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Please see the attached comments and presentation

Additional submitted attachment is included below.



July 23, 2026

California Energy Commission
Docket No. 26-IEPR-04
715 P Street Sacramento, CA 95814

Submitted Electronically

RE: Comments on IEPR Commissioner Two-Day Workshop on California's Geothermal Energy Resources

XGS Energy appreciates the opportunity to comment on the California Energy Commission's 2026 Integrated Energy Policy Report (IEPR) Commissioner Two-Day Workshop on California's Geothermal Energy Resources. XGS strongly supports the Commission's continued assessment of geothermal energy in the 2026 California IEPR. As California evaluates the role of geothermal in meeting its reliability and decarbonization goals, XGS urges the Commission to assess the full spectrum of next-generation geothermal technologies to identify near-term policy actions that can accelerate in-state geothermal development.

About XGS

XGS Energy has developed a proprietary geothermal system to deliver clean, firm geothermal energy anywhere there is hot rock. XGS's advanced geothermal system is a new technology that is distinct from conventional hydrothermal geothermal and other next-generation geothermal systems. The technology has significant development opportunities in the state of California, both by increasing the productivity of existing geothermal fields and by unlocking geothermal potential in new locations that have not historically been suitable for traditional geothermal development. These new resources can provide clean, firm power to support California's reliability needs and long-term clean energy objectives.

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

- **Water independence.** The XGS system continuously recirculates water within a fully contained subsurface and surface system, without producing fluids from or injecting fluids into the surrounding geologic formation, resulting in negligible water consumption during power generation. 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.
- **Scalability.** 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 Load Serving Entities.

These key benefits will help enable additional geothermal deployment in more locations, at a scale aligned with California's energy objectives and in many cases at an accelerated pace.

XGS appreciates the opportunity to provide written comments on the IEPR Commissioner Two-Day Workshop on California's Geothermal Energy Resources. We have organized our comments around four key themes that were discussed:

- 1) Permitting of geothermal exploration and development in California should be simplified and streamlined
- 2) Transmission planning and grid interconnection should support geothermal resource development
- 3) State agencies should play a proactive role in accelerating geothermal deployment in the state
- 4) The importance of recognizing different types of geothermal technology and creating flexibility to capture key attributes of each

Permitting of geothermal exploration and development in California should be simplified and streamlined

During the July 9, 2026 workshop, XGS pointed out that an average 30MW geothermal project in California requires up to twelve permits across the state, local, and utility jurisdictions and noted that even for exploratory wells, California requires a full California Environmental Quality Act (CEQA). XGS urges the Energy Commission to identify concrete steps on which it can take immediate action – including collaboration with other agencies – to make quick and needed progress on simplifying permitting of geothermal exploration wells. XGS supports reduced requirements for exploratory wells like those considered in AB 527¹ or categorical exclusions similar to those already in place for federal lands².

The federal categorical exclusion allows the Bureau of Land Management (BLM) to approve certain geothermal exploration and resource-confirmation drilling projects without preparing a full environmental assessment or environmental impact statement, provided the project does not involve commercial resource use, disturbs no more than 20 acres, includes required reclamation and environmental protections, and presents no extraordinary circumstances. The purpose of the BLM's categorical exclusion is to shorten permitting timelines for determining whether a commercially viable geothermal resource exists. It does not cover construction or operation of a geothermal power plant. The State could adopt similar rules for exploratory wells.

Additionally, California currently has different permitting structures for subsurface and surface resources which is inefficient. In our presentation at the workshop, we highlighted several solutions that could be implemented to address this inefficiency, including:

- Avoiding duplication between surface and subsurface review, and between exploration and production stages
- Ensuring CalGEM and the CEC have staff dedicated to geothermal — capacity, not just policy, is the real constraint
- Building on AB 1359 and AB 531 with a statewide permitting guidebook and clearer timelines

Together, these measures could make geothermal permitting more coordinated, predictable, and efficient. XGS supports each of these recommendations.

