further, as discussed in the Cost Effectiveness Study, a hydrogen pipeline is the most cost-effective option to deliver clean renewable hydrogen at scale.

With respect to ratemaking considerations, please refer to the Draft Affordability Framework. As discussed therein, as a regulated public utility, changes to SoCalGas's customer rates are subject to a public review and approval process in front of the CPUC before they can be passed on to customers.

FOOD & WATER WATCH COMMENT 48-2

Project Options and Alternatives:

Although the report accurately identifies electrification as an alternative to the Angeles Link Project, it severely overlooks the benefits of electrification. This is likely due to how electrification would impact SoCalGas' profits, rather than a good faith analysis of electrification. While SoCalGas claims that the hydrogen in the Angeles Link Project will be used for "hard to electrify" sectors," in reality the industrial sector accounts for a small percentage of SoCalGas's forecasted demand for the project. Even when it comes to trucking, there are numerous alternatives to hydrogen fuel such as overhead charging by connecting directly to power lines for longer trips.

SOCALGAS RESPONSE TO COMMENT 48-2

In response to the general comment concerning the potential benefits of electrification, please refer to Responses to Comments 32-1 and 32-2.

Hard to electrify sectors include sectors outside of the industrial sector, such as heavy-duty trucking.[64] Accordingly, the Phase 1 studies consider clean renewable hydrogen demand in the mobility, power generation, and hard-to-electrify industrial sectors. This is consistent with the findings of ARCHES, which identifies that "Hydrogen can replace diesel and liquid petroleum in hard-to-decarbonize sectors such as medium and heavy-duty transportation, agriculture, industry, and heavy equipment. Over time, it can also facilitate the transition of critical thermal electric assets needed for grid reliability away from fossil natural gas."[65]

[64] CARB 2022 Scoping Plan: https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

[65] ARCHES H2, White Paper Overview (2024) at 6, available at: https://archesh2.org/wp-content/uploads/2024/08/ARCHES-White-Papers-Overview-8.8.24.pdf

FOOD & WATER WATCH COMMENT 48-3

Electrification would also have a significantly smaller water footprint. In the February 2024 water report commissioned by SoCalGas, it claimed that water requirements to produce the hydrogen transported in the project would range from 5,608 to 16,824 acre feet per year. That's equivalent to the amount of water that between 104,000 and 313,000 average Californians use in their homes annually.

SOCALGAS RESPONSE TO COMMENT 48-3

Please see the table below for information regarding estimated annual water needs for the third-party production of the clean renewable hydrogen that Angeles Link proposes to transport, as summarized in the Water Resources Evaluation.

This comment does not provide a reference for the cited annual residential water use. The Water Resources Evaluation determined that the volume of water needed for third-party clean renewable hydrogen producers to produce the quantity of clean renewable hydrogen to meet the projected throughput of Angeles Link comprises a small percentage (less than 0.01 to 0.03 percent) of total annual applied water in California for urban (M&I), agricultural, and environmental purposes.

Water Needs: Angeles Link Throughput

Throughput Scenario	Clean Renewable Hydrogen Throughput (MMT/Year)[1]	Water Needs (AFY)[1,2]	Water Needs (MGD)[1, 2]
Low Case	0.5	5,500	4.9
High Case	1.5	16,500	14.7

[1] MMT/year = million metric of tons per year; AFY = acre-feet per year; MGD = million gallons per day.

[2] Includes the water needs for hydrogen production electrolyzers, electrolyzer cooling, and water treatment.

FOOD & WATER WATCH COMMENT 48-4

Environmental Analysis:

The report fails to adequately address how the construction and implementation of hydrogen infrastructure would impact water resources and air quality. Given that at this time the exact pipeline routes of the Angeles Link Project have not been determined, nor have other key factors such as production facilities and storage areas, then we are not being presented with an accurate representation of the environmental impacts.

Although the report does acknowledge that the transportation of hydrogen has safety risks, particularly due to leakage, this is not reflected in the safety considerations. Given that hydrogen is more volatile than natural gas and more prone to leakage, it does not make sense that SoCalGas is considering applying the same safety considerations to hydrogen pipelines as it does for their potential hydrogen ones. At minimum, different safety considerations would need to be implemented. At the same time, current leak detection and safety technology for hydrogen does not adequately protect frontline communities. SoCalGas does not account for this lack of technology.

As Food & Water Watch has stressed throughout Phase 1 of the Angeles Link Project, SoCalGas' plans for the transportation and use of hydrogen is not in the best interest of ratepayers, frontline communities, nor our climate. We strongly believe that the California Public Utilities Commission should not approve this Project entering Phase 2. Electrification should be the path forward for California's energy future.

SOCALGAS RESPONSE TO COMMENT 48-4

In response to the comment concerning the potential environmental impacts from the construction and operation of Angeles Link, the Environmental Analysis provides only a desktop analysis of the potential environmental impacts of Angeles Link and a comparison of those impacts to identified alternatives. As acknowledged in the Environmental Analysis, details of the Angeles Link preferred route, construction methods, and potential operational and maintenance (O&M) activities were not known at the time of this study. As Angeles Link progresses and more details of the pipeline system are developed, the potential impacts of Angeles Link and potential alternatives, including impacts related to air quality, will be further evaluated in detail in compliance with relevant laws and policies, including the CEQA and the NEPA.

With regard to the comment regarding storage, as discussed in the Production Study, Section 8.0 Evaluation of Potential Hydrogen Storage, aboveground and underground storage is not currently part of Angeles Link. As Angeles Link is further designed and, in alignment with the development of system requirements, the role of storage to support regional hydrogen producers and end users should be considered. Distributed storage equipment located at third-party production and end user sites, along with line pack (storing and then withdrawing gas supplies from the pipeline), can provide storage capacity while larger scale storage technologies are developed over time to support regional hydrogen hub requirements. The potential location, capacity and type of storage and the potential pipeline mileage needed to interconnect to storage would be speculative at this time.

In response to the comment that the Environmental Analysis should not rely on the same safety considerations to apply to hydrogen pipelines as apply to natural gas pipelines, language will be added

in the hazards and hazardous materials sections in each Study Area throughout the report to clarify that hydrogen-specific standards and safety measures may need to be developed and implemented in future phases of Angeles Link.

With regard to the comment regarding affordability, please refer to the Affordability Framework.

