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June 3, 2021

The Honorable J. Andrew McAllister
The Honorable Siva Gunda
California Energy Commission
Docket Unit, MS-4
Docket No. 21-IEPR-05
1516 Ninth Street
Sacramento, CA 95814-5512

**Subject: Comments on the Integrated Energy Policy Report (IEPR) Commissioner Workshop on Natural Gas Infrastructure**

Dear Commissioners McAllister and Gunda:

Southern California Gas (SoCalGas) Company appreciates the opportunity to provide public comments on the California Energy Commission's (CEC) Integrated Energy Policy Report (IEPR) Commissioner Workshop on Natural Gas Infrastructure (Workshop). As discussed in these comments, advancing and achieving carbon neutrality, requires a capable, modern, flexible, and secure energy network, which is essential to deliver affordable and reliable energy. The CEC's IEPR scope relating to a focus on gas infrastructure provides a beneficial forum for evaluating the present and future gas grid from various perspectives, enabling an important review of the services needed from the gas grid to achieve codified public interest benchmarks within the rubric of the decarbonization imperative. Robust conversations, including exchanges of perspectives and data, are critical to ensure continued energy system reliability and resiliency. To quote Commissioner Gunda, "…it's better for the State and the last thing we want to do is act without all the information in hand."[1] It is in the public interest that we continue exchanging diverse viewpoints to explore and validate the necessary capabilities of the gas grid to deliver reliable and increasingly clean molecules to support the State's decarbonization goals by 2045.

As noted during the Workshop, electricity production supported by the gas grid increased from 2012 to 2014 due to lower hydropower capacity. The gas grid also seamlessly facilitated the State's 2,200 mega-watt (MW) electricity needs as San Onofre, the largest generator in California, retired.

[1] *See* CEC IEPR Workshop on Natural Gas Infrastructure Event Recording, at 02:05:38. Available at *https://energy.zoom.us/rec/share/Ym82XSole8qjMTyzUSe30VO1zT4ZyEaLwzD2ebIcBvSLfJ3Srd2xpRiPJKiIs-WP.Yfa_YrcioqWQD6P-*.

The CEC's "Energy Insights" report from July 2020 indicated the overall electricity demand during the first part of COVID's stay at home order, March 23, 2020 through June 21, 2020, was down 3 percent and yet Pacific Gas and Electric's natural gas fired generation was up 53 percent.[2] Currently, natural gas fired generation is the primary resource that can flexibly provide the magnitude of generation needed for a reliable and resilient grid.

Reliance on the gas grid will only increase as buildings and transportation sectors continue to electrify to meet the State's 2045 decarbonization goals. Indeed, the California Public Utilities Commission (CPUC) recently issued two draft decisions specifically targeting capacity needs for the purposes of replacing Diablo Canyon as well as several once-through-cooling (OTC) power plants.[3] The mid-term reliability draft decisions require 11,500 MW of firm resources in addition to the 3,300 MW ordered to be procured per Decision (D).19-11-016 addressing electric system reliability in the 2021-2023 timeframe. While the proposed decision (PD) and the alternate proposed decision (APD) differ with regards to the MWs of gas fired generation permitted, both draft decisions clearly emphasize the importance of gas fired generation and the gas system providing system reliability, both today and in the future.

Thus, our comments focus on: (1) prolific deployment of renewables on the electric grid is dramatically changing how the gas system is used; (2) clean fuels like hydrogen will be a key driver for decarbonizing industry; and (3) the inter-relationship between prospective strategic electrification and managed contraction of the gas distribution system.

**1. Prolific deployment of renewables on the electric grid is dramatically changing how the gas system is used.**

The reliability services and capabilities provided by the gas grid are increasingly being called upon to complement renewable resource deployment. In 2020, in significant measure most peak hour gas deliveries from SoCalGas' system were to serve dispatchable electric generators (DEGs) and electric system ramping needs more so than to serve peak hour core customer thermal load.[4] For example, of the 77 hours in 2020 when deliveries to either core customers or DEGs exceeded 100,000 Dekatherms/hour (Dths/hr) (equivalent to ~ 2.4 billion cubic feet/day (bcf/d) of capacity), 62 hours were to serve DEGs while 15 hours served core customers.[5]

The CPUC is evaluating current electric resource portfolios via a series of reliability decisions, recognizing that California is facing more extreme weather events and corresponding operational challenges due to an increasingly higher renewable resource mix. The CPUC's mid-term reliability draft decisions make clear the operational need and characteristics required to meet the reliability

