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Comments on the CEC-CPUC En Banc Meeting on the EPIC 4 Investment Plan

Additional submitted attachment is included below.

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October 15, 2021

Jonah Steinbuck, Deputy Director
California Energy Commission
Research and Development Division
Docket Unit, MS-4
Docket No. 20-EPIC-01
715 P Street
Sacramento, CA 95814-5512

Subject: Comments on the CEC-CPUC En Banc Meeting on the EPIC 4 Investment Plan

Dear Deputy Director Steinbuck:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide comments on the October 8, 2021, California Energy Commission (CEC or Commission) and California Public Utilities Commission (CPUC) En Banc Meeting on the Electric Program Investment Charge 2021-2025 (EPIC 4) Investment Plan. SoCalGas recognizes the tangible benefits for ratepayers across California that the EPIC Program's targeted investments have yielded. During the meeting, CEC Staff shared that 68 percent of technology demonstration and deployment funds were invested in under-resourced communities.[1] We commend the CEC for its progress on this front and are encouraged that the renewal of the EPIC Program will continue to provide research investments to advance the public interest.

In SoCalGas' previous comment letters on the EPIC 4 Investment Plan, we emphasized the important role of California's existing gas grid to overall electric grid reliability and resiliency. We are pleased that the CEC has added additional language to the final version of the EPIC 4 Investment Plan Initiatives, specifically Initiatives 7 and 8. The additional funding of applicable technology demonstrations, including clean fuel technologies, will benefit the State's electric grid during times of high demand as more end-uses are electrified.

We suggest that the CEC prioritize EPIC 4 funding on advancing diversified energy supplies in communities that are increasingly relying on diesel back up generation. Our comments focus on

[1] *See* Slide 4 of Presentation for EPIC 4 En Banc Meeting October 8, 2021, California Energy Commission. Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=240016&DocumentContentId=73464.

the value of a diversified energy supply to support the development and commercialization of reliable and clean energy systems.

A diversified energy supply can support the development and commercialization of clean energy systems that do not result in net increases of toxic air pollutants, like diesel soot, within the Electric Program Investment Charge, while advancing the needs of distressed communities.

To enhance public safety, it is necessary for California utilities to turn off electricity during times when heightened fire risks are forecasted; this is known as a Public Safety Power Shutoff (PSPS).[2] In order to reduce damage associated with power loss, many critical facilities and customers may rely on back-up generators to keep the power on during these PSPS events. Unfortunately, use of these generators impact air quality, climate and public health.[3] Diesel-fired generation is growing at a rapid pace in California with enough capacity to power 15 percent of the electric grid.[4] As Jack Broadbent, Executive Officer of the Bay Area Air Quality Management District, explained "we have long been concerned about the proliferation of diesel backup generators here in the Bay Area…emissions from these backup generators can harm local residents, regional air quality and the global climate."[5] Over the last three years in the Bay Area Air Quality Management District (BAAQMD), backup generation of all types has increased by approximately 34 percent, with most of these generators relying on diesel for power.[6] In comparison, within the South Coast Air Quality Management District (SCAQMD), backup generation has grown by 22 percent over the past year; collectively, about 90 percent of this backup generation is utilizing diesel fuel.[7]

Per the California Air Resources Board (CARB), "[w]hen electric utilities de-energize their electric lines, the demand for back-up power increases. This demand for reliable back-up power has health impacts of its own. Of particular concern are health effects related to emissions from diesel back-up engines. Diesel particulate matter (DPM) has been identified as a toxic air contaminant, composed of carbon particles and numerous organic compounds, including over forty known cancer-causing organic substances. The majority of DPM is small enough to be inhaled deep into the lungs and make them more susceptible to injury."[8] According to the Mount Sinai Selikoff Center for Occupational Health, long-term exposure to diesel exhaust can cause the

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[2] *See* CARB Draft Report on Potential Emissions Impact of Public Safety Power Shutoff (PSPS), Available at https://ww2.arb.ca.gov/sites/default/files/2020-01/Emissions_Inventory_Generator_Demand%20Usage_During_Power_Outage_01_30_20.pdf

[3] *See* Use of Back-up Engines for Electricity Generation During Public Safety Power Shutoff Events, California Air Resources Board, Available at: https://ww2.arb.ca.gov/resources/documents/use-back-engines-electricity-generation-during-public-safety-power-shutoff

[4] "The Diesel-Fired California Dream," California Energy Markets, October 8, 2021, No. 1662. Available at https://www.newsdata.com/california_energy_markets/bottom_lines/the-diesel-fired-california-dream/article_f65b1070-2876-11ec-b3f1-f3ef2c8a4076.html.

