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**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Application of Southern California Gas Company (U9404G), San Diego Gas & Electric Company (U902), Pacific Gas and Electric Company (U39G) and Southwest Gas Corporation (U905G) to Establish Hydrogen Blending Demonstration Projects.

Application 22-09-006
(Filed September 8, 2022)

OPENING BRIEF OF PACIFIC GAS AND ELECTRIC COMPANY

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SUMMARY OF RECOMMENDATIONS

Pursuant to the Scoping Memo and the evidentiary record in this proceeding, Pacific Gas and Electric Company (PG&E) respectfully submits the following summary supporting its application for Commission approval of PG&E hydrogen blending pilot project. As demonstrated in PG&E's and other applicants' testimony, exhibits, responses to data requests, the record and consistent with the applicable legal and policy framework for advancing California's clean energy goals and objectives, PG&E has met its burden of proof. Accordingly, PG&E respectfully recommends that the Commission approve PG&E's proposed hydrogen blending pilot and adopt the following findings:

**1. Regulatory and Legal Compliance and Alignment with Decision
D.22-12-057**

PG&E's proposed hydrogen blending pilot complies with applicable provisions of the Public Utilities Code and conforms to the requirements of Decision D.22-12-057, including those related to safety, monitoring, reporting, system impact analysis, stakeholder engagement, and Commission oversight.

2. Project Usefulness and Design

PG&E's pilot is well designed and useful because it generates empirical, transmission pressure data necessary to evaluate the impacts of hydrogen blending—data that cannot be obtained through modeling, laboratory testing, or literature review alone—and therefore provides meaningful information to inform future Commission decision making.

3. Project Prudence and Reasonableness of Costs

PG&E's pilot is prudent and reasonable because it will provide benefits to gas ratepayers as required and intended by the Commission in D.22-12-057, including benefits not available under other pilot projects. The costs of PG&E's pilot project are

reasonable, at a cost of \$94.2 million spread over ten years, resulting in a bill impact of only approximately \$0.05 per month for the typical customer bill.

4. Safety

The pilot prioritizes safety through conservative design, use of a closed and isolated transmission test loop, rigorous baseline and ongoing integrity testing, and layered monitoring and risk and emergency management measures appropriate for this hydrogen blending pilot.

5. Equity and Community Impacts.

The pilot minimizes community impacts by avoiding hydrogen delivery to end use customers, incorporating stakeholder and local agency engagement, and aligning with the Commission's equity, environmental, and social justice objectives.

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OPENING BRIEF OF PACIFIC GAS AND ELECTRIC COMPANY

I. INTRODUCTION

Pacific Gas and Electric Company's (PG&E) Opening Brief (Opening Brief) demonstrates that PG&E's proposed hydrogen blending pilot project is just, reasonable and in the public interest under the Public Utilities Code and the California Public Utility Commission's (Commission or CPUC) requirements in this proceeding. In general, the Opening Brief follows the outline of the Scoping Issues from the Assigned Commissioner's Scoping Memo.

PG&E's pilot complies with the criteria set forth in Decision (D.)22-12-057 and satisfactorily addresses the issues raised in the Scoping Memo, including the specific questions attached to the Scoping Memo about PG&E's pilot. The pilot also comports with California's clean energy and climate policies and goals as set forth in PG&E's testimony, data request responses, pleadings and other evidence in the record provided by PG&E and the other applicants in this proceeding.¹

¹ D.22-12-057, pp. 68- 72, Ordering Paragraphs (OP) 7, 10, 11, and 12; Assigned Commissioner's Scoping Memo, (June 12, 2025); Ex. PGE-004 (PG&E Responses to Project Specific Questions, Assigned Commissioner's Scoping Memo, (Aug. 12, 2025); see generally, PG&E testimony and exhibits (Ex.) PGE-001, -002, -003, -004, -005, -005-A to -005-K, -006, and -007. Based on PG&E's and the other applicants' Joint Motion *In Limine* To Exclude Evidence Regarding Hydrogen Blending As A Matter of Macro-Level Decarbonization Policy, (Oct. 3, 2025) and the guidance provided in the ALJ's E-Mail Ruling Directives and Guidance For Final Briefing, Section 3, p. 3, (Mar. 9, 2026), evidence and

More specifically, the Opening Brief demonstrates that:

- PG&E's proposed hydrogen blending pilot project is useful and well designed, because it addresses significant knowledge gaps regarding the feasibility of hydrogen blending in gas transmission pipelines. PG&E's pilot will generate data that current literature does not encompass, including the Hydrogen Blending Impact Report, Hydrogen Blending Compendium Report and other national and global research and demonstrations of hydrogen blending.² PG&E will share the data, findings and conclusions in PG&E's hydrogen blending pilot project with stakeholders, the Commission, and other utility operators for the benefit of PG&E's and California gas customers.³
- The \$94.2 million in forecast nominal capital and expense costs and \$67.09 million in forecast present value of revenue requirements for PG&E's hydrogen blending pilot project are prudent and reasonable as the costs will be recovered and amortized over ten years. Further, the estimated bill impact per customer is approximately only \$0.05 per month on a typical residential gas bill in the peak year with costs spread over ten years.⁴
- PG&E will continue to seek non-ratepayer funds from private and public sources to share the costs of PG&E's hydrogen blending pilot project, including from California state and federal agencies.⁵

testimony opposing PG&E's and the joint applicants' hydrogen blending pilot project proposals for reasons unrelated to and outside the scope of this proceeding should be given zero or little weight in this proceeding.

² See Section IV of PG&E's Opening Brief, below.

³ See Section IV.E of PG&E's Opening Brief, below.

⁴ See Section V of PG&E's Opening Brief, below. Present Value of Revenue Requirements using 7 percent discount rate over 10 years under mid-period method.

⁵ See Section V.C of PG&E's Opening Brief, below.

- The pilot prioritizes safety above all else, and the project design isolates the pilot from PG&E’s commercial, operating gas system.⁶ During project design, construction and commissioning, PG&E will perform comprehensive safety and risk assessments, including baseline testing of infrastructure integrity, documentation of all safety protocols, and development of emergency response plans in coordination with local authorities.⁷ During project operations, PG&E will continuously monitor project’s facilities for compliance with safety protocols, including operation of automated safety and shutdown systems, leak detection, and ongoing monitoring and assessment of pipeline integrity within the pilot project.⁸ Upon request, PG&E will provide all design, engineering and operational safety documentation, data and results to Commission staff.
- PG&E has conducted outreach and engagement with the local community in Lodi where the project is proposed to be located, to ensure that the community has participated in the site selection process and that the site selection complies with the Commission’s Environmental and Social Justice Action Plan, including any potential impacts on environmental and social justice communities.⁹

II. BACKGROUND

The procedural, legal and clean energy public policy background for PG&E’s hydrogen blending pilot project application in this proceeding is provided in PG&E’s and other utilities’ Joint Amended Application and prepared testimony dated March 1, 2024; the Assigned Commissioner’s Scoping Memo and Ruling dated June 12, 2025 including PG&E’s and other applicants’ Responses to Appendix B Project Specific Questions filed

⁶ See Section VI.A of PG&E’s Opening Brief, below.

⁷ See Section VI.B, VI.C and VI.D of PG&E’s Opening Brief, below.

⁸ See Section VI.B and VI.F of PG&E’s Opening Brief, below.

