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SoCalGas Comments on Commissioner Workshop on Building Decarbonization Assessment

Additional submitted attachment is included below.

Tim Carmichael
Agency Relations Manager
State Government Affairs
925 L Street, Suite 650
Sacramento, CA 95814
Tel: 916-492-4248
TCarmichael@semprautilities.com

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California Energy Commission
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Subject: Comments on Commissioner Workshop on Building Decarbonization Assessment, Docket #19-DECARB-01

Dear Commissioners:

I write on behalf of Southern California Gas Company (SoCalGas) in response to the California Energy Commission's (CEC's) Workshop on the Building Decarbonization Assessment (Assessment) required by Assembly Bill (AB) 3232 held on December 4, 2019. SoCalGas appreciates the State's bold attempts to address climate change and wants to be a key partner to reduce greenhouse gas (GHG) emissions from the building sector. SoCalGas believes that a portfolio approach, utilizing all energy sources and technologies to meet our climate goals, will best serve Californians and those that follow our lead. Natural gas and renewable gas (such as hydrogen, synthetic natural gas, and biomethane/renewable natural gas) are clean, reliable, affordable, and resilient sources of energy that should be part of the *solution* to California's energy concerns.

Because residential and commercial buildings account for 12% of total statewide GHG emissions,[1] SoCalGas supports the use of renewable gas in commercial and residential buildings to meet our climate goals. This supports a building decarbonization strategy that allows the State to maintain a diverse portfolio of energy options, and still offers customers choice in their preferred appliances for heating and cooking in their homes and businesses. The CEC should consider this in the development of this Assessment, as building decarbonization efforts will be most successful if it can be done in a way that is affordable to consumers, preserves consumer choice, and is easily adoptable as rapid adoption will be key to meeting 2030 goals. As pointed out several times by California Public Utilities Commission (CPUC) staff at the workshop, electrifying buildings is not the only way to decarbonize buildings. SoCalGas and California

[1] CARB. GHG Emission Inventory Graphs. Available at: https://ww3.arb.ca.gov/cc/inventory/data/graph/graph.htm

local governments[2] believe that forcing a switch to all-electric buildings is neither cost-effective nor consumer friendly. SoCalGas asks that the CEC approach compliance with AB 3232 impartially and consider all evidence and viewpoints throughout the development of the Assessment. Below, SoCalGas offers input in response to the scoping questions presented for stakeholder feedback and comment during the workshop.

1) **The legislation calls for a building decarbonization assessment for 2030. Should CEC staff also include a review of feasibility for California's 2045 zero-carbon goals?**

There are other proceedings reviewing the feasibility of the State's 2045 zero-carbon goals. Therefore, SoCalGas recommends the CEC comply with the statutory requirements of AB 3232 during this process. SoCalGas urges the CEC to approach the Assessment with the CEC's mission in mind. The Warren Alquist Act (Act) created the CEC and gives it the authority to "…conduct an ongoing assessment of the opportunities and constraints presented by all forms of energy, to encourage the balanced use of all sources of energy to meet the state's needs, and to seek to avoid possible undesirable consequences of reliance on a single source of energy."[3]

However, if the CEC deems a review of the 2045 goals should be included in the Assessment, then a thorough evaluation of how gas infrastructure can be leveraged as a climate solution by storing and transporting carbon-free fuels must be performed. In fact, this evaluation of how the benefits of the gas system can be maximized to achieve our climate goals is required by AB 1257 (the Natural Gas Act), which mandates the CEC to "…identify strategies to maximize the benefits obtained from natural gas, including biomethane."[4] SoCalGas asks the CEC to consider addressing AB 1257 requirements in the Assessment as appropriate.[5] Because we do not know how we will meet California's mid-century GHG emissions reduction goals, the State must maintain optionality and flexibility. We need to keep technology, policies, and other options available to meet our climate goals.

2) **Is the proposed baseline recommendation the best approach for the Assessment? Why or why not?**

SoCalGas agrees with the baseline recommendation presented during the workshop. Specifically, we agree that upstream methane emissions from transmission and distribution

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[2] PR Newswire. *SoCalGas Applauds More Than 100 Local Governments in Southern California that Pass Resolutions in Support of Balanced Energy Policies*. October 3, 2019. Available at: https://www.prnewswire.com/news-releases/socalgas-applauds-more-than-100-local-governments-in-southern-california-that-pass-resolutions-in-support-of-balanced-energy-policies-300931093.html

[3] CEC. Warren Alquist Act. 2019 Edition. Available at: https://ww2.energy.ca.gov/2019publications/CEC-140-2019-001/CEC-140-2019-001.pdf

