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September 3, 2021

Ms. Rajinder Sahota, Deputy Executive Officer
Climate Change & Research
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812-2815

Subject: Comments on the 2022 Scoping Plan Scenario Concepts Workshop

Dear Ms. Sahota:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide public comments on the California Air Resources Board (CARB) 2022 Scoping Plan Scenario Concepts Workshop held on August 17, 2021. The CARB and contractor presentations were informative, and we appreciate the speakers' willingness to answer questions on the models that will be used in the Scoping Plan scenario modeling. It was also helpful to hear feedback from members of the Assembly Bill 32 Environmental Justice Advisory Committee (EJAC).

It is abundantly clear that climate events are adversely affecting California: seemingly perpetual drought, wildfire seasons that tragically grow in frequency and magnitude, epically low snowpacks, and heat waves scorching whole swathes of the western United States. It is imperative that we collectively advance policies that reduce greenhouse gas (GHG) emissions at a rate that is consistent with or greater than state climate goals and requirements in pursuit of reduction targets dictated by science.

California represents about 1 percent of global and about 6.5 percent of national GHG emissions. Yet the State's innovative policy perspectives and experience provide an opportunity and the means to foster reductions beyond our borders, and to beneficially impact global emission reductions through development, commercialization, and marketing of new carbon reduction technologies.[1] Likewise, the State can influence the adoption of national and global climate change policies and programs that are successfully deployed in California. We respectfully suggest that the foregoing attributes and opportunities be integrated into CARB's consideration of proposed policy options that may be considered for inclusion in the 2022 Scoping Plan.

[1] California State Legislative Analyst's Office, "The 2020-21 Budget: Climate Change Proposals," 13 February 2020. Available at https://lao.ca.gov/Publications/Report/4155#top.

SoCalGas's comments focus on: (1) including clean molecule solutions to feasibly reduce near term GHG emissions in hard-to-abate sectors; (2) extending the Cap-and-Trade program as the program offers options for an affordable glide path to net zero; and (3) including analyses as to the feasibility and achievability of options considered for the 2022 Scoping Plan.

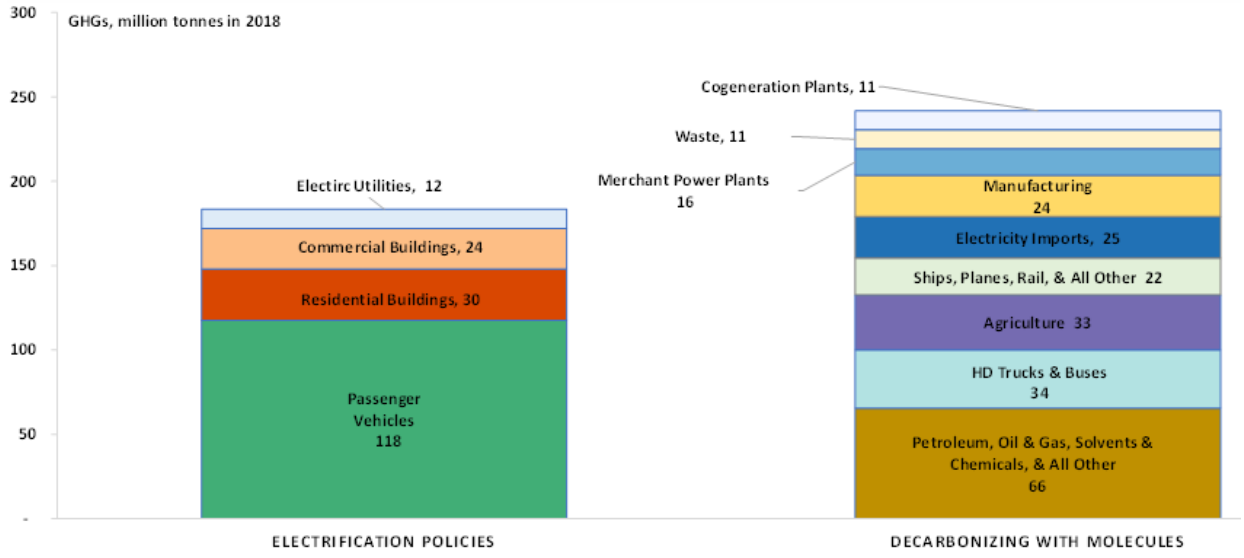
1. Including Clean Molecule Solutions to Feasibly Reduce Near-Term GHG Emissions in Hard-to-Abate Sectors

Clean decarbonized molecules provide a necessary and indispensable pathway for advancing and achieving decarbonization goals and requirements. Clean fuels and an associated clean fuel network along with carbon capture technologies can play key roles in:

a. Providing decarbonization solutions for hard-to-abate sectors such as energy intensive industry and certain transportation sectors (e.g., heavy-duty long-haul trucking, and aircraft).
b. Enabling dispatchable, firm generation resources that support electric system reliability, providing the flexibility needed to further decarbonize the electric sector.
c. Supporting resiliency and affordability of the energy system.