¹ Please see: Section 2, AB 527, as introduced, Papan. California Environmental Quality Act: geothermal exploratory projects. <https://legiscan.com/CA/text/AB527/id/3111953>

² Please see: <https://public-inspection.federalregister.gov/2025-01055.pdf?1736948757>. See also: <https://eplanning.blm.gov/Project-Home/?id=18e33ce3-a7f2-f011-8407-001dd803d7d3>

The CEC highlighted its opt-in certification program as a useful permitting pathway. XGS agrees but notes that further reform to address duplication like those highlighted between surface and subsurface permitting will be needed. While the opt-in program can reduce the number of separate permits required, the overall reduction in the amount of time it takes to get a permit may be limited without dedicated staffing and clearer guidelines.

Transmission planning and grid interconnection should support geothermal resource development

XGS believes it is critical that California agencies quickly identify transmission upgrades and related investment needed to increase capacity for high-potential geothermal regions, especially in regions that are newly accessible by next-generation technology. XGS supports Sonoma and Mendocino counties efforts to identify GeoZones. These GeoZones can serve as a guide for transmission mapping efforts.³ We appreciated CAISO President Mainzer's comments indicating CAISO's interest in accurately capturing upcoming geothermal development and highlighting that the CAISO does not wish to be a barrier to the development of baseload resources that will be critical for electric reliability.

Transmission development can create a chicken-and-egg problem for geothermal projects. CAISO may plan regional transmission before individual projects are commercially advanced, but generally only after the relevant resource type, amount of generating capacity, and location are reflected in the CPUC's base-case resource portfolio; project-specific upgrades are identified later through the interconnection process. At the same time, developers often need a power purchase agreement to secure financing, yet may struggle to obtain one until the necessary transmission is included in CAISO's Transmission Planning Process. This misalignment in timing is further exacerbated by recent reforms where CAISO gives priority in the cluster study process to projects that have already shown commercial interest by having a PPA, but load serving entities are reluctant to execute PPAs for projects that cannot already show full deliverability.

During the workshop XGS proposed several solutions to these challenges, which we highlight again here, and asked the Energy Commission and relevant State entities to:

- Recognize the system value of always-on baseload power in interconnection queue prioritization.

³ Please see: <https://sonomacleanpower.org/geozone>

- Align transmission planning with priority geothermal zones, like the Sonoma-Mendocino GeoZone or GEODE⁴ agreement projects. In April 2026, XGS and CC Power partnered on a 115 MW next generation geothermal project agreement.⁵
- Acknowledge that geothermal reduces curtailment and supports reliability and ensure that value shows up in planning, for example by:
 - Awarding extra points in modeling scenarios,
 - Ensuring the CPUC's IRP and RA processes provide sufficient credit to geothermal's high capacity factor and appropriately value its ability to serve multiple uses including providing reliability at all hours of the day, charging batteries, or being dispatched during emergencies, and
 - Exploring other instances that prioritize clean-firm generation when and where clean-firm is needed.

State agencies should play a proactive role in accelerating geothermal deployment in the state

Another key theme highlighted during the July 9 IEPR workshop that XGS wishes to highlight in our written comments is that the role of government agencies is vital in geothermal development. XGS acknowledged that California has taken action to accelerate geothermal and outlined several important recent initiatives:

- AB 1359 (2024) — lets counties serve as CEQA lead agency for exploratory drilling, easing a longstanding CalGEM staffing bottleneck
- AB 531 (2025) — opens the CEC's streamlined "Opt-In" certification to geothermal projects of any size
- CPUC's 1 GW geothermal procurement, under AB 1373 — D.24-08-064 (2024) reserves 1 GW for geothermal within DWR's long-lead-time procurement, with solicitations starting 2027
- Mid-term Reliability (MTR) requirement, D.21-06-035 — reserves 1 GW for firm, zero-emission resources (80%+ capacity factor); not geothermal-specific, but geothermal is called out as the leading eligible resource

