

DOCKETED	
Docket Number:	23-SB-100
Project Title:	SB 100 Joint Agency Report
TN #:	254770
Document Title:	Fervo Comments on Senate Bill 100 Report Inputs and Assumptions Workshop
Description:	N/A
Filer:	Sarah Harper
Organization:	Fervo Energy
Submitter Role:	Intervenor
Submission Date:	3/1/2024 1:22:01 PM
Docketed Date:	3/1/2024



March 1, 2024

California Energy Commission
Energy Assessment Division
715 P Street
Sacramento, CA 95814

Re: Docket No. 23-SB-100 Comments of Fervo Energy responding to the SB 100 Inputs and Assumptions Staff Workshop

Dear Vice Chair Gunda, Commissioners and Staff:

Fervo Energy (Fervo) appreciates the opportunity to provide public comment on the February 16, 2024, Senate Bill (SB) 100 Inputs and Assumptions Staff Workshop. Fervo acknowledges that this workshop presents the state with a suite of different pathways to achieving SB 100 2045 goals. Fervo recognizes the California Energy Commission's (CEC) role in the state's energy planning process in consultation with the California Public Utilities Commission (CPUC) Integrated Resource Planning Process (IRP) and the California Independent System Operator (CAISO) Transmission Planning Process (TPP), especially as it concerns the integration of firm, 24/7 clean energy sources into the state's electricity grid. The CEC's SB 100 Inputs and Assumptions scenarios must be updated to incorporate enhanced geothermal systems (EGS) technology. Recent innovation and deployment of EGS provides a new, readily deployable, firm, dispatchable resource to help meet the SB 100 targets. EGS is the only clean firm generation resource currently slated to come online at utility scale before 2030. Including EGS in SB 100 modeling is critical to ensure California can meet SB 100 goals, diversify its resources, and maintain a reliable and affordable carbon-free grid.

I. About Fervo Energy

Fervo is a developer of utility-scale enhanced geothermal systems (EGS) projects with lease holdings across the west. Fervo is actively developing projects to support the California grid, including the 400-megawatt Cape Station project in Beaver County, Utah. Cape Station is fully contracted to serve California load serving entities (LSEs) and will come online with the first phase in 2026. The capacity at Cape Station represents almost half of the firm, dispatchable energy ordered by the California Public Utility Commission to meet the grid's reliability needs.¹

¹ CPUC, D. 21-06-035 (2021), <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M389/K603/389603637.PDF>

EGS opens access to a massive set of new subsurface heat resources and increases the capacity of projects to harness them. More capable generators and more abundant resources mean that EGS has the potential to be a critical provider of reliable, zero-emission power for California.

In part due to California's leadership on reliability and grid decarbonization, EGS is ready to serve a critical role in supporting a reliable and affordable carbon-free grid. Fervo is excited to work with the CEC to integrate EGS as a clean firm technology and resource into the SB 100 planning process to ensure a smooth and cost-effective pathway to a fully decarbonized grid.

II. Introduction

Fervo commends the CEC's dedicated focus on planning for a clean energy future. The CEC's SB 100 process sends a very important market signal throughout the state's multi-stage energy planning processes, namely the CPUC's IRP and the CAISO's TPP. Therefore, accurate inclusion of EGS in SB 100 is crucial to meeting the state's clean energy and reliability goals. Fervo requests to collaborate with the CEC to incorporate technological advances in EGS to achieve SB 100 targets. Namely, Fervo is concerned that the omission of EGS as an expansion resource candidate from the scenario components will result in inadequate resource portfolio planning, especially given the major developments in EGS. In particular, the Resource Diversification, Geographic Diversification, and the Combustion Resource Retirements scenarios should include an expanded role for EGS.

To reflect the technological advances in enhanced geothermal systems, Fervo requests the following:

- A. Include EGS as its own category, separate from traditional geothermal sources, as a candidate resource into the Resource Diversification, Geographic Diversification, and Combustion Resource Scenarios;
- B. Under each scenario, include a sensitivity analysis of EGS to inform how technological advances would impact the modeling results;
- C. Allow stakeholders to comment on the scenarios results and make appropriate updates to re-run modeling to ensure results keep pace with real world results and innovation.

In this comment, Fervo addresses modeling EGS resources and recommends strategies for the CEC to consider in its energy planning. Ensuring the CEC provides accurate data and insights on EGS are critical inputs for California's reliability outlook. Fervo welcomes an opportunity to meet with CEC commissioners and staff to share accurate information on EGS advancements.

III. Discussion

A. Include Enhanced Geothermal Systems as its own category, separate from traditional geothermal sources, as a candidate resource under Resource Diversification, Geographic Diversification and Combustion Resource Retirement Scenarios.

Fervo is concerned that the omission of EGS from the candidate resources within the scenario components will result in inadequate resource portfolio planning, especially given the major developments in EGS. The Resource Diversification, Geographic Diversification and Combustion Resource Retirement scenarios are perfect candidates to include EGS resources given the need to provide clean firm capacity. Fervo initially raised the inclusion of EGS into the Resource Diversification and the Combustion Resource Retirement scenarios in response to the Analytical Framework workshop on October 31, 2023. Unfortunately, no progress has been made on the thoughtful inclusion of EGS, and Fervo again recommends EGS' inclusion in the inputs for SB 100.

