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Comments on the Draft 2020 IEPR Update, Volume II

Additional submitted attachment is included below.

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California Energy Commission (CEC)
Docket Unit, MS-4
Docket No. 20-IEPR-01
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Comments on the Draft 2020 Integrated Energy Policy Report (IEPR) Update, Volume II: The Role of Microgrids in California's Clean and Resilient Energy Future, Lessons Learned from the CEC's Research

Dear Chair David Hochschild,

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide public comments on the Draft 2020 IEPR Update, Volume II: The Role of Microgrids in California's Clean and Resilient Energy Future, Lessons Learned from the California Energy Commission's (CEC's) Research. We commend the CEC for investing nearly $180 million over the last decade to advance microgrid research and to expand this technology's role in enabling a clean and resilient energy grid in California.

One of the most important functions of a microgrid is its resiliency to operate independent of the electric grid during unforeseen power outages caused by climate change, fires, earthquakes, imbalances, Public Safety Power Shutoffs (PSPS), and other events. To fulfill this function, a microgrid must be supported by reliable fuel sources. Given its ability to reliably store and deliver gaseous fuel, the gas grid is necessary for providing long-term, long-duration resiliency, for both the greater electric grid and smaller microgrids.

As resiliency functions are increasingly recognized as a priority by the CEC and other State agencies, microgrids play an important role by allowing an electricity customer to manage their demand profile while lowering electricity costs. Further, microgrids can participate in innovative

models such as aggregated demand response and virtual power plants (VPPs), which allow the microgrid to act as an aggregated single entity to the distribution system operator.[1]

According to a recent report by the U.S. Government Accountability Office (GAO), climate change will have "far-reaching effects on the electricity grid that could cost billions and could affect every aspect of the grid from generation, transmission, and distribution to demand for electricity."[2] Warmer temperatures can reduce the carrying capacity of transmission lines by 1.5 to 2.5 percent.[3] Increased demand for cooling in homes and buildings on hot days can also damage transformers making power outages necessary.[4] Given the increasing frequency, intensity, and duration of climate events and extreme weather, understanding the vulnerabilities of the entire electric grid is critical to developing long-term strategies.[5] The Draft 2020 IEPR Update should holistically consider how climate change will impact the electric grid and acknowledge that an increasingly decarbonized gas grid is key to increasing resiliency, while meeting California's air quality, energy, and climate goals. Our comments are as follows:

The gas grid provides resiliency for solar and battery storage applications at critical facilities.

The Draft 2020 IEPR Update notes that microgrids "powered by solar, wind, or bioenergy generation and coupled with a fossil fuel backup generator sited locally, however, are becoming more common."[6] 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, and cost-effectiveness issues, 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 facilities that provide essential services for society and thus should have the opportunity to utilize the "right fit" technology to provide for reliability and resiliency.

[1] *See* SB 1339 (Stern 2018), Section 1(a),(b) (declaring that the Legislature finds "allowing the electricity customer to manage itself according to its needs, and then to act as an aggregated single entity to the distribution system operator, allows for a number of innovations and custom operations).

[2] Government Accountability Office (2021), "Electricity Grid Resilience: Climate Change is Expected to Have Far Reaching Effects and DOE and FERC Should Take Actions." Available at https://www.gao.gov/products/gao-21-423t

[3] Op. cit.

[4] Op. cit.

[5] Oak Ridge National Laboratory (2019). Extreme Weather and Climate Vulnerabilities of the Electric Grid: A Summary of Environmental Sensitivity Quantification Methods. Available at https://www.energy.gov/sites/prod/files/2019/09/f67/Oak%20Ridge%20National%20Laboratory%20EIS%20Response.pdf

[6] California Energy Commission (2020). Draft 2020 Integrated Energy Policy Report Update Volume II.

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

Additionally, the Draft 2020 IEPR Update seems to suggest that solar PV and energy storage with fossil fuel backup are the only microgrid configurations that should be considered. However, gas-fueled backup generators and fuel cells are an optimal choice to provide electricity when PV or battery storage is insufficient or unavailable.[7] These technologies can operate flexibly to either provide 24/7 "baseload" power generation, load follow with the needs of the microgrid operation, and/or dispatch to the larger grid when called upon. This flexibility allows generators to turn down during times of solar PV generation, allowing higher penetration of renewables while still supporting the continuous operation of the microgrid.

Fuel cell and gas generator technologies are crucial for microgrid resiliency.

