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IEPR Commissioner Workshop on Firm Zero-Carbon Resources and Hydrogen

Additional submitted attachment is included below.

Sonoma Clean Power

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August 18, 2025

California Energy Commission
Docket Unit: MS-4
Docket No. 25-IEPR-04
715 P Street,
Sacramento, CA 95814

RE: Sonoma Clean Power Authority Comments, IEPR Commissioner Workshop on Firm Zero-Carbon Resources and Hydrogen

Dear Commissioners and Staff,

Sonoma Clean Power Authority (SCP) appreciates the opportunity to provide these comments to the California Energy Commission (CEC) in response to the July 29, 2025 Integrated Energy Policy Report (IEPR) Commissioner Workshop on Firm Zero-Carbon Resources and Hydrogen.

SCP is the public power provider for Sonoma and Mendocino Counties, serving approximately a half-million residents and businesses. SCP has consistently supported progressive clean energy policy that enables rapid decarbonization while maintaining ratepayer affordability and grid reliability. SCP operates the only 100% 24/7 renewable service in California sourced entirely from within its territory, and is committed to expanding the clean firm resource portfolio that will enable California to meet its Senate Bill (SB) 100 and SB 1020 goals.

The workshop's many excellent presentations provided a useful framework to discuss key issues surrounding the increasing need for clean firm resources, the role of next-generation geothermal energy technologies, and the value proposition of transmission planning process enhancements to augment resource deliverability. Such actions collectively offer opportunities to provide affordable and reliable renewable energy to customers, bring long-term and high value economic benefits into California, and achieve the State's clean energy and climate goals.

SCP believes that next-generation geothermal represents a foundational clean firm resource that will play an essential role in securing the State's clean energy and climate goals. It is in this spirit that SCP respectfully offers the following comments, which emphasize the potential value of policy adjustments designed to scale next-generation geothermal and other clean

firm resources while streamlining and modernizing California's transmission planning and permitting framework to keep pace with resource development timelines.

I. Enhanced Geothermal Systems Offer Significant Potential to Affordably and Reliably Decarbonize California's Grid

Fervo Energy's[1] presentation demonstrates that Enhanced Geothermal Systems (EGS), a next-generation geothermal technology, could provide over 1,000 GW of potential capacity nationwide, with significant resource availability in California and nearby western states. Unlike traditional hydrothermal power production, EGS leverages subsurface engineering techniques proven in the oil and gas industry to access high-temperature rock in geologies previously unsuitable for geothermal power. This technological advancement addresses the geographic and geologic limitations that have constrained geothermal deployment to date.

Next-generation geothermal technologies, including EGS, advanced closed-loop, and novel approaches to hydrothermal development, provide 24/7 carbon-free power with high utilization of transmission capacity, making it an ideal backbone resource for meeting SB 100's 100% clean electricity target. Sacramento Municipal Utility District's (SMUD) Zero Carbon Plan[2] reinforces the conclusion that solar, wind, and short-duration storage alone cannot maintain reliability during prolonged weather events with low renewable output. SMUD's January 2022 event, during which solar production fell below 10% of capability for two weeks, further underscores the need for dispatchable clean firm capacity.

Additionally, the U.S. Department of Energy's (DOE) "Geothermal Earthshot"[3] and Liftoff analyses[4] anticipate dramatic cost declines by 2035, further illustrating how next generation geothermal projects offer both reliable renewable power and cost savings. Fervo's "Project Red"[5] and "Cape Phase I"[6] developments have already achieved cost milestones more than a decade ahead of National Renewable Energy Laboratory's "Advanced Technology"[7] case. The rapid progress enjoyed by EGS is underpinned by DOE's investment in the Frontier Observatory for Research in Geothermal Energy (FORGE) in Utah, which de-risked drilling and deployment of EGS technologies adjacent to the Cape Station project.

