DOCKETED	
Docket Number:	25-IEPR-01
Project Title:	General Scope
TN #:	270012
Document Title:	XGS Energy, Inc. Comments - XGS Comments on Draft 2025 IEPR and Draft Renewable and Firm Zero-Carbon Resources Report
Description:	N/A
Filer:	System
Organization:	XGS Energy, Inc.
Submitter Role:	Public
Submission Date:	5/15/2026 3:09:41 PM
Docketed Date:	5/15/2026

Comment Received From: XGS Energy, Inc.
Submitted On: 5/15/2026
Docket Number: 25-IEPR-01

XGS Comments on Draft 2025 IEPR and Draft Renewable and Firm Zero-Carbon Resources Report

Additional submitted attachment is included below.

May 15, 2026

California Energy Commission
Docket No. 21-ESR-01, 25-IEPR-01
715 P Street
Sacramento, California 95814

RE: XGS Energy, Inc. Comments on the Draft Renewable and Firm Zero-Carbon Resources Report and 2025 Integrated Energy Policy Report

XGS Energy, Inc. (XGS) appreciates the opportunity to submit comments to the California Energy Commission (CEC) on the Draft Renewable and Firm Zero-Carbon Resources Report (SB 423 Report) and the Draft 2025 Integrated Energy Policy Report (IEPR), which includes the SB 423 Report in Appendix B.

XGS strongly supports the CEC's inclusion of geothermal resources as part of California's long-term clean energy planning efforts. As the state evaluates pathways to maintain reliability while decarbonizing the electric system, geothermal technologies can provide an important source of in-state clean firm capacity. However, to ensure that statewide planning efforts accurately reflect the evolving geothermal landscape, the CEC should explicitly evaluate the full spectrum of next-generation geothermal technologies, including both enhanced geothermal systems (EGS) and closed-loop geothermal technologies.

Next-generation geothermal has the potential to address many of the challenges that have historically limited conventional geothermal deployment, improving geothermal's ability to provide cost-effective, carbon-free firm electricity. Next-generation geothermal resources like XGS' closed loop system do not have the geographic and scaling limitations that have historically limited conventional geothermal and can be developed in many more locations across California. This will allow these resources to produce more firm energy at costs that are competitive with non-clean or non-firm resources.

About XGS

XGS Energy has developed a proprietary geothermal system to deliver clean, firm geothermal energy anywhere there is hot rock. XGS Energy's advanced geothermal system is a new technology that is distinct from conventional geothermal and other next-generation geothermal systems such as enhanced geothermal systems. XGS geothermal has significant development opportunities in the state of California, both by increasing the geothermal outputs of traditional geothermal fields and by unlocking geothermal potential in new locations that have not been

suitable for traditional geothermal development. These new resources can provide clean, firm power for California.

XGS Energy's advanced geothermal technology also offers California distinct benefits:

- **Water independence.** The XGS system continuously recycles water in a closed loop, with negligible consumptive water loss over time. This is particularly important for the water-stressed communities of California and the western U.S.

- **Simplified construction and operations.** The XGS system does not require fracking, does not produce nor require management of any geothermal brine, and does not produce any emissions. This simplified design streamlines the development of geothermal projects from zoning, permitting, and community impact perspectives, considering key historical concerns with and barriers to geothermal development.

- **Scalable.** XGS technology is highly scalable, with projects expected to range in size from 5 MW to projects larger than 200 MW. In some regions, phased development with XGS technology is expected to unlock over a gigawatt of new clean firm energy. This range in scale creates more flexibility to locate in load constrained pockets and more flexibility in executing Power Purchase Agreements with LSEs.

These key benefits will help enable additional geothermal deployment across more locations, at a scale aligned with California's energy objectives and, in many cases, at an accelerated pace. This increased deployment will help XGS lower the cost of geothermal energy and provide greater value to ratepayers compared to other clean firm resources.

XGS is actively deploying in California and recently signed a Geothermal Exploration, Offtake, and Development Engagement (GEODE) Agreement with California Community Power (CC Power) to support development of 115 megawatts (MW) of next-generation geothermal energy in California.[1] This partnership builds on a shared commitment to clean, firm power that strengthens grid reliability and supports the state's long-term energy goals.

The SB 423 Report should include the full spectrum of geothermal technologies.

