COMMENTS OF FUELCELL ENERGY, INC. ON JOINT AGENCY SYMPOSIUM ON THE GOVERNOR'S GREENHOUSE GAS REDUCTION GOALS

July 30, 2015

I. Introduction

FuelCell Energy, Inc.(FCE) attended the July 9, 2015 multi-agency symposium to discuss the development of strategies to achieve Governor Brown's 2030 greenhouse gas reduction goals. FCE was encouraged by the organizers to offer comments and appreciates the opportunity to do so.

FCE is hopeful that the California Public Utilities Commission (CPUC), California Energy Commission (CEC), California Air Resources Board (CARB), and the California Independent System Operator (CAISO) will consider the role that stationary fuel cells can and should play to help California solve some of its most pressing energy and environmental concerns.

FCE is a leading integrated fuel cell company that designs, manufactures, sells, installs, operates and services ultra-clean, highly efficient stationary fuel cell power plants for distributed power generation. Our fuel cell plants are operating in more than 50 locations in nine countries. The growing installed base and backlog exceeds 300 megawatts. In California, the company has 19 operating facilities (with many operating on on-site or in-state biogas) and an experienced, full-time sales and support team throughout the state.

II. Climate Change and the Shifting Clean Energy Policy Mix

The impacts of climate change are already being felt in California and will disproportionately impact the state's most vulnerable populations.[1] Governor Brown's response has been bold and decisive, proposing to increase from one-third to 50 percent the electricity derived from renewable sources; reduce today's petroleum use in cars and trucks by up to 50 percent; double the efficiency savings from existing buildings and make heating fuels cleaner[2]; reduce the release of methane, black carbon and other potent pollutants across industries; and manage farm and rangelands, forests and wetlands so they can store carbon.[3]. California's agencies and thought leaders also have taken rapid steps to define the issues and key factors necessary to implement the Governor's directives.

On April 28, 2015, Governor Brown issued an executive order that requires CARB to cut GHG emissions to 40 percent below 1990 levels by 2030. This is designed as an incremental step towards the goals of AB 32, passed in 2006, which requires GHGs cut to 80 percent below 1990 levels by 2050.

In thinking about increased penetration of renewables and reduction of GHGs, a key question has been which type of renewable energy California should use to achieve a 50 percent goal. Last year, Energy and Environmental Economics, Inc. (E3) released a study commissioned by the state's five largest electric utilities that explored the technical, environmental, and economic implications of raising the Renewables Portfolio Standard (RPS) from 33 percent by 2020 to 50

[1] http://gov.ca.gov/news.php?id=19048

[2] Senate Bill 350, which is currently being considered by the legislature, would codify these objectives, including an increase in renewable electricity to 50% by 2030.

[3] http://gov.ca.gov/news.php?id=19048

percent by 2030.[4]

In that study, E3 evaluated a number of potential scenarios to achieve a 50 percent RPS and concluded "that the most valuable integration solutions are those that can reduce solar-driven overgeneration during daylight hours when the system experiences low load conditions."[5] Accordingly, E3 recommended procurement of a more diverse portfolio of renewable resources, which included 4,422 GWh of electricity generated from biogas resources – more than doubling the base case of 2,133 GWh.

Substantially increasing the amount of biogas-derived generation is consistent with CARB's May 7, 2015 concept paper outlining a Short-Lived Climate Pollution Reduction Strategy, in which the agency sets out to "identify strategies and funding mechanisms to encourage and streamline the use of the cleanest technologies to advance the state's air quality, water quality, climate change, and other environmental objectives. Such technologies or strategies may include fuel conditioning of biogas to remove contaminants before vehicle use, injection into the natural gas pipeline, or *fuel cells for electric generation*" (emphasis added).[6]

In addition to renewable energy targets and GHG reduction, criteria air pollutant reduction is another significant state objective. California's air quality issues have led to a legislative mandate for supporting projects with low criteria pollutant emissions and a CARB standard for criteria pollutants. Significant reduction of stationary-source NOx is an important step on the path to meet federal air quality attainment standards.

III. The Role for Stationary Fuel Cells

FCE was troubled that during the entire July 9 multi-agency symposium, a key goal of which was to provide solutions to California's GHG and renewable energy challenges, stationary fuel cells – a technology that can tackle both of these challenges – were not mentioned a single time, either by agency representatives or thought leaders invited to present.

The reality is that no single power resource can meet of all the needs of the CPUC, CEC, CARB, CAISO, investor-owned utilities and other relevant stakeholders. As a proven form of clean distributed generation, stationary fuel cells provide many benefits of other "preferred" resources without compromising the reliability or predictability of conventional resources. Unlike many options, fuel cells such as those manufactured by FCE can be set to a predictable and variable output capacity without loss of efficiency. In addition, they are responsive to key concerns raised in the Governor's Task Force Report regarding natural gas power plant siting in the South Coast Air Quality Management District and throughout the state. FCE's fuel cell plants also can provide reactive power (20 MVAR @ 25 MW) and offer a real and reactive alternative to synchronous condensers.[7]

Unlike a conventional gas peaker plant, which generates air pollution in the summer when ozone air quality is already at its worst, fuel cell plants provide reliable, efficient year-round electricity with virtually zero criteria pollutant emissions. Stationary fuel cell installations also offer many attributes complementary to intermittent renewable resources with an emissions profile far lower than gas combustion plants.