⁹ See Section VII of PG&E’s Opening Brief, below.

and served on August 11, 2025; and the Administrative Law Judge’s Rulings dated October 7, 2025 and March 9, 2026.¹⁰

III. PG&E’S HYDROGEN BLENDING PILOT PROJECT CONFORMS TO LEGAL AND REGULATORY REQUIREMENTS

A. PG&E’s Pilot Complies with Specific Requirements Set Forth in the Public Utilities Code and D.22-12-057

The California Public Utilities Code does not presently contain provisions specific to hydrogen blending within the natural gas infrastructure, nor does it include a framework analogous to Division 1, Part 1, Chapter 3, Article 10, Sections 650–651, which apply to biomethane procurement.¹¹ Division 1, Part 1, Chapter 4.5 of the Public Utilities Code governs gas pipeline safety. PG&E’s pilot project adheres to the existing standards and processes applicable to gas pipelines subject to those requirements. Building on this regulatory foundation, the project’s design, construction, operation, and maintenance practices are tailored to accommodate hydrogen blends. Where applicable, PG&E incorporates hydrogen specific standards, including American Society of Mechanical Engineers (ASME) B31.12, *Hydrogen Piping and Pipelines*, to support safe and effective implementation.¹²

Ordering Paragraph 7(a) of D.22-12-057 requires that a pilot ensure the long-term safety of the California pipeline, prevent hydrogen leakage, include hydrogen monitoring, consider dilution rates, and monitor and report mechanical characteristics of hydrogen-natural gas blends. PG&E’s pilot satisfies these requirements through a standalone, closed transmission test loop that is physically separate from the commercial,

¹⁰ See, generally, Joint Amended Application of Southern California Gas Company, San Diego Gas & Electric Company, Pacific Gas and Electric Company and Southwest Gas Corporation to Establish Hydrogen Blending Demonstration Projects, (Mar. 1, 2024), (Joint Amended Application); PG&E evidence, testimony, exhibits and other documents and rulings cited at fn. 1, *supra*; Joint Motion to Admit Exhibits into the Evidentiary Record, (Apr. 22, 2026).

¹¹ Ex. PGE-003, p. 1, lines 28-31.

¹² Ex. PGE-003, p. 1, line 32 to p. 2, line 7.

operating gas system, enabling controlled evaluation without introducing hydrogen into the utility's in-service pipelines. The test loop is constructed with pipes, equipment, and materials representative of PG&E's high-pressure transmission infrastructure and is designed and tested in accordance with applicable ASME standards, including ASME B31.12 and ASME B31.3, as well as PG&E-specific design standards. Leakage prevention and detection are addressed through 100 percent non-destructive examination of girth welds, isolatable offtakes, and fixed, continuous monitoring using pressure transmitters, thermocouples, and acoustic and vibration sensors. Hydrogen concentration is controlled and verified using gas quality analyzers and metering equipment located at the blending and injection skid prior to injection into the test loop. Mechanical and operational performance is monitored continuously across typical pipeline assemblies, supported by additional instrumentation and periodic laboratory analysis of redundant vintage pipe runs, with results retained and summarized in annual reports to the Commission.¹³

Ordering Paragraph 7(b) of D.22-12-057 requires that pilots prevent hydrogen from reaching natural gas storage areas and electrical switching equipment. PG&E's pilot satisfies this requirement because it is an offline facility that is completely separate from natural gas storage areas and electrical switching equipment, eliminating any pathway for hydrogen to reach such facilities directly or through leakage.¹⁴

Ordering Paragraph 7(c) of D.22-12-057 requires that pilots avoid end-user appliance malfunctions. PG&E's pilot satisfies this requirement because it does not currently have an end user. Should Northern California Power Agency (NCPA) later become ready to accept a hydrogen blend via pipeline following the development of an

¹³ Ex. PGE-001, p. 25, line 25 to p. 27, line 31.

¹⁴ Ex. PGE-001, p. 28, lines 1-4.

approved methodology for blending in existing pipelines, NCPA's Siemens Energy gas turbine is capable of accepting hydrogen blends of up to 45 percent by volume.¹⁵

Ordering Paragraph 7(d) requires evaluation of hydrogen injection at blends between 0.1 and five percent and between five and twenty percent, with approved monitoring, reporting, long-term impact study, and validation programs. This requirement is satisfied across the Joint Utilities' portfolio, with PG&E's pilot evaluating hydrogen blends between five and twenty percent in a closed, transmission-pressure system, while other pilots evaluate hydrogen blends in distribution-pressure systems. PG&E's pilot adheres to approved monitoring, reporting, and long-term impact study requirements and includes validation programs to confirm performance, with detailed protocols to be developed during FEL-3 and Detailed Engineering.¹⁶

Ordering Paragraph 7(e) of D.22-12-057 requires specification of funding amounts and testing durations adequate to draw meaningful conclusions. PG&E satisfies this requirement by providing detailed cost estimates in Chapter 5 and proposing a long-term testing program in which hydrogen blends from five through fifteen percent are held for six months each to validate safe and stable operation, before incrementally increasing to twenty percent and sustaining operation at that level for approximately eight additional years to support long-term performance evaluation.¹⁷

Ordering Paragraph 7(f) of D.22-12-057 requires consistency with all directed courses of action specified in Decision 22-12-057 relevant to leakage, reporting, heating value, system safety, environmental considerations, end-use emissions, and related elements. PG&E's pilot satisfies this requirement, with compliance addressed throughout

¹⁵ Ex. PGE-001, p. 28, lines 5-11.

¹⁶ Ex. PGE-001, p. 28, lines 12-22.

¹⁷ Ex. PGE-001, p. 28, line 23 to p. 29, line 2.

Chapter 5 and organized by theme in Table 5, which demonstrates alignment with each directed course of action enumerated in the decision.¹⁸

Ordering Paragraph 7(g) of D.22-12-057 requires rigorous testing protocols consistent with the University of California, Riverside (UCR) study. PG&E's pilot satisfies this requirement by adopting scientifically rigorous, replicable testing protocols that build on the UCR study and expand them to a large-scale, real-world testing environment, with UCR serving in an advisory role to ensure protocol consistency as testing details are finalized during FEL and Detailed Engineering.¹⁹

Ordering Paragraph 7(h) of D.22-12-057 requires consideration of parties' comments and stakeholder input and inclusion of opportunities for compensation for parties and community-based organizations. PG&E satisfies this requirement through a communication and engagement plan that incorporates stakeholder feedback throughout project stages, active collaboration with parties and community-based organizations, and prior engagement with organizations such as the Environmental Defense Fund, whose feedback is considered in test loop design. Intervenor compensation and compensation for community-based organizations are provided through existing mechanisms, including the Core Fixed Cost Account and Noncore Customer Class Charge Account.²⁰

Ordering Paragraph 7(i) of D.22-12-057 requires a methodology for performing a Hydrogen Blending System Impact Analysis to ensure hydrogen blends do not pose risks to the common carrier pipeline system. PG&E satisfies this requirement by proposing development of a System Impact Analysis methodology informed by demonstration data, structured similarly to a biomethane interconnection framework, and addressing

¹⁸ Ex. PGE-001, p. 29, lines 3-9; pp. 30-31, Table 5.

¹⁹ Ex. PGE-001, p. 31, lines 2-9.

