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SB 100 Joint Agency Report

Additional submitted attachment is included below.

September 19th, 2019

Re: SB 100 Joint Agency Report: Charting a Path to a 100% Clean Energy Future, Docket No. 19-SB-100

Dear Chair Hochschild, Chair Nichols and Commissioner Randolph,

Thank you for the opportunity to comment on the Joint Agency Workshop on the Senate Bill 100 Report of September 5th, 2019. The undersigned represent a large and diverse array of energy producers, researchers, analysts, environmental NGOs, labor unions, power producers and utilities. We have a common interest in promoting solutions that can help California attain its mid-century climate goals. In this context, we offer comments on the interpretation of “zero-carbon resource” by the California Energy Commission, Air Resources Board and Public Utilities Commission, as referenced in SB100.

We collectively believe that electricity generation projects that produce electricity with zero carbon emissions through the use of carbon capture, utilization and sequestration technology should be considered eligible “zero-carbon resources” under SB100.

About carbon capture, utilization, and sequestration (CCUS):

CCS is a deployment-ready suite of climate mitigation technologies that capture the CO₂ from the flue streams of power plants and industrial facilities, preventing them from entering the atmosphere either via safe, secure and permanent sequestration deep underground. Currently, there are 19 large-scale facilities globally in operation, capturing and geologically sequestering more than 33 million tonnes per annum (mtpa) of CO₂.¹ These projects include large electric generating units in the United States and Canada. Decades of research and diverse experience have shown CCUS to be safe and effective if implemented and regulated properly. The California Air Resources Board recently adopted a “CCS Protocol”, which represents the most comprehensive set of regulations for the technology in any jurisdiction worldwide.

Although in nascent stage, CO₂ utilization has shown equal promise in a variety of products from minerals for concrete and other building materials, to biofuels, paint, fertilizers and health supplements.²

CCUS can help California reach both its 100 percent zero-carbon electricity goal by 2045, as well as its economy-wide carbon neutrality goal. In the electricity sector, the Energy Futures Initiative has identified 37 natural gas combined cycle plants that could be candidates for carbon capture and sequestration, leading to the removal of 27.4mtpa of CO₂ (based on 2016

¹ Global CCS Institute, (2019), “CO₂RE Database, Facilities Report”, <https://co2re/FacilityData>

² Paul Bunje and Marcius Extavour, Carbon Xprize Team Semi-Finalists to Transform CO₂ Waste Into Building Materials, Biofuels, and Toothpaste (Oct. 17, 2016), available at <http://carbon.xprize.org/news/blog/carbon-xprize-team-semi-finalists-transform-co2-waste-building-materials-biofuels>

emissions levels).³ Aided by the recently amended federal 45Q tax credit, CCUS on natural gas power facilities can contribute to system resiliency, optionality and flexibility of grid operation, as well as limiting the overall cost of power-sector decarbonization. For example, studies have shown that a grid with firm low-carbon resources such as natural gas with CCUS, availability could result in 62 percent lower cost.⁴

While there are currently no large-scale natural gas power plants⁵ retrofit with CCUS operating, the technology was demonstrated at the Bellingham natural gas plant in Massachusetts, and the experience gained through other applications is transferrable to natural gas.⁶ Additional natural gas-CCUS projects are under active consideration, and as recently as last week, the U.S. Department of Energy announced tens of millions of dollars to advance carbon capture projects, including one with the Electric Power Research Institute (EPRI) at a Kern County natural gas-fired power plant.⁷ Similarly, NET Power is a new power cycle that can reach similar efficiency as conventional gas power plants while having carbon capture intrinsic in the design and creating zero air pollutants. NET Power has built a successful 50 MWth plant and test facility in La Porte, Texas, and is now developing commercial scale projects.

California could become home to crucial advanced energy technology innovation and demonstration likely to be necessary to achieve deep decarbonization of the global economy. There are several possible ways in which electricity could be generated with zero, or possibly negative, emissions, using CCUS. These include, for example, pre-combustion capture projects, capture technology improvements that enable zero carbon emissions, applications where feedstocks of biogenic origin are gasified and used to fuel gas turbines, blending renewable natural gas in existing gas-fired plants while capturing and sequestering the produced CO₂, adding a direct air capture component, and several others.

Therefore, as part of the SB 100 process, we recommend that the agencies and the SB100 report:

- Explicitly define “zero-carbon resource” to include projects that produce electricity with zero carbon emissions by 2045 through the use of carbon capture and permanent sequestration (deep underground or in products).
- Review and summarize existing literature and analysis on the potential role of CCUS in the full decarbonization of the power sector.
- Explore and summarize the further benefits that CCUS could yield in the industrial and other sectors in the pursuit of economy-wide carbon neutrality by mid-century.
- Take into consideration up-to-date CCUS costs as part of the Integrated Resource Planning process and other power sector modeling efforts.

³ Energy Futures Initiative (2019), “Optionality, Flexibility & Innovation: Pathways for Deep Decarbonization in California” https://static1.squarespace.com/static/58ec123cb3db2bd94e057628/t/5ced6fc515fcc0b190b60cd2/1559064542876/EFI_CA_Decarbonization_Full.pdf

⁴ Sepulveda et al (2019) “The Role of Firm Low-Carbon Electricity Resources in Deep Decarbonization Power Generation”, available at: <https://doi.org/10.1016/j.joule.2018.08.006>

⁵ Coal-fired power plants have been retrofitted, however.

⁶ Zero Emission Resource Organisation, Bellingham, “<http://www.zeroco2.no/projects/bellingham>.”

⁷ U.S. DOE, „FOA 2058: Front-End Engineering Design (FEED) Studies for Carbon Capture Systems on Coal and Natural Gas Power Plants“, <https://www.energy.gov/fe/foa-2058-front-end-engineering-design-feed-studies-carbon-capture-systems-coal-and-natural-gas>

- Consider policy, permitting, regulatory and other barriers to the deployment of CCUS in California.

Respectfully submitted,

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