For the other topics addressed by the comment, please refer to Global Response 1 for additional information related to water availability and geographic considerations for third-party production; Global Response 4 for information related to safety; Response to Comment 47-3 for additional information related to the analysis of impacts related to third-party production; Q1 2024 quarterly report Global Response 3 for information on GHG emissions associated with water conveyance and treatment for third-party production; ; Q1 2024 quarterly report Global Response 4 for information on leakage estimates and climate change impacts; and; Q2 2024 quarterly report Global Response 2 for more information on hydrogen leakage.

Comment Letter 49 – California Hydrogen Business Council

Comment Letter 49

California Hydrogen Business Council

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CALIFORNIA HYDROGEN BUSINESS COUNCIL
COMMENTS ON ANGELES LINK PHASE I
DRAFT FRAMEWORK FOR AFFORDABILITY CONSIDERATIONS

October 4, 2024

Submitted via Email to: ALP1_STUDY_PAG_FEEDBACK@INSIGNIAENV.COM

The California Hydrogen Business Council ("CHBC") respectfully comments on the following Angeles Link Phase 1 Draft Framework for Affordability Considerations ("Framework") posted by the Southern California Gas Company in the Angeles Link Living Library on September 20, 2024.

1. Comments on the Draft Framework for Affordability Considerations

The CHBC appreciates the early analysis and consideration of affordability in Angeles Link Phase 1. While the basis for the draft Report reflects the best information available today, as noted in the CHBC comments on the draft High-Level Economic Analysis and Cost Effectiveness Report, there are many uncertainties that will inform more refined analyses in Phase 2 studies, including affordability and cost effectiveness. Comment 49-01

In addressing Ordering Paragraphs 5(a) and 6(k), the report appropriately provides a framework to analyze affordability at the future time when project specifics and costs are more certain. The Framework outlines a process to delve into the rate design and cost allocation when more variables, such as project design and routing, are known. Importantly, the Framework has sufficiently referenced and demonstrated that there is potential for hydrogen to be part of a lower cost energy scenario than electrification alone.

It is also appropriate to outline an assessment of non-ratepayer opportunities for funding, although these may also be variables that change during the course of Phase 2, such as available federal funding. Some of the additional funding opportunities identified in the Framework, like innovative rate design and utility hydrogen procurement, represent paradigm shifts that may be needed to facilitate the energy transition. Both the non-ratepayer opportunities and the additional opportunities should be further explored into Phase 2 and revisited in a subsequent report. These innovations can more broadly inform how this type of infrastructure may be funded in the future.

Comment 49-01

Respectfully submitted,

/s/ Katrina M. Fritz
Katrina M. Fritz
President & Chief Executive Officer
CALIFORNIA HYDROGEN BUSINESS COUNCIL
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Phone: 310-455-6095
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Dated: October 4, 2024

Page 2 of 2

CALIFORNIA HYDROGEN BUSINESS COUNCIL COMMENT 49-1

The California Hydrogen Business Council ("CHBC") respectfully comments on the following Angeles Link Phase 1 Draft Framework for Affordability Considerations ("Framework") posted by the Southern California Gas Company in the Angeles Link Living Library on September 20, 2024.

1. Comments on the Draft Framework for Affordability Considerations

The CHBC appreciates the early analysis and consideration of affordability in Angeles Link Phase 1. While the basis for the draft Report reflects the best information available today, as noted in the CHBC comments on the draft High-Level Economic Analysis and Cost Effectiveness Report, there are many uncertainties that will inform more refined analyses in Phase 2 studies, including affordability and cost effectiveness.

In addressing Ordering Paragraphs 5(a) and 6(k), the report appropriately provides a framework to analyze affordability at the future time when project specifics and costs are more certain. The Framework outlines a process to delve into the rate design and cost allocation when more variables, such as project design and routing, are known. Importantly, the Framework has sufficiently referenced and demonstrated that there is potential for hydrogen to be part of a lower cost energy scenario than electrification alone.

It is also appropriate to outline an assessment of non-ratepayer opportunities for funding, although these may also be variables that change during the course of Phase 2, such as available federal funding. Some of the additional funding opportunities identified in the Framework, like innovative rate design and utility hydrogen procurement, represent paradigm shifts that may be needed to facilitate the energy transition. Both the non-ratepayer opportunities and the additional opportunities should be further explored into Phase 2 and revisited in a subsequent report. These innovations can more broadly inform how this type of infrastructure may be funded in the future.

SOCALGAS RESPONSE TO COMMENT 49-1

Please refer to Global Response 10.

Comment Letter 50 – Environmental Defense Fund

Comment Letter 50

Environmental Defense Fund

October 4, 2024

Chester Britt
Planning Advisory Group Facilitator

Emily Grant
Angeles Link Senior Public Affairs Representative
Southern California Gas Company

Alisa Lykens
Director
Insignia Environmental

Subject: Environmental Defense Fund (EDF) Comments of Draft Framework for Affordability Considerations

EDF appreciates the opportunity to comment on the draft framework for affordability considerations as part of the Angeles Link Phase 1 studies. EDF's comments below will focus on providing general feedback on issues around funding a potential Angeles Link project, rather than details of potential funding opportunities identified by SoCalGas in the draft framework.

Throughout the Angeles Link Proceeding and the Public Advisory Group project, EDF has emphasized that its position is not one of blanket opposition against hydrogen adoption or even of a potential hydrogen pipeline project. Instead, EDF is interested in ensuring that any and all hydrogen adoption is focused on end-uses where hydrogen offers the most cost- and climate-effective decarbonization pathway; and that any potential Angeles Link Pipeline project is right-sized and designed with important environmental, climate, and environmental justice considerations in mind. If hydrogen is indeed identified as the most cost- and climate-effective decarbonization pathway for certain end-uses (*e.g.*, industrial high heat) and if a potential pipeline project—with the appropriate guardrails—is identified as the most appropriate means for hydrogen supply for these end-uses, EDF believes non-ratepayer funding and other innovative financing mechanisms will be important to explore. The transition to a decarbonized future will require substantial investments in the short term, while its benefits will be diffuse and realized over a longer timeframe. Non-ratepayer funding and financing mechanisms can help bridge that gap; and ensuring that ratepayers or end-users are not forced to pay for a decarbonization pathway that may prove critical in the broader goal of meeting California's ambitious climate goals.

Comment 50-01

That all being said, it is important to reiterate the preconditions that need to be met. To have a discussion on how to fund a hydrogen pipeline project, the need for hydrogen and—more specifically—the need for a *hydrogen pipeline* must first be established. Non-ratepayer funding and/or fixed charges suggested by SoCalGas in the draft framework should not be seen as a fallback mechanism that can somehow justify a less (or worse yet, not) cost- and climate-effective decarbonization pathway. In fact, such funding sources and mechanisms would only add to the need to put in place important environmental, climate, environmental justice, and economic guardrails.

