Large Load Enhancements

Draft Final Proposal

September 24, 2026

Prepared by:

Sarah Goldmuntz
Danielle Mills
Bill Weaver

California Independent System Operator

Table of Contents

I. Executive Summary

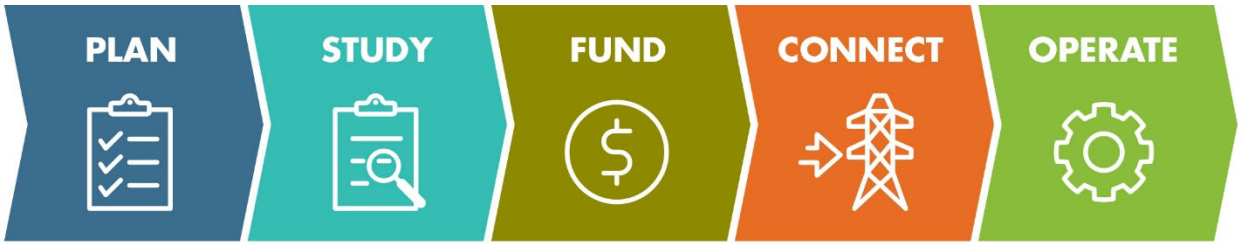
Serving the epicenter of the data-driven economy, the California Independent System Operator (CAISO) offers this proposal to establish new procedures for fast and reliable interconnection of new large loads.

California faces a projected surge in electricity demand over the next decade, driven in part by new large loads such as data centers. The CAISO coordinates closely with local, state and federal regulatory authorities, utilities, and stakeholders to ensure timely access to power for new large loads. This coordination includes anticipating demand growth, exploring the complexities of co-located and flexible loads, ensuring equitable cost allocation, and considering new technical requirements to account for changing operational profiles. The actions described in this draft final proposal will ensure that the CAISO and its Participating Transmission Owners (PTOs) facilitate economic growth and innovation without compromising the overall reliability or affordability of the system.

This paper responds to the Federal Energy Regulatory Commission (FERC) Order to Show Cause on Large Loads and describes five key areas where CAISO leadership and engagement is necessary to enable innovation while protecting customers and ensuring safe and reliable service:

A. Developing procedures to improve coordination related to load interconnection applications, studies, technical standards, and operational requirements for accurate long-term planning and near-term reliability.
B. Upholding a workable framework for the PTOs to develop just and reasonable deposit, financing, and other cost allocation structures within their tariffs.
C. Establishing parallel information and application requirements for co-located arrangements in the CAISO's generator interconnection process to align with PTO load interconnection studies.
D. Creating a framework for new interconnection service to allow large loads to interconnect quickly to the transmission system while waiting for network upgrade completion.
E. Considering the need for a process to study generating facilities serving electrically proximate large loads.

Respecting the current assignment of responsibilities for the system, in which PTOs primarily manage the load interconnection process, this draft final proposal addresses topics that intersect with some of the CAISO's core functions; proactive transmission planning, generator interconnection, and operational reliability.



Plan proactively
Incorporate viable large load growth into CAISO transmission planning and resource interconnection process.

Study consistently
Establish consistent, transparent and timely study processes across PTOs to support efficient interconnection and system reliability.

Protect customers
Allocate costs and financial risks appropriately, improve cost transparency, and protect existing customers from unreasonable cost shifting.

Connect faster
Enable expedited Flexible Interim Load Interconnection (FILI), using enforceable flexibility until required network upgrades are complete.

Operate reliably
Establish the forecasting, visibility, coordination and operational capabilities necessary to reliably integrate large loads.

The CAISO continues to engage the PTOs in the development of this proposal and has made clear its expectations that the PTOs will timely develop consistent and conforming policies and procedures under their transmission tariffs, in service of an enhanced planning regime that provides visibility and transparency to all parties to uphold the CAISO's commitment to reliability. To give the PTOs direction for their filings, the CAISO proposes consistent minimum standards throughout this draft final proposal. In addition, the CAISO is closely coordinating with state and local regulatory authorities regarding this proposal and future large load enhancements going forward.

1. Introduction and Background

This Large Loads Enhancements draft final proposal constitutes a major step forward for the CAISO and Participating Transmission Owners (PTOs) charting a course to enable development and timely interconnection of new large loads, including data centers and other computing loads, onto the CAISO system. The concepts proposed rest on a foundation of highly integrated planning and coordination among the CAISO, PTOs, state energy agencies, and local regulatory authorities, and provide a framework upon which the PTOs will layer their own processes to serve new large loads while upholding and reinforcing the CAISO's commitment to reliability.

The CAISO opened this stakeholder initiative with the intent of clarifying roles and responsibilities in anticipation of accelerating large load inquiries and load interconnection requests coming to the PTOs. In 2025, the CAISO began regular engagement with the PTOs and formed a Large Load Technical Requirements Working Group (LLTRWG) to explore possible technical standards to ensure reliable operations as new large loads interconnect to the CAISO system. The CAISO's Issue Paper, posted in January 2026, described current roles, considerations, and processes for large loads, including transmission and resource planning, transmission service offerings, cost allocation and responsibility, technical requirements and standards, operational requirements, and related issues.[1] The CAISO has continued to monitor and engage in state and federal regulatory discussions regarding large loads and explored central issues and procedural steps that require additional transparency or new products. On June 15, 2026, the CAISO issued a Large Loads Technical Requirements Straw Proposal on behalf of the LLTRWG in order to stay ahead of any potential operational concerns that large loads may present.

On June 18, 2026, the Federal Energy Regulatory Commission (FERC or the Commission) issued six tailored orders to show cause under Section 206 of the Federal Power Act to each of the six regional grid operators under its jurisdiction, including the CAISO. The order to show cause (Order) directed at CAISO focuses on five central concerns, all of which are addressed in this draft final proposal. The CAISO met the first of the Commission's compliance requirements with submission of an Informational Report on Resource Sufficiency, describing recent attention to resource adequacy (RA), generation development, transmission expansion, and load and generator interconnection processes.[2]

---

[1] *See* CAISO Large Loads Issue Paper at https://www.caiso.com/documents/issue-paper-large-load-consideration-jan-20-2026.pdf.