The technologies and applications for clean fuels provide practically achievable pathways to cost effectively accelerate GHG emissions reductions- requiring scale-up as opposed to novel unnamed and/or untested technologies. Figure 1 below illustrates the need for clean molecules in the context of CARB's 2018 GHG inventory. Emitting sectors considered hard-to-electrify and hard-to-decarbonize or abate are a significant portion of current GHG emissions. Figure 1 shows GHG emissions from different sectors in two main stacks; those the State has identified for electrification, and those that are more conducive to clean molecule solutions. This shows that over half of all GHG emissions can be addressed and abated by technologies using or supplying clean molecules. Thus, it is in the public interest for the 2022 Scoping Plan to include clean molecule solutions and for the State to begin expeditious development of such clean molecule solutions discussed below.

Figure 1. GHG Emissions by Sector Grouped by Decarbonization Strategy[2]



Gas infrastructure operators and developers, including investor-owned utilities, are key market participants for channeling capital and investing in decarbonization technologies. SoCalGas's decarbonization initiatives emphasize near-term GHG reductions and include investments in a diverse portfolio of technologies and applications. For example, we are building a state-of-the-art demonstration project to show the role hydrogen could play in attaining California's goal of achieving carbon neutrality. The H2 Hydrogen Home will include a home with solar panels, a home battery, an electrolyzer to convert solar energy into clean hydrogen, and a fuel cell to convert that hydrogen back to electricity.[3] Hydrogen will be blended with natural gas for use in the home's appliances.[4] In addition to hydrogen, SoCalGas is working to develop biogas, biofuels, and synthetic natural gas projects, as well as investigating technologies to transport and store carbon. Such clean fuels approaches can be scaled up to cost effectively achieve carbon neutrality. A technology inclusive energy portfolio will help reduce the risks inherent in the uncertainty of a twenty-plus-year planning horizon. Existing utility fuel networks can and should also be leveraged to transport clean fuels, as is being done throughout Europe.

Developing and maintaining the reliability and resiliency of California's integrated electric and gas grids is foundational to a clean energy future. Both the California Public Utilities Commission and the California Energy Commission are working to ensure energy reliability and resiliency; see the California Public Utilities Commission (CPUC) Long-Term Gas System Planning proceeding (R.20.01.007)[5] and the California Energy Commission's (CEC) 2021 Integrated Energy Policy

[2] CARB Current California GHG Emission Inventory Data, 2019. Available at https://ww2.arb.ca.gov/ghg-inventory-data.
[3] *See* Office of Energy Efficiency & Renewable Energy, "Hydrogen Production: Electrolysis: Hydrogen and Fuel Cell Technologies Office." Available at https://www.energy.gov/eere/fuelcells/hydrogen-production-electrolysis. Also, Fuel Cell & Hydrogen Energy Association, "Fuel Cell Basics." Available at https://www.fchea.org/fuelcells.
[4] *See* Gas for Climate, "European Hydrogen Backbone." Available at https://gasforclimate2050.eu/ehb/. Also, h21, "Pioneering a UK hydrogen network." Available at H21https://h21.green/.
[5] *See* CPUC Long-Term Gas Planning Proceeding (R.20.01.007). Available at https://www.buildingdecarb.org/cpuc-long-term-gas-planning-proceeding-updates.html.

Report (IEPR).[6] Hydrogen is an example of a resource that offers robust capabilities in supporting a reliable and increasingly decarbonized energy system with the potential for the existing gas infrastructure facilitating integration of hydrogen molecules, as is being advanced both by the Biden Administration[7] and the HyDeal Los Angeles project.[8] The State's extensive natural gas grid is an asset that is uniquely positioned to be the most cost-effective, long-term pathway for local hydrogen distribution with sufficiently large, sustained, and localized demand.

SoCalGas owns and operates over 102,000 miles of transmission, distribution, and service lines, serving 21.8 million customers over 24,000 square miles.[9,10] We are currently integrating renewable natural gas (RNG) into our existing pipelines and developing a RNG tariff to provide customers the option to purchase 100 percent renewable gas for their homes and businesses. We are also working towards blending hydrogen into portions of our existing gas system, which can potentially facilitate decarbonization at a rate of emission reduction consistent with or greater than State climate goals. SoCalGas is also studying the potential of utilizing hydrogen as part of a long-duration storage solution by harnessing excess renewable electricity to support a resilient energy system. Hydrogen has the potential to be integrated into the gas grid with multiple locations for injection and withdrawal increasing flexibility of the integrated energy system as a whole. We would like to highlight the CEC's hydrogen roadmap that includes technologies for green hydrogen production, distribution and storage technologies, identification of priority end uses and research to fill knowledge gaps.[11] This will provide a critical framework to support scaling of the hydrogen market.

