



**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

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Order Instituting Rulemaking to Continue
Electric Integrated Resource Planning and
Related Procurement Processes.

Rulemaking 20-05-003

**SONOMA CLEAN POWER AUTHORITY'S COMMENTS ON ADMINISTRATIVE LAW
JUDGE'S RULING SEEKING COMMENTS ON ELECTRICITY RESOURCE
PORTFOLIOS FOR 2025-26 TRANSMISSION PLANNING PROCESS**

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September 30, 2024

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Sonoma Clean Power Authority (“SCP”) submits these comments in response to the Administrative Law Judge’s Ruling Seeking Comments on Electricity Resources Portfolios for 2025-2026 Transmission Planning Process¹ (“ALJ Ruling”), issued September 12, 2024. The ALJ Ruling seeks comments on proposed electricity resource portfolios for use in the California Independent System Operator’s (“CAISO”) 2025-2026 Transmission Planning Process (“TPP”).

I. INTRODUCTION

SCP appreciates the opportunity to provide feedback to the question posed in the ALJ Ruling. SCP is the public power provider for the majority of customers in Sonoma and Mendocino Counties, serving a population of nearly a half-million citizens. SCP is the only power provider in California offering a 100% 24/7 renewable energy product generated purely from within its service territory. SCP intends to build upon this by providing all customers with 100% greenhouse gas (“GHG”)-free energy - accounted for on an hourly basis - by 2026. Based on this experience and the Board-adopted goal, SCP is well poised to offer feedback to best inform statewide planning in the TPP process.

¹ Administrative Law Judge’s Ruling Seeking Comments on Electricity Resource Portfolios for 2025-2026 Transmission Planning Process, Rulemaking (R.) 20-05-003 (Sept. 12, 2024): <http://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=539999211>

II. SCP'S RESPONSE TO QUESTIONS POSED IN THE ALJ RULING

1. Please provide any comments or concerns about the updated modeling inputs and assumptions described in Section 2 of this ruling.

New Transmission Cluster Constraints

SCP has concerns about the new application of interconnection cluster constraints in RESOLVE. SCP appreciates the desire to reduce the need for busbar mapping relocations — but explicitly representing more granular transmission constraints in the resource optimization will limit the flexibility of the model to optimize for other characteristics and likely represents a false sense of precision. In past cycles, the busbar mapping process and CAISO's detailed study plan frequently identified transmission portfolios that are more efficient than what's implied by RESOLVE and there should be hesitancy to adding more explicit constraints in RESOLVE without first demonstrating the ability of the tool to reflect the reliability of the constraints and upgrade options that are already present in the model. As an example, the RESOLVE model used for the 2023-24 TPP identified the need for 12 policy-driven upgrades costing \$8.9 billion dollars for 2033², yet the CAISO identified no needed upgrades in their study outside \$4.5 billion specifically needed to interconnect Humboldt offshore wind. This observation indicates that the tool, even without the new interconnection cluster constraints, is overly restrictive and likely choosing suboptimal resource portfolios.

Fundamentally, SCP also has concerns with modeling adjustments that will add additional bias towards resources that can be accommodated on existing infrastructure. Maximizing the efficient use of existing infrastructure is important from an operational perspective. However, for a planning exercise, assuming all incremental capacity will be perfectly spread across existing infrastructure with no additional needs triggered sends an inaccurate signal to the CAISO about the

² Final 2023 Busbar Mapping Dashboard. Issued Feb. 2, 2023. Available online at: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2022-irp-cycle-events-and-materials/busbardashboard2033_30mmt_hebase_vd_02-22-23.xlsx

true state of future transmission needs. This increases the dependency on the state’s clean energy and reliability goals on a more limited set of resources and geographies. Some of these resources, such as offshore wind and out-of-state wind, have sizable risks and challenges, and with limited transmission build-out the state will have limited flexibility to adapt if resource availability and costs diverge from the assumptions in the model.