Comment 50-01

Various parties, including EDF, have identified major concerns with level of hydrogen demand and associated project costs that SoCalGas has provided in the Phase 1 studies. While recognizing SoCalGas' engagement with and feedback to party comments, EDF continues to express the concern that Phase 1 studies continue to assume extremely high levels of hydrogen demand—above levels projected by California Air Resources Board Scoping Plan updates—and conflates the need for hydrogen supply in the state or the need for hydrogen supply infrastructure in general with the need for the potential Angeles Link pipeline project. For example, the draft affordability framework cites report published by EDF and E3 highlighting the need for clean firm power assets to support California's decarbonized energy future.[1] While the report does include hydrogen as an "all-of-the-above" clean firm power option, it is also important to note that the report should not be read as somehow endorsing the need for the potential Angeles Link pipeline project. Again, the need for and benefits of the Angeles Link pipeline should be determined by the specific demands that can be served by the project as well as other project details—and these considerations should serve as the basis for any future discussions around affordability, non-ratepayer funding, and other innovating financing mechanisms.

Comment 50-02

[1] Draft Affordability Framework at 9.

Respectfully,

Michael Colvin
Director, California Energy Program

Joon Hun Seong
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ENVIRONMENTAL DEFENSE FUND COMMENT 50-1

EDF appreciates the opportunity to comment on the draft framework for affordability considerations as part of the Angeles Link Phase 1 studies. EDF's comments below will focus on providing general feedback on issues around funding a potential Angeles Link project, rather than details of potential funding opportunities identified by SoCalGas in the draft framework.

Throughout the Angeles Link Proceeding and the Public Advisory Group project, EDF has emphasized that its position is not one of blanket opposition against hydrogen adoption or even of a potential hydrogen pipeline project. Instead, EDF is interested in ensuring that any and all hydrogen adoption is focused on end-uses where hydrogen offers the most cost- and climate-effective decarbonization pathway; and that any potential Angeles Link Pipeline project is right-sized and designed with important environmental, climate, and environmental justice considerations in mind. If hydrogen is indeed identified as the most cost- and climate-effective decarbonization pathway for certain end-uses (e.g., industrial high heat) and if a potential pipeline project—with the appropriate guardrails—is identified as the most appropriate means for hydrogen supply for these end-uses, EDF believes non-ratepayer funding and other innovative financing mechanisms will be important to explore. The transition to a decarbonized future will require substantial investments in the short term, while its benefits will be diffuse and realized over a longer timeframe. Non-ratepayer funding and financing mechanisms can help bridge that gap; and ensuring that ratepayers or end-users are not forced to pay for a decarbonization pathway that may prove critical in the broader goal of meeting California's ambitious climate goals.

That all being said, it is important to reiterate the preconditions that need to be met. To have a discussion on how to fund a hydrogen pipeline project, the need for hydrogen and—more specifically—the need for a hydrogen pipeline must first be established. Non-ratepayer funding and/or fixed charges suggested by SoCalGas in the draft framework should not be seen as a fallback mechanism that can somehow justify a less (or worse yet, not) cost- and climate-effective decarbonization pathway. In fact, such funding sources and mechanisms would only add to the need to put in place important environmental, climate, environmental justice, and economic guardrails.

SOCALGAS RESPONSE TO COMMENT 50-1

SoCalGas believes that its Phase 1 feasibility studies demonstrate that Angeles Link is technically feasible, commercially viable, cost-effective, and in the public interest and supportive of California's decarbonization goals. Additional information on appropriate pipeline sizing, end user requirements, environmental impacts and environmental justice considerations will be developed and considered as Angeles Link progresses through engineering and design. This additional information will also allow SoCalGas to develop a more refined cost estimate for Angeles Link.

Please also refer to Global Response 10.

ENVIRONMENTAL DEFENSE FUND COMMENT 50-2

Various parties, including EDF, have identified major concerns with level of hydrogen demand and associated project costs that SoCalGas has provided in the Phase 1 studies. While recognizing SoCalGas' engagement with and feedback to party comments, EDF continues to express the concern that Phase 1 studies continue to assume extremely high levels of hydrogen demand—above levels projected by California Air Resources Board Scoping Plan updates—and conflates the need for hydrogen supply in the state or the need for hydrogen supply infrastructure in general with the need for the potential Angeles Link pipeline project. For example, the draft affordability framework cites report published by EDF and E3 highlighting the need for clean firm power assets to support California's decarbonized energy future. FN1 While the report does include hydrogen as an "all-of-the-above" clean firm power option, it is also important to note that the report should not be read as somehow endorsing the need for the potential Angeles Link pipeline project. Again, the need for and benefits of the Angeles Link pipeline should be determined by the specific demands that can be served by the project as well as other project details—and these considerations should serve as the basis for any future discussions around affordability, non-ratepayer funding, and other innovating financing mechanisms.

FN1 – Draft Affordability Framework at 9.

SOCALGAS RESPONSE TO COMMENT 50-2

Please refer to Response to Comment 50-1. As previously noted in the Q1 2024 quarterly report, while there may be differences in the amount of hydrogen demand projected in all the referenced studies, there is consensus among agencies and researchers that projected demand exists in the power, mobility, and industrial sectors, that demand in those sectors is expected to grow over the next two decades, and that additional analysis is needed to better forecast what demand will be and what portion of the demand could be served by Angeles Link.

As pertaining to the comment regarding cost, please refer to Global Response 10.

Comment Letter 51 – Green Hydrogen Coalition

Comment Letter 51

October 4, 2024

Southern California Gas Company
555 West Fifth Street
Los Angeles, CA 90013

Submitted via email to: ALP1_Study_PAG_Feedback@insigniaenv.com

RE: Feedback for Southern California Gas Company on *Angeles Link Phase 1 Draft Framework for Affordability Considerations*

The Green Hydrogen Coalition ('GHC') is appreciative of SoCalGas' effort to implement Angeles Link, the nation's first dedicated common carrier renewable hydrogen pipeline, as it is an essential component of California's goal of economy wide decarbonization and our transition away from fossil fuels. The GHC is a California educational 501(c)(3) non-profit organization that was formed in 2019 to recognize the game-changing potential of "green hydrogen" to accelerate multi-sector decarbonization and combat climate change. The GHC's mission is to facilitate policies and practices that advance green hydrogen production and use across all sectors of the economy to accelerate a carbon-free energy future and a just energy transition.