[4] FindLaw. California Public Resource Code. Section 25303.5(b). Available at: https://codes.findlaw.com/ca/public-resources-code/prc-sect-25303-5.html

[5] SoCalGas provided the CEC comprehensive input on strategies to consider to maximize the benefits of natural gas and renewable natural gas on November 15, 2019. AB 1257 Letter is available at: https://efiling.energy.ca.gov/GetDocument.aspx?tn=230747&DocumentContentId=62358

should not be included since these are already being addressed under Senate Bill (SB) 1371, Natural gas: leakage abatement requirements. During the workshop, staff from the California Air Resources Board (CARB) also agreed with omitting these emissions. Pursuant to SB 1371, SoCalGas submits a biennial Natural Gas Leakage Abatement Compliance Plan to the CPUC.[6] The Compliance Plan provides a summary of SoCalGas' efforts to reduce fugitive methane emissions from the transmission and distribution system. According to the 2018 CARB and CPUC joint staff report for SB 1371, utility natural gas system emissions were equivalent to only 2.86 million metric tons of carbon dioxide equivalent (MMT CO_2e) in 2017, with around 1.21 MMT CO_2e coming from SoCalGas' system.[7] Comparing this SB 1371 report data with CARB's Climate Change Scoping Plan level emissions reporting,[8] SoCalGas' system only represents about 3% of statewide methane emissions, which is approximately 0.3% of the State's total GHG inventory.

SoCalGas also would like to echo remarks made by both CPUC and CARB staff on the growing concerns with the use of high global warming potential (GWP) hydrofluorocarbons that are being used as refrigerants. As noted during the CPUC's presentation, the two most commonly used refrigerants used in heat pumps today (R-134a and R-410a) have a 100-year GWP of 1,430 and 2,088, respectively.[9] SoCalGas agrees with including refrigerant emissions in the Assessment as addressing these will be key to achieving building decarbonization goals.

3) Staff has identified sectors and topics that will be assessed for impacts, challenges, and opportunities. Do you think this list is appropriate? What additional sectors or topics should be added to the scope of the Assessment?

SoCalGas agrees with the sectors and topics that will be assessed for impacts, challenges, and opportunities in the Assessment, but would like to stress the importance of also considering impacts to ratepayers. Energy affordability must remain paramount as any recommendations that could result in increased costs for Californians can further exasperate the State's equity disparity and affordable housing crisis.[10] SoCalGas recommends the following sectors or topics be added to the scope of the Assessment:

Sectors:

- **Business owners (both commercial and industrial), including small business owners**—asking a business to make major renovations to their

[6] SoCalGas. Natural Gas Leakage Abatement Rulemaking. Available at: https://www.socalgas.com/regulatory/R1501008.shtml

[7] CARB and CPUC. *Joint Staff Report-Analysis for the Utilities' June 15, 2018, Natural Gas Leak and Emission Reports*. December 21, 2018. Available at: https://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Safety/Risk_Assessment/Methane_Leaks/2017%20NGLA%20Joint%20Report%2012-21-18.pdf

[8] CARB. GHG Emission Inventory Program. Available at: https://ww2.arb.ca.gov/ghg-inventory-data

[9] CPUC. Building Decarbonization Efforts Presentation. December 4, 2019. P. 16. Available at: https://efiling.energy.ca.gov/GetDocument.aspx?tn=231007&DocumentContentId=62634

[10] Los Angeles Times. *Column: California's housing crisis reaches from the homeless to the middle class — but it's still almost impossible to fix*. March 29, 2018. Available at: https://www.latimes.com/business/hiltzik/la-fi-hiltzik-housing-crisis-20180330-story.html

operations for new equipment could create challenges with adopting and paying for new technologies, which is already a significant barrier for change.

- **Current homeowners**—current homeowners could also face challenges with upgrading to an all-electric home (e.g. due to increased costs).
- **Critical facilities** (i.e., buildings and facilities that are essential for the delivery of vital services or protection of a community such as hospitals, fire stations, and police stations)—in the context of today's increased number of Power Safety Shutoff Events, the CEC must assess how these facilities will have reliable power to serve communities when electricity is down.

Topics:

- **Grid resiliency**—the CEC cannot manage grid reliability without addressing grid resiliency. Gas infrastructure and storage are becoming increasingly important to resilience, a critical component of any energy supply strategy and one that is gaining momentum in the context of today's increased wildfire risk and other climate-driven disasters. It is of utmost importance that the CEC considers how to maximize the resilience and operational flexibility benefits of the natural gas system to enhance the reliability and resiliency of the State's energy supply (e.g., fuel distributed generation systems, such as using fuel cells to power microgrids).