[2] *See* California Energy Commission's Energy Insights, July 2020. Available at *https://www.energy.ca.gov/sites/default/files/2020-07/Energy%20Insights_FINAL%2007-17-2020.pdf*.
[3] *See* Alternate Proposed Decision and Proposed Decision Requiring Procurement to Address Mid-term Reliability 2023-2026; R20-05-003; May 21, 2021 available at *https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M385/K026/385026495.PDF*
[4] SoCalGas' internal modeling analysis.
[5] Id.

void filled by the loss of Diablo and OTC power plants.[6] The need for firm dispatchable generation to support greater penetrations of renewable resources is unequivocal both in the near and mid-term, as identified by recent CPUC action, and beyond. This becomes particularly acute as questions remain around the ability to procure the amount of long lead time resources with a zero-emission profile given the constraints around online dates (by 2026) and the prescribed operational characteristics identified by the PD and APD.[7]

In fact, this trendline is and will be amplified as more renewables are added and core customer load and transportation are increasingly electrified.[8] In the CEC's recent report assessing electricity needs to meet the State's zero-emission vehicle mandates, researchers observed a new trend on the electric grid called the "dragon curve".[9] As seen in Figure 1, there are two notable increases in load during the day as vehicles charge—once in the morning when commuters arrive to work and once in the evening when they return home.[10] Spikes from fast chargers which use powerful, short bursts of energy can be seen as people plug in throughout the day and "could bring some strain to the grid" when millions come home at the end of the day to charge.[11] Overall, as seen in Figure 2, building electrification and electric vehicle charging will likely add incremental load to the electric grid during early morning and afternoon ramp periods. [12]

[6] *See* CPUC "Alternate Proposed Decision and Proposed Decision Requiring Procurement to Address Mid-term Reliability 2023-2026"; R20-05-003; May 21, 2021 available at https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M385/K026/385026495.PDF

[7] To Deliver at least 8 hours duration, 85% capacity factor and/or dispatchable between hours 17-22 daily. *See* Alternate Proposed Decision and Proposed Decision Requiring Procurement to Address Mid-term Reliability 2023-2026; R20-05-003; May 21, 2021 available at https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M385/K026/385026495.PDF

[8] While beyond the scope of this proceeding, it should be noted that much of the valuable complementary reliability (decarbonization-enabling) service provided by the gas grid to the electric grid is unpriced and largely uncompensated. An effect that must change for a reliable and resilient decarbonizing integrated energy system.

[9] *See* Governor's Wind and Solar Energy Coalition, "Electric vehicles should fear the 'dragon curve,' 26 April 2018. Available at *https://governorswindenergycoalition.org/electric-vehicles-should-fear-the-dragon-curve-researchers-say/*.

[10] *See* CEC's Staff Report "California Plug-In Electric Vehicle Infrastructure Projections: 2017-2025," March 2018, pg. 4. Available a at *https://efiling.energy.ca.gov/URLRedirectPage.aspx?TN=TN222986_20180316T143039_Staff_Report__California_PlugIn_Electric_Vehicle_Infrastructure.pdf*

[11] *See* Governor's Wind and Solar Energy Coalition, "Electric vehicles should fear the 'dragon curve,' 26 April 2018. Available at *https://governorswindenergycoalition.org/electric-vehicles-should-fear-the-dragon-curve-researchers-say/*.

[12] SoCalGas' internal modeling analysis.

