Bloomenergy

August 26, 2014

California Energy Commission
Dockets Office, MS-4
Re: Docket No. 14-CHP-1
1516 Ninth Street
Sacramento, CA 95814-5512dockets@energy.ca.gov

Re: Comments on the Draft Proposal *Estimating Fuel Displacement for California Electricity Reductions: Summary of Staff's Proposed Method*

Thank you for the opportunity to submit these comments regarding the Draft Proposal *Estimating Fuel Displacement for California Electricity Reductions: Summary of Staff's Proposed Method* ("Draft Methodology"). Bloom Energy Corporation ("Bloom Energy" or "Bloom") looks forward to further participation in this proceeding and working with the Commission to ensure the process adequately captures the opportunity, availability and performance attributes of advanced energy technologies like fuel cells to meet the state's energy objectives.

Founded in 2001 and with over 140 MWs of installed capacity across the United States, Bloom Energy is headquartered in Sunnyvale, CA where the company manufactures unique distributed fuel cell power systems which are among the most energy efficient on the planet. Bloom Energy Servers™ produce reliable baseload electricity using an environmentally superior non-combustion process that significantly reduces carbon dioxide emissions while virtually eliminating criteria pollutants and water usage. Bloom Energy Servers can be targeted into specific locations on the electric grid on either the customer side or the utility side of the meter. The result is a new option for energy infrastructure that combines increased electrical reliability and improved energy security with significantly lower environmental impact. Bloom's fuel cell systems were invented in California, are manufactured in California and are being deployed throughout California to help the state meet its energy, environmental and economic objectives.

Reliable, targeted, GHG reducing technologies like Bloom's Energy Servers should play an integral role in the state's energy plans to help address the state's increasing environmental goals, the need to integrate intermittent technologies and the need to quickly deploy reliable resources in critical areas – for instance, post San Onofre Nuclear Generating Station (SONGS) Southern California. Establishing an accurate methodology to account for the GHGs displaced when using clean onsite power is critical. An accurate methodology will ensure that the policies in practice align with the

state's goals. A unified and agreed upon methodology will also provide cohesiveness between state agency programs and provide policy certainty. With these considerations in mind Bloom provides the following feedback on the Draft Methodology.

Bloom Responses to Energy Commission Staff Proposed Methodology for Estimating Fuel Displacement Questions

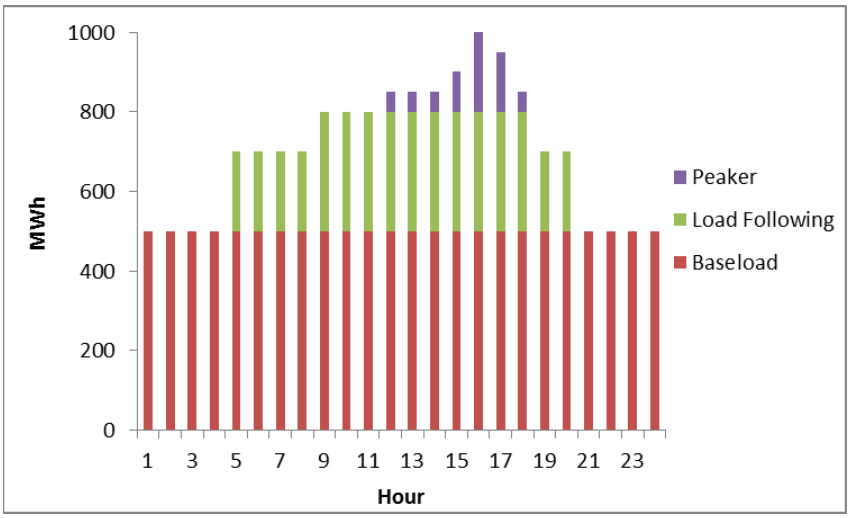
1. **Is the Energy Commission staff's approach to estimating fuel displacement reasonable? If not, please explain why.**

The methodology provides that "peaking resources, although defined as having capacity factors less than 10 percent, only produce 2.5 percent of the total annual energy on average, thus are limited to a maximum of 2.5 percent of the energy displaced annually." This weighting can be improved in two ways:

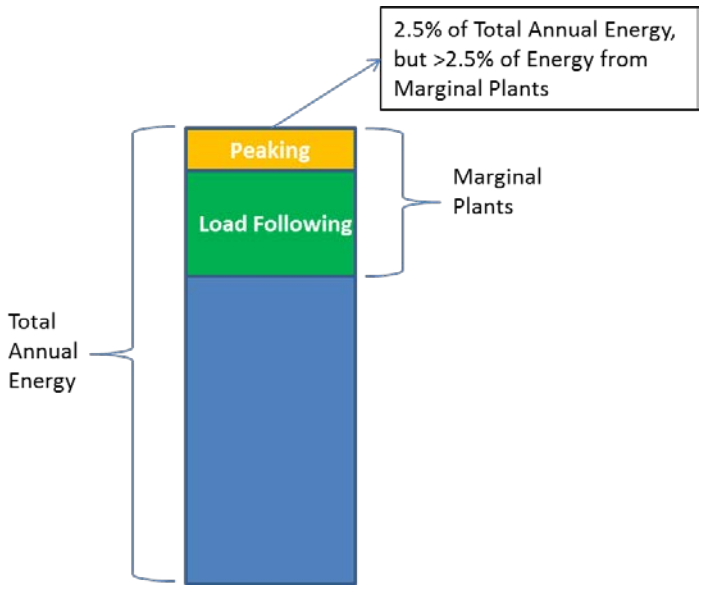
a. The GHG Protocol Guidelines for Grid Connected Electricity Projects[1] provides guidance on determining the emissions or heat rate of plants displaced by distributed energy resources. The Guidelines recommend that the weighting applied to different types of marginal resources is based upon "the length of time these resources actually provide power on the margin." Thus, CEC should considering revising the weighting assigned to peaker plants to be equal to the percentage of time during the year that peaking plants are on the margin. Per the Guidelines, this analysis could be done in one of several ways:
    a. A load-duration curve analysis to calculate weighted average emissions of resources types that are on the margin for specific time periods
    b. An analysis of historical data (i.e. a dispatch decrement analysis) to determine a marginal heat rate for each hour of the year
    c. Dispatch modeling to determine a marginal heat rate for each hour of the year