[5] "New Study Shows a Rapid Increase of Diesel-Fueled backup Generators Across California," Businesswire, October 6, 2021. Available at https://www.businesswire.com/news/home/20211006005088/en/New-Study-Shows-a-Rapid-Increase-of-Diesel-Fueled-Backup-Generators-Across-California.

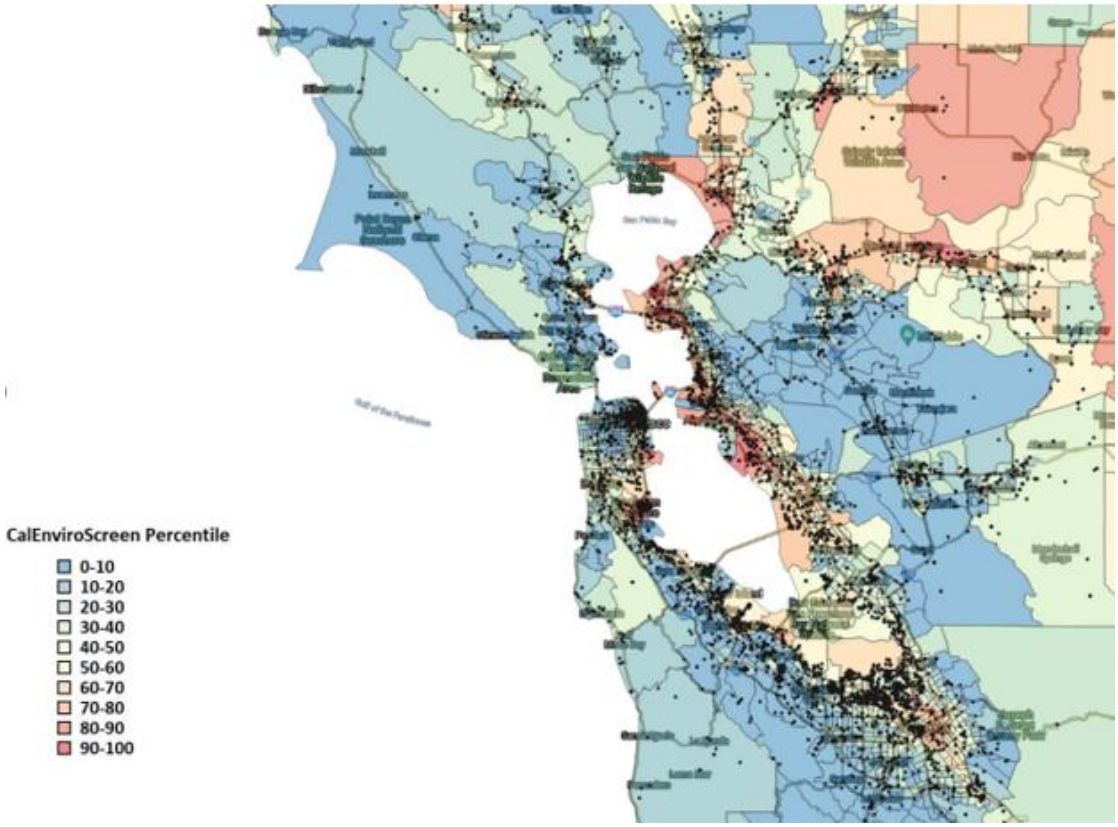
[6] *Ibid.*

[7] *Ibid.*

[8] *See* Use of Back-up Engines for Electricity Generation During Public Safety Power Shutoff Events, California Air Resources Board

worsening of existing lung conditions, such as asthma.[9] The increase in diesel generation statewide is troublesome, as the generators tend to be located near public spaces, such as schools and workplaces.[10] Even more concerning is that many of the diesel generators are located within vulnerable communities in California and can potentially burden these residents with high levels of carcinogenic pollutants.[11]