Background/Basis for GHC's Comments

From 2020-2023 the GHC launched and completed HyBuild Los Angeles, a multi stakeholder independent system planning effort to determine if it is commercially and technically possible to create a mass-scale green hydrogen ecosystem to displace fossil fuels across multiple sectors. This effort was geared toward first identifying potential multi-sectoral buyers/demand for the renewable hydrogen and then architecting the needed scaled production and transport infrastructure to serve that demand. Findings from this effort were highly encouraging. The GHC found that achieving a mass-scale green hydrogen economy to rapidly displace fossil fuels in several hard to abate sectors is indeed technically and commercially possible. It will require shared, scaled infrastructure; namely green hydrogen pipeline transport connected to underground geologic storage of hydrogen. This infrastructure combination affords the lowest cost pathway to achieving mass-scale supply assurance and low delivered cost to enable widespread adoption of GH2. The successful implementation of Angeles Link is thus a gating factor for Southern California's realization of a green hydrogen economy and a faster transition away from fossil fuels economywide. The GHC is pleased to see that many of the assumptions and findings in the SoCalGas draft reports are consistent with the HyBuild LA findings.

Comment 51-01

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GHC Comments: **Angeles Link Phase 1 Draft Framework for Affordability Considerations**

The GHC appreciates the efforts of SoCalGas in pulling together this Angeles Link Phase 1 Draft Framework for Affordability Considerations ("Draft Framework") as part of the Angeles Link project. It is clear that SoCalGas has conducted significant study and analysis of the Angeles Link project and its potential benefits and impacts, and engaged, listened to, and incorporated the feedback of stakeholders in putting this Draft Framework together.

The GHC agrees that there is a critical need to emphasize and safeguard ratepayer affordability as part of the clean energy transition. Based on the analyses presented in the Draft Framework and associated draft reports, clean hydrogen delivered by the Angeles Link project presents a cost-effective pathway for the state of California to meet its net-zero mandate. That said, and as identified in this Draft Framework, SoCalGas and state agencies must take continuing action to ensure project cost effectiveness and ratepayer affordability. It needs to be an ongoing effort throughout the project development process, but both SoCalGas and the state can best and more specifically, address ratepayer impacts once a preferred project route is identified and additional project details developed.

Comment 51-01

Given clean hydrogen's essential role in enabling California to meet its net-zero mandate, the GHC recommends that the Commission take into consideration all its potential benefits when considering cost-effectiveness and affordability, including those benefits for which it is difficult to calculate the direct dollar value. Relatedly, the GHC emphasizes the need to consider a broad base of consumers and ratepayers that can receive these benefits, and accordingly evaluate affordability with the lens of this broader base paying for the infrastructure.

As evaluated in the studies cited in the Draft Framework, GHC's own analyses as part of its HyBuild Los Angeles Initiative[1], and the success of ARCHES in being awarded federal funding[2], by in part, demonstrating the value proposition of clean hydrogen, the benefits of using clean hydrogen are significant, especially for those difficult to decarbonize economic sectors.

The GHC further shares the following specific comments and feedback on the Draft Framework.

Comment 51-02

[1] Green Hydrogen Coalition. "HyBuild Los Angeles." Accessed October 3, 2024. https://www.ghcoalition.org/hybuild-la.
[2] ARCHES. "California's Renewable Hydrogen Hub Officially Launches. - Arches H2," July 18, 2024. https://archesh2.org/arches-officially-launches/.

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Importance of Valuing the Essential Role of Angeles Link Toward Deep Decarbonization of Difficult to Decarbonize Sectors

As the Draft Framework identifies and has widely been discussed as a challenge to meeting clean energy targets, it is particularly difficult to decarbonize certain sectors of the economy. This includes industrial processes which require high heat or chemical processes that cannot be electrified. It also includes heavy duty ground and maritime transportation, where electrification is not cost effective or infeasible. These sectors currently obtain their energy through fossil fuels, and to decarbonize, it is recognized that large quantities of clean fuels will be needed.

The GHC emphasizes that low-cost mass scale clean hydrogen is a proven and cost-effective pathway to transition these hard to decarbonize sectors, a sentiment that is widely shared throughout the energy industry and amongst a broad spectrum of stakeholders. However, achieving low-cost mass scale *delivered* clean hydrogen will require pipeline delivery of the clean hydrogen to these hard to decarbonize loads.

The GHC's HyBuild Los Angeles Phase 2 Report found that in a regional best-case- scenario, clean hydrogen and green ammonia produced from clean hydrogen serve a total of 13.5% of the Ports of Los Angeles and Long Beach's energy needs to fuel port equipment, transoceanic and port vessels by 2030. This translates to a demand of 455 kt (kilo-tonnes) per year of clean hydrogen.[3] Given that trucks have a capacity of between 2,000 to 6,000 kg hydrogen,[4] this is equivalent to between 75,000 to 230,000 trucks each year. These trucks would also need to be powered by electricity, clean hydrogen, or another clean fuel. Meeting this scale of demand necessitates a pipeline.

Comment 51-02

Importance of Valuing the Essential Role of Angeles Link Toward Supporting Electric System Reliability and Resiliency and Repurposing Existing Powerplant Infrastructure

With the energy transition retiring dispatchable fossil resources and shifting the electric grid to increasing dependence on weather dependent variable renewables, there is an increasing need for clean firm dispatchable resources to ensure electric system reliability and resiliency. Clean renewable hydrogen, delivered by Angeles Link, can provide a critical and cost -effective mechanism of both reliability and resiliency for ratepayers across Southern California, particularly as a long duration energy storage solution that can enable repurposing of existing powerplant infrastructure, a

Comment 51-03

[3] Green Hydrogen Coalition. "Report | HyBuild Los Angeles Phase 2 Report," March 23, 2023. https://www.ghcoalition.org/ghc-news/hybuild-la-phase-2-report.
[4] "Summary of the California State Agencies' PATHWAYS Project: Long-Term GHG Reduction Scenarios," Energy+Environmental Economics, https://www.ethree.com/public_proceedings/summary-california-state-agencies-pathways-project-long-term-greenhouse-gas-reduction-scenarios/

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path that will improve affordability of the power sectors energy transition. The GHC emphasizes this potential and recommends SoCalGas and the Commission take this potential value into consideration when considering affordability.