2. Extending the Cap-and-Trade Program Offers Options for an Affordable Glide Path to Net Zero

We respectfully recommend inclusion of the Cap-and-Trade program as part of the 2022 Scoping Plan beyond 2030. Currently, it is unclear how the Cap-and-Trade program would be built into any of the proposed options discussed during the scenario workshop. In 2017, CARB stated that including Cap-and-Trade as part of the Scoping Plan was the most cost-effective way of achieving the 2030 emissions target and helps maintain California's economic strength.[12] Moreover, revenues from the program allow for the State to invests billions of dollars in emission reducing projects;

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[6] *See* CEC 2021 Integrated Energy Policy Report (Docket# 21-IEPR-01). Available at https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2021-integrated-energy-policy-report.

[7] Alex Ivanenko, "What Is the Role of Hydrogen In Biden's Infrastructure Plan," Forbes, 5 August 2021. Available at https://www.forbes.com/sites/forbestechcouncil/2021/08/05/what-is-the-role-of-hydrogen-in-bidens-infrastructure-plan/?sh=148ddc3d72bd.

[8] *See* Green Hydrogen Coalition, "HyDeal Los Angeles." Available at https://www.ghcoalition.org/hydeal-la.

[9] SoCalGas, "SoCalGas Service Territory," December 2013. Available at https://www.socalgas.com/documents/news-room/fact-sheets/ServiceTerritory.pdf.

[10] SoCalGas, "SoCalGas Data Analytics Team Named Most Innovative in the U.S.," 29 January 2021. Available at https://newsroom.socalgas.com/press-release/socalgas-data-analytics-team-named-most-innovative-in-the-us.

[11] *See* CEC Electric Program Investment Charge 2021-2025 Investment Plan Scoping – Hydrogen Technology Workshop on July 1, 2021. Available at https://www.energy.ca.gov/event/workshop/2021-07/electric-program-investment-charge-2021-2025-investment-plan-scoping.

[12] CARB FACT Sheet, Cap and Trade benefits all Californians. Available at https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/2017sp_factsheet.pdf.

the August 2021 auction generated of $1.1 Billion in state revenue.[13] For example, new investments since December 2020 include 51,000 rebates for the purchase of zero-emission vehicles and about 700 affordable housing units.[14] This funding mechanism offsets costs to households and businesses for lower emitting products thereby reducing air pollutants and toxics, providing a healthier environment for Californians and, most importantly, mitigates GHG emissions leakage[15] to other national and global jurisdictions.

Minimizing GHG emissions leakage resulting from California's climate change policies is an important design objective of the Cap-and-Trade program and a statutory requirement in Assembly Bill (AB) 32 and AB 398[16] (requiring CARB to mitigate emissions leakage). A critical determinant of emissions leakage is the marginal emissions intensity of out-of-state suppliers. Researchers are actively collecting data on the emissions intensity of industrial production in various jurisdictions outside California. If the Cap-and-Trade program is allowed to lapse, the consequences to leakage are unclear, as is what would replace the auction revenue that accrues to the State.

3. Including Analysis Regarding the Feasibility and Achievability of Policy Measures for the 2022 Scoping Plan

Implementing either a 2035 or 2045 carbon neutrality goal must specifically consider inclusion of practical and achievable policy and emission reduction measures. While noting that various proposed modeling scenarios include unknown or seemingly infeasible elements, it is imperative for CARB to assess the achievability and feasibility of measures being considered for inclusion in the Scoping Plan.

In 2006, when the Legislature first empowered and mandated that CARB reduce GHGs pursuant to AB 32, they required that CARB do so "in an open public process to achieve the maximum *technologically feasible* and *cost-effective* greenhouse gas emission reductions" (emphasis added).[17] Ten years later, SB 32 furthered the Legislative mandate by requiring that CARB ensure that statewide GHG reductions are reduced to at least 40 percent below the statewide GHG limit by 2030.[18] The Legislature specifically charged CARB to pursue the required reductions in a

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[13] Legislative Analyst's Office, August 2021 Cap-and-Trade Auction Update, see Ross Brown's summary at https://lao.ca.gov/LAOEconTax/article/Detail/690#:~:text=August%202021%20Auction%20Generates%20Over%20%241.1%20Billion%20in,quarterly%20cap-and-trade%20auction%20held%20on%20August%2018%2C%202021.

[14] CARB Press Release "California Climate Investments reports implementation of $9 billion in projects to reduce greenhouse gases," 23 August 2021. Available at https://ww2.arb.ca.gov/news/california-climate-investments-reports-implementation-9-billion-projects-reduce-greenhouse.