²⁰ Ex. PGE-001, p. 31, line 10 to p. 32, line 6.

downstream systems, materials, operating pressures, equipment, pipeline history, end-use equipment, and other factors necessary to ensure system safety.²¹

Ordering Paragraph 7(j) of D.22-12-057 requires discussion of heating values and whether heating value modifications would be required and can be done safely. PG&E satisfies this requirement because its gas quality tariffs do not specify a heating value and propane will not be used to modify heating values. Instead, PG&E relies on Wobbe number for gas quality consistency and monitors calorific value at the blending and injection skid. Given the short length of the test loop and the absence of an end user, gas quality changes are not expected.²²

Ordering Paragraph 7(k) of D.22-12-057 requires demonstration of the ability to reliably detect leakage of hydrogen, methane, and hydrogen-methane blends using rigorous leak testing protocols consistent with the UC Riverside Hydrogen Blending Impacts Study and responsive to party and stakeholder comments. PG&E satisfies this requirement through fixed, continuous monitoring, a dedicated leak testing area with remote-actuated shutdown valves and pressure regulation, controlled leak trials at varied pressures and conditions, and testing of both ground-based and airborne detection technologies. PG&E also proposes installation of a fiber-optic leak detection system monitored by the onsite control center, with final technology selection determined during FEED.²³

Ordering Paragraph 7(l) of D.22-12-057 requires an independent research plan for assessment, measurement, monitoring, and reporting through an independent party engaged throughout the pilot lifecycle. PG&E satisfies this requirement through engagement of experienced independent third parties during early project stages and by committing, in coordination with the Joint Utilities, to issue a competitive solicitation for

²¹ Ex. PGE-001, p. 32, lines 7-27.

²² Ex. PGE-001, p. 32, line 28 to p. 33, line 7.

²³ Ex. PGE-001, p. 33, line 8 to p. 34, line 4.

independent oversight of transmission and distribution research plans during later stages. Costs associated with the independent research plan will be tracked through an administrative memorandum subaccount and recorded in the Hydrogen Blending Demonstration Project Balancing Account.²⁴

Ordering Paragraph 10 of D.22-12-057 requires the Joint Utilities to jointly file a Hydrogen Blending Compendium Report within two years of the issuance of the decision to identify existing studies and regulatory proceedings that are complete or underway and to address the subject areas specified in Ordering Paragraph 10(a) through (h). The Joint Utilities satisfied this requirement by submitting the Hydrogen Blending Compendium Report on February 14, 2025, which addresses the topics identified in Ordering Paragraph 10(a)–(h), including safety performance and integrity considerations, leakage and permeation, storage field impacts, leak detection technologies, impact on heating value, and identified human health issues.²⁵

Ordering Paragraph 11 of D.22-12-057 requires the Joint Utilities to coordinate with the Commission’s Energy Division and host a workshop to obtain feedback from a diverse group of stakeholders regarding the design and implementation of safe and meaningful hydrogen blending pilot projects and the assessment of environmental impacts to customers and communities. The Joint Utilities satisfied this requirement by holding two public workshops. On June 13, 2023, the Joint Utilities conducted a virtual public workshop presenting an overview of their respective projects as formulated at that time and soliciting stakeholder feedback. The workshop included a presentation by a University of California, Riverside professor summarizing findings from the UC Riverside Study and a presentation by ATCO on its open system hydrogen blending project in Fort Saskatchewan, Canada, and provided designated time for verbal and

²⁴ Ex. PGE-001, p. 34, lines 5-20.

²⁵ Joint Amended Application, p. 19; Ex. SCG-08.

written stakeholder input. Comments and questions focused on hydrogen sourcing, leakage issues, stakeholder engagement to date, and environmental considerations, and the Joint Utilities responded to several questions during the workshop. On November 6, 2023, the Joint Utilities held a second public workshop focused on technical issues, during which they shared draft testing plans, discussed approaches to assessing potential environmental impacts, and solicited additional stakeholder input. This workshop included designated time for verbal and written feedback and a public question-and-answer session with a panel of national hydrogen blending experts from the National Renewable Energy Laboratory, the Pacific Northwest National Laboratory, and Sandia National Laboratory. For both workshops, the Joint Utilities provided written responses to questions submitted that were not addressed during the live events.²⁶

Ordering Paragraph 12 of D.22-12-057 requires Pacific Gas and Electric Company to submit its Hydrogen-to-Infinity project reports and findings to the service list in Rulemaking (R.)13-02-008, or its successor proceeding, to provide an opportunity for parties to comment on the project. PG&E satisfied this requirement by outlining the Hydrogen-to-Infinity project in this application, which is the same project as the Hydrogen-to-Infinity project referenced in Ordering Paragraph 12. Through this application proceeding, parties have the opportunity to review and comment on the Hydrogen-to-Infinity project.²⁷

B. PG&E Does Not Request Any Exemptions or Waivers for Its Pilot Project

At this time, PG&E is not requesting any exemptions or waivers of law or regulatory requirements for its hydrogen blending pilot project. PG&E submits that its application for approval of its hydrogen blending pilot project complies with all legal, regulatory and evidentiary requirements. PG&E's hydrogen blending pilot project meets

²⁶ Joint Amended Application, pp. 19-20.

²⁷ Ex. PGE-001, p. 34, lines 21-27.

PG&E's burden of proof to demonstrate that the project is just, reasonable and in the public interest.

However, should the Commission find that PG&E did not meet a particular requirement, PG&E requests the opportunity to seek an exemption or waiver.

C. PG&E's Pilot Project Aligns with Broader State Energy and Climate Goals

PG&E's pilot project aligns with broader state energy and climate goals at the pilot level by supporting state efforts to evaluate hydrogen blending as a potential decarbonization pathway while remaining within a pilot-level scope.²⁸ Findings from PG&E's pilot are designed to inform future policy decisions by generating real-world data that can support the development of safety standards, assess the feasibility of scaling hydrogen blending across different regions and infrastructure types, and lay the foundation for consideration of a statewide hydrogen blending standard.²⁹ The pilot is consistent with the California Air Resources Board's 2022 Scoping Plan, which identifies renewable hydrogen blended into fossil gas pipelines at approximately seven percent by energy (approximately 20 percent by volume), with ramp-up occurring between 2030 and 2040, as a potential strategy for achieving long-term climate goals.³⁰ The pilot also aligns with Senate Bill (SB) 1075 (Skinner, 2022), which directs the California Air Resources Board, in collaboration with the California Energy Commission, the California Public Utilities Commission, and the California Workforce Development Board, to produce a comprehensive report addressing the development, deployment, and use of hydrogen across sectors as part of achieving the State's climate, air quality, and energy goals.³¹ This pilot-level alignment is consistent with the Commission's recognition that

²⁸ Ex. PGE-003, p. 7, lines 5-21; p. 6, line 1 to p. 8, line 11.

²⁹ Ex. PGE-003, p. 7, line 20 to p. 8, line 4.

³⁰ Ex. PGE-003, p. 7, lines 7-10.