⁴ The Geothermal Energy from Oil and Gas Demonstrated Engineering (GEODE) initiative aims to leverage the extensive knowledge, technology, skill, and experience of the oil and gas sector, allowing the geothermal industry to tackle barriers to geothermal deployment while also including fossil-fuel-based communities and workers. Please see: <https://cacomunitypower.org/cc-power-signs-3-geode-agreements-to-incentivize-california-geothermal-development/>

⁵ Please see: <https://www.xgsenergy.com/xgs-energy-and-cc-power-partner-on-115-mw-next-generation-geothermal-development-agreement/> Others companies have also signed agreements with CC Power, please see: <https://cacomunitypower.org/cc-power-signs-3-geode-agreements-to-incentivize-california-geothermal-development/>

- CPUC's 2/26/26 IRP decision, D.26-02-057 — carves out 25% (1,500 MW) of the new 6 GW procurement for clean firm/long-duration resources; not geothermal-specific, but geothermal's ~87% marginal ELCC makes it the leading eligible resource
- CEC cost-share, GFO-25-902 — through the Geothermal Grant & Loan Program, matches California awardees of DOE's \$171.5M Geothermal Power Accelerator opportunity dollar-for-dollar, up to \$2M per project

One key area agencies can help is in reducing the financial risk of exploratory drilling. Simplifying permitting for this exploration can not only reduce permitting timelines, it can also help reduce permitting costs. Another action the state could take immediately is organizing and making available the large amounts of data the state already has on geothermal resources. Providing developers with more data on geothermal potential can meaningfully de-risk exploration early stage development, help drive down exploration costs, and accelerate development.

Additionally, relatively small grant and loan programs, like the CEC's geothermal grant and loan program, can have an outsized market impact by funding the high-risk early work needed to assess resources, demonstrate technologies, support local permitting capacity, and establish project viability. By reducing initial costs and uncertainty, these programs help projects attract private capital and advance toward commercial development. These types of programs can also help drive down costs.

XGS spoke about these practical actions for CEC and California's at the July 9 IEPR workshop and provides them again here for consideration:

- State tax credits for geothermal, at parity with New Mexico⁶ and Colorado⁷
- Keep CEC Geothermal Grant & Loan Program funding at parity with other clean-firm technologies
- Targeted policy alignment unlocks private capital that is already waiting to deploy

It is important to recognize the different types of geothermal technology and create flexibility to capture key attributes of each

As we noted in our oral comments at the June 19, 2026 IEPR workshop, XGS encourages the CEC to evaluate the broad spectrum of next-generation geothermal technologies during the IEPR process. Next-generation technologies include enhanced

⁶ New Mexico's Geothermal Electricity Generation Income Tax Credit, <https://www.nmlegis.gov/sessions/24%20Regular/bills/house/HB0092.HTML..>

⁷ Colorado's Geothermal Energy Tax Credit, <https://energyoffice.colorado.gov/geothermal-tax-credit>.

geothermal, but also geothermal systems, like XGS's, that continuously recycle water in closed pipes. These technologies significantly expand California's geothermal potential.

Given the importance of next-generation, in the future development of geothermal deployment in CA, a specific next-generation geothermal assessment should be included in the IEPR. In that assessment, all types of next-generation geothermal, including both drilling-only and drilling plus fracking approaches, should be explicitly discussed.

We also note that one of the larger issues that XGS sees in the next-generation geothermal space is that regulatory agencies and LSE's are primarily using numbers from the Annual Technology Baseline that the National Lab of the Rockies (formerly NREL) maintains for next-generation geothermal technology. The Annual Technology Baseline provides standardized current and projected cost and performance assumptions for energy technologies through 2050, including capital costs, operating costs, capacity factors, financing assumptions, and levelized cost of energy. Those numbers are based on older EGS-specific data and may not accurately reflect costs and performance assumptions for other types of advanced geothermal technologies.