Figure 1. Bay Area Air Quality Management District Back-up Generators[12,13]



When implementing grid reliability strategies within California, the Commission must weigh costs and benefits of policies that result in a proliferation of backup generation to assure reliable electricity. The growing reliance on these higher-emitting gensets undermines efforts made by the State regarding climate change mitigation, energy affordability, equity, air quality attainment requirements, and reliability on clean energy resources. Figure 1 and Figure 2 duly illustrate the rise in diesel backup generators within the BAAQMD and the SCAQMD, respectively. The maps

[9] *See* Mount Sinai Selikoff Centers for Occupational Health, Diesel Exhaust Exposure, Available at https://www.mountsinai.org/files/MSHealth/Assets/HS/Patient%20Care/Service-Areas/Occupational%20Medicine/Diesel%20Exhaust%20Exposure.pdf

[10] "Diesel Back-Up Generator Population Grows Rapidly in the Bay Area and Southern California," M. Cubed, Available at https://www.bloomenergy.com/wp-content/uploads/diesel-back-up-generator-population-grows-rapidly.pdf.

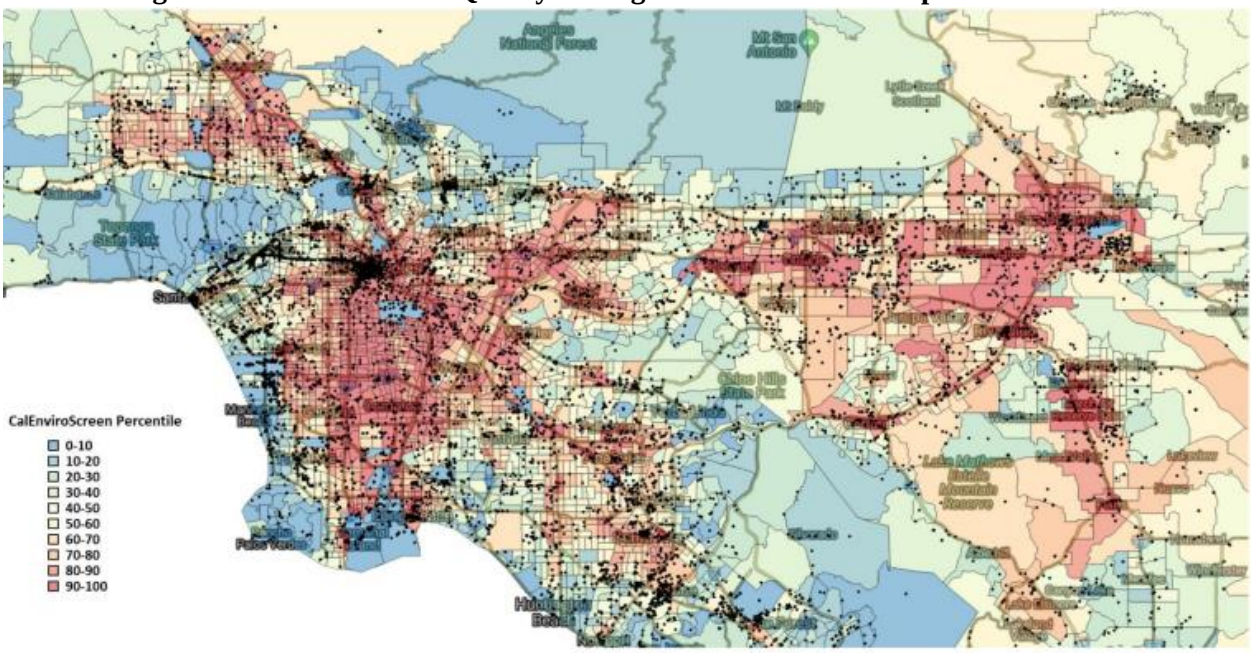
[11] *Ibid.*

[12] "Diesel Back-Up Generator Population Grows Rapidly in the Bay Area and Southern California," M. Cubed.

