COMMENTS OF FUELCELL ENERGY, INC. ON DRAFT SHORT-LIVED CLIMATE POLLUTANT REDUCTION STRATEGY

October 29, 2015

I. Introduction

FuelCell Energy, Inc. (FCE) has closely followed the efforts of the California Air Resources Board (CARB) to reduce the impact of short-lived climate pollutants, particularly methane. FCE appreciates the opportunity to offer these comments to expand on how our stationary fuel cell technology can help meet CARB's broader objectives.

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 and an experienced, full-time sales and support team throughout the state. Several of our California plants operate on biogas that is produced onsite, such as at wastewater treatment facilities. In fact, we are the only company that has successfully commercialized fuel cells that operate using onsite biogas.

We are hopeful that as California dramatically reduces methane emissions from a variety of sources and, in parallel, aims to reduce criteria pollutant and greenhouse gas (GHG) emissions, fuel cell power plants using onsite (as well as in-state directed) biogas will play an increasing and significant role.

II. Climate Change and the Shifting Policy Mix

The impacts of climate change are already being felt in California and will disproportionately impact the state's most vulnerable populations.[1] We applaud California's bold and decisive strategy to, among other things, reduce the release of methane, black carbon and other potent pollutants across industries.

The draft Short-Lived Climate Pollutant Reduction Strategy ("SLCP Strategy") is the latest among many thoughtful and necessary steps CARB has taken to define the issues and implement state directives to address climate change. We are particularly interested in how the SLCP Strategy can help California develop an infrastructure for readily available and cost-effective biogas that can be used as a zero-carbon fuel source for stationary fuel cell power plants.

California has ambitious plans to do the following: (1) increase renewable energy production; (2) decrease GHG emissions; (3) reduce criteria air pollutants; and now, through the SLCP Strategy, (4) reduce the impact of methane from a variety of sources. ***Stationary fuel cell power plants using onsite or in-state directed biogas can decisively contribute to all four of these objectives at once.***

III. The Role for Stationary Fuel Cells

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

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

clean distributed generation, stationary fuel cells provide many benefits of other "preferred" resources without compromising the reliability or predictability of conventional resources.

As the SLCP Strategy states, "On-site electricity generation can displace emissions from centralized fossil-based systems or exported to neighbors or the electricity grid when feasible. Technologies that reduce or eliminate criteria pollutant and toxic emissions should be encouraged in both incentive and regulatory programs, particularly in areas with severe or extreme air pollution. This will help to overcome air quality permitting issues that can hinder project development, especially in the Central Valley and Southern California."[2]

Unlike many power generation 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.[3]

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 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.[4]

IV. Stationary Fuel Cells Using Onsite and In-State Directed Biogas

FCE has pioneered the use of biogas as a zero-carbon fuel resource for stationary fuel cell power plants. Many of these projects have been in California. Earlier this year, we announced our latest biogas fuel cell system at the Wastewater Quality Control Plant in the City of Riverside.[5]

Under our agreement with Riverside, the city will pay FCE only for the power it needs for its operations at a rate marginally lower than what was previously paid for power to the electric company. FCE will pay for and manage the installation, operation and maintenance of the equipment. The project has the strong support of the South Coast Air Quality Management District. The city will also receive grant funding through the Self-Generation Incentive Program (SGIP), an important mechanism to accelerate the adoption of biogas fuel cells and other technologies. Construction is scheduled for completion by the end of 2016.

Riverside's agreement with FCE highlights a new approach to such projects. In the past, FCE's customers have largely been responsible for their own gas cleanup skid, the equipment that removes contaminants from the gas before it can be used in the fuel cell plant. For this project, FCE is engineering and maintaining the skid, so all the city has to do is pay for the

[2] SLCP Strategy, P. 45
[3] Additional MVAR are available at lower real power (MW) outputs (i.e. 34 MVAR @ 10 MW).
[4] http://www.casfcc.org/2/StationaryFuelCells/WhyFuelCells.aspx
[5] http://www.govtech.com/fs/Riverside-Calif-to-Deploy-Onsite-Fuel-Cell-Energy-Power-Plant.html

energy. The wastewater plant is also now in the middle of a $200 million expansion project that will bring two new digesters to the facility that will in turn create more biogas, which the city can later decide to harness with more fuel cells if deemed financially and procedurally practical.[6]

