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Comments on the CEC Lead Commissioner Workshop on Clean Energy Alternatives for Reliability

Additional submitted attachment is included below.

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Vice Chair Siva Gunda
California Energy Commission
Docket Unit, MS-4
Docket No. 21-ESR-01
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Comments on the California Energy Commission (CEC) Lead Commissioner Workshop on Clean Energy Alternatives for Reliability

Dear Vice Chair Gunda:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide comments on the October 28, 2022, CEC Lead Commissioner Workshop on Clean Energy Alternatives for Reliability. SoCalGas commends the CEC on the continued work of remaining "laser-focused on ensuring reliability while decarbonizing electricity and transportation sectors."[1] Extreme weather and drought continue to place stress on California's electric grid, as demonstrated by the recent heat wave in August and September 2022.

SoCalGas offers the following comments in response to the questions posed by the CEC to the public during the workshop: **1)** Preliminary resource supply options that include long-duration energy storage should consider the proposal to develop the nation's largest green hydrogen energy infrastructure system, the Angeles Link; **2)** Additional supply options should be included in the CEC's list of resource options for meeting California's legislative requirements; and **3)** To advance the public interest, additional attributes should be included in the CEC Resource Comparison Framework to define the supply and demand resource options more comprehensively.

[1] *See* "CEC Workshop on Clean Energy Alternatives for Reliability," October 28, 2022, available at: https://www.energy.ca.gov/event/workshop/2022-10/session-1-lead-commissioner-workshop-clean-energy-alternatives-reliability.

1) *In this section, we answer:* **Do you agree with the preliminary categories within the supply and demand options?**

Preliminary resource supply options that include long-duration energy storage should consider the proposal to develop the nation's largest clean hydrogen energy infrastructure system, the Angeles Link.

Last year, SoCalGas became the largest natural gas utility in North America to set a net-zero greenhouse gas emissions goal for our operations and the energy we deliver. Dedicated hydrogen pipelines to direct end-uses could also provide additional resiliency and long-duration storage benefits to the State.

For example, earlier in 2022, SoCalGas submitted its Application of Southern California Gas Company Authority to Establish a Memorandum Account for the Angeles Link Project (Application 22-02-007) to the California Public Utilities Commission, to track costs associated with planning work towards establishing a dedicated clean hydrogen energy transport system.[2] The foundation of the system would be one or more trunk transmission pipelines that would run from clean hydrogen production sources, for example, the Central Valley, Mojave Desert/Needles, or Blythe area, into one or more delivery points in the Los Angeles Basin. On November 7, 2022 the California Public Utilities Commission (CPUC) issued a proposed decision that proposes to grant SoCalGas the authority to establish the Angeles Link Memorandum Account, stating that "[c]lean hydrogen is one of the only few viable carbon-free energy alternatives for the hard-to electrify industries and the heavy-duty transportation sector in the Los Angeles Basin."[3] The Angeles Link Project presents a prime example of how a gas system can help customers reduce their GHG emissions by providing necessary clean fuel infrastructure, while also expanding the State's pathways to decarbonization and enhancing resiliency, including the transportation sector.

A growing body of research shows a prominent role for clean fuels like clean hydrogen in meeting California's clean energy and resiliency goals. For example, Research conducted by Energy and Environmental Economics, Inc. ("E3")[4] and the National Renewable Energy Laboratory (NREL LA100)[5] highlight the need for clean fuels like green hydrogen to achieve Los Angeles's LA100 net-zero goals and California's mid-century climate goals.

[2] *See* CPUC Proposed Decision Approving the Angeles Link Memorandum Account To Record Phase One Costs on Application 22-02-007, , dated November 7, 2022, at Finding of Fact 32-36, Conclusion of Law 1, and Ordering Paragraph 2.
[3] *See* Id..
[4] *See* "Achieving Carbon Neutrality in California & 2022 Scoping Plan," June 8, 2021, Energy and Environmental, Inc., available at: https://ww2.arb.ca.gov/sites/default/files/2021-06/e3-uci-rhodium_sp_kickoff_june2021.pdf.
[5] *See* "LA100: The Los Angeles 100% Renewable Energy Study," NREL, available at: https://www.nrel.gov/analysis/los-angeles-100-percent-renewable-study.html.