[2] *See* CAISO Informational Report - Large Loads and Co-located Loads at https://www.caiso.com/documents/jul-20-2026-informational-report-large-loads-and-co-located-loads-el26-71.pdf.

As directed by the Commission, the CAISO is coordinating closely with state energy agencies to complement their regulatory proceedings, as well as with the PTOs to ensure a fair and consistent application of requirements and procedures across the CAISO system. Such consistency is critical to enabling reliable and timely interconnection, energization, and operations of new large loads.

To anticipate and enable increasing load growth, the CAISO works with the state energy agencies, utilities, and stakeholders in its footprint. A 2022 Memorandum of Understanding (MOU) between the California Energy Commission (CEC), California Public Utilities Commission (CPUC), and the CAISO tightened the linkages between resource and transmission planning, interconnection, and procurement so California is equipped to meet its reliability needs and state energy policy objectives.[3] This framework has allowed the CAISO and the PTOs to meet the increasing demand forecasted for the state. As of January 2026, the CEC forecasts that data center load in the CAISO-managed grid will increase by 1.8 gigawatts (GW) by 2030 and 4.7 GW by 2035.[4] The CAISO also is aware that utilities are receiving an increasing number of large load interconnection and service applications, and is committed to staying ahead of the curve, with the timely serving of new energy demand reliably and affordably.

To date, California's integrated resource planning efforts have resulted in more than 37 GW of nameplate new generation and storage capacity coming online to serve CAISO load since 2020.[5] The close coordination between the CAISO, state agencies, and local regulatory authorities on demand forecasts and resource planning provides a pathway for proactive transmission planning that anticipates emerging large load growth by aligning that growth with commensurate resource and infrastructure development to serve new loads.

The current assignment of transmission responsibilities for the system under the CAISO's operating control gives lead responsibilities for resource (generator and storage) interconnection and transmission expansion planning to the CAISO, while

---

[3] *See* Memorandum of Understanding Between the California Public Utilities Commission and the California Energy Commission and the California Independent System Operator Regarding Transmission and Resource Planning and Implementation at https://www.caiso.com/Documents/ISO-CEC-and-CPUC-Memorandum-of-Understanding-Dec-2022.pdf.

[4] California Energy Demand 2025 Hourly Forecast – CAISO – Planning Scenario: https://efiling.energy.ca.gov/GetDocument.aspx?tn=268127&DocumentContentId=105135.

[5] *See* CPUC Resource Tracking Data Reports at https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/summer-2021-reliability/tracking-energy-development/cpuc-resource-tracking-data-reports.

utilities, specifically the PTOs, hold the lead role for load connections.[6] These relationships are set out in the FERC-approved tariffs of the CAISO and the PTOs and the CAISO transmission control agreement. To date, most of the load interconnections have been distribution-system connections informed by the utilities' distribution system requirements, with third-party customer connections managed with the utilities. This structure has efficiently and effectively enabled the utilities to manage both their PTO responsibilities for transmission connections regulated by FERC and their state-jurisdictional responsibilities for rates and charges that apply to end-use customers.

However, the CAISO and the PTOs recognize that there is an increase in load interconnection requests for transmission-system connections that raise questions about the roles and responsibilities of the CAISO and the PTOs. FERC's Order raises many of these questions. This draft final proposal addresses the issues the Commission raises in the Order that directly pertain to the CAISO's responsibilities to anticipate and plan for new additions to the CAISO system, provide transmission service, and maintain reliable operations of the grid. This document highlights several issues that will require significant coordination among the PTOs to develop consistent tariff policies and procedures that conform to the framework the CAISO proposes. The draft final proposal also continues to respect the distinct roles of the CAISO versus the various types of PTOs, while complying with the requirements the Commission describes in its Order.

The CAISO is also conducting other stakeholder initiatives that will provide additional benefits to reliability, market efficiency, and affordability, as described below. These stakeholder initiatives include the CAISO's ongoing work on Resource Adequacy, Demand and Distributed Energy Market Integration (DDEMI); and Interconnection Process Enhancements

The CAISO also engages in state-level coordination efforts regarding large loads as California agencies are implementing state law related to data centers and examining the implications of large loads in resource planning and procurement, interconnection,

[6] At times in this draft final proposal, the CAISO will distinguish between utility responsibilities as participating transmission owner (PTO), utility distribution company (UDC), or load-serving entity, as all carry different responsibilities depending on the type of load and regulatory topic in question. Utility distribution company refers to an entity that owns a distribution system for the delivery of energy to and from the CAISO-controlled grid, and that provides regulated retail electric service to Eligible Customers, as well as regulated procurement service to those end-use customers who are not yet eligible for direct access, or who choose not to arrange services through another retailer. PTO refers to a party to the Transmission Control Agreement who has placed its transmission assets and Entitlements under the CAISO's Operational Control in accordance with the Transmission Control Agreement. Load-serving entities are responsible for serving retail electricity customers and, in California, this include investor-owned utilities, community choice aggregators, publicly owned utilities, and electric service providers.

retail rate design, and energization,[7] with open proceedings at the CPUC and in certain dockets at the CEC. The CAISO also recognizes that California recently enacted several pieces of legislation related to data centers, which could have implications for large loads connecting to the distribution system. The CAISO will continue to work with the state energy agencies and PTOs to address the new statutory requirements.

As described throughout this draft final proposal and in the CAISO's 30-day Informational Report[8] on resource adequacy to serve large loads, current State planning forecasts and procurement trajectories indicate that California can accommodate the large load growth reflected in the adopted demand forecast, provided planned resource additions, procurement and transmission development continue to materialize. As a risk mitigation tool for capacity constraints, however, the CAISO is exploring the concept through which local regulatory authorities (LRAs), load-serving entities (LSEs), Utility Distribution Company (UDC), a metered sub-system (MSS), and PTO would work with the CAISO to develop a framework for curtailing large loads under tight grid conditions, before a reliability event. The CAISO recognizes the jurisdictional complexities of this approach and plans to work collaboratively with the LRAs, including the CPUC, and LSEs to identify the necessary requirements to enable such a framework. In exploring a potential framework, the CAISO would continue its collaboration with the CEC and the CPUC to understand any implications on the integrated planning framework. Discussions around this curtailment approach are separate and distinct from the CAISO's response to the Order; as such, the CAISO will continue to explore it in a future policy initiative.