The need for resources to maintain electric reliability is clear. The impacts of climate change have resulted in more frequent grid stress events in the state, where increasing and unprecedented temperatures test the ability of the system to meet ever increasing load. This is an environment where imports from the Northwest are less available due to their own grid stress events, water availability patterns for hydroelectric resources are shifting, and the replacement of dispatchable fossil resources with solar and wind limit the flexibility of system operators to respond to grid stress.

In such an environment, low cost- clean hydrogen, delivered at scale to existing and repowered thermal electric generators, fuel cells and/or linear generators can deliver clean, firm, dispatchable power to support the grid and supplement wind and solar resources, limiting the need for significant renewable overbuild. This clean dispatchable resource can work in concert with other forms of energy storage resources to ensure reliable operations across timescales. The LA100 study by the National Renewable Energy Laboratory conducted a scenario modeling analysis to evaluate a pathway to 100% renewable electricity for Los Angeles. NREL found that meeting this target is achievable, and wind and solar resources, supported by battery storage, serves most of the energy need. However, renewable firm capacity, powered by a clean fuel such as clean hydrogen, will be key element to maintain reliability and meet the final 10-20% of energy needs. Absent this, Los Angeles would require a significant overbuild of renewable generation, and even then, would likely not be able to meet energy reliability needs due to its constrained transmission and distribution system.[5]

Comment 51-03

Beyond grid stress events, climate change is also increasing risks to the grid, leading to the potential for multi-day grid contingency events. This includes increased wildfire risk to grid infrastructure that necessitates responses such as multi-day Public Safety Power Shutoffs. During these Shutoffs or other contingencies, the grid needs resources to maintain frequency and provide back-up power to critical loads. As with reliability, clean hydrogen can also be a critical source of grid resiliency.

In a contingency event where centralized generation or transmission capacity is unavailable, for example, due to wildfires, mass-scale clean hydrogen can power dispatchable resources to meet load and maintain grid frequency, keeping the grid operational. In a situation where the grid does get disconnected, a clean hydrogen powered resource, coupled with energy storage, can provide a large black start resource to bring the grid back up. In the California Independent System Operator's (CAISO) annual Summer Loads and Resources Assessment for 2022, it found that contingency

[5] "Powering California's Future with Clean, Affordable and Reliable Energy," California Municipal Utilities Association, 2022 (p. 16)

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measures it had taken had avoided outages. However, given increasing demand and potential climate related risks, CAISO found that the grid continued to have a high degree of vulnerability during summer months. CAISO cited that new resources are moving it to the right direction, but the grid continues to fall short of meeting its reliability risk target for 2022.[6] This has changed somewhat in 2024, given more moderate temperatures and increased hydro availability, but CAISO still identifies potential extreme and emergency events as posing critical grid risk.[7]

In addition to being a resiliency resource for the grid, clean hydrogen can also serve as a resiliency resource for critical loads, providing back up generation using distributed resources such as modular, scalable linear generators and fuel cells to maintain electricity supply to critical loads. For example, the in-construction Calistoga Resiliency Center will leverage clean hydrogen and energy storage to enable a cost -effective clean microgrid that can provide 8.5 MW of power over 48 hours to the local community during Public Safety Power Shutoff events.[8] It will power downtown Calistoga and nearby areas, aiming to keep critical facilities like fire stations and police stations operational during [9] Further, because the Calistoga Resiliency Center includes onsite hydrogen storage assets, in the event of an outage that exceeds 48 hours, the Center can simply arrange to have hydrogen delivered to extend its duration.

Comment 51-03

Another element to the need for grid reliability and resiliency is the question of how a multiday outage might impact- energy affordability for Californians? In the absence of an abundant, clean dispatchable fuel, ratepayers and consumers will continue to rely on fossil fuel resources to provide back-up power to critical loads[10] and electric system operators to maintain system reliability and resiliency.[11] This given the increasing volatility in fossil fuel prices can lead to price shock, leading to a significant negative impact on the affordability of energy supply. In the summer of 2022, elevated temperatures led to unprecedent system load (driven by air conditioning), this was coupled by lower than expected solar and wind output, and limited energy imports due to hot temperatures in the Northwest. This significantly escalated real -time market prices as typically uneconomic generation

[6] California ISO. "2022 Summer Loads and Resources Assessment." May 18, 2022. https://www.caiso.com/documents/2022-summer-loads-and-resources-assessment.pdf
[7] California ISO. "2024 Summer Loads and Resources Assessment." May 8, 2024. https://www.caiso.com/documents/2024-summer-loads-and-resources-assessment.pdf
[8] Energy Vault. "Project – Calistoga Resiliency Center." Accessed October 3, 2024. https://www.energyvault.com/projects/calistoga.
[9] Balaraman, Kavya. "Energy Vault Starts Building Green Hydrogen Storage Project." PV Magazine International, February 28, 2024. https://www.pv-magazine.com/2024/02/28/energy-vault-starts-building-green-hydrogen-storage-project/.
[10] For outage durations beyond the reach of commercial battery systems.
[11] For large scale spinning reserve and contingency reserve needs that cannot yet cost-effectively be fulfilled by battery systems.

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resources that run on fossil fuels were turned on. In this situation, the prevailing price of the fossil fuel to operate these resources set the market clearing price and the cost to use these expensive resources and maintain supply was ultimately born by ratepayers.[12] A renewable fuel alternative like renewable hydrogen will help mitigate the impact of these fossil fuel price shocks.

Accordingly, from a ratepayer affordability perspective, low-cost mass--scale- clean hydrogen delivered by pipeline can provide grid reliability and resiliency, limiting the need for redundant back-up infrastructure and reliance on expensive and volatile fossil fuels.

Comment 51-03

The Affordability Framework Should Factor in Taxpayer and Environmental Benefits of Additional Clean Hydrogen Production Pathways, Including Converting Municipal Mixed and Organic Waste to Clean/Renewable Hydrogen Instead of Sending this Waste to Landfills

Regarding the affordability of the clean hydrogen that Angeles Link would transport, and, accordingly, the relative cost-effectiveness of the project, the GHC recommends further research/study on converting municipal mixed and organic waste that cannot be composted or recycled into clean hydrogen. This pathway could serve as an early-stage hydrogen feedstock for Angeles Link within LA county, as electrolytic hydrogen production ramps up elsewhere.

