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Mr. Mike Tollstrup
California Air Resources Board
Office of Climate Change
1001 I Street
Sacramento, CA 95814

**RE: Proposed First Update to the Climate Change Scoping Plan:
Building on the Framework and Appendices**

Dear Mr. Tollstrup:

The Southern California Gas Company (SoCalGas) appreciates the opportunity to submit these comments on the Proposed First Update to the Climate Change Scoping Plan: Building on the Framework and Appendices. We think this draft is a significant improvement from the discussion draft in the way that it presents a comprehensive vision for a low carbon future for California and identifies specific steps needed to realize this vision, including the establishment of a mid-term target. We support the focus on combined heat and power (CHP) as a tool to reduce energy demand and the action steps proposed to support the development of biomethane projects that inject into California's natural gas pipelines. We appreciate that the language referring to a "phasing out" of natural gas by 2050 has been removed; however, there remains a strong electrification bias in the discussion of the energy sector and there is no language that promotes natural gas usage specifically into the future.

The transitional role described for natural gas reflects the fact that up until now solutions for achieving the deep de-carbonization of California's energy supply that will be required to meet California's long term climate goals have focused almost exclusively on electrification, liquid biofuels, and in some instances, the use of hydrogen fuel in the transportation sector. However, there are challenges associated with each of these technology choices, particularly in delivering low-carbon energy sources to heavy duty vehicles and certain industrial processes, as well as integrating daily and seasonal variability of generation at very high levels of renewable penetration. In the Scoping Plan Update, these challenges are acknowledged but little analysis has been done on the potential long-term role of low-carbon gaseous fuels, distributed through the state's extensive gas pipeline network¹ as a strategy for overcoming some of these issues and meeting the state's GHG goals.

In this letter, we build on the discussion begun in our comments filed on the Discussion Draft (issued 10/1/14) about how natural gas can contribute to meeting the state's mid-term air quality goals and 2050 climate goals with more detailed information about natural gas technology advancements. In

¹ In a low-carbon future, the pipeline infrastructure represents a potential delivery system for these low-carbon energy needs, in the same way that the electricity grid is a delivery system that can utilize electricity produced by renewables or traditional fossil fuel power plants.

particular, we highlight opportunities for developing and utilizing decarbonized supplies of methane and request that this information be incorporated into the overall vision and specific actions described in the First Update to the Climate Change Scoping Plan and Appendices. Our comments focus on the Electricity and Natural Gas Working Paper, Sections 3, 4 and 5 of Appendix C. We also offer brief comments on the discussion of methane, both with respect to leakage rates and the description of methane as an ozone precursor.

I. Appendix C, Electricity and Natural Gas Working Paper: Section 3

A. Overview of State and National Studies, 2050 Vision (p. 15)

Section 3 of the Electricity and Natural Gas Working Paper (Working Paper) puts forward a vision for California's electricity and natural gas sectors to meet California's GHG reduction goals, identifies the major barriers to achieving the vision, and recommends solutions. The vision and solutions described rely on a decarbonized electricity supply, with a minimal role for natural gas generation coupled with carbon capture utilization and sequestration technology for reliability. Below are some example statements from the Electricity and Natural Gas Working Paper:

"In electricity sector...Some natural gas will likely be needed to meet reliability requirements and should be coupled with CCUS technologies" (p. 15).

"Studies at the national and international levels (ECF, 2010;39 CCSP, 200740) suggest that the best option for deep GHG emission reductions involves substantial improvements in energy efficiency, followed by deep de-carbonization of electricity generation, and the **electrification of most energy services** (e.g. heating homes and buildings using electricity)" (p. 15).

Wei et al. (2013) study found that 2050 GHG emission reduction goals can be achieved through a scenario with high energy efficiency, space and water heating **electrification**, industrial **electrification** and **electrification** of most of the transportation sector (p. 15).

SoCalGas understands that, to-date, most of the available studies on approaches to reaching long-term climate goals have relied upon electrification and that ARB has relied upon those studies in developing its long term plans. We are suggesting that, prior to making definitive statements about the future of the energy sector, additional research and analysis needs to be conducted because the preliminary evidence shows that there is a viable and lower cost way of moving towards an ultra-low carbon energy economy that utilizes existing natural gas infrastructure.

SoCalGas is working on a study with the consulting firm E3 that examines the role of natural gas in California and utilization of the state's existing gas pipeline infrastructure through 2050. The study is being peer reviewed and we expect it to be released in the next several months. The preliminary results of the study show that using the state's existing natural gas infrastructure to deliver low carbon gaseous fuel can help address three critical challenges in California's transition to a decarbonized energy supply: (1) reduce emissions from difficult to electrify sectors where thermal heat is more efficient or favored by consumers such as certain industrial processes, heavy duty vehicles, and residential and commercial cooking; (2) reduce the challenges of intermittent renewable energy resources by providing low-carbon gaseous fuels to dispatchable resources and also providing storage functionality for intermittent resources by use of electrolysis and methanation to produce renewable natural gas on demand, producing gas when excess renewables are available, and then storing the low-carbon gas in the pipeline

distribution network for use when needed; and (3) preserves the option of continuing to use the existing gas pipeline infrastructure as an energy delivery system to meet 2050 GHG targets.