The CAISO also notes that the North American Electric Reliability Corporation (NERC) is actively advancing industry-wide efforts to address reliability impacts of large loads, particularly large computational loads, such as data centers. In May 2026, NERC issued a Level 3 Essential Actions Alert addressing large load modeling and data, system studies, commissioning, ride-through performance, and monitoring. In addition, under NERC Project 2026-02 – Computational Loads, on August 19, 2026, NERC posted new and revised Reliability Standards for formal industry comment and ballot. These standards, together with related revisions to NERC registration criteria and other ongoing NERC initiatives, are intended to establish a longer-term reliability framework for computational load. The CAISO is actively participating in these efforts and coordinating its large load technical requirements with the evolving NERC framework.[9]

---

7 The CPUC refers to load interconnection as "energization."

8 *See* Informational Report - Large Loads and Co-located Loads at https://www.caiso.com/documents/jul-20-2026-informational-report-large-loads-and-co-located-loads-el26-71.pdf.

9 *See* Large Load Technical Requirements - Straw Proposal at https://stakeholdercenter.caiso.com/InitiativeDocuments/Large-Load-Technical-Requirements-Straw-Proposal-Jun-15-2026.pdf.

The CAISO will seek to implement the proposed changes expeditiously upon the Commission's approval. As the Order requires, the CAISO will describe how it will timely implement the measures described below while avoiding disruption of existing commercial arrangements. In its filing, the CAISO will clearly identify a reasonable effective date to apply to new large load interconnection applications and accommodate existing commercial arrangements.

The CAISO has an essential role in planning for and maintaining reliable operations of the CAISO-controlled grid and in facilitating consistent approaches to large load interconnections among the PTOs. Considering the urgency of onboarding new large loads and the required timeline to submit a filing to FERC under Federal Power Act Section 205, the CAISO issues this draft final proposal for stakeholder consideration.

Stakeholder Process and Feedback on the Large Loads Straw Proposal

The CAISO received comments on the straw proposal from ACP-California (ACP-California), AltaGas, Antora Energy (Antora), Bay Area Municipal Transmission Group (BAMx), California Community Choice Association (CalCCA), the California Department of Water Resources – State Water Project (CDWR), the California Public Utilities Commission (CPUC), the Public Advocates Office of the CPUC (Cal Advocates), Constellation, Google, GridLiance West (GridLiance), IGNIS Energy USA (IGNIS), Independent Energy Producers Association (IEPA), KritiGrid, Lotus Infrastructure Partners (Lotus), LS Power Grid California (LSPGC) and DesertLink, Microsoft, NextEra Energy Resources (NextEra), Northern California Power Agency (NCPA), Pacific Gas and Electric Company (PG&E), Pattern Energy (Pattern), San Diego Gas and Electric (SDG&E), Solar Energy Industries Association (SEIA), Southern California Edison (SCE), State Water Contractors (SWC), Tesla, Trimark Associates (Trimark), Valley Electric Association (VEA), Viridon California (Viridon), and Voltus. These stakeholder comments informed the draft final proposal and are addressed as appropriate and by topic in the subsequent sections of the draft final proposal.

Stakeholder comments centered on two topics. First, most stakeholders requested to see the PTO proposals before each PTO files tariff revisions at FERC. Second, stakeholders requested to see more implementation details from both the CAISO and PTOs. The CAISO recognizes that its draft final proposal relies on complementary tariff updates from the PTOs. Over the past several months, the CAISO has communicated its understanding of roles and responsibilities clearly with the PTOs, with general consensus on expectations. Throughout this proposal, the CAISO identifies areas that it views as PTO-led and reinforces the previously communicated expectations to stakeholders to ensure alignment. To that end, the CAISO expects to continue to

coordinate closely with the PTOs in the remaining weeks leading up to the compliance filing. In addition, the CAISO expects the PTOs to avail themselves to stakeholder inquiries regarding their efforts to update tariffs, pursuant to the Order.

The CAISO also appreciates the general stakeholder consensus that there will need to be ongoing coordination work on the implementation details. Some of those areas are addressed below, and the CAISO will continue engaging stakeholders on these matters going forward. Stakeholder feedback on this draft final proposal will help to inform the CAISO's filing at FERC in response to the Order.

A. Transmission Service to Eligible Customers on Behalf of Large Loads

The Commission directed the CAISO and the PTOs to either show cause as to why their FERC-jurisdictional tariffs remain just and reasonable and not unduly discriminatory or preferential without provisions addressing the five categories set out in the Order, or to explain what changes to their tariffs would remedy the identified concerns. The first category included provisions addressing the application process, study procedures, and ongoing operational requirements that apply to "Eligible Customers" seeking transmission service on behalf of large loads.[10]

The CAISO agrees with the Commission that additional clarity and information requirements are necessary within the CAISO tariff, especially if interim or non-firm service is being considered to facilitate "speed-to-power," or accelerated large load interconnections. Further, the CAISO encourages consistency among the PTOs in key areas related to large load interconnection application, study, and operations.

In addition, the CAISO proposes a series of operational requirements, which it will continue to develop in coordination with the PTOs and the LLTRWG, and in parallel with the NERC's efforts to develop technical standards for the reliable operation of large loads.

While recognizing some changes to the CAISO tariff are needed to address the Commission's concerns with regard to the first category in the Order, the CAISO does not propose significant changes to the roles and responsibilities associated with large load interconnection applications or studies. The current framework of shared responsibilities among the CAISO and the PTOs remains an efficient and effective mechanism to achieve the aims FERC outlines in the Order. The PTOs remain largely

[10] Order to Show Cause at P 3.

responsible for processing applications and studying new large loads, while the CAISO remains responsible for reviewing those studies and ensuring alignment with transmission planning activities. The CAISO notes the importance of this clarity of roles and consistency as it relates to large load interconnections and operations on the system and believes the proposed tariff enhancements below complement the load and resource planning process described in the December 2022 MOU between the CAISO, CPUC, and CEC. The CAISO believes that this framework, with some clarification and new information and operational requirements, will address the concerns the Commission described in the first category in the Order.