[15] Emission leakage refers to "any change in emissions from sources not covered by the GHG policy or program that is caused by the GHG emissions policy or program. It is worth noting that leakage is a potential issue under any state climate change policy that increases operating costs of regulated entities, not just cap-and-trade. Also, it is worth noting that leakage can also happen within California if there is excess capacity at in-state facilities that are exempt from the GHG regulations." Source: Meredith Fowlie and Danny Cullenward, "Report on Emissions Leakage and Resource Shuffling," 18 September 2018, at 1. Available at https://calepa.ca.gov/wp-content/uploads/sites/6/2018/09/6e.-IEMAC_Meeting_Materials_9-21-18__Fowlie_and_Cullenward_Report_on_Emissions_Leakage.pdf.

[16] As of January 2021, AB 398 requires CARB to use a 100 percent "industry assistance factor" for all industries regardless of leakage risk classification.

[17] Cal. Health & Safety Code section 38560.

[18] Cal. Health & Safety Code section 38566.

feasible and cost-effective manner.[19] Accordingly, the rationale for Scoping Plan measures must be grounded in an analysis of both technological feasibility and costs associated with implementation of each measure. Moreover, CARB is obligated to consider shorter-term emission reduction measures to meet the required 2030 emissions limit.[20]

SoCalGas submits that it is in the public interest to evaluate *attainable* solutions that can demonstrably achieve carbon neutrality and continue California's role as a climate leader. We recommend that modeled scenarios be evaluated based on a set of consistent criteria. We respectfully suggest that, as a starting point, such criteria should include the considerations listed below (noting that the exploratory questions following each criterion are illustrative):

- Reliability – does the scenario provide reliable energy supply considering for example, loss of load expectation?
- Decarbonization efficacy – does the scenario provide a pathway to carbon neutrality by 2035, by 2045?
- Practical achievability – are the tools and policies in the scenario demonstrated in practice or scalable? What degree off customer conversion challenges do they present?
- Cost equities – are the costs for the scenario able to be equitable allocated across different segments of energy customers? Does the scenario address externalized costs in an equitable manner?
- Leakage - is the scenario predicted to contribute to, diminish, or prevent emissions leakage?

Recognizing that each policy option would focus on concrete end goals of the State, the criteria could provide a somewhat standardized evaluative approach to inform and guide the process for decision-making. Creation and presentation of a matrix would be useful to illustrate the comparison of alternatives according to the criteria established. Such an approach will foster transparency and public engagement thereby advancing the public interest. We further recommend that CARB conduct a public workshop to consider the merits of and potential elements for assessment criteria, including to discuss similar approaches used in other such scenario evaluations. SoCalGas would be willing to share and present on this topic whether in a workshop or in further discussions with CARB and stakeholders.

[19] *Id.*

[20] *See* August 6, 2021 letter from Senators Robert Hertzberg, Josh Becker, Bob Wieckowski to Chair Liane Randolph regarding Priorities for California Climate Policy.

More substantively, we respectfully provide the following comments on the practical feasibility of several of the policy measures in the options presented by CARB staff at the workshop. Specifically, these comments address:

a. Role of Engineered Carbon Removal (ECR) – Option A: exclude ECR – not feasible; How to address non-energy emissions such as HFCs?[21]
b. Carbon Free Electricity Grid - Option A includes SB 100 no combustion scenario – not feasible; total load coverage; excludes combustion-based generation regardless of fuel.[22]
c. Carbon Free Electricity Grid - Option B includes SB 100 accelerated timeline scenario – not feasible; uses all available technologies.[23]
d. SLCP Methane – Option B: includes biomass derived fuels from landfills and dairies – feasible.[24]
e. Vehicle Fleet Electrification – Option A: light duty 100% ZEV sales in 2025 – not feasible.[25]
f. Vehicle Fleet Electrification – Option B: heavy duty 100% ZEV sales in 2030 – not feasible.[26]
g. Residential and Commercial Buildings Decarbonization – Option A: all new buildings use electric appliances by 2026 – not feasible; 100% all-electric appliance sales for all buildings by 2030; all buildings retrofitted to electric appliances by 2035.[27]

a. Role of ECR – Option A: exclude ECR – not feasible; How to address non-energy emissions such as HFCs?