Fuel cell-powered microgrids and gas generator technologies are a viable, clean energy alternative for critical facilities like data centers, grocery stores, and hospitals that need power to operate 24/7. These technologies can be fueled by the gas grid, which is underground and therefore is reliable and resilient during extreme weather conditions.[8] As noted by ICF, the gas grid is more protected from natural and manmade disasters, and therefore provides a reliable and continuous fuel supply to keep fuel cells and microgrids running at any given time the gas infrastructure is unimpacted by

[7] Assessment of Backup Power and 24/7 Resilient Power Options for Critical Facilities and Commercial Customers with High Resiliency Needs, ICF, October 2020, pg. 5. Available at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M349/K245/349245336.PDF (Appendix A)

8 ICF, Potential Climate Impacts and Adaptation Options for Electricity and Natural Gas Systems in the San Diego Region, January 24, 2019.

a disaster.[9] Further, subsequent studies by ICF consultants consistently found that the gas infrastructure proved to be considerably more resilient to climate impacts during climate disasters in 2017-2018.[10]

SoCalGas is committed to advancing fuel-cell microgrids and gas generator solutions to support the electric grid. Currently, SoCalGas is powering its two largest Los Angeles facilities with Bloom Energy's AlwaysOn Microgrids to reduce air pollution, GHG emissions, and electricity costs, while increasing reliability for our 22 million customers.[11] SoCalGas is also committed to partnering with businesses, research universities, and state agencies to advance the integration of fuel cells and gas engines at data centers and other critical facilities.

In 2019, SoCalGas partnered with Microsoft and the University of California Irvine (UCI) to investigate how both solid-oxide and proton exchange membrane fuel cells can lower emissions and increase energy reliability.[12] Similarly, SoCalGas worked with Mainspring (formerly EtaGen) and the CEC to deploy a near-zero emissions generator that can quickly alternate between traditional gas and renewable fuels at a local grocery store[13]which has now committed to deploying the technology at 30 additional locations.[14] These technologies can offer benefits such as large capacity factors of generation (*e.g.*, the mega-watt hour produced are high per the mega-watt of capacity installed); increased in-state generation capacity that can lead to reduced congestion on electric distribution networks; support for the utility when resources become constrained or in the face of an outage; and fully dispatchable generation not subject to run time or fuel storage limitations.[15]

Further research at the CEC should continue to focus on developing and deploying fuel cell and gas-fired generator microgrids for their immediate public health benefits, long-term contribution to the State's decarbonization goals, unmatched resiliency benefits, and flexibility to manage diverse energy profiles.

Gas-fired generators and fuel cells are compatible with California's decarbonization goals. Despite advancements made in some market segments, hard-to-decarbonize sectors such as thermal load-dependent processes (*e.g.*, manufacturing) have yet to see energy options that can help them transition to a decarbonized future. Gas-fired generators and fuel cells support the

[9] ICF. Potential Climate Impacts and Adaptation Options for Electricity and Natural Gas Systems in the San Diego Region, January 24, 2019.
[10] ICF. Case Studies of Natural Gas Sector Resilience, October 21, 2019.
[11] SoCalGas Press Release. "SoCalGas Now Powering Two Los Angeles Facilities with Bloom Energy AlwaysON Microgrids." Available at https://www.prnewswire.com/news-releases/socalgas-now-powering-two-los-angeles-facilities-with-bloom-energy-alwayson-microgrids-301095300.html
[12] SoCalGas. "2019 Annual Report: Fostering Breakthrough Innovation." Available at https://www.socalgas.com/sites/default/files/2020-04/2019%20SoCalGas%20RDD%20Annual%20Report.pdf
[13] Op. cit.
[14] Green Tech Media (2021). "Mainspring Energy Lands $150M Deal to Deploy Its Linear Generators with NextEra. Available at https://www.greentechmedia.com/articles/read/mainspring-energys-linear-generators-to-roll-out-through-150m-deal-with-nextera
[15] Reply comments of Southern California Gas Company to The Assigned Commissioner's Amended Scoping Memo for Track 3 and Ruling Questions at 3.

State's long-term decarbonization goals by using low- or zero-carbon fuels. Combined Heat & Power (CHP) systems utilizing low- or zero-carbon fuels can provide cleaner energy for thermal processes. Other benefits beyond what photovoltaics or storage technologies can provide are high-capacity factors (more kilowatt-hour per kilowatt of capacity installed), fully dispatchable generation not subject to run time or fuel storage limitations, and high energy efficiencies that displace other thermal loads that would otherwise consume fuel. Furthermore, some gas-fired generation technologies are already capable of operating on biogas and/or other low- or zero-carbon fuels, such as hydrogen, with minimal modifications to the existing generator, thus providing a direct and inexpensive path to decarbonization.