Background and Stakeholder Comment

The CAISO agreed with the Order's direction to provide additional clarity in its tariff for its part of providing service to large loads, while expecting the PTOs to collectively develop their own consistent set of Tariff reforms to clarify their load interconnection processes and communications, and to align their proposals with the CAISO's processes.

Load interconnection process and responsibilities across PTOs

ACP-California recommended the CAISO take a more active role in guiding the development and alignment of application and study process across all PTO-types. NextEra suggested a guiding principle that implementation of the large load interconnection framework will not adversely affect the timelines, resources, or effectiveness of the CAISO's generator interconnection or transmission activities. The CAISO engaged in frequent discussions with all PTO types on this topic prior to the Order and will continue to encourage alignment of the application and study processes across the PTOs. It should be noted here that the PTOs currently manage the majority of activities associated with load interconnection and the Commission has not indicated a need for the CAISO to take over the load interconnection process from the PTOs, and the CAISO does not propose to do so.

Microsoft encouraged the CAISO to prioritize four reforms in this initiative: study timelines, PTO coordination, energization timeline certainty, and cost transparency. Microsoft suggested that the CAISO, PTOs, and applicable state-jurisdictional processes should clearly define and coordinate their respective responsibilities so customers can receive greater certainty regarding available service and energization dates. The CAISO appreciates this feedback and is working to address all four reforms in partnership with the PTOs.

GridLiance, IEPA, and LSPGC and DesertLink sought further guidance on how the proposed large load interconnection framework would apply to non-load-serving PTOs, noting that the absence of detail creates uncertainty for both non-load serving PTOs and developers. GridLiance also cautioned against a critical gap that could create jurisdictional uncertainty and discourage large load interconnection in non-load-serving PTO territories, suggesting instead that the CAISO establish a consistent framework applicable to non-load-serving PTOs. PG&E suggested that the large load interconnection process be administered by each PTO based on the distribution service territory where the large load is located, acknowledging that implementation details may vary across PTO service territories and whether a PTO is also a UDC. From PG&E's perspective, non-load serving PTOs would not process retail large load interconnections and would continue to offer traditional wholesale load interconnection service to Eligible Customers pursuant to Section 10 of their respective transmission owner (TO) tariffs. The CAISO understands that some stakeholders would like the CAISO to resolve this dispute and appreciates the concern. However, the CAISO reiterates that the PTOs are much more familiar with the current load interconnection processes and responsibilities than the CAISO and are therefore in a better position to negotiate a process that clarifies roles and responsibilities. The CAISO encourages all PTOs, both load-serving PTOs and non-load-serving PTOs, to negotiate a fair and efficient process with clear roles and responsibilities for large load study and interconnection processes in their filings.

ACP-California suggested that the CAISO ensure that end-use customers are provided with the information and access they need to assess and select transmission interconnection options, including on points of interconnection on non-LSE PTO facilities. The CAISO expects the PTOs to describe how this information will be made accessible to end-use customers as part of their filings in response to the Order.

BAMx reiterated that municipal and other non-PTO utilities must have a meaningful role in the study and planning processes that determine the impact of these large loads on the reliability of the grid, and the allocation of costs related to the interconnection of these loads. BAMx recommended that CAISO concurrence should require affected system screening and coordination with non-PTOs before concurrence to protect non-PTO import capability and reliability. CDWR and NCPA expressed particular interest in any affected systems processes that are developed for load interconnections as well as more clarity on the co-located load interconnection process being developed by the PTOs in consultation with the CAISO. CDWR stated its concern about the potential impacts new computational loads could have, especially on CDWR's large pumping plants, which consist of synchronous large rotating mass. NCPA suggested that the CAISO require its PTOs to adopt a consistent, transparent, affected system study process that applies to all PTOs and is overseen by the CAISO. The CAISO notes that

affected system processes for load studies are and will continue to be addressed in the PTO's tariffs, and these roles are not expected to change.

The CAISO reiterates that it does not regulate the PTOs on matters of load interconnection. The Commission may opt to direct the CAISO to require the PTOs to adopt a consistent methodology for interconnecting loads, but the CAISO currently expects the PTOs to organize themselves to develop sufficiently consistent and complementary tariff provisions that align with the CAISO's processes. Specifically, the CAISO expects that each PTO's tariff will provide consistent processes that clarify the process for Eligible Customers seeking service, establish how non-load-serving PTOs coordinate with load-serving PTOs, and detail how affected system issues are coordinated with non-PTO utilities.

PG&E supported the CAISO's approach of preserving the existing allocation of interconnection and study responsibilities.

1. Definition of Large Load

FERC noted in the Order that the CAISO and PTO tariffs lack a definition of large load, as a new category of load.[11] The Commission directed the CAISO and PTOs to create an appropriate definition, including a load size and interconnection voltage threshold, based on the characteristics of CAISO's transmission system. The Commission suggested that a potentially reasonable definition would be "a new commercial or industrial customer, located at a single site behind one or more points of interconnection, and that has a peak load of 50 MW or greater, interconnects to the transmission system at a voltage level of greater than 69 kV, and is not part of a co-location arrangement."[12]

Background and Stakeholder Comment

In the straw proposal, the CAISO recommended the following definition for large load: "An End User located at a single site interconnecting to the CAISO Controlled Grid, and that has a peak load of 50 MW or greater," while indicating that the definition could evolve to account for future NERC standards.

[11] Order to Show Cause at P 58.
[12] *Id.* at P 57.

Several stakeholders, including the CPUC, IEPA, LSPGC, SDG&E, SEIA, SCE, and Viridon broadly supported the CAISO's proposed definition of large loads, and many stakeholders agreed that alignment with NERC standards is critical.