³¹ Ex. PGE-003, p. 7, lines 11-17.

broader policy issues related to long-term gas planning and the role of clean renewable hydrogen are being addressed in other proceedings and agency processes, including R.20-01-007 and implementation of SB 1075.³²

IV. PG&E'S HYDROGEN BLENDING PILOT IS USEFUL AND WELL DESIGNED

PG&E's pilot project is useful and well-designed because it addresses critical knowledge gaps in hydrogen blending that are not currently addressed by other efforts and is structured to generate high-quality, actionable data at transmission pressure.³³ A comprehensive review of global hydrogen blending projects at transmission pressure shows that no such project currently exists in North America, with comparable efforts located in Europe and generally of shorter duration, making PG&E's proposed demonstration uniquely positioned to fill this gap.³⁴ The project is designed as a long duration demonstration of ten years or more, enabling validation of maintenance practices, inspection cadences, and operational performance over time at operating pressures of approximately 720 psi and hydrogen blend levels up to twenty percent.³⁵ The pilot complements, rather than duplicates, other hydrogen research and demonstration efforts, including those sponsored by the California Energy Commission and the UC Riverside Study, which focus on laboratory testing, end use applications, or explicitly exclude live pipeline demonstrations due to the absence of a hydrogen injection standard.³⁶ The UC Riverside Study specifically identified the need for real world hydrogen blending demonstrations in isolated or custom built infrastructure using representative materials and equipment over extended periods to address knowledge gaps

³² D.22-12-057 p. 38.

³³ Ex. PGE-003, p. 12, lines 3-21.

³⁴ Ex. PGE-001, p. 3, line 8 to p. 6, line 3.

³⁵ Ex. PGE-001, p. 5, lines 19-27.

³⁶ Joint Amended Application, pp. 4-6.

that cannot be resolved through modeling or laboratory testing alone, recommending blend levels between five and twenty percent.³⁷ Consistent with these findings, PG&E's transmission focused pilot addresses fundamentally different technical and operational questions than distribution focused projects and is designed to generate data necessary to inform future standards development.³⁸

A. PG&E'S Pilot Project Addresses Specific Knowledge Gaps About Gas Transmission Hydrogen Blending That Is Not Encompassed in Other Literature

PG&E's hydrogen blending pilot is designed to address specific, well-defined knowledge gaps that remain unresolved by the Hydrogen Blending Impacts Report and the Hydrogen Blending Compendium Report, both of which synthesize existing literature, modeling, laboratory research, and prior demonstrations but identify the need for additional real-world data. PG&E's pilot targets a subset of those identified gaps that are applicable to transmission-pressure infrastructure and long-duration operations, including gaps associated with materials performance, system integrity, operational behavior, and monitoring under hydrogen-natural gas blends that cannot be fully addressed through laboratory testing or literature review alone.³⁹ Specifically, the pilot complements the Hydrogen Blending Impacts Report by addressing eleven applicable recommendations related to closing knowledge gaps through controlled, real-world demonstration, and complements the Hydrogen Blending Compendium Report by generating empirical data across five overarching gap categories organized by report chapter, thereby providing operational evidence that supplements and extends the research summarized in those reports.⁴⁰ In this way, the pilot is structured not to duplicate

³⁷ *Id.* pp. 57.

³⁸ Ex. PGE-003, p. 12, line 22 to p. 13, line 16.

³⁹ Ex. PGE-003, p. 21, line 27 to p. 22, line 4, pp. 22-28 (depicting table of knowledge gaps addressed); p. 28, lines 1-8; pp. 29-31, Table 5.

⁴⁰ *Ibid.*

prior studies, but to produce the transmission-pressure, long-term, system-level data necessary to validate, refine, or contextualize findings from the existing body of research.

B. The Additional Knowledge, Contributed By PG&E's Pilot Project, Will Be Useful to Utility Operators and State Policy Makers

The additional knowledge generated by PG&E's hydrogen blending pilot will be useful to utility operators and state policymakers by providing critical real-world data to inform future decisions regarding decarbonization of California's energy infrastructure.⁴¹ The project's outcomes are intended to help determine whether hydrogen blending represents a viable and cost-effective decarbonization strategy, ensuring that future investment and policy decisions are guided by empirical data rather than speculation.⁴² The pilot is designed to enable knowledge-based fitness-for-service assessments, validate maintenance and inspection cadences and practices under hydrogen blending conditions, and support workforce readiness by informing training and transition needs associated with potential future deployment of hydrogen blending.⁴³

C. The Success Of PG&E's Pilot Project Will Be Well Defined, Measured, and Reported

PG&E defines the success of its hydrogen blending pilot by the project's ability to generate high-quality, actionable data that fills critical knowledge gaps and informs evaluation of hydrogen blending in California's natural gas transmission system, rather than by achieving a predetermined conclusion regarding safety or feasibility.⁴⁴ Success is measured by the quality and usefulness of the data collected on system performance, material compatibility, and operational impacts associated with hydrogen blends of up to

⁴¹ Ex. PGE-003, p. 31, lines 1-5.

⁴² Ex. PGE-003, p. 31, line 13 to p. 32, line 2.

⁴³ Ex. PGE-003, p. 32, lines 3-14.

⁴⁴ Ex. PGE-003, p. 33, lines 10-24.

twenty percent under real-world operating conditions.⁴⁵ The value of the project's outcomes lies in their contribution to the development of a potential statewide hydrogen blending standard and their support for broader decarbonization strategies.⁴⁶ Progress toward project success and desired outcome will be documented and reported through ongoing knowledge sharing during the demonstration period through whitepapers, technical reports, presentations, and/or public tours of the demonstration facility.⁴⁷ PG&E will submit annual reports to the Commission that include data collected through instrumentation, manual inspections and in-depth material analysis.⁴⁸

D. PG&E Considered Alternative Approaches for its Pilot

Due to the nature of PG&E's gas transmission system, creating an isolated test environment using existing operational assets was not feasible, which led PG&E to evaluate alternative approaches for studying hydrogen blending at transmission pressure.⁴⁹ Two primary options were considered: phased small-scale field testing focused on individual asset types and a large-scale, purpose-built facility capable of representing a broad range of pipeline materials and equipment in a single, integrated demonstration. The small-scale phased approach was set aside because of its limited scope and cost inefficiencies, while the large-scale, purpose-built facility was selected to enable comprehensive evaluation across representative transmission assets.⁵⁰ In developing this approach, PG&E coordinated with other California utilities to avoid duplication of effort, with SoCalGas, San Diego Gas and Electric (SDG&E), and Southwest Gas focusing on distribution system research while PG&E's pilot addresses

⁴⁵ *Ibid.*

⁴⁶ Ex. PGE-003, p. 34, lines 2-5.

⁴⁷ Ex. PGE-001, p. 11, lines 16-22; p. 25, lines 8-10.

⁴⁸ Ex. PGE-001, p. 27, lines 29-31.

⁴⁹ Ex. PGE-003, p. 34, lines 13-21.

⁵⁰ *Ibid.*

transmission-level infrastructure, incorporating a main test loop with dedicated branches to safely evaluate vintage assets in a compact and comprehensive configuration.⁵¹ The selected site near the Northern California Power Agency's Lodi Energy Center provides an opportunity for potential future hydrogen integration, given the facility's gas turbine capability to accommodate hydrogen blends up to 45 percent and the potential availability of planned hydrogen production, while also offering approximately 130 acres of agricultural land that is naturally isolated from populated areas and sufficient to accommodate the demonstration facility.⁵² The project design and site selection have received support from a range of stakeholders, as reflected in letters of support from organizations including labor, research institutions, utilities, and local government entities.⁵³

E. The Ultimate Findings from PG&E's Pilot Project Will Be Documented, Validated, And Shared with Stakeholders and the Commission

The ultimate findings from PG&E's hydrogen blending pilot will be documented, validated, and shared through defined project deliverables and structured reporting. Expected project deliverables include external white papers detailing results, internal technical reports to support PG&E engineering decision-making, internal and external workshop presentations, and on-site tours and learning sessions, supported by a long-term large-scale demonstration facility.⁵⁴

To support these deliverables, PG&E will conduct comprehensive data collection, analysis, and reporting, using automated instrumentation such as sensors and supervisory control and data acquisition systems, manual inspection in accordance with PG&E

⁵¹ Ex. PGE-003, p. 34, lines 22-28.