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[1] Harper, S. (2025, July 29). *2025 Fervo Energy and the Geothermal Decade: Delivering 24/7 Carbon Free Power to California*. https://efiling.energy.ca.gov/GetDocument.aspx?tn=265137
[2] Elsevier, S. (2025, July 29). *2030 Zero Carbon Plan*. https://efiling.energy.ca.gov/GetDocument.aspx?tn=265034
[3] Augustine, C., Fisher, S., Ho, J., Warren, I., & Witter, E. (2023). *Enhanced Geothermal Shot Analysis for the Geothermal Technologies Office* (No. NREL/TP-5700-84822, 1922621, MainId:85595; p. NREL/TP-5700-84822, 1922621, MainId:85595). https://doi.org/10.2172/1922621
[4] Blankenship, D., Gertler, C., Kamaludeen, M., O'Connor, M., & Porse, S. (2024, March). *Pathways to Commercial Liftoff: Next-Generation Geothermal Power*. U.S. Department of Energy. https://www.energy.gov/sites/default/files/2025-07/LIFTOFF_DOE_Next-Generation-Geothermal Power.pdf
[5] *Fervo Energy Announces Technology Breakthrough in Next-Generation Geothermal—Fervo Energy*. (2023, July 18). https://fervoenergy.com/fervo-energy-announces-technology-breakthrough-in-next-generation-geothermal/
[6] *Fervo Energy Secures $206 Million In New Financing To Accelerate Cape Station Development—Fervo Energy*. (2025, June 11). https://fervoenergy.com/fervo-secures-new-financing-to-accelerate-development/
[7] Harper, S. (2025, July 29). *2025 Fervo Energy and the Geothermal Decade: Delivering 24/7 Carbon Free Power to California*. https://efiling.energy.ca.gov/GetDocument.aspx?tn=265137

Clean firm resources reduce system reliance on high-cost market purchases during scarcity events, avoiding the extreme price spikes and volatility that burden ratepayers. Both the Burbank Water and Power (BWP) and SMUD analyses show that integrating firm capacity early in the planning horizon reduces long-term rate escalation compared to late-stage replacement of retiring gas plants with only variable resources and batteries.[8, 9] By replacing the reliability function of natural gas with clean firm resources like EGS and long duration energy storage, California can both meet its decarbonization goals and contain costs for customers.

II. SCP Recommendations to Accelerate Clean Firm Resource Development

The value proposition for next-generation geothermal resources has motivated SCP to develop a strategic initiative to use public-private partnership to expand the capacity of geothermal resources in Sonoma and Mendocino counites. SCP started its Geothermal Opportunity Zone (GeoZone) in October 2021 to leverage its interest in off-taking geothermal power, community relationships, and advocacy experience to attract geothermal industry partners with next generation geothermal expertise and an interest in local development.

Through working on the GeoZone initiative, SCP has identified a series of opportunities and barriers that would improve the viability of next generation geothermal technologies in California. SCP supports many of Fervo's policy recommendations and urges the CEC to:

Permitting Timelines and Certainty: Align California's geothermal permitting practices with leading states by setting statutory timelines and transparent cost expectations for developers. This is especially critical, given the separate permitting processes and agency authorities governing exploration and production phases for geothermal development projects.

Integrate Next-generation Geothermal into Resource and Transmission Planning: California's Integrated Resource Plan (IRP), SB 100 Report, and California Independent System Operator (CAISO) Transmission Planning Process (TPP) must incorporate updated cost and performance data for next-generation geothermal. Transmission buildouts require 10+ years; failure to model next-generation geothermal now risks underbuilding the delivery capacity needed for projects coming online in the 2030s. Additionally, as the BWP IRP and Pacific Gas & Electric IRP integration analysis[10] demonstrate, new transmission and interconnection capacity is essential for delivering geothermal and other

[8] Elsevier, S. (2025, July 29). *2030 Zero Carbon Plan*. https://efiling.energy.ca.gov/GetDocument.aspx?tn=265034
[9] Samra, M. (2025, July 29). *2024 Integrated Resource Plan (IRP) & the Role of Clean Firm Resources*. https://efiling.energy.ca.gov/GetDocument.aspx?tn=265057
[10] Kolnowski, K. (2025, July 29). *Incorporating Clean, Firm Resources into PG&E's Integrated Resource Planning*. https://efiling.energy.ca.gov/GetDocument.aspx?tn=265059

clean firm resources to load centers. Additionally, BWP's IRP shows that scenarios with new transmission and geothermal power purchase agreements maintain lower long-term rate impacts (~4% annual increase) than scenarios relying on less diverse or delayed clean firm integration. This cost containment is directly tied to the high capacity factor of geothermal resources capable of consistent power production across all hours of the day.