There are several California based companies working on technologies to convert waste to clean hydrogen, presenting the potential for significant state economic development value. For example, the SGH2 Lancaster plant in Lancaster, CA will be a waste to hydrogen plant producing up to 3.8 million kg of clean hydrogen per year, saving the City of Lancaster between $50 to $75 per ton in landfilling and landfill space costs.[13] In fact, analysis conducted at Lawrence Livermore National Laboratory finds that biomass gasification (including municipal solid waste) to produce hydrogen fuel has the largest potential for carbon removal at the lowest cost[14] and a study by the University of California and Stanford finds that hydrogen production from municipal solid waste has the best economics (internal rate of return) relative to all biomass feedstocks.[15]

Comment 51-04

[12] Public Advocates Office. "Preliminary Analysis of California's Resiliency During The September 2022 Heat Wave." https://www.publicadvocates.cpuc.ca.gov/-/media/cal-advocates-website/files/press-room/reports-and-analyses/220922-caladvocates-sept-22-heat-wave-analysis---full.pdf
[13] SGH2 Energy. "World's Largest Green Hydrogen Project to Launch in California." Accessed October 3, 2024. https://www.sgh2energy.com/worlds-largest-green-hydrogen-project-to-launch-in-california.
[14] Lawrence Livermore National Lab, Getting to Neutral Report: https://str.llnl.gov/past-issues/januaryfebruary-2022/path-carbon-neutral-california
[15] Gilani, H.R., Ibrik, K. and Sanchez, D.L. (2023), Techno-economic and policy analysis of hydrogen and gasoline production from forest biomass, agricultural residues, and municipal solid waste in California. Biofuels, Bioprod. Bioref., 17: 988-1002. https://doi.org/10.1002/bbb.2492.

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Converting waste destined for landfill to hydrogen can also serve as a mechanism for significant taxpayer savings in avoiding the processing of solid waste. For example, currently, Los Angeles spends $700 million per year processing solid waste to send to landfills![16] This does not include the toxic emissions from diesel-fueled trucking of this waste to distant landfills.

Comment 51-04

Summary – GHC Recommends that SoCalGas and The Commission Take Into Consideration All Potential Benefits of Clean/Renewable Hydrogen When Considering Cost-effectiveness and Affordability, Including Those Benefits for Which it is Difficult to Calculate the Direct Dollar Value.

In summary, the GHC applauds SoCalGas' efforts in putting together this comprehensive Draft Framework for Affordability and encourages SoCalGas to continue to strive for affordability as it continues progress towards developing the Angeles Link project. The GHC also strongly encourages the Commission and state agencies to consider pathways to enable customer and ratepayer energy, reliability and resiliency affordability, many of which SoCalGas has laid out as options in its Draft Framework.

The GHC appreciates the opportunity to submit comments on the Draft Framework and looks forward to participating in the final October PAG meeting and to the opportunity to further comment as additional analyses are completed.

Comment 51-05

[16] City of LA 2023-2024 Adopted Budget; solid waste collection and disposal cost is budgeted at $669,819,775 for 2023-2024; an additional $1,328,074,031 is budgeted for wastewater collection and treatment page 6: 2023-24 Budget Summary_FINALrev.pdf (lacity.gov)

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GREEN HYDROGEN COALITION COMMENT 51-1

The Green Hydrogen Coalition ('GHC') is appreciative of SoCalGas' effort to implement Angeles Link, the nation's first dedicated common carrier renewable hydrogen pipeline, as it is an essential component of California's goal of economy wide decarbonization and our transition away from fossil fuels. The GHC is a California educational 501(c)(3) non-profit organization that was formed in 2019 to recognize the game-changing potential of "green hydrogen" to accelerate multisector decarbonization and combat climate change. The GHC's mission is to facilitate policies and practices that advance green hydrogen production and use across all sectors of the economy to accelerate a carbon-free energy future and a just energy transition.

Background/Basis for GHC's Comments

From 2020-2023 the GHC launched and completed HyBuild Los Angeles, a multi stakeholder independent system planning effort to determine if it is commercially and technically possible to create a mass-scale green hydrogen ecosystem to displace fossil fuels across multiple sectors. This effort was geared toward first identifying potential multi-sectoral buyers/demand for the renewable hydrogen and then architecting the needed scaled production and transport infrastructure to serve that demand. Findings from this effort were highly encouraging. The GHC found that achieving a mass-scale green hydrogen economy to rapidly displace fossil fuels in several hard to abate sectors is indeed technically and commercially possible. It will require shared, scaled infrastructure; namely green hydrogen pipeline transport connected to underground geologic storage of hydrogen. This infrastructure combination affords the lowest cost pathway to achieving mass-scale supply assurance and low delivered cost to enable widespread adoption of GH2. The successful implementation of Angeles Link is thus a gating factor for Southern California's realization of a green hydrogen economy and a faster transition away from fossil fuels economywide. The GHC is pleased to see that many of the assumptions and findings in the SoCalGas draft reports are consistent with the HyBuild LA findings.

GHC Comments: Angeles Link Phase 1 Draft Framework for Affordability Considerations

The GHC appreciates the efforts of SoCalGas in pulling together this Angeles Link Phase 1 Draft Framework for Affordability Considerations ("Draft Framework") as part of the Angeles Link project. It is clear that SoCalGas has conducted significant study and analysis of the Angeles Link project and its potential benefits and impacts, and engaged, listened to, and incorporated the feedback of stakeholders in putting this Draft Framework together.

The GHC agrees that there is a critical need to emphasize and safeguard ratepayer affordability as part of the clean energy transition. Based on the analyses presented in the Draft Framework and associated draft reports, clean hydrogen delivered by the Angeles Link project presents a cost-effective pathway for the state of California to meet its net-zero mandate. That said, and as identified in this Draft Framework, SoCalGas and state agencies must take continuing action to ensure project cost effectiveness and ratepayer affordability. It needs to be an ongoing effort throughout the project development process, but both SoCalGas and the state can best and more specifically, address ratepayer impacts once a preferred project route is identified and additional project details developed.

Given clean hydrogen's essential role in enabling California to meet its net-zero mandate, the GHC recommends that the Commission take into consideration all its potential benefits when considering cost-effectiveness and affordability, including those benefits for which it is difficult to calculate the direct dollar value. Relatedly, the GHC emphasizes the need to consider a broad base of consumers and

ratepayers that can receive these benefits, and accordingly evaluate affordability with the lens of this broader base paying for the infrastructure.

As evaluated in the studies cited in the Draft Framework, GHC's own analyses as part of its HyBuild Los Angeles Initiative FN1, and the success of ARCHES in being awarded federal funding FN2, by in part, demonstrating the value proposition of clean hydrogen, the benefits of using clean hydrogen are significant, especially for those difficult to decarbonize economic sectors.