⁵² Ex. PGE-003, p. 34, line 29 to p. 35, line 11.

⁵³ Ex. PGE-003, p. 36, lines 3-10.

⁵⁴ Ex. PGE-001, p. 11, lines 16-22.

standards, and in-depth material analysis using non-destructive examination techniques and laboratory testing.⁵⁵ As mentioned in Section IV.C., data collected through these methods will be maintained as records and summarized in annual reports provided to the Commission.⁵⁶ As mentioned in Section III.A, validation of testing protocols will be supported through the involvement of the University of California, Riverside, which serves in an advisory role to ensure alignment with validated methodologies for data collection.⁵⁷ In addition, consistent with Decision 22-12-057, Ordering Paragraph 7(l), the project includes an independent research plan for assessment, measurement, monitoring, and reporting throughout the development, construction, and operational life of the pilot, with an independent third party engaged to carry out this plan and potentially validate the project's data, analysis, and findings.⁵⁸

F. PG&E's Pilot Project Is Designed to Provide Information and Results Needed To Implement Hydrogen Blending at Scale

If PG&E's hydrogen blending pilot is successful, moving from a pilot project to full implementation would require a phased approach grounded in the findings of the CPUC's Hydrogen Blending Impact Report, the Hydrogen Blending Compendium Report, and the results of the approved pilot projects.⁵⁹ The initial step in such a transition would be a comprehensive evaluation of pilot data to assess system performance, safety, material compatibility, and operational impacts under real-world hydrogen blending conditions, with those findings informing the development of a statewide hydrogen injection standard.⁶⁰ Consistent with this approach, the University of

⁵⁵ Ex. PGE-006, pp. 10-11.

⁵⁶ Ex. PGE-001, p. 27, lines 29-31.

⁵⁷ Ex. PGE-001, p. 31, lines 2-9.

⁵⁸ Ex. PGE-006, p. 11.

⁵⁹ Ex. PGE-003, p. 37, lines 1-14.

⁶⁰ *Ibid.*

California, Riverside proposed a three-year timeline in the Commission’s Hydrogen Blending Impact Report, beginning with real-world hydrogen blending demonstrations and culminating in the development of a statewide hydrogen injection standard, based on data from the literature and ongoing research and demonstration efforts.⁶¹

V. PG&E’S HYDROGEN BLENDING PILOT PROJECT IS PRUDENT AND ITS COSTS ARE REASONABLE

PG&E’s hydrogen blending pilot is a prudent undertaking because it is a targeted, data-driven effort designed to close key operational knowledge gaps under Commission oversight and inform future decisions regarding the use of existing gas infrastructure in a lower-carbon energy system.⁶² The pilot is focused on system integration and safety validation rather than fuel production and is structured to evaluate whether existing gas transmission assets—already paid for by ratepayers—can potentially be repurposed to transmit lower-carbon fuel without requiring significant investment in new, dedicated hydrogen infrastructure.⁶³ Gas ratepayers have already invested in a multi-billion-dollar gas system that will persist and otherwise continue to transport conventional fuels, making it prudent to test whether that infrastructure can be adapted for cleaner fuel delivery before additional infrastructure investments are considered.⁶⁴ While intervenors have raised concerns regarding the overall cost of the pilot, no party has identified or challenged specific cost elements—such as engineering, materials, or construction—as unreasonable or imprudent.⁶⁵

⁶¹ Ex. PGE-003, p. 37 (depicting figure of three-year timeline); p. 38, line 1 to p. 40, line 20.

⁶² Ex. PGE-003, p. 40, lines 22-28.

⁶³ Ex. PGE-003, p. 41, lines 27-31.

⁶⁴ Ex. PGE-003, p. 46, lines 20-23.

⁶⁵ Ex. PGE-003, p. 44, lines 3-19.

A. PG&E has Provided a Detailed and Reasonable Cost Breakdown for Its Pilot Project, Including Equipment, Monitoring, Safety System, And Administration

PG&E's estimated capital and operating costs for the project are detailed in Chapter 5, Section VI, which provides order-of-magnitude cost estimates by research, development, and demonstration facility based on a preliminary feasibility study, in compliance with Ordering Paragraph 7(e) of Decision 22-12-057.^{66 67} The total estimated capital cost is \$63,457,362 and estimated annual operating cost is \$2,988,000, with higher-accuracy estimates to be developed during subsequent FEED and detailed engineering studies and all actual costs to be recorded in the Hydrogen Blending Demonstration Project Balancing Account (HBDPBA) for Commission review.⁶⁸

PG&E's Chapter 9 details the cost recovery, revenue requirements, and rate proposal governing the accounting treatment and recovery of costs associated with the pilot project, as well as PG&E's request to establish a new balancing account.⁶⁹ Specifically, PG&E proposes to establish the HBDPBA, consisting of two subaccounts: (1) a two-way Hydrogen Demonstration Project Subaccount to track and record project costs and any external funding received compared to adopted amounts, and (2) an Administrative Memorandum Subaccount to track associated administrative expenses.⁷⁰ PG&E forecasts a total project revenue requirement of \$94.2 million⁷¹ and proposes recovery on an equal cents per therm basis through existing core and noncore gas rate mechanisms.⁷² PG&E's share of the joint utility proposal would result in an estimated bill impact of approximately \$0.05 per month on a typical residential gas bill in the peak

⁶⁶ Ex. PGE-001, p. 37, line 1 to p. 38, line 2.

⁶⁷ Ex. PGE-003, p. 44, lines 16-19.

⁶⁸ Ex. PGE-001, p. 37, line 1 to p. 38, line 2.

⁶⁹ Ex. PGE-002, p. 1, lines 4-11.

⁷⁰ Ex. PGE-002, p. 1, line 12 to p. 3, line 7.

⁷¹ Ex. PGE-002, p. at 5 (Table 9-1 depicting 2027-2036 revenue requirement forecast); p. 6, lines 1-7.

⁷² Ex. PGE-002, p. 6, lines 9-21.

year, for a non-CARE customer using an annual monthly average of 33 therms,⁷³ with costs spread over multiple years, resulting in a present value of revenue requirements of \$67.09 million.⁷⁴ The evidence further shows that the pilots have de minimis bill effects and remain subject to the Commission’s “just and reasonable” standard and affordability considerations applied to all utility expenditures.⁷⁵

B. Gas Ratepayers Will Receive Specific Benefits from Investment in PG&E’s Pilot Project

Gas ratepayers are the primary beneficiaries of PG&E’s hydrogen blending pilot because the project is designed to evaluate hydrogen blending within infrastructure that already serves them and in which they have already invested.⁷⁶ If the pilot successfully demonstrates the safe and reliable transport of hydrogen blends, the existing gas system could potentially be used to deliver cleaner fuel, supporting California’s decarbonization goals while extending and enhancing the useful life of existing assets rather than potentially requiring investment in entirely new infrastructure.⁷⁷ If hydrogen blending is shown to be safe, PG&E intends to retain the test loop as an operating asset, preserving ratepayer investment by avoiding decommissioning and enabling continued use of the facility.⁷⁸ In addition, PG&E may allow third parties to use the facility to test their own equipment or assets on a self-funded basis, and any such participation could help offset a portion of operating expenses, thereby reducing costs passed on to ratepayers.⁷⁹ While the application requests ratepayer funding, PG&E also acknowledges that external

⁷³ Ex. PGE-002, p. 13, lines 7-9.