    As an illustrative example of the importance of this distinction, consider the scenario below. In this scenario, peaker plants generate only 3% of total energy and 13% of the energy generated by all marginal plants (load following + peaker), but would actually be on the margin 7 out of 24 hours, or 29% of the time. In this scenario, 29% of the output from the baseload DER would displace fuel at the heat rate of the peaker plant, and thus 29% would be the appropriate weighting to assign to peaker plants.

[1] http://www.ghgprotocol.org/files/ghgp/electricity_final.pdf



b. If the Energy Commission determines that the approach illustrated above is not practical, the approach of using percent of energy generated may be an appropriate estimate if the correct weighting is used. Since the weighting is being applied only to the heat rate of gas plants (load following + peaking plants) and not to all power generation sources, the weighting should be based upon the energy generated by peaking plants *as a percentage of the energy generated by gas plants*, not the 'total annual energy'. Thus, 2.5% is not an appropriate weighting and further analysis should be conducted to determine the percentage of energy generated by gas plants that can be attributed to peaker plants.



2. Is the Energy commission staff's approach to the treatment of renewable energy appropriate? If not, please explain.

The methodology extrapolates reductions in heat rate among gas plants based upon historical technological improvements. The introduction of more variable energy resources to the grid in the coming years will result in more cycling and a reduction in the number of hours plants will operate at their maximum efficiencies, and peaker plants may generate a higher percentage of total energy than they currently do.

This operational change is highlighted by the California Independent System Operator's (CAISO's) concern about the need for greater generation resource flexibility, specifically ramping to accommodate variable output renewables. The CAISO has been conducting a stakeholder process to develop a new "Flexible Ramping" product, and the resulting straw proposal stated that "[w]ith increasing levels of variable energy resources and behind the meter generation, the operational challenge of ramping capability is even more prominent, as the variable outputs of the renewable resources may increase the magnitude of the 5-minute to 5-minute net load changes."[2]

Thus, the Energy Commission's projected decrease in heat rates likely overestimates the rate at which heat rates will decline. Similarly, the Energy Commission should consider the potential increase in the percentage of electricity coming from peaker plants in each year.

3. How could the method be applied across programs so that it creates beneficial comparison without interfering with existing program-specific displacement metrics?

The proposed methodology, with the suggested modifications proposed by Bloom, should be used with existing and future programs that identify GHG reduction as a goal of the program. The CEC's methodology should be used as it is comprehensive and accurately calculates displaced emissions. To date, other GHG accounting methodologies do not benefit from the same rigorous analysis and are therefore less precise in accurately accounting for GHG emission reductions.

4. Is the use of a single state-wide heat rate projection appropriate? If not, please explain and provide an alternative.

Yes, this is appropriate to meet the goals and needs of the State, as natural gas-fired generation is the marginal generating resource across the state. This simple approach will also enable easier implementation across programs.

5. Is the use of two heat rate categories (peaking and load following) adequate? If not, please explain and propose an alternative.

This concept is appropriate, but imported electricity should be included as a third heat rate, as noted in response to question #6.

[2] Xu, Lin and Donald Tretheway. Flexible Ramping Products Revised Straw Proposal. California Independent System Operator. August 13, 2014.

6. Does the approach sufficiently address the issue of imported electricity? If not, please suggest ways that it could be improved.

The approach does not appear to incorporate imported electricity, which often comes from sources with higher heat rates than those within California. The approach should include imported electricity as a third heat rate in addition to the load following and peaking heat rates already included. The heat rate for imported power should be based upon the default emissions factor for unspecified imports previously determined by CARB, CPUC, CEC, and other WCI jurisdictions to be 961 lbs/MWh (before T&D losses), equal to a heat rate of 8,221[3]. Additional analysis would be required to determine the appropriate weighting to assign to the imported electricity heat rate, although the CEC estimates that unspecified sources of power contributed 12.48% of the overall CA power mix in 2013[4].

7. Do you agree with the line loss factor used? If not, please explain and propose an alternative.

Yes.

8. **Do you agree with the heat rate floor used? If not, please explain and propose an alternative*.***

We agree that a heat rate floor based on natural gas-fired generation is appropriate, and that the Energy Commission has proposed a reasonable estimate.

Conclusion

In conclusion, Bloom reiterates its appreciation for the opportunity to comment on the 2013 IEPR. Bloom finds that the IEPR with more broad inclusion of DG technologies like fuel cells can provide California with better energy solutions. Consideration of advance energy technologies to help address the Commission's many important objectives will provide more robust discussion and the potential for new and innovative technologies to solve the energy problems of today and tomorrow. New technologies such as Bloom's provide clean, reliable generation that can fit many different scenarios and should be considered as a solution for the objectives discussed herein.

Thank you for your consideration,

Erin Grizard
Director, Regulatory and Government Affairs

[3] http://ei.haas.berkeley.edu/pdf/working_papers/WP236.pdf
[4] http://energyalmanac.ca.gov/electricity/total_system_power.html