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SoCalGas Comments - IEPR Workshops on H2 Supply, Infrastructure, and FCEV Market Trends

Additional submitted attachment is included below.

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California Energy Commission
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1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Comments on Workshops on Hydrogen Supply and Infrastructure Status and Fuel Cell Electric Vehicle Market Status

"It is no longer up for debate; hydrogen will be a part of California's clean energy future. I have fought for investments in both hydrogen infrastructure and clean transportation programs in the California Legislature and I will continue to do so."

- State Senator Archuleta comments at the Pico Rivera AlwaysON Microgrid Ribbon Cutting on July 17, 2020

The legislature supports hydrogen technology development and use, including requiring that 20 percent of the Clean Transportation Program funds go to light-duty hydrogen refueling stations. Additionally, Senate Bill 1369 (Skinner, 2018) requires the CPUC, ARB, and CEC to consider green electrolytic hydrogen as an eligible form of energy storage.

Southern California Gas Company (SoCalGas) appreciates the opportunity to comment on the California Energy Commission (CEC) Workshops on Fuel Cell Electric Vehicle (FCEV) Market Status held on July 2, 2020, as part of the 2020 Integrated Energy Policy Report Update.

SoCalGas supports the efforts of CEC to accelerate the commercial development of all advanced technologies and agrees with the CEC that "Hydrogen fuel cell electric vehicles (FCEVs) are a cornerstone for (1) achieving the governor's target of 5 million zero-emission vehicles on the road in California by 2030; (2) meeting environmental goals directed toward removing the emissions of carbon and criteria pollutants from the transportation sector, (3) retaining the range, fueling time, and scalability (for example, light-, medium-, and heavy-duty vehicles, locomotives, ships), especially for those who live in apartments or don't own their house and cannot consider buying a battery electric vehicle, to which the public is accustomed; and (4) succeeding in achieving fuel independence."[1]

To meet the state's aggressive climate and air quality goals, a portfolio of technologies will be needed, including renewable natural gas, plug-in electric, and FCEVs. Having multiple zero-

[1] Roadmap for the Deployment and Buildout of Renewable Hydrogen Production Plants in California, UC Irvine Advanced Power and Energy Program for CEC, June 2020.

emission options with different capabilities will accelerate the transition away from traditional fuels. SoCalGas believes that FCEVs will be a critical technology within this portfolio because FCEVs have inherent advantages over plug-in zero emission counterparts. While battery electric trucks can work in some applications, they have weight, range, and fuel time limitations which currently prevents them from operating in a number of duty cycles. FCEVs are lighter, can achieve 380 miles per fill[2,3] which can refuel in a matter of minutes. These characteristics are similar to existing diesel technologies and therefore, would not disrupt the operational or fueling model for truck fleets. Additionally, because hydrogen does not rely on electrical infrastructure, there is little to no load, demand, or reliability impacts to the electric grid. In fact, hydrogen as an energy source and energy carrier can help balance the grid, which is discussed below.

CEC has done a commendable job in supporting hydrogen as a transportation fuel. CEC has funded over $135 million in hydrogen refueling infrastructure as well as has committed an additional $115.7 million through its Clean Transportation Program. The CEC has released a solicitation for fuel cell locomotives and harbor craft and is preparing a solicitation for a large-scale demonstration project for zero-emission vehicle Class 8 fleets. These market signals help to provide certainty for investors and technology providers. We urge CEC to stand by their commitments and avoid redirecting any committed funds to other technologies.

Beyond transportation, hydrogen can help manage and balance the energy demands of the state, as it strives for economy-wide carbon neutrality by 2045. As the renewable energy mix on the grid increases to over 60%, resource planning models are predicting that energy production will exceed "demand in over 20% of the hours of the year, totaling between 5% and 10% of all renewable power produced."[4] Addressing this seasonal imbalance will require large scale storage resources capable of storing power over longer durations cycles. The long duration and seasonal storage need for storing renewable energy will increase as California moves towards 100% clean energy goals. Hydrogen can offer long duration/seasonal storage solutions and should be part of a balanced portfolio. In a soon to be released CalTech study, they found that in 100 percent renewable scenarios, long duration storage through power-to-gas-to-power can reduce system costs by 32 percent over battery only scenarios.[5] SoCalGas can help to achieve this. Leveraging the existing gas grid for hydrogen use and storage through blending offers opportunities for synergy with renewable power generation since hydrogen can be stored in existing natural gas infrastructure and used to generate electricity when renewable energy sources are not available—supporting electric grid reliability in California.