The Riverside project builds on previous success at installations like the University of California at San Diego (UCSD)[7] and Inland Empire Utilities Agency (IEUA).[8] Outside of California, Microsoft recently tested a modular data center run from a biogas-powered fuel cell located at a wastewater treatment plant in Cheyenne, Wyoming. Local officials approved a trial of Microsoft's Data Plant research program in a $5.5 million project funded by Microsoft, FCE, and the state of Wyoming.[9]

V. The Intersection of RPS and SLCP

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.

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 percent by 2030.[10]

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."[11] 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.

We applaud the SLCP's discussion of renewable biogas for power generation and look forward to working with appropriate policymakers and stakeholders to accelerate these opportunities. Lack of readily available or cost effective biogas is problematic, as is the absence of effective programs to use biogas for clean power generation (such as in fuel cells) as opposed to as transportation fuel. To help level the playing field, we agree with the SLCP's assertion that we should consider "potential new policies like a feed-in-tariff for renewable biogas."[12] We will also to continue to advocate that SGIP's biogas adder be increased to better reflect the cost difference of doing a biogas project.

We also agree with the need to reduce hurdles for wastewater and other facilities to make the decision to beneficially reuse methane. SCLP correctly states as follows:

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[6] Id.
[7] http://ucsdnews.ucsd.edu/archive/newsrel/general/12-07EnergyInnovation.asp
[8] http://inhabitat.com/worlds-largest-biogas-fuel-cell-power-plant-launches-at-california-sewage-treatment-facility/
[9] http://www.technologyreview.com/view/507626/microsoft-data-center-fueled-by-waste-gases/
[10] http://blog.ucsusa.org/powering-california-with-50-percent-renewable-energy-by-2030-393
[11] https://ethree.com/documents/E3_Final_RPS_Report_2014_01_06_with_appendices.pdf at 16.
[12] SLCP, P. 13.

"Many wastewater treatment plants are permitted to burn digester biogas through flaring and are classified as industrial facilities. Capturing the biogas to produce electricity, such as through a combined heat and power (CHP) system may result in re-classifying the facility's purpose as "electricity generation" and subject the plant to more onerous emission compliance and abatement equipment rules, even though the change in criteria pollutant emissions are minimal. In addition, the beneficial use of methane generated at wastewater treatment facilities faces many of the same hurdles faced by dairy digesters and waste treatment facilities. State agencies will work collaboratively to address these barriers, as they are for those hindering other productive uses of California's waste streams, in the dairy and landfill sectors, as well."[13]

VI. New Fuel Cell Applications Consistent with State Objectives

Using renewable biogas in FCE's fuel cell technology opens capabilities beyond electricity and heat production. FCE has innovated the use of fuel cells for the on-site production of high purity hydrogen (in addition to 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.

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.[14]

VII. 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 and consider an emphasis on projects using onsite biogas or in-state directed biogas, with a higher adder for such projects. SGIP has been a successful program to promote fuel cell technology and has helped transform the industry.[15]
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

[13] SLCP, P. 55.
[14] Remarks by U.S. EPA Administrator Gina McCarthy, 4/23/2015, available at http://yosemite.epa.gov/opa/admpress.nsf/a883dc3da7094f97852572a00065d7d8/338ed1dee5f0006a85257e3000514f3e!OpenDocument
[15] 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.[16] 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 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. A biogas feed-in-tariff with preference for projects that avoid criteria pollutant emissions and use onsite or in-state directed biogas should be strongly considered.
d. Fourth, 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.

FCE appreciates the opportunity to offer these comments to expand on how our technology can help achieve CARB's broader objectives and the SLCP.

Respectfully submitted,

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[16] http://www.cpuc.ca.gov/PUC/energy/DistGen/netmetering.htm