In the last decade, our plants have emerged from smaller, customer-side applications to

[4] http://blog.ucsusa.org/powering-california-with-50-percent-renewable-energy-by-2030-393
[5] https://ethree.com/documents/E3_Final_RPS_Report_2014_01_06_with_appendices.pdf at 16.
[6] http://www.arb.ca.gov/cc/shortlived/concept_paper.pdf at 14.
[7] Additional MVAR are available at lower real power (MW) outputs (i.e. 34 MVAR @ 10 MW).

larger, utility-scale projects, often replacing conventional power generation. These installations are unique in their ability to provide efficient, reliable, high quality power and, in the case of Combined Heat and Power (CHP) applications, waste heat, while requiring minimal water consumption and avoiding the pollution and acoustic impacts of combustion resources.[8]

IV. New Fuel Cell Applications Consistent with State Objectives

FCE's fuel cell technology is versatile and capable of producing multiple value streams including the on-site production of high purity hydrogen in addition to ultra-clean electricity and usable heat. This application helps to address the need for a hydrogen fueling infrastructure by cleanly and affordably generating high-purity hydrogen in urban locations. An ideal application is at wastewater treatment facilities to utilize renewable biogas as the fuel source and generate power and heat for the water treatment process and zero-carbon hydrogen for transportation. Price points are competitive with existing hydrogen generation technologies and the environmental profile is much more attractive than traditional hydrogen generation technologies. This reflects the virtual absence of pollutants by fuel cells and low carbon footprint when utilizing natural gas and carbon-neutral when fueled by renewable biogas.

Next, as recently noted by U.S. EPA Administrator Gina McCarthy, FCE's fuel cell technology can also be used to capture carbon emissions from existing fossil-fueled combustion plants and combustion-based industrial facilities. When in "carbon capture" mode, our fuel cells can destroy approximately 70% of the combustion plant's smog-producing NOx pollutants and produce additional power in an environmentally friendly manner.[9]

FCE is an industry leader in fuel cell projects using on-site and in-state directed biogas. As outlined in the E3 study discussing alternatives for achieving a 50 percent RPS, FCE believes renewable biogas projects should play an increasingly important role in the shifting clean energy policy mix. Using on-site biogas allows customers such as wastewater treatment facilities and food and beverage processors to avoid the release of this greenhouse gas into the atmosphere or eliminate gas flaring, which emits pollutants and wastes a potential revenue source. The only thing holding back more of these projects are thoughtful policies needed to advance them.

V. Policy Suggestions

Stationary fuel cell plants can and should play an important and increasing role in California's clean energy mix, and there are some specific steps that can help make this happen:

a. First, we should keep stationary fuel cell incentives intact for the Self-Generation Incentive Program (SGIP) and consider an emphasis on projects using onsite biogas or in-state directed biogas. SGIP has been a successful program to promote fuel cell technology and has helped transform the industry.[10]
b. Second, we should open the fuel cell Net Energy Metering (NEM) program to all stationary fuel cell manufacturers and reasonable project sizes, and extend its duration

[8] http://www.casfcc.org/2/StationaryFuelCells/WhyFuelCells.aspx
[9] Remarks by U.S. EPA Administrator Gina McCarthy, 4/23/2015, available at http://yosemite.epa.gov/opa/admpress.nsf/a883dc3da7094f97852572a00065d7d8/338ed1dee5f0006a85257e3000514f3e!OpenDocument
[10] http://www.cpuc.ca.gov/PUC/energy/DistGen/sgip/aboutsgip.htm

to be consistent with SGIP. Fuel cells with a base nameplate capacity over 1 megawatt do not receive the benefit of participation in fuel cell NEM, which allows a customer-generator to receive a financial credit for power generated by its onsite system and fed back to the utility, and provides other provisions that help support development of eligible projects.[11] There is considerable merit to offer California's larger institutional and commercial energy consumers proportional access to cost effective on-site fuel cell generation commensurate with their energy demand and usage.

c. Third, we should encourage further clarification for the role of stationary fuel cells as "preferred resources" in the state's energy planning. This is consistent with the Energy Action Plan,[12] past practices of the Public Utilities Commission[13], and investor-owned utility procurement plans.[14] California investor-owned utilities currently have little incentive to procure electricity generated by a natural gas fuel cell project over a conventional combustion gas plant. The procurement process emphasizes the importance of "preferred resources" but makes little distinction between natural gas powered fuel cells and natural gas combustion. The reality is that fuel cells powered by natural gas have equivalent or better GHG emissions and much lower criteria pollutant emissions than other natural gas generation and the grid as a whole, even at higher proposed renewable penetrations.
d. Fourth, we should do all we can to improve the cost and availability of renewable biogas, so that consistent with CARB's strategy for short-lived climate pollutants, as many fuel cell projects as possible can use renewable fuel and be completely zero carbon.[15]
e. Fifth, we should recognize that the strong legacy of California's forward thinking and support for fuel cells to date has yielded the private investment in newer applications including distributed hydrogen and carbon capture that are poised to complement California's future grid and GHG goals. California's energy thought leaders need to assure that stability and support for this technology remains a cornerstone of California energy policy.

VI. Conclusion

Stationary fuel cells promise to help California solve some of its most pressing energy and environmental problems, including grid resiliency and poor air quality, as well as greenhouse gas emissions that contribute to global climate change. We look forward to working with relevant agency and industry stakeholders to advance California's ambitious policy agenda while increasing the visibility of our technology.

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[11] http://www.cpuc.ca.gov/PUC/energy/DistGen/netmetering.htm
[12] Energy Action Plan II, Implementation Roadmap for Energy Policies, September 21, 2005, p.2. See also 2008 Energy Action Plan Update pp. 15-16
[13] D.13-02-015 p. 3.
[14] See, e.g. SCE Track 1 Procurement Plan p.2.
[15] See, e.g., SB 687 (Allen, 2015), available at http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB687

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