2) *In this section, we answer:* **Are there resource options that should be added to or removed from the preliminary list?**

Additional supply and demand options should be included in the CEC's list of resource options for meeting California's legislative requirements

As the CEC compiles its comprehensive list of eligible supply options, SoCalGas respectfully proposes adding the following bolded categories and options to its list:

- **Ancillary services as a supply option within the preliminary list of resource options, since enhancing ancillary services by coupling batteries with existing gas-fired power plants could reduce gas burned and associated emissions with spinning reserve needs.**

Energy storage is proving to be foundational in providing ancillary support to the grid, however those markets may become saturated and drive prices for those services down.[6] As extreme weather events are increasingly impacting the ability of our power system to meet resiliency and reliability needs, energy storage systems are necessary to maintain acceptable grid operation in California and across the country.[7] Electricity grids therefore require a minimum level of service capacity, including spinning and non-spinning reserves to provide the primary functions of:

a. Steadying the power grid through frequency control when demand and production are misaligned over short-term time periods.[8]
b. Making sure energy reserves are accessible during unplanned changes in generational output, plant failures, or line outages.[9]

Currently, California power plants must at least run at *PMin* to sufficiently provide ancillary services. In this scenario, *PMin* is defined as the minimum normal capability of the generation unit.[10] However, if existing powerplants are coupled with battery storage technologies, gas-fired power plants do not necessarily need to operate at *PMin* to provide ancillary services. For instance, batteries may be able to provide ancillary services while reducing greenhouse gas emissions from existing power plants by allowing them to remain offline for more hours. By using a relatively minor coupling modification, California could potentially reduce the amount of gas demand and associated emissions for providing ancillary services, while increasing thermal efficiency for such gas-fired power plants and maintaining the capacity provided by the existing thermal fleet. Indeed,

[6] *See* "Energy storage is changing the grid. Here's how to navigate the new dynamics," Utility Dive, August 1, 2022, available at: https://www.utilitydive.com/spons/energy-storage-is-changing-the-grid-heres-how-to-navigate-the-new-dynamic/627973/.
[7] *Ibid.*
[8] Guidehouse, "Market Data: Ancillary Service Markets for Energy Storage," 2017. Available at https://guidehouseinsights.com/reports/market-data-ancillary-service-markets-for-energy-storage.
[9] *Ibid.*
[10] *See* California Independent System Operator Glossary of Terms and Acronyms, 13 November 2015. Available at http://www.caiso.com/Pages/glossary.aspx?Paged=TRUE&p_SortBehavior=0&p_Letter=P&p_Term=Participating+Intermittent+Resource+Program&p_ID=1008&SortField=Letter&SortDir=Desc&PageFirstRow=451&SortField=Letter&SortDir=Desc&&View=%7B8034109D-E87A-4203-90DC-41FF59CA116E%7D.

California has the opportunity to further synergize the beneficial attributes of the interrelated electric and gas grid.

As an example, AES Corporation, an electrical power distributor, is actively modernizing a gas-fired power plant that combines a lower profile cycle gas turbine at the Alamitos Energy Center in Long Beach.[11] AES is essentially updating a gas power plant with more efficient, lower emitting technologies. This low-profile combined cycle gas turbine (CCGT) power plant will be consolidated with a 100MW/400 MWh battery energy storage system (BESS).[12] The BESS is not integrated to replace existing gas fired units themselves, but instead improve their operations. AES began the modernization project in the second quarter of 2017 and construction is ongoing. There are significant environmental benefits expected from this project as a whole - the modernized CCGT power plant will use 70 percent less fresh water and will avoid using ocean water for cooling.[13] The Alamitos Generating Station is a prime example of leveraging the combined strengths of a battery facility with a gas power plant to further integrate renewables, achieving decreased emissions associated with the gas power plant's activities.

- **Linear generators as an additional supply option under the Distributed Energy Resources (DERs) category.**

A linear generator is another clean energy technology that can supply power to the grid as necessary, for reliability and resiliency. Its ability to use flexible fuel sources, dispatchability, and lower operating cost makes the linear generator a flexible distributed generator that is designed to tailor its operation to meet the cost, resiliency, and/or sustainability goals of the end user.[14] The flexible operation allows the resource to provide 24/7 load following or primary power operation when needed. The dispatchability of the generator allows it to respond to certain signals, such as dispatching for peak load shaving or firming other assets in a microgrid configuration. Having a dispatchable technology with the ability to black start[15], load follow[16], and island[17] offers distribution system operators flexibility when balancing the distribution system. Linear generators also have near-zero NOx emissions due to the technology's low-temperature, non-combustion reaction.[18] Additionally, linear generators can use clean fuels such as hydrogen (H2), ammonia, and renewable natural gas (RNG) to help reduce GHG emissions.