**Figure 1: The "Dragon Curve": Electricity Use from EVs in 2025**

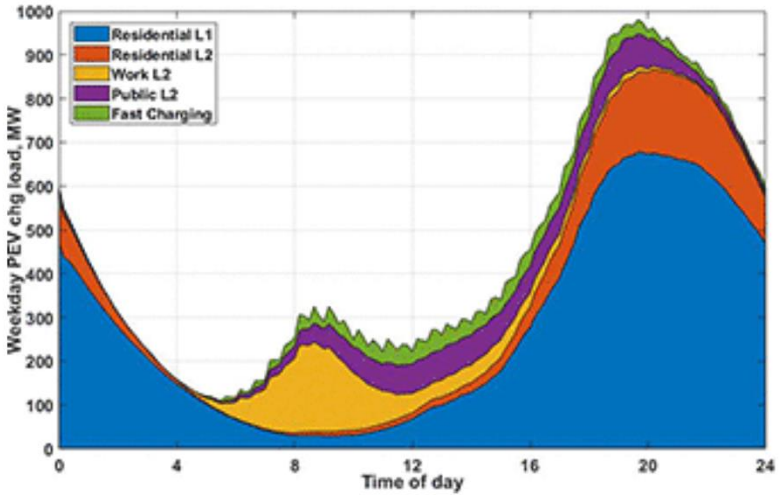
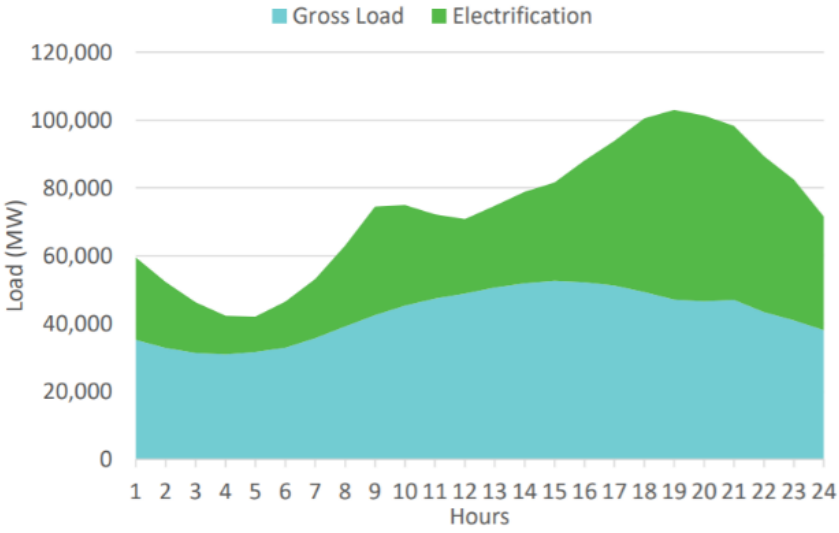



**Figure 2: Potential Electric Load, Winter Day in 2045**

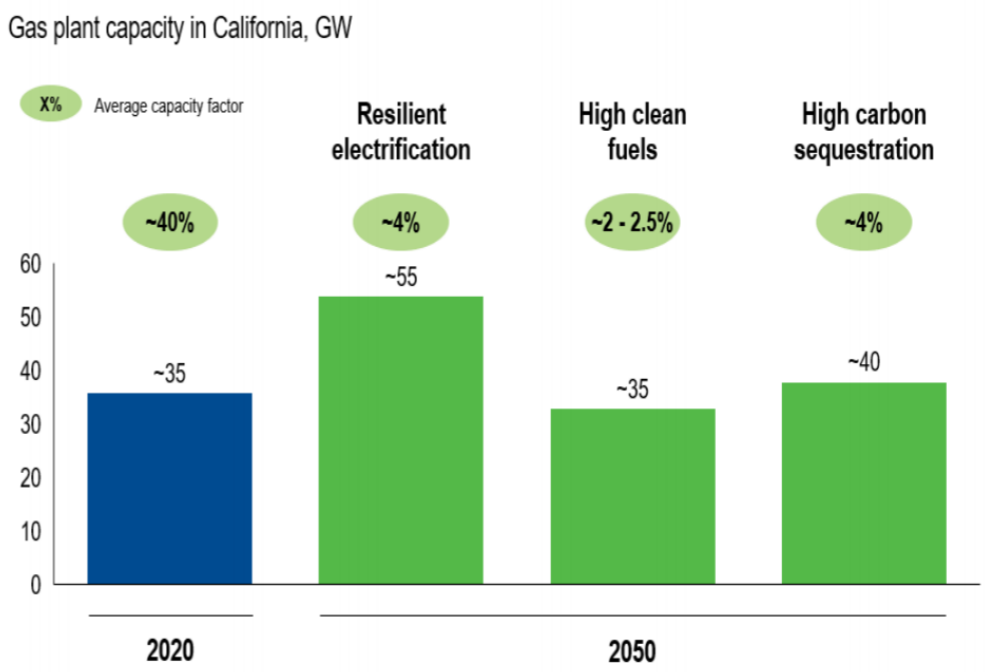



As a result of projected increased load on the electric grid during peak hours, an increasingly decarbonized gas grid is critical to support peaking capacity if/when renewable resources and energy storage are unavailable or insufficient. Modeling across various decarbonization strategies suggests up to 15 GW of incremental gas capacity will be needed in 2050 to provide system reliability.[13] As seen in Figure 3, thermal generators will be operating at less capacity factors in the future (as seen by the green circles), but current or increased capacity will be needed to support any decarbonization pathway. [14] It should also be noted that more thermal generation capacity is needed in higher electrification scenarios to support sustained peaking needs from increased electric load. Clean fuels and carbon capture and sequestration technologies will be needed to

[13] SoCalGas' internal modeling analysis.
[14] Id.

ensure thermal generators support the electric grid with a clean energy profile in accordance with the State's decarbonization goals.