To fully capture the potential of geothermal technologies, XGS recommends that the CEC acknowledge differences between the various technologies to ensure that it and the State are accounting for important nuances – for example XGS's technology needs hot rock, but not hot water. This opens up the number of locations where some geothermal projects can be sited which then changes transmission analyses etc. Or, if the analysis is more "one size fits all", the CEC could include caveats about how and where the analysis might be limited.

Next-generation geothermal differs from conventional geothermal in several key respects:

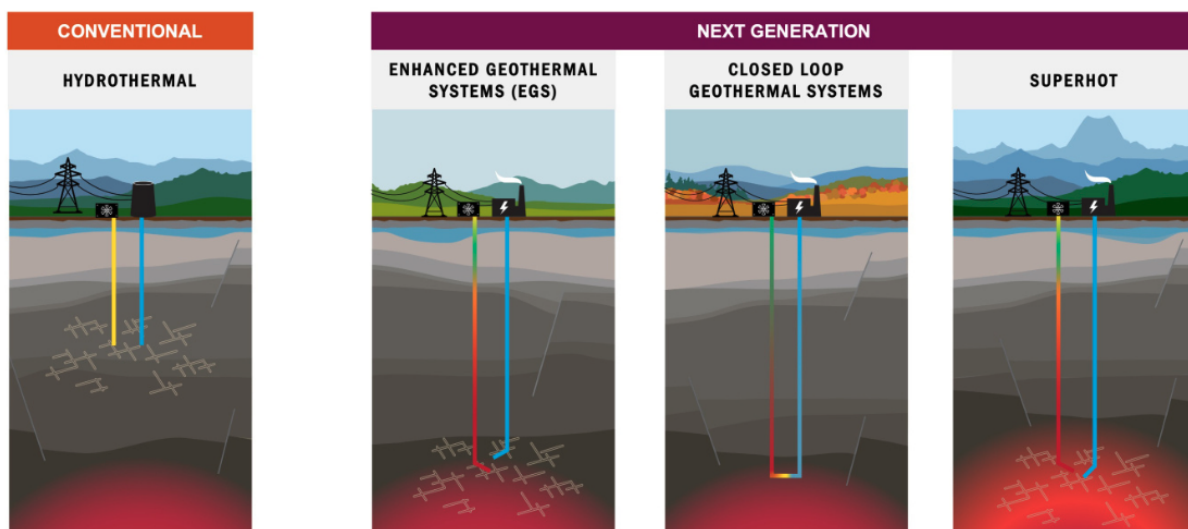
- **Potential:** Next-generation geothermal can extract significantly more heat and energy potential from the subsurface. Recent modeling by the California Public Utilities Commission estimates approximately 24 GW of in-state geothermal resource potential.⁸

⁸ Near-field next-generation geothermal has 3.4 GW of potential while deep geothermal resources, derived from temperature-at-depth datasets, could unlock an additional 21 GW of potential. All data from 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/2024-2026-irp-cycle-events-and-materials/2025_inputs_and_assumptions_report_20260210.pdf

- **Geography:** These technologies are not bound by the same geographic limitations as traditional hydrothermal systems.
- **Cost:** Next-generation systems are likely to become more cost-effective than conventional geothermal systems as the technology scales.

The graphic below illustrates the varying types of geothermal power generation technologies⁹. Given these distinctions, there may be risks in appropriately understanding the potential, unique development considerations, development timelines, and policy needs if all geothermal technologies are always grouped under one broad umbrella.

Geothermal Power Generation Technologies



Conclusion

In conclusion, XGS appreciated the opportunity to participate in the July 9, 2026 IEPR workshop on geothermal energy and to share our perspective on the opportunities and challenges facing geothermal development in California. We are pleased to submit these written comments as a follow-up to that discussion and welcome the opportunity to provide any additional information that may be helpful. Please also consider the

⁹ Please see: <https://www.energy.gov/hgeo/geothermal/geothermal-electricity-generation>

references we have included as you are drafting the IEPR. Feel free to contact us with questions or requests for more detail.