Types of large loads

Many stakeholders, including AltaGas and the CPUC, did not see a need for the CAISO to specify certain types of large loads (e.g. computational). CDWR recommended that the CAISO specifically state in the tariff that the definition applies only to new large load interconnections. The CAISO reiterates that the policies proposed in this initiative will begin to apply for new large loads only, and after resulting tariff revisions become approved and effective.

Direct connection to the CAISO-controlled grid

AltaGas, SDG&E, SCE, and others agreed that specifying connection to the CAISO-controlled grid is preferable to using a specific voltage level for defining large loads. The CPUC did not suggest a specific voltage level but notes that most large loads would be better served at higher transmission voltages. SDG&E and SCE agreed that the definition should be based on the connection to the CAISO-controlled grid rather than relying on a transmission voltage threshold, noting that some large loads may connect through distribution facilities that are not under CAISO operational control and may fall under state or local regulatory jurisdiction. The CAISO agrees with SDG&E and SCE and proposes to clarify that large loads to which the draft final proposal applies must be directly connected through a point of interconnection to the CAISO-controlled grid.

PG&E and BAMx argued that the phrase "interconnecting to the CAISO-controlled grid" was ambiguous as written because end users do not connect directly to CAISO-controlled facilities but rather are served by Eligible Customers via points of interconnection with the CAISO-controlled grid. To ensure uniform application, PG&E recommended a final proposed definition that includes all loads above the MW threshold that *affect* the CAISO transmission system, i.e., loads above the MW threshold served by an Eligible Customer via a point of interconnection on the CAISO-controlled grid. PG&E also recommended that the CAISO consider a 50 kV threshold at the end user's retail point of interconnection to the UDC as an additional measure to distinguish between customers that will have a high impact on the CAISO grid and those that will not. The CAISO believes that PG&E's proposed definition creates additional ambiguity because it seems to include intervening assets that may be first connected to the distribution system. It is also likely to lead to ongoing disputes about the meaning of "affecting" the CAISO transmission system. The CAISO recognizes the

clear jurisdictional boundary that the Commission initially suggested in the Order, that any large load must be directly connected to the transmission system. Therefore, the CAISO declines to adopt PG&E's proposal and proposes to specify that the point of interconnection must be to the CAISO-controlled grid whether that end user's facilities are directly connected to the transmission system or through radial/non-network interconnection facilities. The CAISO clarifies, however, that to the extent that distribution-connected or non-PTO connected loads create a need for network upgrades elsewhere on the system, those upgrades can be considered in the CAISO transmission planning process (TPP).

The CAISO understands that distribution-connected and non-PTO connected loads can impact the transmission system. The CAISO may address these instances in the future, including through the DDEMI Initiative. The PTOs, likewise, may address cost allocation impacts from such loads through both their FERC and CPUC tariffs. But, as discussed at length in the Order, FERC has jurisdiction over wholesale electricity sales and the transmission in interstate commerce. The Order is premised on FERC's duty to remedy the potential for undue discrimination in transmission access by regulating interconnections to the transmission system, not the distribution system, which is left to the states. The CAISO's large load definition is thus similarly limited by FERC's jurisdiction. The CAISO may not assert substantial rules on distribution-connected loads for the same reason that FERC has not asserted rules on them: distribution-connected retail customers are not jurisdictional to FERC under the Federal Power Act.

The CAISO nonetheless seeks to clarify the large load definition to recognize that there can be interconnection facilities between the actual load and the CAISO-controlled grid. The CAISO's draft tariff revisions likewise modify the definitions of Point of Interconnection and Interconnection Facilities to recognize the same.

Load-peak

Several stakeholders expressed support or comfort with the 50 MW load-peak threshold in the straw proposal. PG&E suggested reducing the load-peak threshold to 20 MW. BAMx, the CPUC, and Constellation suggested that the lack of apparent gaming is not sufficient reason to assume load projects will not need clear direction or enforcement to discourage them from breaking up projects to avoid large load treatment. Constellation suggested that the CAISO clarify how it will apply the 50 MW threshold to phased projects, expansions of existing facilities, and multiple loads that share a point of interconnection. BAMx recommended an aggregation rule for commonly-owned or electrically proximate loads, together with a look-back mechanism for staged additions. The CAISO recognizes that any arbitrary cutoff creates some incentive to avoid the load-peak threshold. This reality is inescapable regardless of where the cutoff lies.

However, the CAISO believes that the 50 MW threshold it proposed is based on the potential impact to the grid. Disaggregation and phasing cases may be addressed by determinations of whether the loads actually share a site, interconnection facilities, etc., and actually comprise a single load. Just as a single generating facility may consist of many generating units with their own meters and resource identifications, developers are unlikely to escape the large load threshold by trying to create the appearance of multiple loads. At the same time, the CAISO does not want to stifle developers and LSEs' flexibility to set up multiple meters and disaggregate facilities within a single large load campus. As such, the CAISO believes it can address these cases in the future on a case-by-case basis, as it does today with generator interconnections.

CalAdvocates noted that interconnecting to the CAISO-controlled grid would eliminate the need for a capacity threshold because customers interconnecting to the transmission system would be large enough to pose unique challenges to the interconnected system. The CAISO appreciates this point but views the capacity floor as a useful determinant and is aligned with what FERC identifies in the Order. As noted elsewhere, the CAISO does review both distribution- and transmission-interconnected loads of different sizes as a part of the TPP process.

LSPGC and Desert Grid suggested clarifying that the Eligible Customer is the entity directly connected to the CAISO-controlled grid and a qualifying end user has a peak load of at least 50 MW and is served by the Eligible Customer. The CAISO declines to include the term "Eligible Customer" in its definition of large loads to avoid unnecessary confusion. The CAISO believes that including Eligible Customer within the large load definition could introduce confusion, including because the CAISO tariff does not use Eligible Customer, and introducing it here could require other changes to the CAISO tariff, and because FERC Order No. 888 has a clear definition for Eligible Customer.

