

June 23, 2022

The Honorable Liane Randolph
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Draft 2022 Scoping Plan

Dear Chair Randolph,

FuelCell Energy (FCE) thanks the California Air Resources Board (ARB) for developing the Draft 2022 Scoping Plan. This Scoping Plan tackles the tremendous task of helping steer California toward a carbon-neutral future by analyzing and presenting policymakers and stakeholders with the bold options needed to achieve carbon neutrality by 2045. FCE is encouraged to see that hydrogen's role in the Scoping Plan is significant and will provide meaningful emissions reductions throughout every segment of the economy. FCE is also encouraged that carbon capture and sequestration (CCS) is identified as a key tool in mitigating fossil fuel emissions while California drives its decarbonization to the lowest levels practical.

FCE manufactures fuel cells that provide clean and reliable energy to customers around the world. FCE's fuel cells produce power and can deliver solutions with additional features such as biogas clean-up, heat recovery for combined heat and power (CHP), and the production of vehicle quality hydrogen for zero-emission vehicles or for other hydrogen end uses. FCE is commercializing its carbon capture solution using its carbonate fuel cell technology which captures fossil fuel combustion exhaust and processes and prepares the captured CO₂ for sequestration. The FCE carbon capture solution is a net producer of power and water, and reduces NO_x emissions from the combustion source by up to 70%.

FCE is also commercializing a solid oxide electrolyzer to efficiently create hydrogen derived from renewable resources. The same solid oxide fuel cell platform is also being commercialized as a power generator, operating on biogas or hydrogen to provide clean zero emissions power for California. FCE is a global leader in the stationary fuel cell market, providing affordable and clean onsite energy to customers including wastewater treatment plants, hospitals, universities, industrial facilities, and serving utilities including at substations.

Non-Combustion Resources

Scoping Plan Alternative 1 correctly notes that non-combustion fuel cell systems could provide firming capacity with hydrogen if combustion-based generation resources were no longer available. Under all Scoping Plan Alternatives, fuel cell systems can provide electricity, CHP and hydrogen generation without criteria air pollutant emissions while also reducing greenhouse gas emissions. As the state moves away from combustion resources, FCE urges the ARB to consider fuel cells as important elements for grid reliability and

energy storage, especially when integrated with hydrogen applications.

FCE is developing fuel cell systems that convert waste methane gas, like what is produced from wastewater treatment plants or dairies, directly and without any combustion into hydrogen. Our fuel cells use electrochemistry to convert methane gas into hydrogen or electricity, preventing the harmful emissions and particulate matter that is produced from steam methane reforming or combustion. This biogas-to-hydrogen application could give local governments the opportunity to produce green hydrogen for vehicle fleets, to sell green hydrogen to the public to generate revenue, or utilize it in an on-site energy storage application. Because FCE fuel cells can use this biogas onsite, wastewater facilities can harness our technology to generate revenue-creating electricity, use waste heat to improve the efficiency of their treatment systems, and end the flaring or venting of harmful methane emissions.

Using biomethane will be critical to meet emissions reductions required by SB 1383 (Lara, 2018) and the Short-Lived Climate Pollutant Reduction Strategy. Mitigating anthropogenic emissions by utilizing methane emissions from landfills, dairies, and municipal wastewater facilities to produce low-to-negative carbon hydrogen will both create the best and highest possible use from the biomethane, while avoiding undue costs to ratepayers of those public goods. This process, based on non-combustion fuel cell technology, will be integral to eliminating combustion related pollution and to meeting growing demand for hydrogen in California.

Carbon Capture and Sequestration

FCE is encouraged by the inclusion of CCS as part of the solutions required in the scoping plan Proposed Scenario and Alternative 4. As the Draft Scoping Plan states “The lessons for California from these analyses are clear: invest now or pay the price later.” Including CCS as an important tool, especially to jump start significant emissions reductions in hard to decarbonize sectors, is a key policy point.

The two identified Sectors (Table 2.2) of Petroleum Refining and Stone, Clay, Glass & Cement can be decarbonized as FCE commercializes its CCS technology. FCE would like to add that the Chemical and Allied Products and Pulp and Paper boilers emissions can be significantly reduced by up to 90% by 2030 with the FCE carbonate technology. This is in contrast to where the Proposed Scenario has 0% of boilers in this sector switched to electricity by 2030. The FCE carbonate technology has the additional clean air benefit of reducing the amount of NOx in the processed fossil fuel combustion exhaust by as much as 70%. The FCE technology undergoing commercialization is able to mitigate the concerns regarding air pollution and CCS.

Decarbonization

Sectors of the economy that are difficult to decarbonize are also some of the most pollution intensive. Hydrogen has shown potential to be a far better technology than electrically charged battery packs in fueling long-haul trucks, construction and industrial equipment, and even trains, all of which use very high torque engines and require a lot of

sustained power. Hydrogen also does a much better job storing energy over days, weeks, and months when compared to batteries. By storing energy in hydrogen, we can take the power of wind or sun and keep it for exactly when we need it, thus improving grid reliability and reducing carbon emissions.

FCE is developing solid oxide electrolyzer fuel cells that will efficiently use electricity and water to create hydrogen. This electrolyzer system will produce hydrogen as green as the electricity that is feeding into the fuel cell. FCE electrolyzers would be able to be paired with renewable energy projects like large-scale solar or wind farms to create 100% green hydrogen for vehicles or energy storage. Our electrolyzer systems will create hydrogen without creating any air emissions or pollution and can be accompanied with onsite storage capability. FCE's electrolyzers will be able to run in reverse, converting back the produced hydrogen into electricity through the very same fuel cell system. Fuel cell systems, like FCE's forthcoming electrolyzer, will be important tools for supplying carbon free hydrogen fuel for hard to decarbonize applications.

Fuel Cells Provide Grid Benefits

Fuel cell systems can be called on for emergency capacity services, whether installed behind-the-meter or in-front-of-the-meter. Fuel cells can peak shave, operate as firm baseload power in microgrids, and provide emergency capacity services to the grid. Fuel cell systems can be interconnected to the grid to provide backup power during grid outages and can be called on to put electricity back on to the grid during capacity shortfalls. FCE's fuel cells are non-combustion generation devices and already meet California's criteria pollutant and toxic air contaminant emissions standards, with no criteria air pollutants harmful to human health when operating using biogas or hydrogen.

Carbon Intensity for Hydrogen

FCE supports the use of carbon intensity (CI) scores as metrics for grading the cleanliness of hydrogen instead of using a broad color-based system. Failing to adopt a clear and universal definition could stifle the growth of the hydrogen market in California and may impede California's ability to work toward decarbonization with neighboring states interconnected to California's electric grid and natural gas system. For this reason, we urge ARB to base hydrogen eligibility on a CI framework using a well-to-gate life cycle assessment rather than adopting the criteria outlined in the Scoping Plan. Adopting a CI framework using a well-to-gate assessment is a technology-agnostic approach, as it only considers the lifecycle emissions based on onsite and upstream production emissions. As a result, the door is open for competition to flourish so long as the hydrogen in question can meet the desired lifecycle emissions threshold.

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FuelCell Energy thanks the ARB for the opportunity to comment on the Draft 2022 Scoping Plan and looks forward to future work to execute this plan in the coming months and years.

Sincerely,

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