

DOCKETED	
Docket Number:	22-IEPR-05
Project Title:	Emerging Topics
TN #:	244042
Document Title:	Bloom Energy Corporation Comments - on June 21, 2022, Workshop on the Role of Hydrogen in California's Clean Energy Future
Description:	N/A
Filer:	System
Organization:	Bloom Energy Corporation
Submitter Role:	Public
Submission Date:	7/12/2022 1:21:45 PM
Docketed Date:	7/12/2022

Comment Received From: Bloom Energy Corporation
Submitted On: 7/12/2022
Docket Number: 22-IEPR-05

Comments on June 21, 2022, Workshop on the Role of Hydrogen in California's Clean Energy Future

Additional submitted attachment is included below.

July 12, 2022

California Energy Commission
715 P Street
Sacramento, CA 95814

Re: Docket 22-IEPR-05. Bloom Energy Corporation Comments on June 21, 2022, Workshop on the Role of Hydrogen in California's Clean Energy Future

Dear CEC Commissioners and Staff,

Bloom Energy (Bloom) appreciates the opportunity to comment on the IEPR Commissioner Workshop on the Role of Hydrogen in California's Clean Energy Future ("workshop") held on June 21, 2022. The workshop panelists presented a well-rounded case on the potential role of hydrogen in California's economy-wide decarbonization effort. Bloom is supportive of the state's hydrogen initiatives and looking forward to the hydrogen developments forthcoming. As such, Bloom respectfully offers the following comments as a partner in ensuring safe, reliable, affordable, and clean energy in California.

Bloom is a provider of solid oxide fuel cell technology that produces always-on, reliable, resilient, and cost-effective electricity both behind-the-meter and in-front-of-the-meter. We have deployed almost 300 MW of firm power to Californians to date.¹ We are proud to be a California company, with manufacturing facilities in the Bay Area, that is exporting leading-edge energy technology worldwide, including fuel cells and hydrogen electrolyzers.

Panel 1 Comments

Bloom urges the CEC staff to consider that the California Air Resources Board's 2022 Scoping Plan Update presented by Maureen Hand must incorporate more favorable hydrogen assumptions and inputs, and keep these points in mind for the IEPR as well. As seen throughout the workshop, multiple research and development (R&D) projects and investments by the public and private sectors are rapidly changing the hydrogen industry. For instance, during the workshop the CEC's staff presented \$45 million worth of hydrogen efforts underway and planned funded by California alone. When also considering federal and worldwide R&D efforts,

¹ Our systems produce near zero criteria pollutants (NO_x, SO_x, and particulate matter) and far fewer carbon emissions than legacy technologies. When running on renewable fuels, electricity produced by Bloom Energy Servers can be RPS-eligible and SB 100 compliant.



it is clear the CEC must account for the fact that hydrogen production and price figures are rapidly changing. The IEPR assumptions and modeling must reflect this rapidly changing landscape. When Mark Rothleder, Sr. Vice President and Chief Operating Officer of the CAISO, asked when hydrogen would be considered in the IEPR, the response included, “it’s coming.” For policymakers and stakeholders to foresee and plan for the role of hydrogen more clearly in California’s future (which is the purpose of the workshop), Bloom urges the CEC to clearly illustrate scenarios with explicit hydrogen considerations. Hydrogen must be one of the top priorities during this and all future IEPR updates.

During Gia Vacin’s presentation on the California Hydrogen Hub, it was stated that “≤ \$5-6 dispensed hydrogen would be game-changing.” While \$5-6 would be a substantial improvement from today’s prices, Bloom believes that the CEC and its sister agencies must aim for even lower dispensed hydrogen prices. Specifically, staff must consider what prices would enable the hydrogen scenarios modeled in the SB 100. For instance, the No Combustion Scenario includes 25 GW of hydrogen fuel cell resources by 2045.² Today’s hydrogen R&D and investments should sufficiently facilitate California’s clean air and energy scenarios being modeled.

Bloom is looking forward to the outcomes of the hydrogen blending efforts described by Jack Chang from the California Public Utilities Commission (CPUC) and is supportive of hydrogen blending initiatives. Hydrogen blending into existing natural gas pipelines allows for reduced GHGs and criteria pollutants during the transition to 100% clean or renewable gases. Hydrogen blending also utilizes existing pipeline infrastructure as long-term energy storage, which facilitates integration of high levels of variable renewable resources. Renewables curtailment is a growing issue in California: average curtailment in 2020 was approximately 4.3 GWh per day and CAISO projects an increase to about 15 GWh by 2030 and 100 GWh by 2045.³ Electrolytic hydrogen produced from renewable resources injected into existing pipeline infrastructure can reduce curtailments, provide seasonal energy storage, and advance decarbonization of end uses attached to the gas pipeline system.

² March 2021. 2021 SB 100 Joint Agency Report.

<https://efiling.energy.ca.gov/EFiling/GetFile.aspx?tn=237167&DocumentContentId=70349>, pg. 13.

³ Mark Rothleder, “Briefing on Post 2020 Grid Operational Outlook,” CAISO, 2019. (available at)

<https://www.caiso.com/Documents/BriefingonPost2020GridOperationalOutlook-Presentation-Dec2019.pdf>



Panel 2 Comments

It should be noted that the presentation from Matthew Bravante of Bloomberg NEF consisted of proton-exchange membrane (PEM) electrolyzer capital cost figures; however, CEC staff should also consider solid-oxide electrolysis cells (SOEC) as another gauge of electrolyzer capital costs. Because SOECs operate at higher temperatures (700 to 850°C) than PEMs, several benefits are realized that make the economics of SOECs the most favorable of all electrolyzers. For instance, the higher temperatures of SOECs means less electricity is needed to produce hydrogen. Additionally, the steam can be used as an input to further reduce the electricity needs. Nearly 80% of the operating cost of clean hydrogen production comes from the electricity used to break the water. Therefore, CEC staff must consider electrolyzers such as Bloom's SOEC, which use less electricity in planning for making low cost, clean hydrogen a reality.

Panel 3 Comments

Presenters in the third panel highlighted the positive impact of public-private partnerships and funding for hydrogen opportunities. Vice Chair Siva Gunda asked for "tangible recommendations" for boosting hydrogen, to which the panelists' recommendations included aligning the hydrogen market and the electric grid, as well as more funding and grant monies. Bloom agrees with the panelists and believes the CEC is uniquely situated to help provide funding to boost California's hydrogen industry and reduce the price of hydrogen. Bloom supports the CEC's funds earmarked for future hydrogen R&D projects and encourages staff to continue finding innovative ways to jump-start emerging projects and make hydrogen production, transportation, and storage more economical.

Panel 4 Comments

Bloom agrees with Nicholas Connell of the Green Hydrogen Coalition that a "well-to-gate" or carbon intensity approach should be used for hydrogen classification, rather than labeling hydrogen by various colors. Bloom recommends that the CEC adopt a carbon intensity framework that sets a technology-neutral foundation upon which all hydrogen production options can be fairly assessed, rather than prematurely selecting preferred hydrogen fuels. By considering carbon intensity, the CEC will foster the development of low and zero carbon solutions.





Bloom appreciates CEC staff's work on the IEPR and in advancing hydrogen technologies and research. As a company that calls California home, Bloom is a committed partner as we collectively transition towards our clean air and energy goals. We appreciate the opportunity to participate and to provide comment.

Best Regards,

Christina Tan

Sr. Energy & Environmental Policy Manager



Bloom Energy Corporation
4353 North First Street, San Jose, CA 95134
408 543 1500
www.bloomenergy.com