During the SB 100 Inputs and Assumptions workshop, CEC staff provided a general overview of the different phases of modeling for resources needed to meet SB 100 2045 targets. Within Phase 1, staff cited that specific resources will be identified under each scenario and run through the REGEN model. In Phase 2, modeling through PLEXOS will identify the specific capacity of the identified resource. Given that Phase 1 informs the entire modeling process, including the identification of specific resource types, Fervo strongly urges the CEC to identify EGS as a candidate resource needed in Phase 1. Doing so would ensure Phase 2 can identify the specific capacity expansion needed, namely Fervo's Cape Station 400 MW project. Failing to do so will result in inadequate resource portfolio planning given the major developments in EGS.

Additionally, Fervo urges that the CEC distinguish between geothermal generation types to provide greater clarity on resource assumptions. Specifically, Fervo requests that the CEC specifically model Binary Cycle power plants, as it's broken down in the CEC's SB 423 Firm Zero Resources workshop presentation (see Deep EGS/Binary geothermal generation).² Binary Cycle power plants are the most commonly built geothermal power plants today. These generators operate with no evaporative water losses and have no emissions.³ It's important to make this distinction given the magnitude of EGS expansion, as evidenced in projects such as Fervo's 400-megawatt Cape Station project in Beaver County, Utah. For example, to reflect the innovation and availability of EGS, the CEC should update the Resource Diversification scenario to include an increased role for EGS from in-state and imported resources. Adequate EGS assumptions should be accounted for in this case. Fervo welcomes the opportunity to work with the CEC on clarifying this important distinction.

² See CEC's slide on costs and reference of types of geothermal: Hydro/Flash, Hydro/Binary, NF EGS/Flash, NF EGS/ Binary, Deep EGS/Flash, Deep EGS/Binary

³ DOE, Geothermal FAQs, accessed at <https://www.energy.gov/eere/geothermal/geothermal-faqs>

B. The CEC, within the Resource Diversification, Geographic Diversification and Combustion Resource Retirement Scenarios, should undergo a sensitivity analysis specifically for EGS to inform how technological advances would impact the modeling results.

As a next step to including EGS as a candidate resource under the scenarios described above, Fervo strongly urges the CEC to conduct sensitivity analyses of EGS, and how these technological advances would impact the modeling results. For example, under the Resource Diversification scenario, the CEC should select EGS as a candidate resource and conduct a sensitivity analysis, or a range of EGS available, using the 400 MW Cape Station project as a key input.

Separately, the CEC presentation clearly demonstrated that certain resources, namely hydrogen, would support the state's retirement of the natural gas fleet (see slide 56). EGS is dispatchable, flexible, weather independent, zero emission, and ready to deploy today. Given these favorable characteristics, EGS should also be included as a resource option to replace the retiring natural gas fleet. Expanding the role of EGS across SB 100 scenarios will provide additional capacity for the state to reduce reliance on fossil fuels. Thoughtfully integrating EGS, alongside weather dependent renewable sources, ensures that the state's energy grid remains resilient and capable of meeting high-demand periods, all while relying less on gas powered peaker plants.

C. Stakeholders should be allowed to weigh in on the full results of scenarios before they are officially modeled in order to make major changes.

During the question-and-answer portion of the presentation, a stakeholder asked CEC staff whether there would be additional time incorporated into the modeling process to re-run scenarios to make adjustments or changes to the SB 100 inputs and assumptions. CEC staff answered that there would be an opportunity to see the results of the full scenarios, but there would likely not be sufficient time to make major changes to SB 100 modeling. Given the sustained omission of EGS advances in the Scenarios, Fervo urges the CEC to allow stakeholders the opportunity to weigh in on the full results of scenarios and request that significant changes be made before the full results are set. Allowing more input from stakeholders will enable the critical collaboration between industry stakeholders and state planning that will enable SB 100 goals. Considering the delayed publication of the SB 423 Firm Zero-Carbon Resources legislative report, which specifically evaluated the need for firm zero carbon resources in reliability modeling, stakeholders should be given additional information on SB 423 insights before being asked to weigh in on SB 100 inputs.

IV. Conclusion

Fervo is developing clean firm resources to meet California's pre-2030 (and 2045) resource needs today and encourages continued support for long lead time resources to meet the needs of the coming decades.

The need for clean firm resources will only increase into the next decade, and the state must start planning for them today to ensure their availability. As currently proposed, the SB 100 inputs and assumptions omit the proven resource and promising potential of EGS, despite hundreds of megawatts planned capacity to come online by 2028. California is facing a dilemma of affordability, reliability and decarbonization. Expanding EGS helps address all three of these challenges and deserves serious consideration in the CEC's SB 100 planning framework.

Fervo is committed to California's clean energy future through the development and integration of EGS. We look forward to collaborating with the CEC and other stakeholders in this endeavor, ensuring a smooth transition to a decarbonized and resilient energy grid.

Sincerely,

A handwritten signature in black ink that reads "Sarah Harper". The signature is written in a cursive style with a long, sweeping underline.

Sarah Harper
Policy and Regulatory Affairs Associate
Fervo Energy Company