The SB 423 Report discusses geothermal as a clean firm resource technology; however, the discussion of emerging geothermal technologies is focused primarily on enhanced geothermal

[1] XGS Energy and CC Power Partner on 115 MW Next-Generation Geothermal Development Agreement. https://www.xgsenergy.com/xgs-energy-and-cc-power-partner-on-115-mw-next-generation-geothermal-development-agreement/

systems (EGS). While EGS is an important technology pathway, it represents only one category of next-generation geothermal technologies currently being developed.

Stakeholders sometimes use the terms "enhanced geothermal" and "next-generation geothermal" interchangeably, but these terms are not synonymous. Enhanced geothermal systems create a new underground geologic fracture network, typically through hydraulic fracturing; water then flows through that new fracture network to extract heat from the rock and is returned to the surface to generate electricity. The SB 423 Report's discussion of next-generation geothermal technologies primarily reflects this EGS framework.[2]

However, next-generation geothermal also includes other types of new geothermal technologies. Closed-loop is a distinct type of next-generation geothermal that uses fluids circulating through closed wellbore loops. This means that the working fluid does not come into direct contact with the hot rock and the system remains closed.

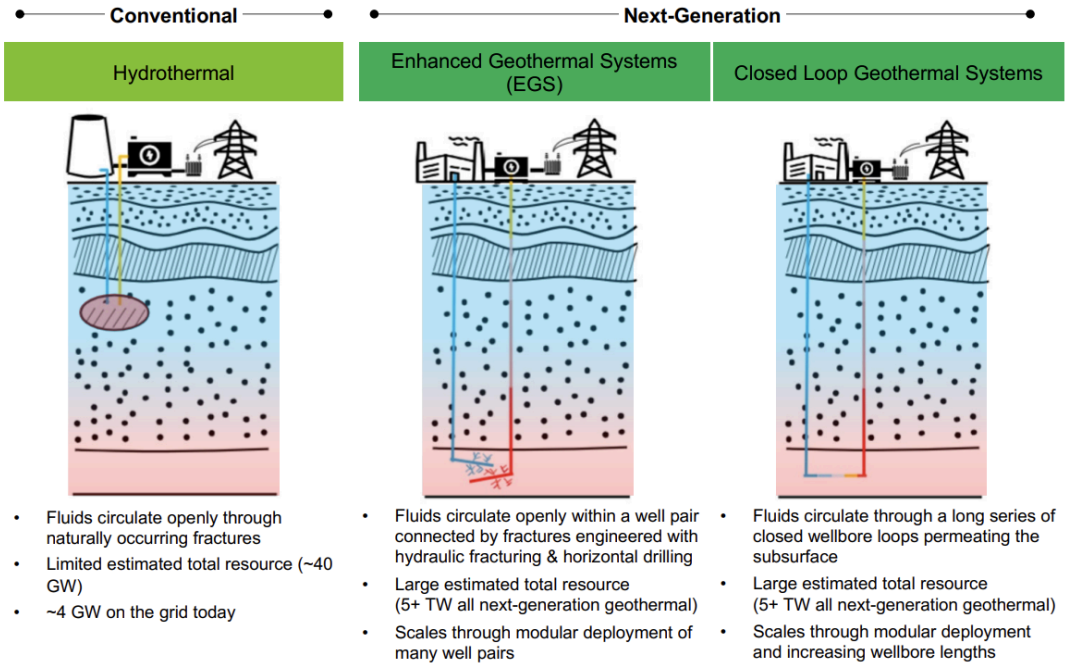
XGS recommends that the CEC focus on both conventional and next-generation geothermal in the SB 423 report. XGS recommends the next-generation geothermal definition below, which is derived with some adjustments for clarity from the Department of Energy's Report "Pathways to Commercial Liftoff: Next-Generation Geothermal Power":[3]

> Next-generation geothermal technologies use drilling, completion, and/or hydraulic fracturing advances to enable heat extraction from hot rock that is naturally impermeable, expanding the geothermal resource potential past naturally occurring, permeable underground reservoirs. Two prominent categories of next-generation geothermal being developed today are closed loop and enhanced geothermal systems.

The Pathways to Commercial Liftoff Report also includes the following overview of geothermal technologies that the CEC should reference.