4) Building costs from substituting end-use appliances include direct and indirect costs. One example of indirect costs are fuel infrastructure costs, such as gas piping to and within buildings, and electric distribution systems. Which indirect costs should be included in this Assessment and what are sources for this information?

The CEC must not disregard the significant costs associated with converting a home from mixed-fuel to an all-electric alternative since swapping gas appliances for all-electric alternatives would cost the average household in Southern California more than $7,200 to upgrade wiring and electrical panels and to purchase new appliances.[11] This, along with higher electricity bills, could increase energy costs up to $877 per household each year. Across Southern California's seven million single-family homes, the total cost increase would be $4.3-6.1 billion per year.[12]

5) The total costs to reduce or eliminate emissions from energy usage are uncertain. However, reducing or eliminating emissions will have cost impacts, at the individual and social level. Which cost-effectiveness tests should be included in this Assessment?

SoCalGas offers no input on this question at this time.

[11] California Building Industry Association Comments. Navigant Study: *Impacts of Residential Appliance Electrification*. September 20, 2018. Available at: https://efiling.energy.ca.gov/GetDocument.aspx?tn=224761

[12] *Ibid*.

6) What additional data, analyses, or studies should be reviewed as part of the Assessment? Please specify sources, and include links or electronic copies, if possible.

SoCalGas offers the following studies that should be reviewed as part of the Assessment:

1. Energy Futures Initiative (EFI). *Optionality, Flexibility, & Innovation. Pathways for Deep Decarbonization in California*. May 2019.[13]
   - SoCalGas would like to point the CEC to EFI's research analyzing the options within the parameters of existing state policy for each sector for meeting California's near- (2030) and long-term (2050) carbon emissions reductions goals. Specifically, please see their findings on energy efficiency and how best to reduce emissions from the buildings sector by 2030 (Chapter 5).
   - The authors emphasize the need for the State to pursue a building decarbonization strategy that allows California to maintain a diverse portfolio of energy options.
   - **EFI found that energy efficiency is a major pathway for residential and commercial buildings to reduce emissions.** "Energy efficiency, defined broadly, is likely to be the most cost-effective approach to decarbonization in the energy end-use sectors in California." (p. xiv)
   - **EFI identified emissions reduction pathways for the building sector that promote optionality and flexibility: energy efficiency of building end use technologies, increased use of renewable natural gas, and expanded deployment of combined heat and power units in large commercial facilities**.

2. Navigant Consulting, Inc. *Analysis of the Role of Gas for a Low-Carbon California Future*. July 24, 2018.[14]
   - SoCalGas would like to point the CEC to research we commissioned from Navigant to conduct a technical analysis of the following: 1) potential GHG emissions reductions from building electrification; 2) estimated amount of renewable gas needed to match reductions under different scenarios; 3) projected combined annual cost for consumer utility and appliance costs in each scenario; and 4) cost-effectiveness of each GHG emissions reduction strategy under different assumptions.
   - The report quantifies the amount of renewable gas that would need to be supplied to SoCalGas' retail customers to decarbonize gas at similar pace as the electric supply. That is, how much renewable gas would have to be supplied so building end uses have the same GHG footprint regardless of whether gas or electric appliances were used.
   - **Navigant found that replacing less than 20% of traditional natural gas with renewable natural gas can achieve GHG emissions reductions equivalent to converting 100% electrification of buildings by 2030, *at a significantly lower cost.***

3. American Council for an Energy-Efficiency Economy. *Valuing Distributed Energy Resources: Combined Heat and Power and the Modern Grid*. April 2018.[15]

[13] Available at: https://energyfuturesinitiative.org/s/EFI_CA_Decarbonization_Full-b3at.pdf
[14] Available at: https://www.socalgas.com/1443741887279/SoCalGas_Renewable_Gas_Final-Report.pdf
[15] Available at: https://aceee.org/sites/default/files/valuing-der.pdf

- SoCalGas would like to point the CEC to this study which defines energy system resiliency and explores the ways in which utilities, insurance companies, cities, investors, and energy users are valuing (or not valuing) energy systems' abilities to withstand high-consequence events.
- **This study shows the estimated cost of loss of power for medium and large commercial and industrial facilities (>50,000-kilowatt hour/year) ranges from $12,952 for a momentary outage to $165,000 for a 16-hour outage.**