SOCALGAS RESPONSE TO COMMENT 51-1

Please refer to Global Response 10.

GREEN HYDROGEN COALITION COMMENT 51-2

The GHC further shares the following specific comments and feedback on the Draft Framework.

Importance of Valuing the Essential Role of Angeles Link Toward Deep Decarbonization of Difficult to Decarbonize Sectors

As the Draft Framework identifies and has widely been discussed as a challenge to meeting clean energy targets, it is particularly difficult to decarbonize certain sectors of the economy. This includes industrial processes which require high heat or chemical processes that cannot be electrified. It also includes heavy duty ground and maritime transportation, where electrification is not cost effective or infeasible. These sectors currently obtain their energy through fossil fuels, and to decarbonize, it is recognized that large quantities of clean fuels will be needed.

The GHC emphasizes that low-cost mass scale clean hydrogen is a proven and cost-effective pathway to transition these hard to decarbonize sectors, a sentiment that is widely shared throughout the energy industry and amongst a broad spectrum of stakeholders. However, achieving low-cost mass scale delivered clean hydrogen will require pipeline delivery of the clean hydrogen to these hard to decarbonize loads.

The GHC's HyBuild Los Angeles Phase 2 Report found that in a regional best-case- scenario, clean hydrogen and green ammonia produced from clean hydrogen serve a total of 13.5% of the Ports of Los Angeles and Long Beach's energy needs to fuel port equipment, transoceanic and port vessels by 2030. This translates to a demand of 455 kt (kilo-tonnes) per year of clean hydrogen.FN3 Given that trucks have a capacity of between 2,000 to 6,000 kg hydrogen,FN4 this is equivalent to between 75,000 to 230,000 trucks each year. These trucks would also need to be powered by electricity, clean hydrogen, or another clean fuel. Meeting this scale of demand necessitates a pipeline.

FN 3 Green Hydrogen Coalition. "Report | HyBuild Los Angeles Phase 2 Report," March 23, 2023. https://www.ghcoalition.org/ghc-news/hybuild-la-phase-2-report.

FN 4 "Summary of the California State Agencies' PATHWAYS Project: Long-Term GHG Reduction Scenarios," Energy+Environmental Economics, https://www.ethree.com/public_proceedings/summary-california-stateagencies-pathways-project-long-term-greenhouse-gas-reduction-scenarios/

SOCALGAS RESPONSE TO COMMENT 51-2

Please refer to Global Response 10.

GREEN HYDROGEN COALITION COMMENT 51-3

Importance of Valuing the Essential Role of Angeles Link Toward Supporting Electric System Reliability and Resiliency and Repurposing Existing Powerplant Infrastructure

With the energy transition retiring dispatchable fossil resources and shifting the electric grid to increasing dependence on weather dependent variable renewables, there is an increasing need for clean firm dispatchable resources to ensure electric system reliability and resiliency. Clean renewable hydrogen, delivered by Angeles Link, can provide a critical and cost -effective mechanism of both reliability and resiliency for ratepayers across Southern California, particularly as a long duration energy storage solution that can enable repurposing of existing powerplant infrastructure, a path that will improve affordability of the power sectors energy transition. The GHC emphasizes this potential and recommends SoCalGas and the Commission take this potential value into consideration when considering affordability.

The need for resources to maintain electric reliability is clear. The impacts of climate change have resulted in more frequent grid stress events in the state, where increasing and unprecedented temperatures test the ability of the system to meet ever increasing load. This is an environment where imports from the Northwest are less available due to their own grid stress events, water availability patterns for hydroelectric resources are shifting, and the replacement of dispatchable fossil resources with solar and wind limit the flexibility of system operators to respond to grid stress.

In such an environment, low cost- clean hydrogen, delivered at scale to existing and repowered thermal electric generators, fuel cells and/or linear generators can deliver clean, firm, dispatchable power to support the grid and supplement wind and solar resources, limiting the need for significant renewable overbuild. This clean dispatchable resource can work in concert with other forms of energy storage resources to ensure reliable operations across timescales. The LA100 study by the National Renewable Energy Laboratory conducted a scenario modeling analysis to evaluate a pathway to 100% renewable electricity for Los Angeles. NREL found that meeting this target is achievable, and wind and solar resources, supported by battery storage, serves most of the energy need. However, renewable firm capacity, powered by a clean fuel such as clean hydrogen, will be key element to maintain reliability and meet the final 10-20% of energy needs. Absent this, Los Angeles would require a significant overbuild of renewable generation, and even then, would likely not be able to meet energy reliability needs due to its constrained transmission and distribution system. FN5

Beyond grid stress events, climate change is also increasing risks to the grid, leading to the potential for multi-day grid contingency events. This includes increased wildfire risk to grid infrastructure that necessitates responses such as multi-day Public Safety Power Shutoffs. During these Shutoffs or other contingencies, the grid needs resources to maintain frequency and provide back-up power to critical loads. As with reliability, clean hydrogen can also be a critical source of grid resiliency.

In a contingency event where centralized generation or transmission capacity is unavailable, for example, due to wildfires, mass-scale clean hydrogen can power dispatchable resources to meet load and maintain grid frequency, keeping the grid operational. In a situation where the grid does get disconnected, a clean hydrogen powered resource, coupled with energy storage, can provide a large black start resource to bring the grid back up. In the California Independent System Operator's (CAISO) annual Summer Loads and Resources Assessment for 2022, it found that contingency measures it had taken had avoided outages. However, given increasing demand and potential climate related risks, CAISO found that the grid continued to have a high degree of vulnerability during summer months. CAISO cited

that new resources are moving it to the right direction, but the grid continues to fall short of meeting its reliability risk target for 2022.FN6 This has changed somewhat in 2024, given more moderate temperatures and increased hydro availability, but CAISO still identifies potential extreme and emergency events as posing critical grid risk.FN7

In addition to being a resiliency resource for the grid, clean hydrogen can also serve as a resiliency resource for critical loads, providing back up generation using distributed resources such as modular, scalable linear generators and fuel cells to maintain electricity supply to critical loads. For example, the in-construction Calistoga Resiliency Center will leverage clean hydrogen and energy storage to enable a cost -effective clean microgrid that can provide 8.5 MW of power over 48 hours to the local community during Public Safety Power Shutoff events.FN8 It will power downtown Calistoga and nearby areas, aiming to keep critical facilities like fire stations and police stations operational during FN9. Further, because the Calistoga Resiliency Center includes onsite hydrogen storage assets, in the event of an outage that exceeds 48 hours, the Center can simply arrange to have hydrogen delivered to extend its duration.