Climate modeling and data express that it is not practical to exclude engineered carbon removal (ECR) technologies, including CCS, from the 2022 Scoping Plan. A 2020 study by the Energy Futures Initiative and Stanford addressed the risk that dismissing options such as CCS may constrain the State's ability to achieve its climate policy requirements concluding that:

> California cannot afford to limit its flexibility by eliminating technology options or pursuing unfocused or suboptimal policies that may hinder, rather than accelerate, decarbonization...Carbon capture paired with permanent geologic storage (*e.g.*, deep saline reservoir) offers a viable and important option for reducing emissions from the industrial

[21] CARB, 2022 Scoping Plan Update – Scenario Concepts Technical Workshop Presentation, 17 August 2021, at slide 14. Available at https://ww2.arb.ca.gov/sites/default/files/2021-08/carb_presentation_sp_scenarioconcepts_august2021_0.pdf.
[22] CARB, 2022 Scoping Plan Update – Scenario Concepts Technical Workshop Presentation, at slide 15-16.
[23] *Id.*
[24] CARB, 2022 Scoping Plan Update – Scenario Concepts Technical Workshop Presentation, 17 August 2021, at slide 24.
[25] CARB, 2022 Scoping Plan Update – Scenario Concepts Technical Workshop Presentation, 17 August 2021, at slide 20.
[26] *Id.*
[27] CARB, 2022 Scoping Plan Update – Scenario Concepts Technical Workshop Presentation, 17 August 2021, at slide 28.

and electricity sectors that are key contributors to California's economy and the reliability of its grid.[28]

The EFI position amplifies that expressed by Governor Edmund G. Brown's Executive Order B-55-18 which calls for achieving negative emissions beyond 2045; and postulates that technologies like ECR will be brought to the market and deployed at scale by then.

California is fortunate to have in-state natural underground resources appropriate for sequestering carbon as well as the imminent need to address GHG emissions from industry (a major engine for the State's prosperity). CCS can cost effectively support California's carbon neutrality goals and foster significant carbon reductions while maintaining California's competitive advantage as the fifth largest economy in the world.[29] We acknowledge concerns expressed by environmental justice advocates and community organizations regarding impacts and equities relating to CCS, which should be vetted and addressed as part of scenario and prospective policy analysis. We respectfully suggest that advancing decarbonization goals, including within the 2022 Scoping Plan, should entail include modeling and consideration of CCS.

b. Carbon Free Electricity Grid - Option A includes SB 100 no combustion scenario – not feasible; total load coverage; excludes combustion-based generation regardless of fuel.

The Final SB 100 report includes a no combustion scenario that includes approximately 20 percent of new capacity which is a "generic carbon resource" (gas-fired generation was swapped out as an accounting exercise for a later to be determined technology and that acts just like gas-fired generation). This zero-carbon dispatchable generic resource has not been identified and is otherwise fictitious, but to which the modeling assigns a price of $60 per MWh–effectively precluding known and scalable resources like renewable natural gas and hydrogen on an assumed cost competitive basis. The extent to which modeling fictitious optimized decarbonization implements provides informative data remains to be seen; but it is axiomatic that such an approach does not reflect feasibility or practically achievable pathways. In light of the magnitude of the societal decarbonization challenge (*see., e.g.*, Governor Newsom's 2021 report[30] on California's Electricity System of the Future: "*[t]he technology exists today to achieve California's clean energy goals, but we need to build new resources at an unprecedented pace and scale, and we need to start now*"), we respectfully suggest that modeling should attempt to reflect realistic scenarios, which at present do not support "no combustion" as part of the Carbon Free Electricity Grid - Option A.

[28] Sally M. Benson, et al., "An Action Plan for Carbon Capture and Storage in California: Opportunities, Challenges, and Solutions," *Energy Futures Initiative, Stanford University's Precourt Institute for Energy, and Stanford Center for Carbon Storage*, (2020). Available at https://sccs.stanford.edu/sites/g/files/sbiybj7741/f/efi-stanford-ca-ccsfull-rev1.vf-10.25.20.pdf.

[29] *See* Governor's Office of Business and Economic Development, "California Produces." Available at https://business.ca.gov/#.

[30] California's Electricity System of the Future. Available at https://www.gov.ca.gov/wp-content/uploads/2021/07/Electricity-System-of-the-Future-7.30.21.pdf.

It also bears noting that the Final SB 100 report did not account for the reliability and resiliency of California's integrated electrical and gas grids, which are foundational to a clean energy future.[31] The joint agencies are looking to include loss of load modeling, which was not performed for the SB 100 report published in March 2021, to ensure a high level of reliability for each of the proposed options. We recommend CARB consider reliability and the forthcoming joint agency analysis to ensure that the reliability needs of the energy system will be achieved.

c. Carbon Free Electricity Grid - Option B includes SB 100 accelerated timeline scenario – not feasible; uses all available technologies.