4. Navigant Consulting, Inc. *Gas for Climate. The Optimal Role for Gas in a Net-Zero Emissions Energy System*. March 18, 2019.[16]
   - SoCalGas would like to point the CEC to a study that assessed the cost-optimal way to fully decarbonize the European Union's (EU's) energy system by 2050 and to explore the role and value of renewable and low-carbon gas used in existing gas infrastructure. Navigant compares a "minimal gas" scenario with an "optimized gas" scenario.
   - The "minimal gas" scenario decarbonizes the EU energy system assuming a large role of for direct electricity use in the buildings, industry, and transportation sectors, with some biomethane being used to produce high temperature industrial heat. The "optimized gas" scenario also has a strongly increased role of direct electricity in buildings, industry, and transportation sectors, but concludes that renewable and low-carbon gas will be used to provide flexible electricity production, to provide heat to buildings in times of peak demand, to produce high temperature industrial heat and feedstock, and to fuel heavy road transportation and international shipping.
   - **Navigant found that in the "optimized gas" scenario, peak demand can be delivered at lower societal costs, replacement costs in existing buildings are lower, and distribution and transmission infrastructure costs are lower compared to the "minimal gas" scenario.**

5. International Energy Agency (IEA). *The Future of Hydrogen. Seizing Today's Opportunities*. June 2019.[17]
   - SoCalGas would like to point the CEC to a study that analyzes the current status hydrogen and offers guidance on its future development.
   - The report finds that clean hydrogen is currently enjoying unprecedented political and business momentum, with the number of policies and projects around the world expanding rapidly. It concludes that now is the time to scale up technologies and bring down costs to allow hydrogen to become widely used.
   - IEA assesses the opportunities for hydrogen in the transportation, buildings, and power sectors. IEA notes that the largest near-term opportunity in buildings is

[16] Available at: https://gasforclimate2050.eu/files/files/Navigant_Gas_for_Climate_The_optimal_role_for_gas_in_a_net_zero_emissions_energy_system_March_2019.pdf

[17] Free membership is required to download report. Available at: https://webstore.iea.org/download/direct/2803

blending hydrogen into existing gas networks and states that the potential is highest in multifamily and commercial buildings, particularly in dense cities, where conversion to heat pumps is more challenging than elsewhere.

6. University of California, Riverside (UCR). *Optimal Pathways to Achieve Climate Goals—Inclusion of a Renewable Gas Standard.* September 24, 2018.[18]
   - SoCalGas would like to point the CEC to a study conducted by UCR's Center for Renewable Natural Gas which evaluated the role renewable gas can play in a comprehensive strategy that can be deployed across different sectors, including transportation, buildings, commercial, and industrial.
   - The study elaborates on the benefits of replacing fossil fuels with renewable gas, which are broad and multifaceted. These include reduced landfilling of waste, criteria and toxic pollutant emissions reductions compared to other fossil fuels, and short-lived climate pollutant emissions reductions.
   - UCR supports a diverse portfolio approach as it is important to achieve sustained, long-term emission reductions across sectors and from all source categories. More importantly, large scale renewable gas production would address some emissions from sources that are unlikely to be mitigated in the near-term through other measures.
   - **UCR recommends the adoption of a renewable gas standard with gradual increased percentage thresholds to help provide stable financing for expanded renewable gas production to assist cost-effective GHG emissions reductions.** To further expand renewable gas supply potential and facilitate cost-effective GHG emissions reduction, consider policies that enable continued out-of-state supply of renewable gas, not unlike out-of-state electric resources enabled under current Renewable Portfolio Standard requirements.

7. California Poly State University, San Luis Obispo. GHG assessment made by students[19]
   - SoCalGas would like to point the CEC to a GHG assessment of the City of San Luis Obispo's then-proposed building code that would discourage natural gas in new development which was conducted by a Cal Poly Solar Photovoltaic System Engineering class.
   - The professor, Art MacCarley, assigned students to support or oppose the ordinance on the basis of total CO_2 emissions from energy sources to end-use.
   - **When looking at the switch from mixed-fuel to all-electric buildings, the professor and students found that the ordinance would increase emissions because a significant portion of California's energy production is still very carbon intensive and experiences efficiency losses from generation to distribution.**

[18] Available at: https://www.cert.ucr.edu/sites/g/files/rcwecm1251/files/2019-01/Optimal_Pathways_Report.pdf

[19] Professor MacCarley can be contacted at amarccarl@calpoly.edu or at 805-756-2317. For a summary of findings, see: New Times. *Student Guide: Cal Poly solar class took a vote on SLO's all-electric building code—and got a different result.* September 12, 2019. Available at: https://www.newtimesslo.com/sanluisobispo/student-guide-against-the-grain/Content?oid=8810227

7) What strategies or actions should be analyzed as options for reducing GHG emissions in the building sector?