**Figure 3: Thermal Capacity Needed to Support Electric Grid in 2050**




To this end, SoCalGas is encouraged by the CPUC's recent Alternative Proposed Decision (APD) which includes and recognizes the critical role of hydrogen to decarbonize needed dispatchable electric generation capacity.[15] An important and critical step in advancing hydrogen applications for thermal generation use is to allow green hydrogen to be eligible under the state's Renewable Portfolio Standard (RPS). Allowing green hydrogen RPS eligibility will prove an important market incentive to further advance the development and deployment of a critical decarbonization tool. Further, Governor Newsom's revision plan for the state's 2021-22 budget earmarks $110 million from the General Fund to the CEC for green hydrogen production to accelerate the transition away from fossil fuels to produce hydrogen and displace the use of natural gas at power plants.[16] Both the APD and the revised budget are important pivotal steps supporting the use of alternative fuels and technologies that will help reduce GHG emissions and enhance energy reliability and resiliency. SoCalGas looks forward to collaborating with the CEC on future demonstrations to help bring to scale green hydrogen production technologies and delivery infrastructure.

[15] *See* CPUC "Alternate Proposed Decision to Address Mid-term Reliability 2023-2026"; R20-05-003; May 21, 2021 available at *https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M385/K026/385026495.PDF*

[16] *See* Clean Technica, "California Governor Newsom Taps Budget Surplus for Clean Energy", 15 May 2021, available at https://cleantechnica.com/2021/05/15/governor-newsom-taps-budget-surplus-for-clean-energy/

**2. Clean fuels like hydrogen will be a key driver for decarbonizing industry.**

In addition to decarbonizing the operations of the critical and much needed thermal generation fleet, clean fuels and carbon management strategies will be needed by other sectors as California advances towards its net zero 2045 goal. California leads the nation in economic output from manufacturing and is home to over 35,000 firms employing 1.3 million people.[17] Despite advancements made in some market segments, industrial sectors, such as thermal load-dependent processes in manufacturing, have yet to see energy options that can help them transition to a decarbonized future. During the Workshop, Commissioner Monahan expressed interest in modeling hydrogen blending into the gas grid to understand overall impacts, especially for industrial end-uses. Commissioner Monahan's comments are aligned with the work SoCalGas is doing to advance the modeling, science, and real-world applications of hydrogen for energy supply, energy storage, and energy grid decarbonization. In effect, successful energy system decarbonization depends on the successful integration at scale of decarbonized molecules.

SoCalGas is studying how the existing gas transmission and delivery system can be leveraged to transport low-carbon gases, such as hydrogen and renewable natural gas (RNG). Combustion of hydrogen produces no carbon dioxide emissions. Hydrogen-containing fuels thus can reduce carbon emissions when fired in gas turbine generation assets, depending both on how the hydrogen is produced and on the amount of hydrogen in the fuel.[18]

SoCalGas is also studying how hydrogen can be blended into the gas grid. SoCalGas and SDG&E along with PG&E and Southwest Gas Corporation have proposed a Hydrogen Blending Demonstration Program to begin blending hydrogen at lower levels in isolated sections of the gas grid, similar to international demonstrations of blending hydrogen at less than 20 percent.[19] Research indicates hydrogen-natural gas blends may be compatible with sections of the natural gas distribution system.[20] Over time, the utilities will further evaluate the prospective need to retrofit certain sections of the gas grid to transport higher levels of hydrogen to support energy resilience while facilitating the goal of carbon neutrality. Achieving commercialization and cost reductions for the deployment of low and zero-carbon hydrogen at scale are emerging as the preferred pathway to decarbonize many sectors including industry (steel, cement, glass, and chemical), thermal power plants, and the transportation sector (including light-, medium- and heavy-duty vehicles, goods movement, and air travel) and accelerate progress towards the State's

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[17] *See* The Governor's Office of Business and Economic Development: Manufacturing, 2021. Available at *https://business.ca.gov/industries/manufacturing/*.