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[11] *See* Andy Colthorpe, "AES switches on 400MWh California battery project alongside 'modernized' natural gas plant," *Energy Storage News,* 27 January 2021, available at: https://www.energy-storage.news/news/aes-switches-on-400mwh-california-battery-project-alongside-modernised-natu.

[12] *Ibid.*

[13] *Ibid.*

[14] *See* Mainspring Datasheet on Linear Generators, available at: https://cdn.sanity.io/files/m8z36hin/production/93ec6bb11c57b1087bed2175b5100719047f1d91.pdf?dl=MSE%20Datasheet%20-%202022%20-%20r30021.pdf

[15] According to NREL, Black Start is the ability of generation to restart parts of the power system to recover from a blackout.

[16] Load following allows a generator to alter output to meet varying demand.

[17] According to NREL, microgrids that are connected to one another, and the larger grid need to be able to switch to "island" mode seamlessly to insulate themselves during widespread disruptions such as blackouts and cyberattacks.

[18] *See* Mainspring Datasheet on Linear Generators.

- **Air-cooled gas turbines with carbon capture under gas-fired generation as a supply option in the CEC's list of resource options.**

On September 23, 2022, the U.S. Department of Energy's (DOE) Office of Clean Energy Demonstrations (OCED), in partnership with the Office of Fossil Energy and Carbon Management (FECM), announced up to $2.54 billion to develop six integrated carbon capture, transport, and storage demonstration projects that can be readily replicated and deployed at fossil energy power plants and major industrial sources of CO2, such as cement, pulp and paper, iron and steel, and certain types of chemical production facilities. This funding topic area has federal support from the DOE and FECM and emphasizes projects designed to capture carbon dioxide from a natural gas electric generation facility.[19] The funding opportunity provides up to $189 million for up to 20 integrated front-end engineering design studies, with a potential second funding round to support detailed design, construction, and operation of carbon capture projects, as well as transport and storage of the captured CO_2.[20]

The technology pairing of carbon dioxide capture plus natural gas electric generation should be added to the preliminary list of supply resource options as a technology that provides firm, dispatchable power and has a low carbon emissions profile. Further, the CEC could consider following the DOE's lead in directing funding for this technology pairing.

3) In this section, we answer: **Are there other attributes that should be considered?**

To advance the public interest, additional attributes should be included in the CEC Resource Comparison Framework to define the supply and demand resource options.

SoCalGas respectfully proposes that, in addition to the preliminary qualitative attributes list, the CEC consider adding the following attributes:

- **Affordability:** Including this attribute would provide transparency and help assure that disadvantaged communities are not disproportionately impacted.
- **Reliability and Resiliency:** As California decarbonizes and electrifies, a clean fuels network will play an increasingly vital role in providing reliability, resource adequacy, resiliency, and peaking capacity.
- **Ancillary Service:** Ancillary Services are the services (other than energy) required by system operators to ensure reliable operation of the electric grid. They are used to keep the system operating within acceptable frequency and voltage levels and to restore the system when contingencies occur.[21]

[19] *See* Funding Notice: Bipartisan Infrastructure Law: Carbon Capture Demonstration Projects Program, Office of Fossil Energy and Carbon Management (FECM), available at: https://www.energy.gov/fecm/funding-notice-bipartisan-infrastructure-law-carbon-capture-demonstration-projects-program.
[20] *Ibid.*
[21] *See* The Energy Knowledge Base by Enerdynamics, Ancillary Services, available at: Ancillary services · Energy KnowledgeBase.

Conclusion

Grid reliability is key for the health and safety of all Californians and staying on track to meeting the State's climate goals. Planning and implementing a comprehensive list of resource options can play a pivotal role in procuring the right portfolio of clean resources to enhance and improve the resiliency of the electric and overall energy system. With the optimal allocation of clean energy resources implementation, the State can reduce the air quality impacts of the program while increasing electric and gas service reliability during the times when the grid is the most stressed. Thank you for considering our comments.

Respectfully,

/s/ Kevin Barker

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