⁷⁴ Ex. PGE-003, p. 44, line 25 to p. 45, line 2. Present value of revenue requirements based on 10-year period using 7 percent discount rate and mid-period method.

⁷⁵ Ex. PGE-003, p. 45, lines 3-12.

⁷⁶ Ex. PGE-003, p. 36, lines 11-16.

⁷⁷ Ex. PGE-003, p. 36, lines 11-16; p. 45, line 21 to p. 46, line 2.

⁷⁸ Ex. PGE-003, p. 46, lines 3-10.

⁷⁹ *Ibid.*

funding sources are preferable when available and is seeking Commission support to help unlock such resources, which would further reduce the financial burden on gas customers.⁸⁰

C. PG&E Has Pursued and Will Continue to Pursue Reasonable Non-PG&E Ratepayer Cost-Sharing Arrangements with Potential Non-Ratepayer Beneficiaries to Offset the Costs

PG&E has made sustained efforts to pursue cost-sharing arrangements with potential non-ratepayer beneficiaries of its hydrogen blending pilot. Beginning in August 2021, PG&E engaged with a range of external entities, including the U.S. Department of Energy's Hydrogen and Fuel Cell Technologies Office and Loan Programs Office, PHMSA, PRCI, LCRI/EPRI, Breakthrough Energy, Hy24, and others, all of whom expressed interest in the project but did not provide funding.⁸¹ PG&E also submitted the project to the Department of Energy's Unsolicited Proposal Program, but the proposal was denied due to perceived overlap with the Hydrogen Hubs Program, notwithstanding PG&E's position that the project qualifies as pilot-scale research consistent with Decision 22-12-057 and therefore falls outside the scope of Hydrogen Hub funding eligibility.⁸² PHMSA leadership expressed engagement and support for the project but indicated that its research and development budget is insufficient to provide funding absent legislative authorization, while committing to explore potential opportunities within the Department of Energy.⁸³ Chapter 5, Section VI.a further documents PG&E's efforts to pursue cost-sharing through a Joint Industry Project, which did not proceed because external partners did not commit funding sufficient to cover the full costs of the FEL-3 and detailed engineering studies for the full-scale testing facility.⁸⁴ PG&E continues to

⁸⁰ Ex. PGE-003, p. 46, line 28 to p. 47, line 10.

⁸¹ Ex. PGE-001, p. 35, lines 1-6.

⁸² Ex. PGE-001, p. 35, lines 7-13.

⁸³ Ex. PGE-001, p. 35, line 14 to p. 36, line 3.

⁸⁴ Ex. PGE-003, p. 47, line 22 to p. 49, line 3.

engage with national laboratories regarding potential future opportunities, including possible inclusion of the pilot in a subsequent phase of the HyBlend initiative, while acknowledging that the availability of such funding remains uncertain.⁸⁵ To date, no external funding has been secured, and PG&E attributes this outcome to limited availability of hydrogen blending funding opportunities, while requesting the Commission's support to reinforce the importance of the project and increase visibility with potential non-ratepayer funders.^{86 87}

D. Any Cost Overruns in PG&E's Pilot Project Will Be Handled Consistent with the Commission's Standards and Criteria for Reviewing Costs Incurred and Recorded in Balancing Accounts

Cost overruns associated with PG&E's hydrogen blending pilot will be managed through a proposed two-way Hydrogen Demonstration Project Subaccount within the HBDPBA, which will track actual project costs against amounts adopted by the Commission. The adopted revenue requirement will be included in rates through the Annual Gas True-Up or another Commission-approved advice letter, and the subaccount will record the difference between adopted and actual costs. If actual costs exceed adopted amounts, the resulting balance would be recovered from ratepayers on an annual basis through the Annual Gas True-Up; if actual costs are lower than adopted amounts, the difference would be returned to ratepayers through the same mechanism. Current cost estimates are order-of-magnitude estimates that incorporate a conservative budgeting approach, including a higher-than-typical contingency to account for uncertainties associated with a first-of-its-kind hydrogen blending demonstration project, with more detailed cost estimates to be developed in subsequent engineering stages and any costs

⁸⁵ Ex. PGE-003, p. 48, lines 3-7.

⁸⁶ Ex. PGE-003, p. 48, lines 8-14.

⁸⁷ Ex. PGE-001, p. 36, lines 6-16.

exceeding preliminary estimates subject to evaluation for reasonableness to minimize additional impacts on ratepayers.⁸⁸

VI. PG&E'S HYDROGEN BLENDING PILOT PROJECT IS SAFE

Safety, including protection of public health and the environment, is the highest priority in the development and execution of PG&E's hydrogen blending pilot, as reflected in the extensive safety-related information provided in Chapter 5 testimony, Appendix B responses, data request replies, stakeholder workshops, and Public Participation Hearing.⁸⁹ The pilot is designed to address key safety considerations associated with hydrogen blending—such as leakage, material compatibility, and operational controls—through a controlled, data-driven approach that relies on purpose-built testing infrastructure and operational monitoring rather than attempting to justify a system-wide hydrogen blend.⁹⁰ PG&E acknowledges hydrogen's unique properties, including its small molecular size and potential for embrittlement, and the pilot incorporates dedicated testing infrastructure to simulate real-world operating conditions in representative materials while enabling safe monitoring and control.⁹¹ Data generated through this approach is intended to assess material and equipment suitability and inform future infrastructure decisions based on real-world evidence and engineering integrity.⁹²

⁸⁸ Ex. PGE-007, p. 3.

⁸⁹ Ex. PGE-003, p. 48 line 25 to p. 49, line 10.

⁹⁰ Ex. PGE-003, p. 49, lines 4-10.

⁹¹ Ex. PGE-003, p. 49, line 29 to p. 50, line 4.

⁹² *Ibid.*

A. PG&E Will Conduct Comprehensive Risk Assessments (I) for Its Pilot Project and (II) for the Specific Hydrogen Blend Percentages Attempted in Its Project; and Will Generate Data (III) for Each Segment of the California Gas Infrastructure for Which Its Pilot Project Is Designed to Inform Broader Risk Management Considerations

As part of its safety framework, PG&E will conduct a comprehensive risk assessment for its hydrogen blending pilot project and for each hydrogen blend percentage evaluated in the project, specifically 0, 5, 10, 15, and 20 percent by volume.⁹³ This assessment will be performed at the 60-percent engineering design stage following completion of the Front-End Engineering Design study, when sufficient design detail is available, and will be carried out by a multidisciplinary team consisting of PG&E subject-matter experts and third-party industry experts.⁹⁴ The risk assessment includes a formal Process Hazard Analysis, beginning with a Hazard Identification study during the FEED phase to identify hazards and preventative measures, followed by a Hazard and Operability Study during detailed engineering to systematically review design and operational deviations and refine the design to mitigate identified risks.⁹⁵ For each credible risk scenario identified through this process, consequence modeling and frequency estimation will be conducted to assess baseline risk at each hydrogen blend level.⁹⁶ While the pilot is focused on a transmission test loop, the project is designed to generate data over time on system response to prolonged hydrogen exposure that will inform broader risk management considerations for California's gas transmission infrastructure, rather than conducting a comprehensive, system-wide risk assessment for all gas asset segments during the pilot itself.⁹⁷ The findings from the pilot are intended to

⁹³ Ex. PGE-003, p. 50, line 28 to p. 51, line 16.