[13] Approximately 8,700 backup generators in the Bay Area, totaling approximately 4.8 gigawatts of available power. Within the context of CalEnviroScreen, Red & Orange areas are the most vulnerable communities, and the Blue & Green are the least vulnerable communities.

display the current fleet of backup generators overlayed with the CalEnviroScreen Fourth Assessment results. Within the BAAQMD, 17 percent of generators are in communities that are highly vulnerable to pollution; and within the SCAQMD, the situation is more significant with 47 percent of generators located within communities highly vulnerable to pollution, per the CalEnviroScreen Fourth Assessment results.[14]

Figure 2. South Coast Air Quality Management District Back-up Generators[15,16]



Microgrids are an important option to address the need for back-up generation. Microgrids have the potential to reduce demand on the electrical grid, increase resiliency in the community, and reduce greenhouse gas emissions. An important function of a microgrid is the ability to continue to operate even during power outages, such as those caused by extreme weather events. To be capable of fulfilling this function, a microgrid must be supported by a reliable fuel transportation system and source. This fuel can be used in stationary fuel cells, fuel cell electric vehicles, as well as linear generator and microturbines when energy from the electric grid is unattainable.

There are some market segments for which these technologies are of particular significance. Table 1 shows various market segments with facilities that do not lend themselves well to the integration of renewable generation technologies in behind-the-meter (BTM) applications. Due to intermittent generation, space limitations, cost-effectiveness concerns, and overall level of demand, solar photovoltaics (PV) and battery storage seldom meet electric load needs for various customer classes. Many of these market segments are considered essential businesses and/or critical facilities

[14] "Diesel Back-Up Generator Population Grows Rapidly in the Bay Area and Southern California," M. Cubed.
[15] *Ibid.*
[16] Approximately 14,800 BUGs are located within SCAQMD territory, generating approximately 7.3 GW of power in the region. The red and orange indicate the most environmentally burdened communities.

that provide essential public health and safety services for society and thus should have the opportunity to develop the "right fit" of technology options to meet their reliability and resiliency needs.

Table 1. Critical Facilities Analyzed in SoCalGas Service Territory

Building Type	Number of Buildings Analyzed	Average Electric Load (kW)	Maximum Thermal CHP Size (kW)	Summer Loads met by PV Output (%)	Storage Capacity for 24-hour Resilience (kWh)	Life-Support Loads
Hospitals	296	3,706	1,800	4%	88,877	Yes
Nursing Homes (med-large)	794	369	100	6%	9.044	Yes
Colleges/ Universities	215	4,943	1,000	10%	112,488	-
Hotels	656	677	600	10%	15,411	-
Restaurants (large)	3,595	291	200	9%	6,563	-
Fast Food Restaurants	6,392	52	n/a	13%	1,125	-
Grocery Stores (large)	648	370	170	23%	7,166	-
Gas Stations	747	79	n/a	3%	6,077	-
Fire Stations	637	25	n/a	63%	361	Yes
Police Stations	157	277	n/a	40%	4,747	Yes

Within the City of Fremont, for instance, solar and battery storage microgrids were installed at three critical fire stations. The City of Freemont Fire Stations Microgrid Project [EPC-14-050] received approximately $1.8 million in EPIC funding from the CEC.[17] These microgrids protect critical facilities against electric grid power outages, as the batteries have capacity to island for 8-12 hours. At any given time, the Fremont Fire Stations can island for three hours without using a generator.[18,19] The fire stations also installed diesel generators as a secondary backup to the solar and battery microgrid. According to Rachel DiFranco, Sustainability Manager of the City of Fremont, the secondary diesel generators are used during critical needs and are still run monthly to test and make sure they work properly for such needs.[20] As such, an emissions challenge remains prevalent with the use of solar and battery microgrids. Utilizing another technology, such as fuel