Another element to the need for grid reliability and resiliency is the question of how a multiday outage might impact- energy affordability for Californians? In the absence of an abundant, clean dispatchable fuel, ratepayers and consumers will continue to rely on fossil fuel resources to provide back-up power to critical loads FN10 and electric system operators to maintain system reliability and resiliency.FN11 This given the increasing volatility in fossil fuel prices can lead to price shock, leading to a significant negative impact on the affordability of energy supply. In the summer of 2022, elevated temperatures led to unprecedent system load (driven by air conditioning), this was coupled by lower than expected solar and wind output, and limited energy imports due to hot temperatures in the Northwest. This significantly escalated real -time market prices as typically uneconomic generation resources that run on fossil fuels were turned on. In this situation, the prevailing price of the fossil fuel to operate these resources set the market clearing price and the cost to use these expensive resources and maintain supply was ultimately born by ratepayers.FN12 A renewable fuel alternative like renewable hydrogen will help mitigate the impact of these fossil fuel price shocks. Accordingly, from a ratepayer affordability perspective, low-cost mass--scale- clean hydrogen delivered by pipeline can provide grid reliability and resiliency, limiting the need for redundant back-up infrastructure and reliance on expensive and volatile fossil fuels.

FN5 “Powering California’s Future with Clean, Affordable and Reliable Energy,” California Municipal Utilities Association, 2022 (p. 16) FN6 California ISO. “2022 Summer Loads and Resources Assessment.” May 18, 2022. https://www.caiso.com/documents/2022-summer-loads-and-resources-assessment.pdf

FN7 California ISO. “2024 Summer Loads and Resources Assessment.” May 8, 2024. https://www.caiso.com/documents/2024-summer-loads-and-resources-assessment.pdf

FN8 Energy Vault. “Project – Calistoga Resiliency Center.” Accessed October 3, 2024. https://www.energyvault.com/projects/calistoga.

FN9 Balaraman, Kavya. “Energy Vault Starts Building Green Hydrogen Storage Project.” PV Magazine International, February 28, 2024. https://www.pv-magazine.com/2024/02/28/energy-vault-starts-buildinggreen-hydrogen-storage-project/.

FN10 For outage durations beyond the reach of commercial battery systems. 11 For large scale spinning reserve and contingency reserve needs that cannot yet cost-effectively be fulfilled by battery systems.

FN11 11 For large scale spinning reserve and contingency reserve needs that cannot yet cost-effectively be fulfilled by battery systems.

FN12 Public Advocates Office. “Preliminary Analysis of California’s Resiliency During The September 2022 Heat Wave.” https://www.publicadvocates.cpuc.ca.gov/-/media/cal-advocateswebsite/files/press-room/reports-and-analyses/220922-caladvocates-sept-22-heat-wave-analysis---full.pdf

SOCALGAS RESPONSE TO COMMENT 51-3

Please refer to Global Response 10.

GREEN HYDROGEN COALITION COMMENT 51-4

The Affordability Framework Should Factor in Taxpayer and Environmental Benefits of Additional Clean Hydrogen Production Pathways, Including Converting Municipal Mixed and Organic Waste to Clean/Renewable Hydrogen Instead of Sending this Waste to Landfills

Regarding the affordability of the clean hydrogen that Angeles Link would transport, and, accordingly, the relative cost-effectiveness of the project, the GHC recommends further research/study on converting municipal mixed and organic waste that cannot be composted or recycled into clean hydrogen. This pathway could serve as an early-stage hydrogen feedstock for Angeles Link within LA county, as electrolytic hydrogen production ramps up elsewhere.

There are several California based companies working on technologies to convert waste to clean hydrogen, presenting the potential for significant state economic development value. For example, the SGH2 Lancaster plant in Lancaster, CA will be a waste to hydrogen plant producing up to 3.8 million kg of clean hydrogen per year, saving the City of Lancaster between $50 to $75 per ton in landfilling and landfill space costs. 13 In fact, analysis conducted at Lawrence Livermore National Laboratory finds that biomass gasification (including municipal solid waste) to produce hydrogen fuel has the largest potential for carbon removal at the lowest cost FN14 and a study by the University of California and Stanford finds that hydrogen production from municipal solid waste has the best economics (internal rate of return) relative to all biomass feedstocks. FN15

Converting waste destined for landfill to hydrogen can also serve as a mechanism for significant taxpayer savings in avoiding the processing of solid waste. For example, currently, Los Angeles spends $700 million per year processing solid waste to send to landfills!FN16 This does not include the toxic emissions from diesel-fueled trucking of this waste to distant landfills.

FN14 Lawrence Livermore National Lab, Getting to Neutral Report: https://str.llnl.gov/past-issues/januaryfebruary-2022/path-carbon-neutral-california

FN15 Gilani, H.R., Ibrik, K. and Sanchez, D.L. (2023), Techno-economic and policy analysis of hydrogen and gasoline production from forest biomass, agricultural residues, and municipal solid waste in California. Biofuels, Bioprod. Bioref., 17: 988-1002. https://doi.org/10.1002/bbb.2492

FN16 City of LA 2023-2024 Adopted Budget; solid waste collection and disposal cost is budgeted at $669,819,775 for 2023-2024; an additional $1,328,074,031 is budgeted for wastewater collection and treatment page 6: 2023-24 Budget Summary_FINALrev.pdf (lacity.gov

SOCALGAS RESPONSE TO COMMENT 51-4

Please refer to Global Response 10.

GREEN HYDROGEN COALITION COMMENT 51-5

Summary – GHC Recommends that SoCalGas and The Commission Take Into Consideration All Potential Benefits of Clean/Renewable Hydrogen When Considering Cost-effectiveness and Affordability, Including Those Benefits for Which it is Difficult to Calculate the Direct Dollar Value.

In summary, the GHC applauds SoCalGas' efforts in putting together this comprehensive Draft Framework for Affordability and encourages SoCalGas to continue to strive for affordability as it continues progress towards developing the Angeles Link project. The GHC also strongly encourages the Commission and state agencies to consider pathways to enable customer and ratepayer energy, reliability and resiliency affordability, many of which SoCalGas has laid out as options i its Draft Framework.

The GHC appreciates the opportunity to submit comments on the Draft Framework and looks forward to participating in the final October PAG meeting and to the opportunity to further comment as additional analyses are completed.

SOCALGAS RESPONSE TO COMMENT 51-5

Please refer to Global Response 10.