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Calpine comments on the SB 100 draft study results

Additional submitted attachment is included below.

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Calpine welcomes the opportunity to comment on the SB 100 draft study results. Calpine owns and operates approximately 6 GW of capacity in California including the 725 MW Geysers geothermal plant and a fleet of modern, flexible, efficient gas generation. In addition, Calpine is actively engaged in developing battery storage and Carbon Capture Utilization and Sequestration (CCUS) projects in California.

Calpine generally supports the “key takeaways”¹ of the draft study and the interpretation of SB 100 on which the study is based. In particular, consistent with a similar study sponsored by Calpine,² Calpine appreciates that the study appropriately identifies the importance of “firm generation,” i.e., generation that is not restricted by the availability of its fuel, such as intermittent renewables, or use limits, such as limited-duration storage, in meeting decarbonization goals. As in the Calpine study, the draft study suggests that some continued reliance on gas generation for firm generation, may be the most economical means of meeting reliability and climate goals. To the extent that the state ultimately decides to eliminate reliance on gas generation, it should consider a broader range of technologies more carefully than the draft study as better cost information about these technologies becomes available. For example, the study does not explicitly model gas generation with CCUS or the use of hydrogen in existing gas generation but instead reflects hypothetical zero-carbon firm resources in certain scenarios.

Below, Calpine expands on these general themes in response to the key takeaways of the draft study.

First, while it is an assumption rather than a conclusion of the draft study, Calpine supports the interpretation of SB 100 on which the study is based, i.e., SB 100 requires LSEs to procure clean energy equal to their retail sales. As the joint agencies indicated, this approach is consistent with the plain language of SB 100 and mirrors the RPS on which it is based.³ In addition, Calpine agrees with the joint agencies that there is nothing in SB 100 that supports limits on combustion, regardless of whether combustion is used to make carbon-free energy or other energy beyond the energy required to meet SB 100 requirements.

Second, Calpine agrees that SB100 goals are achievable with existing technologies, particularly with some continued reliance on gas generation to backstop storage and renewables. Nevertheless, Calpine has some concerns that the draft study may understate the difficulty of maintaining reliability as the electricity grid is decarbonized because it does not include rigorous reliability modeling beyond assuring that modeled portfolios meet a planning reserve margin (PRM). Calpine’s own decarbonization study as

¹ Summarized on slide 43 of <https://efiling.energy.ca.gov/getdocument.aspx?tn=234549>

² https://www.ethree.com/wp-content/uploads/2019/06/E3_Long_Run_Resource_Adequacy_CA_Deep-Decarbonization_Final.pdf

³ <https://efiling.energy.ca.gov/getdocument.aspx?tn=234542>, at 8.

well as similar modeling in the CPUC's IRP proceeding includes an additional step that involves testing whether selected portfolios can maintain reliability under a broad range of load and renewable generation conditions. Such modeling may identify extreme events, such as multi-day periods of high load and low renewable generation, during which it may be challenging for portfolios that meet simpler PRM screens to maintain reliability.

Third, Calpine agrees that diverse renewables, including geothermal, can facilitate the achievement of ambitious decarbonization goals, such as SB 100's. As indicated above, Calpine believes that the joint agencies should model resource diversity more comprehensively by explicitly reflecting the characteristics and costs of more resources in the modeling, including gas generation with CCUS or the use of hydrogen in existing gas generation. Although, a combined cycle gas turbine (CCGT) plant retrofitted with CCUS has yet to become commercial, several plants are in development and reliable cost data is becoming more available.

Fourth, Calpine agrees that achieving the SB100 goals will require extremely fast development of zero carbon resources. While the pace suggested by the draft study is ostensibly feasible, constraints on land use and transmission, for example, that are not explicitly reflected in the modeling, may slow implementation. Consequently, the joint agencies should give greater consideration to technologies and portfolios that may not encounter similar constraints. For example, both geothermal and CCUS retrofits to existing gas generation entail minimal land use relative to additional wind and solar development and CCUS retrofits to existing gas units can achieve significant carbon reductions without additional transmission.

Finally, Calpine strongly agrees that the retention of gas generation capacity but producing less energy (and emissions) from the same capacity is an economic means of maintaining reliability while achieving the state's environmental goals. Calpine also agrees that new technologies may eventually obviate the need for continued reliance on gas generation (without CCUS). For example, Calpine believes that CCUS retrofitted to existing gas generation could further reduce emissions from electricity sector while maintaining the valuable reliability benefits of the gas generating fleet.

Notwithstanding the above, Calpine believes that the SB 100 draft study is sufficient for its intended purpose, i.e., a "directional" determination of the feasibility of the SB 100 goals.

Thank you for your consideration.