⁹⁴ *Ibid.*

⁹⁵ *Ibid.*

⁹⁶ *Ibid.*

⁹⁷ Ex. PGE-003, p. 51, line 28 to p. 52, line 10.

contribute to a broader risk management framework to support future evaluation, prevention, and mitigation measures for hydrogen blending in existing gas infrastructure.⁹⁸

B. Beyond Monitoring, Automated Safety Systems and Shutdown Protocols Will Be in Place For PG&E's Pilot Project

Beyond monitoring, PG&E's hydrogen blending pilot incorporates automated safety systems and shutdown protocols designed to ensure safe operation under hydrogen blending conditions. The pilot's design incorporates applicable requirements of the California Fire Code and National Fire Protection Association Standard 2, with fire protection, life-safety elements, and automated safety and shutdown systems to be further specified during subsequent engineering design stages.⁹⁹ At a high level, the test loop facility will include an Emergency Shut Down (ESD) system with activation buttons located at or near all test areas and at facility escape and egress points, with defined ESD responses for each test area that include isolation, blowdown, and make-safe functions controlled by the ESD system.¹⁰⁰ In addition, the main test loop will be equipped with an automatic shut-off valve capable of remote operation from the on-site Gas Control Center.¹⁰¹ PG&E also intends to engage with the AIChE Center for Hydrogen Safety to obtain input on the safe handling and use of hydrogen, including guidance related to automated safety systems and shutdown protocols incorporated into the project design.¹⁰²

⁹⁸ *Ibid.*

⁹⁹ Ex. PGE-003, p. 52, lines 12-19.

¹⁰⁰ Ex. PGE-003, p. 52, lines 20-26.

¹⁰¹ *Ibid.*

¹⁰² Ex. PGE-003, p. 52, lines 27-31.

C. Baseline Testing of Infrastructure Integrity Will Be Completed Prior to PG&E's Pilot Project Implementation

Prior to implementation of PG&E's hydrogen blending pilot, baseline integrity testing will be conducted to ensure that vintage pipeline assets included in the test loop are suitable for hydrogen exposure.¹⁰³ Baseline testing will occur before the test loop becomes operational and will include non-destructive examination of 100 percent of girth welds for future record, fracture toughness and production testing of line pipe—including hardness and hydrogen compatibility—in accordance with the minimum requirements of ASME B31.12, and standard pressure testing prior to placing the pilot pipeline into service.¹⁰⁴ In addition, pipe spools will be inspected and coatings tested using in-ditch holiday testing prior to backfill, consistent with PG&E's standard construction practices.¹⁰⁵ The specific details of baseline integrity testing will be further developed during subsequent engineering design stages of the project.¹⁰⁶

D. Emergency Response Plans Will Be Updated in Coordination and Collaboration with Local and State Authorities Specifically for Hydrogen Incidents at PG&E's Pilot Project

PG&E is preparing for emergency response planning tailored to hydrogen-related risks as part of its data-driven approach to safety for the pilot project, recognizing that comprehensive emergency response protocols depend on completion of subsequent engineering design stages.¹⁰⁷ Because the project has not yet progressed through the FEL-3 and Detailed Engineering phases, there is currently insufficient facility-level design detail to develop emergency response plans or establish response arrangements

¹⁰³ Ex. PGE-003, p. 53, lines 1-16.

¹⁰⁴ *Ibid.*

¹⁰⁵ *Ibid.*

¹⁰⁶ *Ibid.*

¹⁰⁷ Ex. PGE-003, p. 55, line 26 to p. 56, line 5.

with local, county, or state agencies.¹⁰⁸ In November 2023, PG&E met with the San Joaquin Office of Emergency Services to share preliminary information about the project and address initial questions.¹⁰⁹ As the project progresses, PG&E plans to continue engagement and collaborate with emergency response agencies to develop comprehensive, site-specific emergency response protocols that build on PG&E's existing Gas Emergency Response Plan and incorporate response strategies, risk mitigation measures, and training specific to potential hydrogen-related incidents, including fires and explosions.¹¹⁰

E. PG&E Has Conducted Outreach with Communities Potentially Affected by Its Pilot

PG&E has undertaken community outreach with potentially affected communities in advance of and during development of its hydrogen blending pilot through a series of public and agency meetings in the cities of Lodi and Stockton. In October and November 2023, PG&E conducted four engagement events, including meetings with the San Joaquin Disaster Council, the San Joaquin Office of Emergency Services, the Stockton Environmental and Legislative Committee, and a local community meeting in the City of Lodi.¹¹¹ Following the March 1, 2024 application submission, PG&E conducted additional outreach through a meeting with the San Joaquin County Board of Supervisors.¹¹² These engagement efforts are intended to understand community priorities, respond to questions and concerns, and provide information regarding safety measures associated with the project, with input received during these meetings provided to the project's independent party for consideration and potential incorporation into the

¹⁰⁸ *Ibid.*

¹⁰⁹ Ex. PGE-003, p. 56, lines 6-8.

¹¹⁰ Ex. PGE-003, p. 56, lines 8-17.

¹¹¹ Ex. PGE-001, p. 24, lines 6-11; p. 25, lines 1-10.

¹¹² Ex. PGE-003, p. 58, line 21 to p. 59, line 2.

test loop design.¹¹³ Notably, the City of Lodi is a project partner and plays an active role in representing the interests of Lodi residents, helping ensure that community perspectives are reflected in the project’s development in alignment with the City’s strategic vision to support affordable, reliable, and clean energy.¹¹⁴ There does not appear to be a particular legal requirement or mechanism to document “consent” in this context;¹¹⁵ however, the relevant stakeholders have been informed and will continue to have opportunities to obtain more information and raise concerns.

F. PG&E’s Pilot Project Will Monitor Pipeline Integrity to Assess Potential Hydrogen Embrittlement Effects of the Gas Components Within Its Pilot Project

Because hydrogen embrittlement cannot be monitored directly, PG&E’s pilot will assess its potential effects through established pipeline integrity monitoring practices that evaluate changes in material behavior over time.¹¹⁶ This includes inline inspections (ILI) to identify pre-existing cracks before hydrogen exposure and monitor those cracks after hydrogen exposure.¹¹⁷ Hydrogen embrittlement does not initiate cracks and does not change the strength of steel materials but can accelerate the growth of existing defects or cracks and may affect mechanical properties by reducing fracture resistance and increasing fatigue crack growth rates.¹¹⁸ The extent of these effects on pipeline integrity depends on factors such as hydrogen concentration, pipe material composition, stress, and operating pressure.¹¹⁹

¹¹³ Ex. PGE-003, p. 59, lines 3-8.

¹¹⁴ Ex. PGE-003, p. 58, lines 15-20.

