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Bloom Energy comments on June 27 RNG workshop

Additional submitted attachment is included below.



July 14, 2017

Chair Robert Weisenmiller
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

**Re: Integrated Energy Policy Report (IEPR) Renewable Natural Gas Workshop
on June 27, 2017**

Dear Chair Weisenmiller,

Bloom Energy (Bloom) appreciates the opportunity to provide these comments on the IEPR Renewable Natural Gas (RNG) Workshop. Bloom strongly supports the State's efforts to capture methane from waste stream sources and make it available as a renewable fuel. The need to capture methane from all available sources is a critical issue as the State seeks solutions to climate change. The inclusion of renewable natural gas in the IEPR is timely and important. Ideas and concepts from the IEPR are often translated into specific policy. Thus, Bloom's comments here on the specific issue renewable natural gas are particularly relevant as we present unique solutions.

All-electric fuel cells are a unique clean distributed electricity resource

Bloom Energy is a provider of a breakthrough all-electric solid oxide fuel cell technology that produces reliable power using a highly resilient and environmentally superior non-combustion process. Bloom's fuel cells are fuel flexible and can operate on either natural gas or RNG. The fuel cells can operate using pipeline-injected RNG or directly at the location where the RNG is generated. In addition, our all-electric solution allows fuel cell systems to be deployed at sites where it is not necessary to match an on-site thermal load thereby expanding the opportunities available to address energy needs with clean, reliable distributed generation. With more than 160 MW installed across over 400 sites in California, Bloom has a proven technology with a strong track record of providing cost competitive, clean, reliable energy solutions.

Bloom Energy Servers efficiently convert fuel into electricity through an electrochemical process without combustion. By virtue of the non-combustion process, Bloom Energy Servers virtually eliminate emissions of criteria air pollutants including NO_x, SO_x, CO, VOCs, and particulate matter that are associated with combustion. The result is a significantly lower air emissions profile as compared to combustion-based distributed or central station power generation.

The high power density of Bloom Energy Servers leads to a small footprint required for the local generation of clean electricity, in turn resulting in reduced system-wide transmission losses. In addition, the fuel cells require only a small amount of water on start-up and consume no water during normal operation. They can help mitigate environmental impacts by displacing high water usage options with a clean and

water-free alternative resulting in direct environmental benefits within local watersheds and reduced need within the energy sector to draw on California's increasingly limited supplies of water.

Importantly, on any fuel source, Bloom Energy Servers reduce CO₂ emissions compared to the grid. Bloom's CO₂ emissions per MWh are about 20% lower than the California marginal emissions rate when run on natural gas and are zero emission on RNG.

Bloom supports developing a robust renewable methane supply

Bloom stands ready to further contribute to strategies aimed at achieving the State's ambitious climate and energy goals through the use of renewable fuels. Bloom's fuel cell technology is the most efficient at converting methane to electricity and is able to run on RNG produced from a variety of sources such as dairies, landfills, and wastewater treatment plants. As a source of firm 24x7 power, Bloom can significantly contribute to overall reductions in methane emissions from these sources while providing a reliable power source.

Bloom has over 20 MW installed in California running on pipeline-injected RNG. However, increasing the number of these ultra-clean projects and expanding our positive environmental benefits has been stunted by limited availability of RNG. Therefore, we fully support the State's goal to explore options that will accelerate RNG projects, increase supply, and allow access to pipeline injection in order to make this an economical option available for our customers.

The CEC should develop a sector-based roadmap for RNG end use

Bloom recommends that the Commission develop a roadmap that will help guide policy development for robust and efficient RNG use across multiple sectors. Appendix A of the Staff White Paper that outlines production pathways and end uses could be expanded to include specific sectors (e.g. commercial/industrial, heavy duty transportation, light duty transportation, agriculture, hospitals, manufacturing, etc.) where RNG use will help to capture significant air quality benefits and also drive GHG reductions. Each sector may have more than one opportunity for RNG end use, for example manufacturing might use RNG for CNG/LNG vehicle fuel, heat/steam production, and onsite electricity generation. This holistic sector-based view will allow for a multi-faceted solution to achieve short-lived climate pollutant reductions by sector rather than viewing each potential end use as competing with the others.