An accelerated SB 100 timeline scenario, if modeled, should integrate known and scalable clean fuels that optimizes current infrastructure including hydrogen, synthetic gas, renewable natural gas (RNG), and/or limited fossil gas with CCS. A clean fuels strategy would reduce the level of finite land use needs that an accelerated build rate for solar, wind, and battery storage would require. As discussed in the Final SB 100 report, the long-term resource build rates would be at all-time historic rates year after year until 2045. The high electrification scenario projects build rates of 2.8 GW/year, 0.9 GW/year, and 2.0 GW/year for solar, wind and battery storage capacity, respectively.[32,33] Under an accelerated SB 100 goal of carbon free electricity by 2035, the build rates will be 4.67 GW/year, 1.5 GW/year, and 3.33 GW/year, respectively. To put that into perspective current capacity of solar, wind and batteries in California is about 14 GW, 6 GW, and 0.5 GW, respectively.[34,35] It does not, therefore, appear feasible to presume an accelerated pace and scale greater than historic build rates would be achievable.

d. SLCP Methane – Option B: includes biomass derived fuels from landfills and dairies

It is in the public interest to preserve California's agriculture economy and address tree mortality issues through a supportive waste management framework as envisioned by SB 1383 and SB 1440. SB 1383 requires organic waste diversion of 75 percent from landfills creating a waste stream that can be used at existing organic waste digesters with excess capacity, such as at wastewater treatment plants. SB 1440 creates a biomethane procurement program such that digester produced biomethane will have buyers in California's gas utilities. Inclusion of biomass derived fuels from landfills, wastewater treatment plants, agricultural residues, dairies, and other forest and urban wood waste is a practical and feasible solution to help achieve carbon neutrality in the 2045 timeframe; and is consistent with existing legal requirements. Biogas fuels derived from dairy digesters and some other wastes are carbon negative and reduce demand for fossil fuels. All biomass waste sources should be utilized for biofuel production before reliance on energy specific crops.

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[31] SoCalGas refers CARB to the California Public Utilities Commission Long-Term Gas System Planning proceeding (20-01-007) and the California Energy Commission's (CEC) 2021 Integrated Energy Policy Report (IEPR).

[32] *See* Joint Agency 2021 Senate Bill 100 Report, at 101. Available at https://efiling.energy.ca.gov/EFiling/GetFile.aspx?tn=237167&DocumentContentId=70349.

[33] Source: CEC Staff and E3 analysis

[34] CEC Electricity Generation Capacity and Energy. Available at https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/electric-generation-capacity-and-energy.

[35] US Energy Information Administration, 2020 Form EIA-860 Data – Schedule 3, "Energy Storage Data."' Available at https://www.eia.gov/electricity/data/eia860/.

e. Vehicle Fleet Electrification – Option A: light duty 100% ZEV sales in 2025

It does not appear reasonable to model an increase in light duty zero-emission vehicle (ZEV) sales to 100 percent by 2025 (Option A). According to a 2021 report by the California Center for Jobs and the Economy on the State's vehicle market covering the fourth quarter of 2020, the ZEV and plug-in electric vehicles (PEVs) market share is 15.1 percent of all new car sales.[36] The current trendline estimated from a regression of the data to date indicates that ZEVs are currently on course to reach less than half of the State's goal of 100 percent by 2035.[37] This raises questions over the feasibility of 100 percent passenger ZEV sales not only by 2025 but also 2035 to replace all internal combustion engine (ICE) vehicle sales as the goal relies heavily on customer acceptance and consumer behavior as well as customer income.

Success of the State's ZEVs goals will also heavily rely on deploying new fueling infrastructure and potentially needing new electric generation to charge the ZEVs. Executive Order B-48-18 set a goal of 250,000 ZEV chargers and 1.5 million ZEVs by 2025.[38] California currently only has 70,000 shared chargers installed. To meet this goal by 2025, more than 1,000 chargers per week would need to be installed from now until December 31, 2024. Accordingly, such an exponential increase in ZEV chargers or expectation of 100 percent ZEV sales by 2025 does not appear to be realistic or reasonable to assume for scenario modeling purposes.

f. Vehicle Fleet Electrification – Option B: heavy-duty 100% ZEV sales in 2030

Governor Newsom's Executive Order N-79-20 encourages all medium and heavy-duty vehicles to be zero emission (ZE) by 2035 and mandates all drayage trucks to be ZE by 2035. We understand CARB expects the number of heavy-duty trucks on the road to increase from 1.5 million in 2015 to 2 million by 2029.[39] Currently, even heavy-duty truck manufacturers have indicated that while long-haul ZE heavy-duty trucks (non-drayage) are being field tested, they will not be commercially available[40] until the end of the decade. Additionally, fleet owners are very concerned about whether fueling for fuel-cell battery electric heavy-duty trucks will be readily available and charging times will fit their duty cycles.