[17] See City of Freemont & Gridscape Solutions, LLC CEC PON 14-301: Demonstration of Low-Carbon based Microgrid for Critical Facilities, Available at https://www.bayrencodes.org/wp-content/uploads/2018/03/Fremont-Fire-Stations-Microgrid-Demonstration_1-31-18.pdf

[18] See Freemont Fire Stations Become Epic PV Microgrids, Sunlight & Power, Available at: https://www.sunlightandpower.com/blog/fremont-fire-stations-become-epic-pv-microgrids

[19] *See* Rachel DiFranco Presentation on Resilience Impacts on the Microgrid Market at 2020 IEPR Commissioner Workshop on Assessing the Future Role for Microgrids in California, 09 July 2020. Available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=233761&DocumentContentId=66393.

[20] *Ibid*.

cells running on hydrogen, renewable natural gas, or natural gas can complement existing systems and reduce harmful emissions emitted by secondary backup diesel generators.[21]

As CARB asserted regarding the need to identify approaches to reduce emissions from back-up engines, "[c]ertain emerging technologies, such as battery electric storage (which can be combined with solar electric generation), fuel cells, and natural gas fueled engines may be useful in meeting the back-up power needs of California residents and some businesses. CARB will continue to encourage the development and use of these clean technologies, especially in areas subject to PSPS events."[22] Through supporting alternative forms of dispatchable generation used for reliability and resiliency, including back-up generation, the Commission can address EPIC Initiatives 8 and 9 of the Investment Plan, while at the same time reducing greenhouse gases (GHGs) and criterion pollutants for the State's most vulnerable populations.

Utilizing an increasingly decarbonized gas grid is a viable solution to mitigate emissions from the increase in diesel backup generators, while supporting intermittent renewable energy sources that the State relies upon. We are pleased that Initiative 7 on the 'Green Hydrogen Roadmap Follow-up and Implementation' will now "provide for technology demonstrations focused on Hydrogen for Grid Reliability use case(s)."[23] In April 2021, researchers from the California Institute of Technology (Caltech) and Carnegie Institution for Science (CIS) demonstrated the inherent issues of variability and availability for wind and solar resources in California and the Western Interconnect using a data-driven approach to directly quantify periods of resource droughts that would limit renewable energy dispatch.[24] Over a period of 39-years (1980 – 2018), researchers found that California experiences multi-day cloudy and calm periods. These rare but severe weather-related events result in solar resource droughts for 6.6 days and wind resource droughts for 48 days, annually.

Researchers also found that aggregating resources over larger areas like the Western Electricity Coordinating Council (WECC) reduces the frequency and duration of these events and can reduce costs in 100 percent reliable, renewable electricity systems. In fact, the modeling results indicate that for wind-solar-battery electricity systems, meeting California demand with generation resources from the WECC reduces costs by 9 percent compared to constraining resources entirely in California. Figure 3 represents various system cost scenarios for meeting California's electricity demand; based on the modeled system costs scenario, the "Battery + Power-to-Gas-to-Power (PGP)" stacked area indicates that combining Battery and PGP is $0.03/kWh cheaper than both

[21] SoCalGas also filed a Petition for Modification of CPUC Decision (D.)15-10-049 in CPUC Application (A.)14-08-007, relating to its Distributed Energy Resources Services Tariff. The petition seeks to expand eligibility of the tariff to meet the reliability and resiliency needs of critical customers and decrease greenhouse gas emissions and reducing reliance on diesel backup generation.