Proposal

The CAISO proposes to include a definition of "Large Load" in the CAISO tariff; however, the CAISO believes it may be premature to do so at this point, while NERC is developing similar, potentially overlapping, terms for computational loads. As such, the CAISO's proposed definition may shift in the coming months to avoid regulatory conflicts between its definition and NERC's. Aligning with future NERC standards will avoid creating dual or conflicting regulatory requirements for the same loads. Nevertheless, the CAISO describes below the principles it believes are helpful in defining large loads.

The CAISO proposes that a potential definition could be: "An End User located at a single site whose Point(s) of Interconnection is/are to the CAISO-Controlled Grid, and

that has a peak load of 50 MW or greater."[13] The CAISO likewise proposes to add large loads to its definitions of Interconnection Facilities and Point of Interconnection to clarify how all three terms work together.

Similar to generating facilities, the CAISO proposes to continue to adhere to FERC and California regulations on what constitutes a "site." The CAISO expects the large load definition will adequately apply to large loads comprised of distinct loads, even if they have separate retail meters, which will address concerns expressed regarding loads pursuing multiple connections to avoid pre-determined and specified MW threshold. Operationally, such loads would still have the same impact on the CAISO transmission system.

The CAISO believes that its proposed large load definition addresses the issues in the Order and coheres with FERC's jurisdiction to address them. The CAISO may develop other terms in the future to address other load types and locations. The Midcontinent Independent System Operator (MISO), for example, has proposed a 50 MW generic large load class as well as a 20 MW computational load class. The CAISO may follow this course in the future, depending on the Order proceeding and NERC's developments. At this time, however, the CAISO's intent is to comply with the Order without overburdening developers with what could become duplicative or onerous regulations.

2. Large Load Application Process

The Commission suggested that the CAISO and the PTOs lack clear and consistent provisions establishing the application process and study procedures that will be used when the CAISO and/or the PTOs evaluate the provision of transmission service to Eligible Customers on behalf of large loads, including an application process, application fee and readiness requirements, and information and data requirements.[14] The Order also suggested that the CAISO and PTO tariffs lack appropriate study provisions to recognize the unique operational characteristics of large loads that are willing and able to limit their energy withdrawals under certain conditions to lessen or avoid the need for network upgrades.[15]

---

[13] Appendix A to the CAISO tariff defines an End User as "A consumer of electric power who consumes such power to satisfy a Load directly connected to the CAISO Controlled Grid, a Distribution System…" It defines the CAISO Controlled Grid as "The system of transmission lines and associated facilities of the Participating TOs that have been placed under the CAISO's Operational Control."

[14] Order to Show Cause at P 58.

[15] *Id.* at P 59.

In addition, the Commission noted that accurate models using Electromagnetic Transient (EMT) studies may help to ensure that transmission service needed on behalf of large loads can be provided without compromising reliability and suggests clarity and consistency in the evaluation of alternative transmission technologies (ATTs) as potential solutions to accommodate an Eligible Customer's request for transmission service on behalf of a large load.[16] To the extent that traditional network upgrades are selected over ATTs, the Commission recommended demonstration of why ATTs were not selected.[17]

Finally, the Commission directed the CAISO and the PTOs to explain whether their tariffs sufficiently address identification of Direct Assignment Facilities and Network Upgrades (as the Order defines) necessary to reliably provide transmission service to Eligible Customers on behalf of large loads; include provisions for a 60-90-day timeline to study the unique operational characteristics of large loads; and include a study deadline to assess large loads.[18]

Background and Stakeholder Comment

The CAISO proposed enhancements to data sharing and ongoing coordination with PTOs who lead the load interconnection application and study process, while noting that the PTOs should develop consistent load application processes to support efficiency, visibility, and planning.

Study process for co-location agreements with exporting generators

AltaGas suggested clarification that the generation component of new large load generation/storage combinations planning to discharge energy into the grid would interconnect under the CAISO tariff, including cluster-study processes and listings in the queue, and requested clarity on how the relatively recent generator interconnection request intake and study rules would apply to these combinations.

AltaGas further noted that the application process is not clear if an existing resource adding a large load to its site might still discharge energy into the grid (see discussion below about RA status retention for the resource). This would seem similar to the above situation where a new large load-resource combination would inject energy into the grid, but that new combination type must apply under CAISO tariffs. The CAISO confirms that existing generators planning to add large loads to their current interconnection

16 *Id.*
17 *Id.* at P 61.
18 *Id*. at P 62.

arrangements would interconnect under PTO Tariffs, even if they plan to continue to discharge energy into the grid. The CAISO encourages these generators to come to the CAISO to update their Generator Interconnection Agreement (GIA), master file, or seek a post-COD modification if necessary.

Study transparency

BAMx and the CPUC encouraged the CAISO to clearly require standardized, transparent study framework with common base cases, assumptions, and criteria across wholesale interconnection studies and PTO retail load-cluster studies, with the CPUC noting that the straw proposal lacked any enforcement details pertaining to application process, study requirements, and timelines. BAMx notes that (i) FERC has placed the TO Tariffs directly at issue in this §206 proceeding and may itself direct standardized study provisions. BAMx also points out that the CAISO independently possesses authority under the Transmission Control Agreement and its own tariff to condition concurrence, transmission planning process treatment, and transmission access charge (TAC) cost recovery on studies performed using common base cases, assumptions, and criteria. The CAISO understands these concerns but notes that the PTOs will develop sufficiently similar rules to meet their requirements to comply with the Order. Large loads have interconnected and continue to interconnect in California without jeopardizing base cases, cost recovery, or reliability, and the CAISO believes its continuing work with the PTOs, regulators, and stakeholders will maintain this *status quo*.

Regarding EMT studies, the CPUC noted that the need for study data is being evaluated in other forums such as IEEE 1547.7 and NERC and suggests that the CAISO should take the lead role in preparing and maintaining the State's EMT data**.**

Proposal

The CAISO reiterates that the existing load interconnection process is conducted efficiently and effectively by the PTOs. For this reason, the CAISO proposes enhanced and ongoing coordination with the PTOs on the load and resource interconnection processes and expects the PTOs to align their load application processes with the CAISO's resource interconnection process to ensure the level of visibility necessary for the CAISO to plan for new large loads and maintain reliability once they are interconnected.