At present, clean molecules are achieving greater total GHG emission reductions than electrification in the transportation sector because new compressed natural gas engines are commercially available today and are replacing petroleum-based sources of energy with use of

[36] California Center for Jobs and the Economy, "State's Progress on Zero-Emission Vehicles (ZEV) Goals: Q4 2020 Results," 16 February 2021, at 1. Available at https://centerforjobs.org/wp-content/uploads/ZEV_Report_Q4_2020.pdf.
[37] California Center for Jobs and the Economy, "State's Progress on Zero-Emission Vehicles (ZEV) Goals: Q4 2020 Results," 16 February 2021, at 3.
[38] *See* Governor Edmund G. Brown EO B-48-18. Available at https://www.ca.gov/archive/gov39/2018/01/26/governor-brown-takes-action-to-increase-zero-emission-vehicles-fund-new-climate-investments/index.html.
[39] CARB, "EMFAC Model," 2021. Available at https://arb.ca.gov/emfac/.
[40] Commercially available is when (1) it is being manufactured in large quantities and within similar timeframes as the baseline equipment (Class 7-8 diesel ICE tractors), and (2) it has baseline-equivalent customer support systems for vehicle warranty, maintenance, and parts.

RNG. CARB's Low Carbon Fuel Standard reporting shows that by the end of 2019, 98 percent of all natural gas used in motor vehicles was RNG.[41] Beginning in September 2020, the RNG procured for and sold at California's compressed natural gas refueling stations had a carbon intensity (CI) of -5.845 gCO_2e/MJ.[42,43] This is in comparison to a 2020 annual CI of 82.92 gCO_2e/MJ for transportation fuel supplied by grid electricity.[44] Furthermore, the new natural gas engines meet or exceed CARB's optional low NOx standard of 0.02 grams of NOx per brake horsepower hour. The Clean Truck Rule does not require new diesel trucks engines to meet the standard of 0.02 grams of NOx per brake horsepower hour until 2027, which is achievable by natural gas truck engines now.[45]

In a recent letter to environmental justice and advocacy groups, Wayne Nastri, Executive Director of the South Coast Air Quality Management District (SCAQMD), stated that actions to make progress toward climate goals and to reduce air pollution "can and must go hand-in-hand."[46] The letter further states that heavy-duty trucks fueled with RNG are commercially available today, can "provide substantial GHG emission reductions," and are "at least 90 percent cleaner than new diesel trucks on [the air pollutant nitrogen oxide] NOx and 100 percent cleaner on cancer-causing diesel particulate matter."[47] In addition, a peer-reviewed study recently published by the University of California, Riverside in the journal "Transportation Research Part D" further substantiates this point by stating heavy-duty trucks fueled with RNG should be rapidly deployed in the 2020-2040 timeframe to achieve GHG and NOx emission reduction targets, and "accelerating [the diesel trucks] fleet turnover is a more important NOx control strategy than dividing up vehicle replacements…between near-zero emissions and zero emissions vehicles."[48]

It is important to understand that heavy-duty vehicles have duty cycles tied to the nature of their use. Implements for GHG and air pollution reductions must compliment the usage patterns and needs of such vehicles including long-distance travel, short down times, and heavy payloads. A

[41] CARB, "CARB LCFS Data Dashboard, Figure 2," 2 April 2021. Available at https://www.arb.ca.gov/fuels/lcfs/dashboard/dashboard.htm.
[42] CARB, "LCFS Pathway Certified Carbon Intensities," 9 August 2021. Available at https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities.
[43] Laura Sanicola, "California's renewable natural gas vehicles turn carbon negative in 2020," *Reuters*, 2 June 2021. Available at https://www.reuters.com/business/autos-transportation/californias-renewable-natural-gas-vehicles-turn-carbon-negative-2020-2021-06-02/.
[44] CARB "Low Carbon Fuel Standard Annual Updates to Lookup Table Pathways," 16 January 2020, at 2. Available at https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/elec_update.pdf.
[45] Erin Miller, "CARB Formally Adopts Low-NOx Omnibus Rule," *Transport Topics News*, 28 August 2020. Available at https://www.ttnews.com/articles/carb-formally-adopts-low-nox-omnibus-rule.
[46] Wayne Nastri, "Letter to Partners in Environmental Justice and Environmental Health," 3 August 2021.
[47] *Id.*
[48] Arun S.K. Raju, Barry R. Wallerstein, and Kent C. Johnson, "Achieving NOx and Greenhouse gas emissions goals in California's Heavy-Duty transportation sector," *Transportation Research Part D: Transport and Environment*, Volume 97, August 2021. Available at https://www.sciencedirect.com/science/article/pii/S1361920921001826.

2020 study shows 1.7 BEVs are needed to replace one diesel truck.[49] Solutions that offer a one for one replacement of diesel trucks should be included in any of the scenarios.

g. Residential and Commercial Buildings Decarbonization – Option A: all new buildings use electric appliances by 2026 – not feasible; 100% all-electric appliance sales for all buildings by 2030; all buildings retrofitted to electric appliances by 2035.