Geothermal Resource Cost

SCP supports the California Public Utilities Commission’s (“CPUC”) recalibration of geothermal resource costs to reflect the use of binary power plants. In addition to this, SCP recommends the CPUC work to appropriately represent the gradational quality of geothermal resources — many of which are higher quality than the example binary plant used for the updated cost estimate. SCP has been both actively procuring new geothermal resources in the market and working with geothermal developers on long-term opportunities through its GeoZone initiative and can confirm that nearly all new geothermal projects outside the Salton Sea lithium project are utilizing binary plant technology. However, SCP would also like to note that not all geothermal resources are equivalent. Based on our experience in the market, there is a large gradation between the cost of developing high-quality vs. low-quality geothermal resources. This is directly evident in the overnight capital costs noted in the 2023 NREL ATB dataset used by the CPUC — where the overnight cost of capital for binary projects varies from \$4,589/kW for the highest temperature binary resources to \$25,364/kW. Importantly, the example plant used in the 2023 NREL ATB dataset has a temperature of 175°C which is far lower than many of the resource areas capable of meeting California’s need for geothermal capacity such as: Salton Sea (310°C), Clear Lake (300°C), East Brawley (285°C). In addition, many potential resources in Nevada show higher temperatures than 175°C, including Dixie Valley (225°C), Beowawe (215°C), and Humboldt House (205°C)³.

³ National Renewable Energy Laboratory. (2017). GeoVision ReEDS Geothermal Supply Curve Inputs.

When evaluating resource costs in the long-term, SCP encourages the CPUC to explore applying a supply curve approach to geothermal opportunities, perhaps adopting NREL’s 2023 Renewable Energy Potential model⁴. In the interim, the CPUC should at least define one higher-quality geothermal resource type with costs that better represent the near-term opportunities for geothermal development. SCP also recommends the CPUC immediately prioritize modeling next-generation geothermal technologies with their own cost and resource availability as discussed in response to prompt 7 below.

2. Do you recommend any changes to the proposed base case portfolio in Section 2 of this ruling? If so, provide rationale and justification for your recommended changes.

SCP supports the CPUC’s decision to retain the same policy assumptions as the 2024-2025 TPP base case. However, before finalizing the 2025-2026 TPP portfolio, SCP urges the CPUC to allocate additional time for analysis to address the following critical concerns:

Incorporate 2024 CAISO Transmission Capability Estimates

On August 28th, the CAISO released an updated whitepaper on transmission capability estimates⁵ for the CPUC to use for resource planning. Given the changes the CAISO implemented in its deliverability methodology over the past year, SCP believes it’s critically important that the CPUC incorporate the updated capability estimates in RESOLVE before selecting a final portfolio. SCP’s preliminary review of the updated dataset suggests that the changes are quite significant. For example, the 500 kV Delevan constraint in the 2023 Whitepaper only had 1.0 GW of available transmission plan deliverability (“TPD”) compared to 3.4 GW in the 2024 Whitepaper while the

Available online at:

<https://gdr.openei.org/files/1179/GeoVision%20ReEDS%20Geothermal%20Supply%20Curve%20Inputs.xlsx>

⁴ National Renewable Energy Laboratory. (2023). Renewable Energy Potential Model: Geothermal Supply Curves. Available online at: <https://gdr.openei.org/submissions/1549>.

⁵ Available online at: <https://www.aiso.com/documents/transmission-capability-estimates-white-paper-2024.pdf>

Vincent-Lugo constraint had 9.1 GW of available TPD in the 2023 Whitepaper compared to only 6.7 GW in the 2024 Whitepaper. Capturing these changes in a timely manner is critical, as the TPP upgrades identified in the 2025-2026 TPP will inform CAISO’s 2027 TPD allocation which will ultimately determine the eligibility for intaking resources into Cluster 17. If the CPUC delays incorporating these updates until next year and needed upgrades aren’t identified in the 2025-26 TPP, load-serving entities (“LSEs”) will have to wait until Cluster 18 to see the benefits of policy-driven transmission upgrades. As described above, SCP retains some skepticism on the efficacy of transmission constraint modeling in RESOLVE — but at the very least any constraints that are employed need to reflect the latest data.

Updated SERVM Modeling on Winter Reliability

The Ruling and supplemental analysis slides do not discuss any updates to reliability modeling in SERVM. SCP is concerned that the increased load forecast and longer planning horizon could pose reliability challenges that are not captured in the Effective Load Carrying Capabilities (“ELCCs”) used in RESOLVE, particularly given that the analysis slides acknowledge that the managed net peak load shifts to winter in 2040. Although the base case portfolio does include more out-of-state wind to address winter loads — it’s also building a significant amount of solar and 8-hour storage. If the winter reliability contribution of solar and 8-hour storage is overstated, it is very possible the state will need more wind and geothermal resources than what is represented in the base case portfolio. Given that these resources are more geographically constrained and dependent on proactive transmission constraints, it’s critical that the CPUC identify their need sooner rather than later.