[18] *See* Electric Power Research Institute, *Technology Insights Brief: Hydrogen-Capable Gas Turbines for Deep Decarbonization*, 14 November 2019, at 2. Available at *https://www.epri.com/research/products/000000003002017544*.

[19] The GHRYD project in France blended up to 20% hydrogen into the gas network serving a new residential community around 200 homes without any modifications to the gas system or customer appliances. Blending demonstration projects in other countries produced similar results. Engie, "The GRHYD demonstration project," *available at https://www.engie.com/en/businesses/gas/hydrogen/power-to-gas/the-grhyd-demonstration-project*. Also *see* CPUC A. 20-11-004 available at https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M351/K622/351622423.PDF.

[20] *See* CPUC A. 20-11-004, Chapter 4 testimony. Available at *https://www.socalgas.com/sites/default/files/2020-11/H2_Application-Chapter_4-Technical.pdf*.

climate, clean air, and clean energy goals. More research is needed now to understand key challenges for safety, system integrity, and system reliability and how they should be addressed.[21]

To support acceleration of these innovative clean energy solutions, consistent with California's decarbonization leadership, SoCalGas, SDG&E, PG&E and Southwest Gas filed Application (A.) 20-11-004 with the CPUC to authorize the development and implementation of a hydrogen injection standard for California.[22] SoCalGas and SDG&E also engage in hydrogen blending research and are partners in several consortia with other utilities pioneering hydrogen blending pilot projects. Therefore, we understand the scale of costs for pilot tests and demonstration projects that would blend hydrogen into existing natural gas systems. We suggest that the CEC fund one project on an isolated steel pipeline to a heavy end user like manufacturing to advance the science and real-world applications for hydrogen as part of California's future energy mix.

**3. The inter-relationship between prospective strategic electrification and managed contraction of the gas distribution system.**

A net zero 2045 will require transformative change to the energy system. While pathways may differ among decarbonization studies, a consistent theme is that gas demand is projected to decline in all scenarios. The magnitude and rate of decline is uncertain, but under any pathway utilization of design of the gas grid will undoubtedly change. While a 2045 future will have significant levels of building electrification, portions of the energy system will continue to be needed and served by clean molecules for a myriad of reasons.

SoCalGas is participating in a community-level multi-disciplinary and objective analytical effort to assess the practicalities of building electrification and to identify locations in Southern California where decommissioning can potentially occur in a just, equitable, and cost-effective way, led by the RAND Corporation. Other participants include Southern California Edison (SCE), the Gas Technology Institute (GTI), and Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC) and the Southern California Public Power Authority (SCAPPA). The proposed project will pull together detailed data of the gas system along with socioeconomic data for candidate communities to evaluate different decommissioning sites and approaches.

This, and similar proposed analysis, is critically important to provide a deeper sectoral view of GHG mitigation strategies applicable to the building sector, offering a more holistic perspective that accounts for technical and engineering considerations as well as more granular and informed data around customer conversion challenges, including customers' openness to fuel switching. To advance the public interest and the provision of essential utility services, an examination of the interaction between strategic electrification of the distribution system and decommissioning is

[21] *See* Application (A.) 20-11-004. SoCalGas and SDG&E also proposed a Hydrogen Blending Demonstration Program in this application. The first project will blend hydrogen into an isolated section of primarily polyethylene (PE) plastic distribution system in SoCalGas' service territory. The initial hydrogen blend level is planned at one percent and may increase to as much as twenty percent.

[22] *See* CPUC A. 20-11-004 available at https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M351/K622/351622423.PDF.

imperative to inform and implement key policy tools as California updates legal and regulatory frameworks to support a 2045 net zero transition.

We appreciate the opportunity to provide insights and engage with policymakers and stakeholders on the future of gas infrastructure and how an increasingly decarbonized gas grid helps support California's decarbonization goals and requirements. We are open and look forward to sharing our data, analyses and perspectives as the CEC proceeds through the IEPR development process.

Respectfully,

*/s/ N. Jonathan Peress*

N. Jonathan Peress
Senior Director
Business Strategy & Energy Policy

cc: The Honorable David Hochschild, Chair
The Honorable Karen Douglas, Commissioner
The Honorable Patty Monahan, Commissioner