It is not practically possible, feasible, or reasonable to mandate a retrofit of almost 14 million California homes[50] with all electric appliances by 2035.

The City and County of San Francisco recently requested that the Board of Supervisors Budget and Legislative Analyst evaluate data to inform potential policies to reduce or eliminate the use of natural gas appliances and to provide financial or other incentives to homeowners for the purchase and use of electric appliances.[51] The Budget and Legislative Analyst 2021 report found that a "key barrier" to electrical retrofits is the "financial burden" that would fall on property owners, city government and/or both. The study found that the cost range to electrify one existing single-family household was between $14,363 and $34,790. If these costs were to expand to 10 million homes, the total cost of electrification could be upwards of $144 billion to $348 billion. This does not consider the potential of homeowners to refuse to electrify without additional financial incentives. It is not feasible to impose these financial burdens on homeowners, let alone low-income households.

Thorough, transparent analysis will inform policy and the public regarding the costs for scaling residential electrification including cost allocation and prospective subsidies and incentives, as discernible aspects of modeling these proposals. Likewise, modeling with realistic cost assumptions can inform the required timelines including for deployment of customer-owned and system (transmission and distribution) electric infrastructure needed to support increased electric appliance use, among other costs to retrofit existing single family and multifamily homes statewide.

As discussed above, modeled scenarios should also provide useful data and analysis relating to equitable cost allocation, considering potential impacts to low-income customers. Ongoing utility costs also may play a significant factor in renters or homeowners desires to electrify their residence. The 2021 Budget and Legislative Analyst report found that the unit cost of electricity is currently higher than the unit cost of natural gas, potentially placing an additional cost burden on property owners who retrofit.[52] The report goes on to say that "at present the total annual energy

[49] Genevieve Giuliano, et al., Developing Markets for Zero Emission Vehicles in Short Haul Goods Movement: A Research Report from the National Center for Sustainable Transportation, 2020 November. Available at https://escholarship.org/uc/item/0nw4q530.
[50] California's Housing Future: Challenges and Opportunities Final Statewide Housing Assessment 2025. Available at https://hcd.ca.gov/policy-research/plans-reports/docs/sha_final_combined.pdf.
[51] City and County of San Francisco Board of Supervisors Budget and Legislative Analyst's Office, "Decarbonizing Residential Buildings by Eliminating Natural Gas Usage." Available at https://sfbos.org/sites/default/files/BLA.ResidentialDecarbonization.042221.pdf.
[52] City and County of San Francisco Board of Supervisors Budget and Legislative Analyst's Office, "Decarbonizing Residential Buildings by Eliminating Natural Gas Usage." Available at https://sfbos.org/sites/default/files/BLA.ResidentialDecarbonization.042221.pdf.

cost tends to be greater for electric appliances than for gas appliances due to higher unit costs for electricity compared to natural gas." Such cost burdens will disproportionately impact low-income single family and multi-family households.

An additional factor to consider is the need for stable, accessible broadband internet as a pre-condition for energy efficient smart technology-based equipment to be widely deployed. Home internet is necessary for and a catalyst to expand participation in building decarbonization programs. Currently, only about 25 percent of California's households have access to broadband internet.[53] Researchers found that income is a key determinant in whether a household has broadband internet access. In fact, low-income households often forgo broadband internet services for extensive periods to save money.[54] The implication is that for low-income households to participate in and derive benefits from increasing building electrification, affordable broadband internet is a prerequisite.

Conclusion

SoCalGas recognizes and appreciates the magnitude of analytical efforts and resources CARB has undertaken to date, and to be completed before the proposed scenarios are presented to the EJAC and the public later this fall. We appreciate the opportunity to provide insights and engage with policymakers and stakeholders so we may collectively advance policies that reduce greenhouse gas emissions at a rate that is consistent with or greater than State climate goals and requirements in pursuit of reduction targets dictated by science. To that end, we are open and look forward to further engagement including sharing our data, analyses, and perspectives as CARB proceeds with the Scoping Plan development process. Should you have any questions or wish to discuss these matters, please reach out to me or my engaged colleagues.

Respectfully,

/s/ N. Jonathan Peress

N. Jonathan Peress
Senior Director
Business Strategy and Energy Policy

[53] *See* CEC IEPR Commissioner Workshop on Building Decarbonization (Equipment), 21 June 2021, at 00:14:41. Available at https://energy.zoom.us/rec/share/FH-AVI9d86DGmPFFwM-YGcYsS3AqXaRSyRxgZNsdHYSv5vV-OzaqFfzTxwbYBwUX.Jq7xNmo_vvd0NrAn.

[54] Ron Mackovich, "California surpasses 90% internet connectivity, but low-income households still lack access," *USC News*, 30 March 2021. Available at https://news.usc.edu/183952/california-internet-access-usc-survey-broadband-connectivity/.