Over Dependency on Out-of-state Resources

SCP is increasingly concerned with the growing dependency on out-of-state resources to meet the state’s climate goals. In 2035, the base portfolio shows reliance on meeting over 58% of demand

from out-of-state resources (25.3 GW of out-of-state generation out of 43.1 GW total). The concentration on out-of-state resources is concerning for multiple reasons: (1) reducing the agency the state has in building the infrastructure and implementing supportive policy to enable the planned capacity to be built; (2) tying California’s energy future to out-of-state resources will result in a significant and potential permanent export of wealth on the back of ratepayers; and (3) relying on out-of-state resources puts California’s climate goals at-risk to the political whims of other state governments with different political priorities. While out-of-state resources are included in the portfolio, it also delays approval of in-state infrastructure projects that could provide the flexibility to pursue alternative resource portfolios with less risk. As a starting point, SCP recommends the CPUC assess the impact of capping out-of-state capacity share at one-third of the total build-out and consider adopting the resulting portfolio as the base case.

Increased Reliance on Gas

SCP is concerned that the base portfolio requires the retention of an additional 2.7 GW of gas capacity compared to the 2024-25 TPP and foresees no gas retirement until 2045. Retaining natural gas capacity not only continues to burden nearby communities with local air and water pollution, but also holds onto scarce interconnection capacity that could be utilized by clean resources. Although RESOLVE implies retaining the natural gas fleet improves affordability, that result is dependent on the model’s assumption that the natural gas fleet’s fixed costs remain unchanged as their capacity factors plummet. SCP believes this is very unrealistic — especially when considering the cost of maintaining the gas system infrastructure that will also see large reductions in utilization from the impacts of electrification. The \$1.181 billion in annual fixed costs for the 26 GW thermal fleet in RESOLVE equates to \$3.79/kw-mo — which also seems incredibly low when benchmarked against the near-term cost of resource adequacy (“RA”). Given the current energy affordability crisis, SCP recommends the Commission revisit its characterization of the cost of the natural gas fleet and assess

whether near-term retirements in the base portfolio could better support the dual goals of increased affordability and enhanced environmental justice.

3. Do you support the staff-recommended or alternate sensitivity portfolio in Section 3 of this ruling? Which one and why? If you recommend any changes to the sensitivity portfolio you support, or if you recommend a different portfolio altogether, provide a complete description, rationale, and justification for your recommendations.

SCP does not support the sensitivity portfolios as currently recommended by staff. Sensitivity portfolios should be used to stress-test the base portfolio for key risks and uncertainties and provide insight into infrastructure investments that provide value beyond what is characterized in the base portfolio. In the past, the CPUC has shared a comprehensive sensitivity analysis to inform the selection of a sensitivity portfolio. The recommended portfolios do not provide risk mitigation, but rather represent an optimistic future where long-lead resources, which entail more development and technology risk, are able to play a more prevalent row. SCP recommends the Commission reinstate the practice of sharing sensitivity analysis results and using the results to inform the selection of a portfolio that demonstrates a more conservative approach to decarbonization. As an example, SCP appreciated the Commission's selection of a sensitivity portfolio for the 2024-2025 TPP that included a future with no offshore wind. Given the technology risk and cost uncertainty offshore wind, it's prudent for the state to continue considering alternative pathways to decarbonize the grid.

SCP supports minimizing the role of planned resources submitted in LSE Integrated Resource Plans ("IRPs") in any sensitivity portfolio, and perhaps the base portfolio. Resources that were reported by LSEs as in-development in the 2022 IRP (and ideally updated to reflect recent procurement status updates) should be retained in the portfolio, but market conditions have changed substantially in the past two years that have likely led LSEs to change course relative to their plans for uncontracted resources in November 2022. For example, the gas price spike in December 2022 has fundamentally changed forward price forecasting in California; most LSEs are now getting first-

hand experience with battery energy storage in their fleets, Renewable Portfolio Standard (“RPS”) and RA prices have greatly inflated, Inflation Reduction Act subsidies are being actualized, the CAISO has made very structural to its interconnection process, and the Commission has ordered supplemental mid-term reliability procurement and many LSEs have nearly completed procurement for the first mid-term reliability order. Using any resources LSEs reported as uncontracted in November 2022 likely introduce more harm than good. Instead of using LSE planned resources, the CPUC should consider supplementing data on contracted resources with the CAISO’s interconnection queue to provide a more robust near-term representation of available resources. This would capture resources being developed by all LSEs as well as those being developed by a Central Procurement Entity.

4. Do you recommend any changes to the busbar mapping methodology or process described in Section 5 of this ruling and in Attachment A? If so, provide rationale and justification for your recommended changes.