In 2013, the governor signed AB1257, the Natural Gas Policy Act. The Act requires the California Energy Commission (CEC) to determine the role of natural gas-fired generation as part of a resource portfolio, identify strategies and options to take advantage of natural gas as a low-emission resource, and optimize the role of natural gas as a flexible and convenient end use energy source. We expect that utilization of the pipeline to deliver low-carbon gaseous fuels (decarbonization) and deeper examination of biomethane, hydrogen blends and synthetic gas will become part of the AB 1257 natural gas utilization report required from the CEC in 2015. And in the spirit of Natural Gas Policy Act, we believe that the SPU should at least identify potential long-term natural gas pathways for further inquiry in its discussion of post-2020 GHG reduction strategies.

Despite the current shortage of published studies on gas pipeline utilization and the decarbonization of gas supply as a CO2 strategy for inclusion in the Scoping Plan Update, the European Union nations have been confronting their growing oversupply of renewable generation, just as we will in a short few years to come, by engineering power to gas projects as part of the CO2 reduction strategies. There is much more research and analysis to be done on the costs and efficiencies of Power-to-Gas, which is potentially a more optimal zero carbon energy pathway for California. We have the opportunity to learn from and build upon the EU experience. California state officials have already been visiting existing power to gas facilities in Europe. We have included an annotated bibliography of power to gas studies as **Attachment 1** and a presentation on Renewable Natural Gas, Hydrogen and Storage Pathways as **Attachment 2**.

B. Emissions related to natural gas (Electricity and Natural Gas Working Paper, p. 19)

CARB's Scoping Plan Update's Electricity and Natural Gas Working Paper quotes, "Recent measurements of ambient methane in CA suggest that the ARB's GHG inventory may be underestimating total methane emissions" (p. 19). These recent measurements are from studies measuring atmospheric methane concentration, and not emissions associated with natural gas system. The studies measuring emissions from the natural gas system actually show similar and often much lower emissions than currently reported in both the ARB and EPA inventories. The EPA April 2014 Inventory of U.S. Emissions (1990-2013) shows that annual distribution system methane emissions have declined 22 percent since 1990 even as the industry has added more than 600,000 miles of distribution mains and services lines to serve 17.5 million more customers, a 32 percent increase in miles of pipe and number of customers. Due to proactive efforts by the natural gas industry, emissions from the natural gas system overall are on a declining trend. These reductions are the results of advancements in natural gas sector technologies and best practices. The natural gas system methane emissions as a rate of production are 1.3% (for the entire value chain from production to customer) and the distribution system methane emissions as a rate of production are 0.24%. Continued efforts to upgrade and modernize the natural gas pipeline network to enhance safety are lowering emissions even further. Understanding the rate and location of emissions from the natural gas system—and the degree to which emissions can be reduced—is critical to ensuring that regulators continue to include natural gas as a viable energy resource in future state energy and GHG reduction plans.

The Electricity and Natural Gas Working Paper also quotes, "Emissions are potentially high enough to substantially diminish comparative advantage vs other fossil fuels from a climate perspective" (p. 19). There are several efforts currently underway to provide greater transparency on the factors that contribute to the overall methane leakage rate. Gas Technology Institute (GTI) is updating the emissions factors for distribution pipes, meters and regulators. Also, the Environmental Defense Fund (EDF) is conducting a series of studies on each area of the natural gas supply chain to develop a more credible estimate of the methane leakage rate for the natural gas system. SoCalGas is directly involved in these

efforts. Study findings will inform sound policies for addressing methane emissions from natural gas local distribution, and create greater public certainty of methane leakage rates. We request that the results of these studies be incorporated into CARB's planning process as they become available.

C. Bioenergy (Electricity and Natural Gas Working Paper, P. 54)

Bioenergy applications for transportation should focus on using the fuel in its gaseous form—biomethane (or biogas). Natural gas – as both CNG and LNG – is moving into the transportation market – and not just for passenger and fleet vehicles – but for long haul and short haul trucking, buses, rail, marine, off road port equipment, and for providing distributed shore power at ports for marine shipping reductions – all of which are some of the biggest sources of air emissions. After these transportation sources move from a liquid fuel like diesel and bunker fuel to CNG and LNG, they are not going to move back to liquid biofuels, such as biodiesel. They will run on biomethane, which is produced from the same fuel feedstocks as liquid biofuels. Biomethane, as a simpler hydrocarbon will likely be more economical to produce than biodiesel or other liquid biofuels. At the same time, vehicle and fuel delivery cost differences between liquid and gaseous fuels are declining. Based on this, we believe that in the future the bioenergy of choice for transportation will most likely be biomethane. Therefore, state policy should prioritize the development of sustainable biomethane (biogas) facilities that inject into existing natural gas utility infrastructure so that biomethane can be widely distributed to end use transportation facilities.