SoCalGas recommends the CEC consider analyzing the following options as part of the Assessment:

- The CEC must consider how renewable gas (biomethane, hydrogen, synthetic gas) can help the State meet building decarbonization goals. As mentioned earlier, replacing less than 20% of traditional natural gas with RNG can achieve GHG emissions reductions equivalent to converting 100% electrification of buildings by 2030, *at a significantly lower cost*.[20] Switching out the fuel used in residential and commercial buildings with a renewable option like renewable gas, rather than switching out infrastructure, also results in less disruption to customers and provides GHG emissions reduction benefits.
- The CEC should conduct a thorough GHG emissions analysis of both a mixed-fuel home and an all-electric home through 2030. An all-electric building could have a higher GHG emissions profile today through 2030 compared to a mixed-fuel home. Any inputs and assumptions used to perform the analysis must be shared and discussed in an open forum.
- The use of gas technologies must also be considered as a cost-effective strategy to reduce GHG emissions from buildings. For example, natural gas-powered distributed generation resources, like combined heat and power systems, natural gas microturbines, and fuel cells, offer energy cost savings, reduced peak electricity demand on the grid, leverages existing infrastructure, avoids expensive electric distribution additions and high GWP gases such as sulfur hexaflouride, and reduces GHG and criteria air pollutant emissions.

8) The CEC is planning to hold workshops on the Building Decarbonization Assessment in early 2020. Are there specific topics that you would like to have discussed at a workshop?

SoCalGas appreciates providing input on topics to be discusses at future Assessment workshops. We ask that CEC staff:

- Share what data, assumptions, and existing analysis is being considered in their Assessment during future workshops.
- Consider and discuss renewable gas incentives and renewable gas standard mandates as GHG emissions reduction strategies. The CPUC just opened a fourth phase in the Biomethane Order Instituting Rulemaking to address: 1) standards for injection of renewable hydrogen into gas pipelines, and 2) implementation of SB 1440 to consider adopting biomethane procurement targets or goals.[21] These proceedings must be considered in the Assessment as the CPUC has recognized the need to advance the use renewable gas to meet our climate goals.

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[20] Navigant Consulting. *Analysis of the Role of Gas for a Low-Carbon California Future*. July 24, 2019. Available at: https://www.socalgas.com/1443741887279/SoCalGas_Renewable_Gas_Final-Report.pdf

[21] CPUC. Assigned Commissioner's Scoping Memo and Ruling Opening Phase 4 of Rulemaking 13-02-008. November 11, 2019. Available at: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M320/K307/320307147.PDF

- Explore and discuss energy storage solutions beyond batteries and explore how power-to-gas projects can be expanded to meet energy storage needs. For example, the University of California at Irvine (UCI) operates a campus microgrid that uses a 19-megawatt natural gas-fired cogeneration facility to support intermittent solar resources and to produce heating and cooling for campus. A study funded by SoCalGas of their microgrid operation, showed that by using hydrogen energy storage as a resource, the campus could increase the fraction of renewable energy consumed from 3.5-35%.[22] The hydrogen energy storage system relies on the natural gas turbine to convert hydrogen to power when solar panels are not producing electricity. UCI has demonstrated the capability of "islanding" the campus from the electric grid in case of utility power outage.[23] The research team noted that power-to-gas presents a significant advantage over lithium-ion batteries, which store energy for shorter time periods and require extensive construction of battery systems and infrastructure. UCI also demonstrated full-scale hydrogen production and injection into an existing 400 pound per square inch natural gas pipeline that feeds the UCI central power plant. The system ran at full capacity for over 800 hours and produced and injected over 700 kilograms of hydrogen into the gas turbine of the UCI central plant.

Conclusion

SoCalGas provides these comments to help move California towards meeting our aggressive climate goals in a thoughtful, reasoned, studied, and cost-effective way. We believe that we can decarbonize buildings by decarbonizing both electricity and natural gas supplies—not just electrifying end uses. We look forward to participating in additional workshops that thoughtfully consider different options for building decarbonization and their effects on customers and communities.

Sincerely,

/s/ Tim Carmichael

Tim Carmichael
Agency Relations Manager
Southern California Gas Company

[22] UCI. Advanced Power and Energy Program Bridging. Annual Report. Volume 5. 2017. Available at: http://www.apep.uci.edu/Research/publications/ANNUAL_REPORTS/Bridging_2017_APEP_082417_1030am_RedSz.pdf

[23] UCI. Samueli School of Engineering. *UCI 'Islands' its Microgrid from Southern California Edison Grid*. February 23, 2018. Available at: http://engineering.uci.edu/news/2018/2/uci-islands-its-microgrid-southern-california-edison-grid