SCP supports the improvements the CPUC has identified to the busbar mapping process, particularly concerning improved characterization of in-development resources, reconciling the baseline, and improving alignment of out-of-CAISO resources with available Maximum Import Capability (“MIC”).

SCP recommends the CPUC add direct engagement with LSEs contracted with out-of-CAISO resources as part of its MIC alignment process. Although CAISO and Participant Transmission Operators can provide guidance to the CPUC on interties that can accommodate increased imports, they do not have a direct understanding of the ability to wheel from the point of interconnection outside CAISO to the intertie. LSEs, through their contractual relationship with suppliers, can provide the CPUC with insight into what is possible. The CPUC should add a step at the start of the busbar mapping exercise to collect information from outside CAISO resources and potential import points from LSEs, as well as a step at the end of the process where the CPUC notifies LSEs which

relevant import point was assumed in the busbar mapping exercise for their project, as well as the CAISO's expectation of when MIC expansion would be possible. Direct engagement with LSEs on MIC expansion would address a key risk many LSEs are undertaking in procuring import resources without line-of-sight on import capacity. The CPUC and LSEs should also contemplate a likely future where import resources need to COD before MIC is available and reflect that outcome in modeling and planning.

5. Do you recommend any changes specifically to the selection criteria within the busbar mapping methodology related to “gas capacity not retained” in Attachment A? If so, provide rationale and justification for your recommended changes.

SCP has no comments at this time.

6. Do you recommend any additional criteria or processes for improving the busbar mapping for future iterations, specifically in the potential improvement areas listed below? If so, provide rationale and justification, as well as pertinent data sources, for your recommended changes:

- Assessing commercial development interest beyond interconnection queues and other sources currently used in the methodology;
- Application of existing or additional land-use and environmental impact criteria to mapping stand-alone battery storage resources;
- Mapping battery storage to existing renewable generators and utilizing their existing interconnections;
- Mapping additional storage energy to existing storage to increase its duration, but not exceeding its existing maximum interconnection ability; or
- Other potential improvements not specifically covered above in this question, to improve efficient use of existing and already-planned transmission.

The CAISO's reform to its interconnection process to only intake requests in regions with planned deliverability will remove an important data source the CPUC has historically used to evaluate commercial development interest. SCP is not aware of an alternative data source the CPUC will be able to use to understand the commercial viability of specific opportunities outside areas where deliverability is available. The CPUC should continue to use data from Cluster 15 applications — even those that will not be accepted by the CAISO under the new reforms — but also invest in

building a process for collecting insight from developers for the future. The process could take the shape of an annual request for information where developers can share information on prospective development opportunities and site control status. This process could be incorporated in busbar mapping or further upstream in the CEC's land use screening process to inform new transmission investments.

The CAISO interconnection reforms will have the corollary effect of increasing the significance of projects in the interconnection queue. Whereas many projects historically in the queue dropped-out or did not secure deliverability, the limited intake requirements from the CAISO should dramatically increase the percentage of in-queue projects that reach COD. Given this change, the CPUC should consider increasing the weight of interconnection queue data.

7. Include any comments in response to this ruling that are not covered in the other questions above

Include Next-Generation Geothermal in Modeling to Identify Infrastructure Needs

In September 2022, the CPUC released a report on emerging zero-carbon technologies including enhanced geothermal systems, carbon capture and sequestration, small modular nuclear, and other technologies expected to potentially play a substantial role in decarbonization. SCP would like to see the CPUC accelerate efforts to explicitly include these technologies in RESOLVE to understand the potential trade-offs and infrastructure implications.

In particular, SCP requests the CPUC prioritize modeling next-generation resources in RESOLVE, including enhanced geothermal systems (“EGS”) and closed loop. EGS has already been procured in significant quantities by California LSEs and has shown enormous promise. Just this month, EGS developer Fervo Energy announced results from a 30-day flow test demonstrating triple the flow rate of their initial pilot project that is sufficient to generate 10 MW of power from a well pair and aligned with the National Renewable Energy Laboratory's 2035 target for its more

aggressive “advanced” scenario.⁶ Importantly, the most cost-effective EGS opportunities are geographically constrained and proactive transmission planning will be required for projects to move forward. Incorporating EGS explicitly in RESOLVE will allow the CPUC to assess the ability of EGS to meet the state’s decarbonization needs and begin the process of identifying the required transmission investments.

III. CONCLUSION

For the reasons set forth in this response, SCP respectfully requests that the CPUC adopt the above changes.

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Respectfully submitted,

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⁶ Available online at: <https://fervoenergy.com/fervo-energys-record-breaking-production-results-showcase-rapid-scale-up-of-enhanced-geothermal/>