The CAISO suggests that the PTOs develop consistent application processes, study requirements, and agreements to ensure sufficient transparency in the load application

and study process. It is important for the PTOs to maintain some degree of consistency in their respective tariffs so the CAISO has a greater certainty around the consistency of data and operational details received by the PTOs in the load applications

The CAISO currently evaluates relevant alternative transmission technologies (ATTs) in its transmission planning process, which is the primary process through with the CAISO ensures service to new large load interconnection requests. The CAISO's evaluation routinely includes static synchronous compensators, static VAR compensators[19], advanced power flow control devices, transmission switching, synchronous condensers, voltage source converters, advanced conductors, and tower lifting. The CAISO understands that transmission providers must consider ATTs at all times. As a transmission provider, the CAISO must include in the generator interconnection cluster study report an explanation of the results of the evaluation of the enumerated ATTs for feasibility, cost, and time savings as an alternative to a traditional network upgrade.

Therefore, the CAISO supports and has broadly adopted the practice of duly considering and assigning ATTs to meet identified system needs, including when triggered by new loads interconnecting to the CAISO grid. The CAISO documents consideration of such technologies in its annual Transmission Plan. This has been the practice in CAISO for several years and was recently memorialized in the CAISO's tariff in compliance with FERC Order Nos. 2023 and 1920 (pending FERC approval).[20] To respond to the Order and the large load interconnection context specifically, the CAISO proposes to clarify these considerations through consistent language in the CAISO tariff, which the CAISO expects the PTOs will similarly include in their tariffs. Rather than providing standardized documentation of the detailed rationale each time a traditional transmission technology is approved over the use of ATTs, the CAISO proposes to continue to report annually on the approvals of ATTs within each transmission plan. The CAISO will continue to set out the alternatives that were considered in the selection of all preferred transmission solutions, whether ATTs or other more conventional solutions, to the reasonable depth necessary given the nature of the transmission need. This approach has worked well in the generator interconnection study process, enabling the consideration and use of ATTs and grid-enhancing technologies (GETs) without slowing down studies.

With regard to the Commission's ATTs-related modeling requirements, the CAISO coordinates annually with the transmission owners during the annual transmission planning process on the feasibility of ATTs, particularly evaluating the application of advanced conductors and flow control devices. The CAISO notes that Dynamic Line

[19] VAR refers to voltampere reactive, which is the unit used to measure reactive power in an AC electrical grid.
[20] *See, e.g.*, Section 6.2 of Appendix KK to the CAISO tariff.

Rating (DLR) refers to a transmission line rating varying based on local conditions, such as ambient air temperature, wind speed, cloud cover, solar heating, and precipitation, etc., rather than a static rating assumption. DLRs can provide additional capacity for a transmission line. In the CAISO's production cost simulation, many congestions were observed in the evening or in lower-temperature months. Such congestion can be potentially mitigated or reduced by adopting DLRs for the lines. In the CAISO's most recent planning cycle, DLRs were not modeled in production cost modeling cases, since it not only requires operational history data of weather conditions and line ratings, but also requires software and modeling enhancement to accommodate the data in production cost model. The CAISO is coordinating with the PTOs, the Western Electricity Coordinating Council (WECC), and the software vendor of GridView to explore the feasibility and possibility of implementing dynamic line rating in production cost models in future planning cycles.

As a general matter, the CAISO recognizes that the Order implicates various types of PTOs, including non-load-serving PTOs and approved project sponsors that could be impacted by large load interconnection requests but are not load-serving entities and do not have retail interconnection tariffs. The CAISO expects the PTOs to work together to clarify and develop complementary roles and responsibilities in their respective tariffs regarding requests for interconnections to non-load-serving PTO facilities.

3. Large Load Interconnection Study Procedures

The Commission highlighted a lack of clarity and consistency regarding the study of the provision of transmission service to Eligible Customers on behalf of large loads.[21] Further, the Commission noted that, while it does not seek to alter the allocation of rights and responsibilities between CAISO and PTO tariffs, the CAISO's and PTO's tariffs may not clearly specify which entity will be responsible for studying the provision of transmission service to Eligible Customers on behalf of large loads.[22] The Order suggested that additional study considerations may be necessary to address the unique operational and reliability challenges presented to the transmission system by providing transmission service to Eligible Customers on behalf of large loads.[23] The Commission noted that clear and consistent study processes may be necessary to fully capture the transmission system impacts of providing such transmission service, which could result in significant operational risks for the transmission system,[24] and suggested that tariff provisions may prevent disputes over a variety of issues, e.g. study timelines and delays, how the transmission service needed on behalf of the large load is studied, what

21 Order to Show Cause at P 51.
22 *Id*. at P 51.
23 *Id*. at P 52.
24 *Id*. at P 53.

types of network upgrades are considered, and how required network upgrades to provide the requested transmission service are determined.[25]

Finally, the Commission suggested that the CAISO and PTO tariffs fail to deter speculative or duplicative requests for transmission service by Eligible Customers on behalf of large loads.[26]

Background and Stakeholder Comment

In the straw proposal, the CAISO proposed coordination enhancements included a more robust data exchange process between PTOs and the CAISO. The CAISO noted that the PTOs should align their load interconnection studies with the CAISO's transmission planning process timelines, as feasible, and further proposed that it would clarify when and how it accounts for new load additions, including in the TPP concurrence process.

Stakeholders generally supported the comprehensive coordination the CAISO proposed with utilities, regulators, NERC, and WECC. Several expressed concerns or asked questions regarding the PTO ability to complete studies within 60-90 days.

Microsoft noted that following completion of the studies, customers should be provided with available options regarding firm, non-firm, or temporary non-firm service, project phasing, the use of GETs or ATTs, and any associated operational requirements, together with an estimate of project cost and schedule. Providing this information early in the process will give customers greater certainty regarding project feasibility, cost, and timing and will allow them to make informed investment and development decisions. The CAISO agrees with these objectives.