Further, during the energy resilience and ZEVs workshop, we learned about the importance of FCEVs in the context of building-scale microgrids. Since FCEVs are the "other' electric vehicle,

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[2] Energy and Futures. National Hydrogen Roadmap: Pathways to an economically sustainable hydrogen industry in Australia. 2018. Available at: https://www.csiro.au/~/media/Do-Business/Files/Futures/18-00314_EN_NationalHydrogenRoadmap_WEB_180823.pdf?la=en&hash=36839EEC2DE1BC38DC738F5AAE7B40895F3E15F4

[3] Hyundai Website. Accessed 6.7.20 at: https://www.hyundaiusa.com/nexo/index.aspx

[4] Integrating Clean Energy Technologies with Existing Infrastructure. Available at: http://www.apep.uci.edu/PDF_White_Papers/Integrating_Clean_Energy_013020.pdf

[5] J. A. Dowling, K. Z. Rinaldi, T. H. Ruggles, S. J. Davis, M. Yuan, F. Tong, N. S. Lewis, K. Caldeira. Role of long-duration energy storage in variable renewable electricity systems. Joule, Accepted 2020. Research brief is available at: http://carnegieenergyinnovation.org/wp-content/uploads/2020/07/Research-Brief-Dowling-LDS-11July20.pdf

they can provide electricity to support critical loads during times of PSPS or other grid disturbances. Solar and storage may not be functional under high fire conditions because smoke can reduce solar output to close to zero. Jackie Birdsall noted hydrogen tanks provide much larger storage capability and have the flexibility to be refilled in 4 minutes at a hydrogen refueling station. Battery electric vehicles don't have this fast-refueling flexibility and during times of grid outages they cannot be recharged at all. It would be foolish to think that battery electric vehicles will be the winner and only technology to fit every need and situation in the future.

Commissioner Monahan has stressed the importance of California not being alone in the hydrogen infrastructure and vehicle arena. As many experts on the panels noted, regional needs regarding hydrogen may be very specific and pushing a solution in one area may not necessarily be the same solution to push in another area. With that said, Europe is leading the charge on hydrogen issues.

The European Union set a 40-gigawatt goal of electrolyzers to be installed within its borders by 2030.[6] The CEC has funded green hydrogen production projects in the past, but the funding cycle for the 2020/2021 Investment Plan fiscal year cycle has zeroed out funding for this technology after the draft plan included up to $10 million for this category. SoCalGas recommends the CEC include funding for alternative fuel production to help drive these types of projects to California. Snam and Baker Hughes have also successfully tested a hybrid turbine that allows a mix of natural gas and up to 10 percent hydrogen.[7] LADWP doesn't believe it can make it to 100 percent renewable without hydrogen. They have committed to replacing the coal-fired Intermountain Power Plant with 30 percent hydrogen and 70 percent natural gas by 2025 and 100 percent hydrogen by 2045.[8] Hydrogen is the flexible fuel that the power sector needs and the increased demand on in electricity, industrial, and transportation sectors will result in price decreases to the $1-2 per kilogram sweet spot.

In conclusion, SoCalGas provides these comments to support California's move towards aggressive climate goals and we can provide additional input if needed. SoCalGas supports the CEC role of a technology enabling agency that supports all options and opportunities to meet near- and long-term greenhouse gas reduction goals and air quality goals.

Sincerely,

/s/ Tim Carmichael

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[6] Greentech Media https://www.greentechmedia.com/articles/read/eu-sets-green-hydrogen-targets-now-blue-hydrogen-has-to-keep-up

[7] Reuters, https://uk.reuters.com/article/uk-snam-it-hydrogen-baker-hughes/snam-and-baker-hughes-test-first-hydrogen-hybrid-turbine-for-gas-transportation-idUKKCN24L1P8

[8] LA Times, https://www.latimes.com/environment/story/2019-12-10/los-angeles-hydrogen-fueled-intermountain-power-plant