Gas backup generators are needed to support California's clean air goals amid PSPS events. Throughout California, PSPS events are increasing the reliance on diesel generators for backup power. In 2019, PSPS events affected nearly 2 million people in California, with power outages ranging from 15 to 55 hours.[16] At a CEC workshop earlier this year, the Bay Area Air Quality Management District noted that in the last three years, more than 3,000 diesel backup generators have been installed due to an increase in data centers and PSPS awareness in the region.[17] Additionally, a recent survey found that 15 percent of people who experienced outages during a PSPS event purchased a diesel backup generator for power.[18]

The adverse impacts to local and regional air quality from relying on diesel backup generators during PSPS events have been documented by both the California Air Resources Board (CARB) and the South Coast Air Quality Management District (SCAQMD). CARB evaluated the emissions impact from the October 2019 PSPS events alone and concluded that 8.3 tons of diesel particulate matter (PM) was emitted from permitted stationary diesel backup generators.[19] To put this number in perspective, 9 tons of diesel PM is equivalent to emissions from almost 29,000 heavy duty diesel trucks (above 14,000 pounds) driving on California's roadways for a period of one month.[20] CARB further concluded that the same diesel backup generators emitted 125.7 tons of smog-forming nitrogen oxides (NOx).[21] According to SCAQMD, diesel backup generators create NOx emissions "200 to 600 times greater, per unit of electricity, than new or controlled existing central power plants fired on natural gas."[22] As such, SCAQMD estimated that during a 2019 PSPS event in Los Angeles and San Bernardino Counties, fewer than 2,000 diesel backup generators emitted 6 tons

[16] California Energy Commission (2020). Draft 2020 Integrated Energy Policy Report Update Volume II: The Role of Microgrids in California's Clean and Resilient Energy Future, Lessons Learned From the CEC's Research. Available at https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2020-integrated-energy-policy-report-update

[17] California Energy Commission (2021). Workshop for Research into Clean Energy Alternatives to Diesel Backup Generator Systems on January 21, 2021. Materials available at: https://www.energy.ca.gov/event/workshop/2021-01/workshop-discuss-research-clean-energy-alternatives-diesel-backup-generator

[18] Energy Institute at HAAS. Electricity Outages Lead to Substantial Backup Generator Purchases. Available at https://energyathaas.wordpress.com/2020/05/26/electricity-outages-lead-to-substantial-backup-generator-purchases/

[19] California Air Resources Board (CARB). Emission Impact: Additional Generator Usage Associated with Power Outage. January 30, 2020. Available at https://ww2.arb.ca.gov/sites/default/files/2020-01/Emissions_Inventory_Generator_Demand%20Usage_During_Power_Outage_01_30_20.pdf

[20] Op. cit.

[21] Op. cit.

[22] South Coast Air Quality Management District (SCAQMD) Fact Sheet on Emergency Backup Generators. Available at http://www.aqmd.gov/home/permits/emergency-generators#Fact2

of NOx per day. This is higher than average daily emissions from the largest refinery in its jurisdiction.[23]

The Draft 2020 IEPR Update omits the substantial distinction in emissions between natural gas and diesel backup generators when stating that "relying on diesel, gasoline, or fossil fuel gas-fired generators for backup power is inconsistent with the [S]tate's air quality, energy, and climate goals."[24] Natural gas backup generators are significantly cleaner than diesel backup generators and are compatible with California's clean air and climate goals. As CARB asserted regarding the need to identify approaches to reduce emissions from backup 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."[25] SCAQMD also recognizes that "technologies such as natural gas/renewable natural gas/hydrogen fuel cells and natural gas-powered backup generators can provide substantially cleaner forms of backup power, emitting far less NOx and diesel particulate matter than diesel-fueled options."[26]

Again, we commend the CEC for its dedication to advance microgrid research and deployment in California. SoCalGas offers these comments in the spirit of collaboration. We look forward to continuing to support microgrids as a resiliency solution for the electric grid.

Respectfully,

/s/ N. Jonathan Peress

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cc: Commissioner Andrew McAllister
Commissioner Siva Gunda
Deputy Director Laurie ten Hope

[23] SCAQMD. Legislative Update Presentation by Philip Crabbe to the Environmental Justice Community Partnership Advisory Council on September 2, 2020. Available at http://www.aqmd.gov/home/news-events/webcast/live-webcast?ms=0U9KfvvcV3w
[24] California Energy Commission (2020). Draft 2020 Integrated Energy Policy Report Update Volume II.
[25] California Air Resources Board (CARB). "Use of Back-up Engines for Electricity Generation During Public Safety Power Shutoff Events." Available at https://ww2.arb.ca.gov/resources/documents/use-back-engines-electricity-generation-during-public-safety-power-shutoff
[26] California Public Utilities Commission (CPUC). Public comment for D.15-10-049.