Sincerely,

/s/ Caity Smith

Caity Smith

Director of Stakeholder Engagement

XGS Energy, Inc.

Tel: (707) 477 5567

E-mail: csmith@xgsenergy.com

XGS Energy

Clean. Low Cost. Round-the-Clock
Energy. Everywhere. Forever.

CEC IEPR Geothermal Workshop — Permitting Panel

July 9, 2026



Who We Are: A Next-Generation Geothermal Technology & Project Developer

- **Headquartered in Palo Alto, CA, with offices in Houston, TX** — 30+ FTEs and growing, with a team behind 10+ GW of U.S. renewables development experience
- **A proprietary, water-independent next-generation geothermal system** — zero consumptive water use and no hydraulic stimulation, deployable anywhere there is hot rock
- **Proven at commercial scale** — 3,000+ hour demonstration of our system at commercial geothermal conditions at the Coso field near China Lake, California
- **Advancing a multi-GW project pipeline** — including a 115 MW Geothermal Exploration, Offtake, and Development Engagement (GEODE) Agreement with CC Power to develop this power in-state, for use by California ratepayers
- **Not just a technology company** — we permit, build, and operate geothermal projects directly

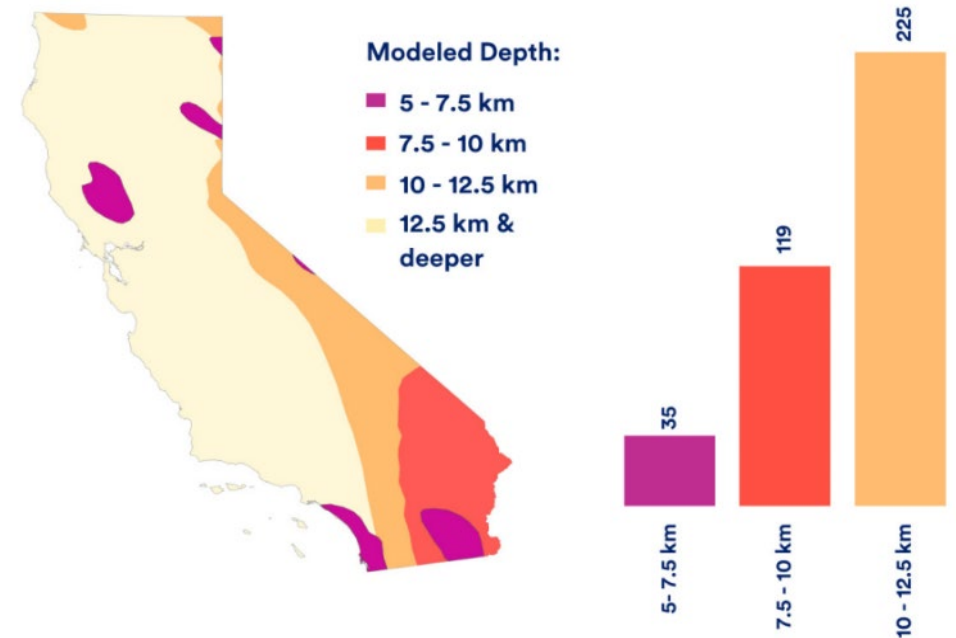


XGS's water-independent system, proven at commercial scale — Coso field, California
Source: XGS Energy

Why California Is Central to XGS's Strategy

- **35+ GW of geothermal opportunity** — when hot-rock resources are counted alongside California's legacy geothermal fields
- **Already permitted and demonstrated in-state** — XGS's system has cleared BLM permitting and EPA waste stream approval, and completed a commercial-scale demonstration at the Coso field
- **Building a multi-GW project pipeline sited in California** — to meet grid reliability needs, growing clean-firm demand from industry and data centers, and long-term decarbonization goals
- **No consumptive water use, no hydraulic stimulation** — aligning with environmental and community priorities relative to legacy geothermal development