[2] Draft SB 423 Report at 10-11.
[3] U.S. Department of Energy (DOE), *Pathways to Commercial Liftoff: Next-Generation Geothermal Power*, https://cdn.catf.us/wp-content/uploads/2025/06/09154348/doe-liftoff-nextgen-geothermal.pdf

Geothermal Overview from *Pathways to Commercial Liftoff*[4]



Executive Summary Figure 1: Geothermal technology overview across conventional (left) and next-generation (right) designs [b]

Evaluating different types of next-generation geothermal is important because different geothermal technologies present different operational characteristics and risk profiles. For example, the SB 423 Report discusses the potential for EGS technologies to create induced seismicity. However, not all next-generation geothermal technologies carry these same risks.

XGS's closed-loop geothermal system specifically addresses concerns related to induced seismicity and water usage. XGS's system uses a single well drilled into hot rock, surrounded by thermally conductive materials that enhance heat transfer. Fluid circulates entirely within a sealed casing system and returns to the surface through an insulated inner tube, creating a fully closed-loop configuration. Because the system maintains geologic integrity and does not rely on creating underground fracture networks, it avoids the seismicity concerns associated with some EGS technologies.

A more comprehensive evaluation of next-generation geothermal technologies would therefore provide the CEC with a more accurate understanding of the range of geothermal technologies available to support California's clean energy transition.

[4] Ibid at Figure 1.

Next-Generation Geothermal Can Significantly Expand California's Clean Firm Resource Potential

It is critical that the full spectrum of geothermal resources are included in the SB 423 Report because recent modeling by the California Public Utilities Commission (CPUC) demonstrates that next-generation geothermal could materially expand California's in-state clean firm resource potential.

The CPUC estimates approximately **24 GW of in-state geothermal resource potential**, including both near-field and deep next-generation geothermal resources. Near-field next-generation geothermal has the potential to approximately double the capacity of existing geothermal resource areas from approximately 3.4 GW of conventional geothermal to 6.8 GW when next-generation technologies are included.[5] Deep geothermal resources, derived from temperature-at-depth datasets, could unlock an additional ~21 GW of potential.[6]

Next-generation geothermal technologies also expand siting opportunities beyond traditionally defined Known Geothermal Resource Areas (KGRAs). While these technologies are most likely to be developed near existing geothermal fields in the near term, they are not limited to those boundaries. For example, XGS has confirmed significant viable geothermal heat resources for its technology in Lake and Sonoma counties, outside of the existing defined Geysers KGRA in that region. This is further supported by data shared by Sonoma Clean Power Authority showing known 1.5 GW of in-development geothermal projects in California, both inside and outside of the explicit boundaries of the KGRAs.[7]

In the future, XGS expects that additional next-generation geothermal potential will be unlocked in new areas outside of KGRAs, areas that have traditionally been unsuited to geothermal development. These include locations with good thermal resources, or hot rock, but no natural hydrothermal features or water access. As next-generation geothermal companies continue to explore thermal resources across California, additional development opportunities for this new geothermal technology are likely to emerge.

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[5] CPUC 2024 – 2026 Integrated Resource Planning (IRP) Inputs & Assumptions, February 2026, at p.74. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2024-2026-irp-cycle-events-and-materials/2025_inputs_and_assumptions_report_20260210.pdf

[6] Ibid.

[7] Sonoma Clean Power Authority Comments on the ALJ Ruling Seeking Comments on Busbar Mapping of Electricity Resource Portfolios for 2026-27 Transmission Planning Process at p.5. https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M588/K056/588056548.PDF

Taken together, these analyses demonstrate that next-generation geothermal is not a marginal resource, but rather a potentially foundational source of clean firm energy that should be explicitly evaluated in California's statewide planning processes.

Conclusion

XGS appreciates the opportunity to comment on the updated SB 423 Report and the Draft 2025 IEPR Update. As California evaluates pathways to maintain electric reliability while achieving long-term decarbonization goals, it is important that statewide planning efforts reflect the full range of emerging clean firm technologies under development. Explicitly evaluating the broader category of next-generation geothermal technologies, including both EGS and closed-loop systems, will provide the CEC with a more comprehensive understanding of the opportunities available to expand California's in-state clean firm resource base.

Sincerely,

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