¹¹⁵ Assigned Commissioner’s Scoping Memo, p. 12 (June 12, 2025) (“What specific outreach has been conducted with communities potentially affected by each pilot project and how has informed consent been documented?”).

¹¹⁶ Ex. PGE-003, p. 57, lines 11-19.

¹¹⁷ Ex. PGE-003, p. 57, lines 3-10.

¹¹⁸ Ex. PGE-003, p. 56, line 24 to p. 57, line 2 and p. 57, lines 11-19.

¹¹⁹ Ex. PGE-003, p. 57, lines 11-19.

VII. PG&E’S PILOT PROJECT IS EQUITABLE AND HAS LOCAL COMMUNITY SUPPORT

PG&E’s hydrogen blending pilot is designed to be equitable and to minimize adverse community impacts, with local community support and ongoing engagement in the City of Lodi. The project incorporates measures intended to ensure an equitable distribution of risks and benefits across communities, including meaningful stakeholder involvement and continued community engagement throughout both the planning and implementation phases.¹²⁰ PG&E has considered potential environmental and social justice impacts on local communities and evaluated the pilot’s alignment with the Commission’s nine Environmental and Social Justice Action Plan goals.¹²¹

A. PG&E’s Pilot Project Location Was Selected Openly and with Community Input

PG&E selected the pilot project location near the Northern California Power Agency’s Lodi Energy Center based on a combination of technical suitability, safety considerations, and site characteristics. Additional details on pilot project location selection can be found in Section IV.D.

B. PG&E’s Pilot Project Includes Measures that Ensure Equitable Distribution of Risks and Benefits for Its Project

PG&E has incorporated multiple measures to ensure an equitable distribution of risks and benefits across communities associated with the hydrogen blending pilot.¹²² These measures include community engagement and stakeholder involvement throughout project development, as well as targeted siting of the facility away from overburdened neighborhoods to avoid placing disproportionate environmental or safety risks on

¹²⁰ Ex. PGE-003, p. 57, line 20 to p. 58, line 3.

¹²¹ *Ibid.*

¹²² Ex. PGE-003, p. 58, lines 11-13.

vulnerable populations.¹²³ The project also relies on existing affordability protections to prevent low-income ratepayers from bearing unfair financial burdens, supported by programs such as CARE that help maintain affordability.¹²⁴ In addition, workforce equity considerations are addressed by providing local skilled workers with access to training and education opportunities related to hydrogen blending pipeline operations, including through PG&E's Power Pathway program, thereby promoting inclusive career pathways.¹²⁵ Taken together, these measures reflect a commitment to distributing risks equitably while broadly sharing project benefits related to engagement, affordability, and workforce development across communities.¹²⁶

C. Community Stakeholders Have Been Included in the Planning Process for PG&E's Pilot Project

Community Stakeholders were included in the planning process for PG&E's hydrogen blending pilot through formal partnership and ongoing engagement with local governments and community representatives. The City of Lodi is a project partner and plays an active role in representing the interests of Lodi residents, helping ensure that community perspectives are reflected in the project's development in alignment with the City's strategic vision to support affordable, reliable, and clean energy.¹²⁷ Details of PG&E's community outreach can be found in Section VI.E.

D. Ongoing Community Engagement Is Planned During and Throughout Implementation of PG&E's Pilot Project

During implementation of PG&E's hydrogen blending pilot, ongoing community engagement is planned through a combination of in-person meetings and written communications with residents and city officials in the cities of Lodi and Stockton.

¹²³ Ex. PGE-003, p. 59, lines 13-16.

¹²⁴ Ex. PGE-003, p. 59, lines 17-20.

¹²⁵ Ex. PGE-003, p. 59, lines 21-24.

¹²⁶ Ex. PGE-003, p. 60, lines 1-4.

¹²⁷ Ex. PGE-003, p. 58, lines 15-20.

Planned outreach activities include an in-person meeting following completion of the Front-End Engineering Design study to present results, and an in-person meeting following completion of the Detailed Engineering study to present results.¹²⁸ For project stages after Detailed Engineering and prior to the project going live, PG&E plans to provide written communications, accompanied by annual in-person meetings, to inform stakeholders of project progress and address community concerns.¹²⁹ As mentioned in Section IV.C, during the demonstration period, ongoing engagement and transparency will also be supported through knowledge-sharing activities, including whitepapers, technical reports, presentations, and public tours of the demonstration facility.¹³⁰

E. The Impacts of PG&E’s Pilot Project on Environmental and Social Justice Communities Are Consistent with the Commission’s Environmental and Social Justice Action Plan

PG&E’s hydrogen blending pilot is designed to limit impacts on environmental and social justice (ESJ) communities while supporting achievement of several goals of the Commission’s Environmental and Social Justice Action Plan. Hydrogen-related emissions have been accounted for in the project design through fixed, continuous monitoring of the entire facility to detect leaks, with the facility designed to minimize and monitor leakage and evaluate leak detection technologies across different hydrogen blends.¹³¹ The pilot is conducted at a controlled research, development, and demonstration facility and is designed to evaluate the safe integration of hydrogen into existing natural gas infrastructure, aligning with ESJ Action Plan Goal 2 by supporting development of hydrogen as a potential clean energy resource that could reduce reliance on fossil fuels and improve air quality over time, particularly in communities

¹²⁸ Ex. PGE-001, p. 24, line 22 to p. 25, line 7.

¹²⁹ *Ibid.*

¹³⁰ Ex. PGE-001, p. 25, lines 8-10.

¹³¹ Ex. PGE-003, p. 60, lines 21-25.

disproportionately affected by pollution.¹³² The project also aligns with Goal 4 by supporting evaluation of hydrogen's potential role in decarbonizing hard-to-electrify sectors and assessing the repurposing of existing transmission infrastructure as a cost-effective pathway to reduce reliance on fossil fuels.¹³³ With respect to Goal 5, PG&E intends to engage stakeholders throughout the project lifecycle and ensure that project updates and results are broadly accessible through ongoing knowledge sharing, even though the demonstration is not located within an ESJ community.¹³⁴ The pilot also supports Goal 7 by considering impacts to disadvantaged communities and offering training and education related to hydrogen blending pipeline operations through workforce development programs such as Power Pathway, creating pathways into clean energy careers.¹³⁵ In addition, the project's location in Lodi provides proximity to SB 535 and Assembly Bill (AB) 1550 disadvantaged communities and has been identified as creating prevailing-wage construction and permanent job opportunities for surrounding communities.¹³⁶ Finally, because the pilot is conducted at a standalone facility and does not involve live hydrogen blending in homes, the potential for direct environmental or safety impacts to ESJ communities is significantly reduced during this phase.¹³⁷

VIII. CONCLUSION

For the reasons stated in this opening brief and the record evidence in this proceeding, PG&E respectfully requests that the Commission approve PG&E's application for approval of its hydrogen blending pilot project in this proceeding.

¹³² Ex. PGE-003, p. 61, lines 13-27.

¹³³ Ex. PGE-003, p. 61, line 28 to p. 62, line 4.

¹³⁴ Ex. PGE-003, p. 62, lines 25-30.

¹³⁵ Ex. PGE-003, p. 63, lines 1-8.

¹³⁶ Ex. PGE-003, p. 63, lines 9-16.

¹³⁷ Ex. PGE-003, p. 63, lines 17-24.

Respectfully Submitted,

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