Modeled Geothermal Resource Potential



Estimated GW potential grows with modeled resource depth — deeper hot-rock zones (10-12.5 km) represent the largest share of the opportunity

Source: CATF

California's Permitting Landscape Today

Local and state review stack sequentially for every project – utility interconnection runs as a separate, parallel track

12 permits

typically required for a 30 MW project across local, state, and utility agencies

Up to 24 months

for CEQA environmental review alone, depending on project complexity

2+ years

for exploratory drilling approval to clear all required California reviews

Local

- Use permit & site plan review (county planning department)
- CEQA lead agency role for exploratory drilling review, since AB 1359 (2024)
- Cultural and biological resource review; fire safety review

State

- CalGEM: notice of intention to drill, well bonding & operations oversight
- State Water Resources Control Board: water use & discharge permits
- Local air district: air quality permit
- CEC: streamlined certification ("Opt-In") pathway for qualifying projects

Interconnection

- Utility interconnection agreement, under CPUC oversight. Average wait time from submitting an IX request to reaching commercial operations is 4-7 years
- CPUC clean-firm procurement mandate is separately driving demand for these connections

California Has Started to Move

- **AB 1359 (2024)** — lets counties serve as CEQA lead agency for exploratory drilling, easing a longstanding CalGEM staffing bottleneck
- **AB 531 (2025)** — opens the CEC's streamlined "Opt-In" certification to geothermal projects of any size
- **CPUC's 1 GW geothermal procurement, under AB 1373** — D.24-08-064 (2024) reserves 1 GW for geothermal within DWR's long-lead-time procurement, with solicitations starting 2027
- **MTR requirement, D.21-06-035** — reserves 1 GW for firm, zero-emission resources (80%+ capacity factor); not geothermal-specific, but geothermal is called out as the leading eligible resource
- **CPUC's 2/26/26 IRP decision, D.26-02-057** — carves out 25% (1,500 MW) of the new 6 GW procurement for clean firm/long-duration resources; not geothermal-specific, but geothermal's ~87% marginal ELCC makes it the leading eligible resource
- **CEC cost-share, GFO-25-902** — through the Geothermal Grant & Loan Program, matches California awardees of DOE's \$171.5M Geothermal Power Accelerator opportunity dollar-for-dollar, up to \$2M per project

But growth has still stalled

~139 MW

added statewide since 2000 — just four new projects in a quarter century

357 MW

of proposed projects requested suspension in 2025

49.9 MW

approved in 2024, but construction has yet to begin

Practical Fixes That Would Speed Projects Up

Permitting

- Avoid duplication between surface and subsurface review, and between exploration and production stages
- Ensure CalGEM and the CEC have staff dedicated to geothermal – capacity, not just policy, is the real constraint
- Build on AB 1359 and AB 531 with a statewide permitting guidebook and clearer timelines

Grid & Interconnection

- Recognize the system value of always-on baseload power in interconnection queue prioritization
- Align transmission planning with priority geothermal zones, like the Sonoma-Mendocino GeoZone or GEODE agreement projects.
- Geothermal reduces curtailment and supports reliability – that value needs to show up in planning

Incentives

- State tax credits for geothermal, at parity with New Mexico and Colorado
- Keep CEC Geothermal Grant & Loan Program funding at parity with other clean-firm technologies
- Targeted policy alignment unlocks private capital that is already waiting to deploy

Clean.
Low Cost.
Round-the-Clock Energy.
Everywhere.
Forever.

California has the geology, demand, workforce, and urgency to lead the next phase of geothermal development — XGS is excited to build here, and we're already doing it.

Thank you — Caity Smith, XGS Energy | csmith@xgsenergy.com

[XGSENERGY.COM](https://xgsenergy.com)