Consider the High System-Need Hours of Future Load Growth Scenarios when Evaluating Candidate Resources: In determining the role geothermal should play in California's future energy mix, it is important to look beyond the conventional framework for evaluating candidate resources today. As residential, commercial, and industrial sectors all continue to grow and electrify, load profiles are expected to shift toward winter peaks, with significant new demand from conversion to electric heating systems. Although high system-need hours currently occur in the summer for most regions of California, SCP encourages the CEC to examine clean firm resource benefits under future scenarios where high system-need hours are expected to occur more frequently in winter months and renewable generation is typically lower. The state's current portfolio envisions winter reliability sourced primarily from offshore wind and out-of-state wind routed through Southern California, exacerbating congestion on Path 15. SCP encourages the CEC to work with CAISO and the California Public Utilities Commission to begin planning today to ensure sufficient development of the diverse mix of clean resources required to ensure reliability throughout the year.

Interagency Alignment and Strategic Planning: Developing a statewide geothermal strategic plan to identify high-potential next-generation geothermal development zones, transmission corridors, permitting reforms, and financing mechanisms will lower several of the most prominent market entry barriers to developing in California. A statewide strategic plan for geothermal energy also offers an opportunity for stakeholder collaboration, public participation, coordinated identification of priority development zones, alignment of policies and permitting processes across regulatory bodies, and the identification of key recommendations for further actions in each relevant policy venue.

Funding Opportunities to Develop a "California FORGE" Project: The DOE's FORGE project served to significantly de-risk and augment the cost effectiveness of EGS development in Utah. FORGE has become a magnet for private industry investment in next-generation geothermal, including Fervo's Cape Station, which is directly adjacent the project. Cape Station is largely paid for by California ratepayers, with 320 MW contracted to Southern California Edison, 53 MW to community choice aggregators, 31 MW to Shell for California customers. But the vast majority of the economic benefits and workforce development opportunities associated with next generation geothermal are flowing to Utah. Providing funding opportunities to create a California-based FORGE project would serve to similarly de-risk early EGS development in the state and attract industry leaders

with the expertise required to successfully develop next generation geothermal resources to invest locally and provide long-term grid and economic benefits to the state.

Each of these recommendations offers distinct opportunities to expand development opportunities for EGS technologies. SCP believes that the above points highlight some of the most significant barriers to unlocking next generation geothermal energy as a clean firm resource within California.

III. Conclusion

California's decarbonization pathway requires a high level of stakeholder coordination, process alignment, and technological innovation. The continued development of high value renewable resources must be paired with planning process enhancement to ensure infrastructure readiness and cost containment. EGS and other next-generation geothermal technologies provide the rare combination of high-capacity-factor, zero-carbon, dispatchable power that can both displace fossil generation and optimize use of new transmission lines, but the long lead times required to effectively and affordably develop these projects requires careful planning and greater certainty.

SCP strongly supports the CEC's exploration of policy actions enabling the development of clean firm resources and increased interagency coordination supporting next generation geothermal technologies within California. By working with stakeholders and agency partners to evaluate process improvements in IRP, IEPR, and TPP actions, the CEC's efforts are leading the State toward a clear, actionable pathway to 100% clean electricity that is reliable, affordable, and equitable for California's ratepayers.

SCP appreciates the CEC's leadership and looks forward to continued engagement on these critical issues. SCP is happy to provide support on these efforts where appropriate. Please reach out anytime with comments, questions, or if the SCP team can serve as a resource.

Sincerely,

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