D. Natural Gas with Carbon Capture Utilization and Storage (Electricity and Natural Gas Working Paper, p.60)

Another key focus of the Electricity and Natural Gas Working Paper is Carbon Capture Utilization and Storage (CCUS). Emissions studies used by CARB to prepare the Scoping Plan Update rely on natural gas for a large share of centralized power generation. These base load and peaking plants will need to be combined with Carbon Capture and Utilization technology in order to meet the 2050 climate goals.

In the Working Paper CARB states, “Policy actions are needed in the near-term to incorporate CCUS into the portfolio of accepted compliance technologies” (p. 62). SoCalGas concurs with this statement. We also think that a clean energy standard – and not an expansion of Renewable Portfolio Standard – is what is needed to incent the development CCUS projects. An incremental standard based on a carbon metric will incentivize natural gas renewable assist technology, helping to grow renewables, and will also incentivize CCUS by increasing the demand for low carbon power.

II. Appendix C, Electricity and Natural Gas Working Paper: Section 4—Energy Sector Priorities (p. 65)

This section includes a table listing priority recommendations for the energy sector needed to meet the 2050 GHG reduction goal. Based on the material submitted in SoCalGas' Attachment 1, please add a section for Hydrogen Electrolysis and Power-to-Gas and include steps necessary to encourage the development of these technologies in California. Currently there are at least 30 Power-to-Gas projects under construction or operating in the EU, while there are no operating CCUS projects in the EU, the US or elsewhere. SoCalGas is working with various entities including those active in the international Power-to-Gas projects to develop one or more demonstration projects in California. These projects will allow stakeholders including interested state officials the opportunity to view these technologies in operation and will provide technical and economic data to guide policy development in this area.

III. Appendix C, Electricity and Natural Gas Working Paper: Section 5—Conclusions (p. 69)

SoCalGas agrees with CARB that “a diversified suite of policy options must be pursued in part because it is unclear what technological or other breakthroughs may happen in coming decades, and because a multi-faceted approach makes each element more achievable” (p.69). In order to make the rest of Section 5 consistent with this statement, we request the following changes as noted below:

“Although the future energy ~~generation~~ mix is unknown, this working paper lays out a vision for decarbonizing California’s energy sector ~~electricity generation mix~~ using a portfolio of strategies which include: a decrease in the cap on carbon emissions, an increase of clean technologies, increased use of solar thermal to displace natural gas and electricity, the use of low-carbon gaseous fuels (biomethane, synthetic natural gas, and hydrogen) distributed through existing utility infrastructure for thermal and transportation end uses, and the use of ~~some~~ natural gas-fired electricity with CCUS along with storage, including hydrogen electrolysis and Power-to-Gas, and demand response to help maintain reliability of the grid.”

“Increased research and development will be critical to success and areas of focus include energy efficiency, storage for renewable integration, hydrogen electrolysis, Power-to-Gas, and CCUS.”

IV. Scoping Plan Update Section II: Short Lived Climate Pollutants—Methane (Scoping Plan Update, pp. 22-23)

The Draft Scoping Plan Update, CARB for the first time asserts that methane is a precursor to ozone. Specifically, the language states:

Methane contributes to background tropospheric ozone levels, and studies consistently show that reducing global methane emissions can lower tropospheric ozone. Tropospheric ozone can also act as a direct GHG and as an indirect controller of GHG lifetimes. Atmospheric levels of ozone have risen by around 30 percent since the pre-industrial era, and are now considered by the IPCC to be the third most important GHG after carbon dioxide and methane.

SoCalGas has several questions about how ARB arrived at this finding. Although we have had preliminary discussions and correspondence with staff about this first-time in the Scoping Plan assertion that methane is precursor to ozone, we remain concerned about the scientific findings and studies upon which staff based their finding. For example, we would like to know specifically what research papers staff references and which atmospheric models those papers used.

We respectfully request further clarification in the Scoping Plan Update section discussing this issue and that references be included in order to understand the reasoning and the science behind this new assertion regarding methane as a precursor to ozone.

V. Conclusion

The long-term energy sector strategies described in CARB’s Scoping Plan Update focus on electrifying all end uses of energy and “de-carbonizing” electric generation. SoCalGas encourages ARB and other state agencies to pull back from an *a-priori* orientation toward end use electrification, and begin to do the research and analytical work needed to develop new energy pathways that utilize near zero gas end use technology. Decarbonizing the gas delivery system will keep intact the inherent energy

efficiencies of direct uses of natural gas, at a lower carbon content, without creating the dramatic increase in electric demand and systems costs that make decarbonizing electric generation such a challenge.

SoCalGas appreciates your consideration of these comments and CARB's willingness to engage on the important issues raised in the Scoping Plan Update and Appendices. Thank you and if you have any questions, please do not hesitate to contact me by telephone or email.

Sincerely,

A handwritten signature in cursive script, reading "Samara Parly". The signature is written in dark ink and is positioned below the word "Sincerely,".