Additionally, while relying on centralized electrification of some sectors will make the most sense, Bloom requests consideration of onsite distributed electricity generation using RNG where centralized electricity resources aren't a solution. For example, clean on-site distributed generation resources that provide reliable primary power such as all-electric fuel cells can replace banks of diesel generators that building occupants currently use for back-up power thereby realizing both GHG and air pollutant benefits. Bloom has several data center customers that use our high reliability all-electric fuel cell systems as primary power resulting in significant local benefits of reducing the environmental and health impacts of criteria pollutant and

black carbon emissions associated with these back-up resources. These are just a few examples of the use of RNG onsite to meet customer needs and achieve significant environmental benefits. If the IEPR were to only discuss the potential benefits of an electrification strategy considering centralized resources, it would limit innovative, and in some cases environmentally superior, technology applications.

Onsite electricity generation should continue to be considered as an end use

Multiple stakeholders expressed concern that encouraging onsite electricity generation projects would exacerbate air quality issues, implying that all electricity generation is combustion-based. It is true that combustion results in significant air quality impacts, however, not all options for electricity generation are combustion-based. For example, Bloom Energy Servers efficiently convert fuel into electricity through an electrochemical process without combustion. By virtue of the non-combustion process, Bloom Energy Servers virtually eliminate emissions of criteria air pollutants including NO_x, SO_x, CO, VOCs, and particulate matter that are associated with combustion. The result is a significantly lower air emissions profile as compared to combustion-based distributed or central station power generation. Onsite electricity generation projects using ultra-low emissions technologies such as fuel cells can provide reliable onsite power as well as air quality benefits to surrounding communities.

Pipeline RNG diversifies the end use and broadens the market

Pipeline RNG should be included as one of the pathways for end users. As much of the available RNG will not be located in load centers, delivering the RNG via the pipeline to projects that are located next to load is a common sense approach. By including this option, the market is expanded creating more fluidity and competition.

Long-term electricity generation contracts support project financing

Both onsite electricity generation and pipeline RNG contracts for electricity generation end use can be structured as long term agreements. Longer term, fixed price agreements (10-20 years) provide a predictable base of revenue that will aid in the ability of RNG projects to be financed. RNG for electricity generation and transportation are complementary markets. Therefore, electricity generation should not be seen as competitive with transportation end use, but rather an approach that allows RNG developers to diversify their portfolio with multiple end uses from the same RNG project to enable project development. This approach also does not preclude policies that will help to stabilize the LCFS (Low Carbon Fuel Standard) and RIN (Renewable Identification Number) market credit prices; rather it provides an immediate remedy while these complementary policies are developed to further increase the attractiveness of projects to investors. Especially in light of the need for expedient action before regulations are considered for the dairy industry, electricity generation offtake agreements that can occur now make sense as part of the solution to encourage RNG project development.

Interconnection and injection pilots are critical

In addition to encouraging onsite electricity generation at dairies, wastewater treatment plants, and landfills, it will be critical to the overall expansion of the market to identify and overcome barriers to pipeline interconnection and injection. Transport of RNG through the common carrier pipeline system will make this renewable resource accessible to a broader geography and wider array of consumers who are interested in generating reliable, renewable onsite power, but specific and targeted policies are needed to address this significant market barrier.

Bloom's experience in working to connect our customers with RNG sources matches that of other stakeholders who mentioned that uncertainties around cost and timeline of pipeline interconnection have been a primary barrier to potential suppliers obtaining project financing. Achieving a better understanding of the interconnection process through the pilot projects with the CPUC and working to establish standard processes and costs will provide the certainty needed for financiers to invest and for projects to move forward and increase supply.

Another challenge in obtaining financing for projects has been the need for an understanding of what scale of project is needed to develop a project and inject into the pipeline (e.g. approximate number of cows, annual tons of waste, or MMBtu/day) as well as a consistent methodology to estimate the energy yield from a given input of waste. Understanding that there will be some variability across projects, a consistent framework to consider these concepts will facilitate communication between project developers, financiers, and offtake customers.

Bloom Energy thanks the Energy Commission for a productive and informative workshop on this important topic, and looks forward to continued engagement as these discussions move forward.

Respectfully,



Erin Grizard
Senior Director, Regulatory and Government Affairs