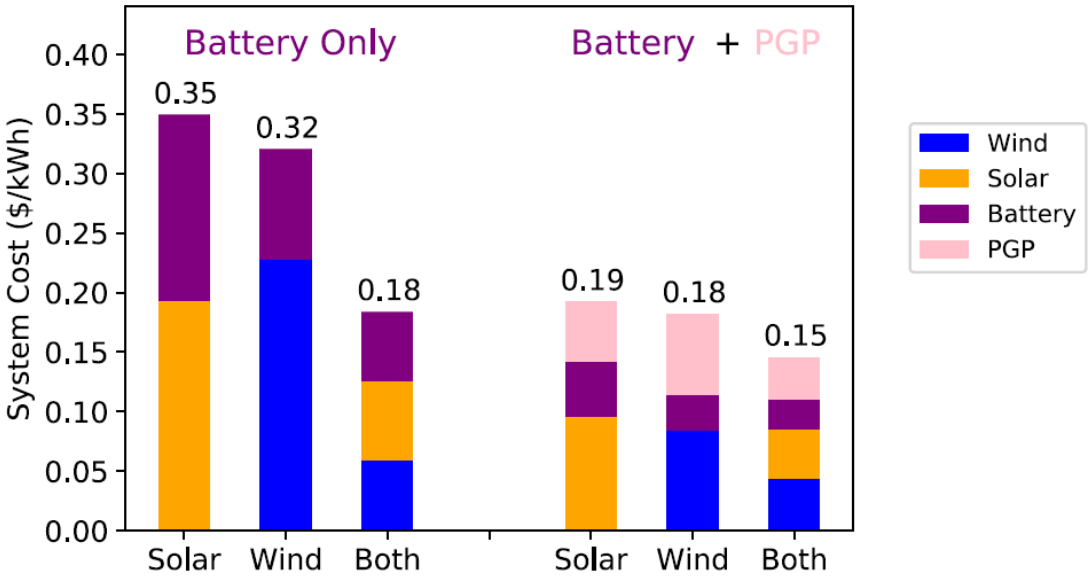
[22] *See* Use of Back-up Engines for Electricity Generation During Public Safety Power Shutoff Events, California Air Resources Board, Available at https://ww2.arb.ca.gov/resources/documents/use-back-engines-electricity-generation-during-public-safety-power-shutoff

[23] *See* CEC Electric Program Investment Charge 2021-2025 Investment Plan Summary, Available at https://efiling.energy.ca.gov/getdocument.aspx?tn=239994

[24] Katherine Z. Rinaldi, Jacqueline A. Dowling, Tyler H. Ruggles, Ken Caldeira, and Nathan S. Lewis. "Wind and Solar Resource Droughts in California Highlight the Benefits of Long-Term Storage and Integration with the Western Interconnect." *Environmental Science & Technology* 55.9 (2021): 6214-6226.

solar and wind systems with only battery storage. Therefore, further research for hydrogen storage has the potential to produce significant benefits to electric rate payers and should be a consideration for the EPIC 4 Investment Plan.

Figure 3. System Costs for Scenarios Meeting California Electricity Demand with California Resources Using Various Generation and Storage Technologies[25]



A supplemental study by Caltech on the "Role of Long-Duration Energy Storage in Variable Renewable Electricity Systems" also explored the impact that natural gas generators would have on overall system costs in the contiguous United States, while approaching a 100 percent decarbonized system and controlled for the natural gas generator dispatch to a fraction of total demand. The study found that the "introduction of natural gas to the technology mix at 10% of demand minimizes or eliminates the need for storage."[26]

Diversification of fuels increases energy system reliability and resiliency attributes. Now more than ever, we need to take advantage of all beneficial resources - solar, wind, biogas, hydrogen, renewable natural gas, natural gas, and fuel cells applications - to increase California's climate adaptation capabilities while meeting the State's energy policy goals and protecting the most vulnerable communities within California.

[25] *Ibid.*
[26] Katherine Z. Rinaldi, Jacqueline A. Dowling, et al., "Role of Long-Duration Energy Storage in Variable Renewable Electricity Systems." JOUL, Volume 4, Supplemental Information, Available at https://authors.library.caltech.edu/104772/4/1-s2.0-S2542435120303251-mmc1.pdf

Conclusion

SoCalGas appreciates the opportunity to comment on the EPIC Program. We appreciate the CEC's continued focus on research and development through the topics listed within the EPIC 4 Initiatives. A focus on research and development that leads to a reliable and robust electricity system will have the greatest benefits of GHG and other air pollutant emission reductions. Consideration of a more diversified energy supply will assure sustained emission reductions and avoid energy deficit issues that result in more diesel back up procurement. SoCalGas looks forward to collaboratively pursuing our common interest of lowering greenhouse gas emissions today and in the future.

Respectfully,

/s/ Kevin Barker

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