The CPUC recommended a high large load sensitivity in the annual CAISO TPP that aggregates active load-cluster requests (e.g., Group 1 and Group 2) above a threshold, so cumulative reliability and congestion effects are assessed before energization rather than merely reported. The CAISO notes that PTOs already study all active load interconnection requests within their interconnection study, which provides insight on the cumulative impact of the requests.

Cal Advocates suggested that the CAISO should refrain from using its concurrence process for approving transmission projects for large load interconnections, noting that

[25] *Id.* at P 54.
[26] *Id.* at P 55.

the proposed clarifications to the concurrence process give PTOs an opportunity to inject speculative loads into transmission planning and could impair the state's aim to coordinate resource planning. Cal Advocates also noted that CAISO's concurrence process does not include any transparent evaluation of alternative transmission technologies, like GETs or energy storage. The CAISO's concurrence review does include GETs in potential alternative options for both local upgrades that move forward as load interconnection upgrades and area upgrades that are reviewed in the TPP.

More generally, the CAISO notes that the concurrence process provides important validation of the assumptions used in planning and confirms that proposed load interconnections and associated network upgrades do not create adverse reliability impacts to the regional system. The concurrence process also helps ensure that new infrastructure is appropriately sized, timed, and initiated based on credible and coordinated planning to meet forecasted load growth. The CAISO's planning framework identifies and mitigates area-wide impacts driven by significant new load growth. In parallel, the PTOs continue to advance the local and interconnection-driven network upgrades needed to reliably serve retail customers and safely integrate new large loads under the PTOs' obligation to serve them. This coordinated approach, whereby the CAISO addresses area-wide impacts through the Transmission Planning Process and PTOs advance local network reinforcements associated with load interconnections through the load interconnection process, is essential to facilitating the timely integration of new loads and minimizing reliance on operational workarounds.

Constellation suggested that the study framework should clearly explain the respective responsibilities of CAISO, the PTO, and the interconnection customer. It should also establish clear application requirements, a delineation of the studies to be conducted, study milestones and timelines, data-sharing procedures, and timelines for communicating material changes to study assumptions or required upgrades. Constellation also requested that customers receive access to the assumptions, methods, and results that support material upgrade or operating requirements, subject to appropriate confidentiality protections. The CAISO agrees that a clearly articulated study framework is necessary and intends to share all details around the process, as well as details on assumptions, methods, and results once its tariff revisions are filed. After filing these proposed tariff changes with the Commission, the CAISO proposes to convene regular working group meetings to communicate the PTO-CAISO load interconnection application and study framework to stakeholders, to begin working on implementation details, and on sharing assumptions, methods, and others, as feasible.

PG&E suggested that PTOs should retain the flexibility to conduct studies either sequentially or in clusters, and notes that additional details around study procedures and upgrade determinations methodologies be developed through PTO tariff revisions.

The CAISO looks forward to continued collaboration on these procedures to ensure alignment prior to filing proposed tariff changes with the Commission and, ultimately, as the CAISO and PTOs work through implementation details.

Long-term load forecasting

CalCCA noted that even if the primary responsibility for protecting against speculative load is best suited for the PTO, the CAISO still must ensure that it adopts tariff provisions that maximize the ability of the CAISO to validate new load additions and minimize the potential for approving transmission build out based upon inaccurate forecasts. The CAISO agrees and will continue to provide input into the load forecasting process with the CEC and in discussions with the PTOs.

Deterring speculative load interconnection requests for transmission service

The CPUC and Cal Advocates suggested that the straw proposal lacks any enforcement details pertaining to requirements to deter speculative load interconnection requests. Cal Advocates suggested that the CAISO refrain from studying and approving network upgrades for large loads until the large load completes readiness requirements. Cal Advocates noted that large load data center applications with signed agreements with the utility for electric service are included in the highest confidence group in the CEC's data center forecast. Cal Advocates stated that the CEC's current confidence groups may be insufficient to curb speculative load additions. The CAISO notes that the CEC is currently reviewing its data center forecast confidence level definitions in the 2026 Integrated Energy Policy Report process.

The CAISO reiterates that the PTOs have methods to evaluate the viability of specific load interconnection requests, and the CAISO expects PTOs to substantiate those methods in their proposed tariff filings. The CAISO will work with PTOs during the study process to further consider the viability of these requests in the transmission planning process and through concurrence.

Consideration of Advanced Transmission Technologies

The CPUC noted that the need for EMT study data is also being evaluated in other forums such as IEEE 1547.7 and NERC. State entities will need to formulate how these data will be collected and stored to ensure their consistent availability at a central, known location when required. The CPUC suggested that CAISO take a lead role in preparing and maintaining the state's EMT data. Voltus asked CAISO and PTOs to apply a technology-neutral standard for ATTs that would include contracted demand response and distributed energy resources (DR/DER) in the same way CAISO already evaluates hardware options: in the generator interconnection cluster study, in CAISO's

annual Transmission Plan reporting, and in the concurrence process. The CAISO incorporates demand response and distributed energy resources into the transmission planning process via the CEC's statewide demand forecasting efforts. Both types of resources with the appropriate attributes are considered as inputs to the transmission planning process to reduce the need for new transmission. The CAISO proposes clarifying how demand response and distributed energy resources are included in these processes in its tariff.

Proposal

As a minimum standard, the CAISO expects the PTOs to develop consistent study procedures to be completed within 60 to 90 days, as required by the Commission. In addition, the CAISO proposes a number of data requirements for the large load interconnection study procedures, described in Section A.4, to ensure the CAISO has the necessary information to account for such flexibility.

The CAISO agrees with the Commission's concerns in the Order that information in the large load interconnection study process regarding a large load's willingness to limit energy withdrawals under certain conditions is important for the CAISO's planning and operational purposes. The CAISO therefore proposes a framework for agreements under which large loads commit to limiting energy withdrawals under the flexible load interconnection service offerings described in Section D of this draft final proposal. The CAISO proposes to clarify in its tariff that the current process requires load interconnection requests to be submitted to the appropriate PTO pursuant to the PTO tariffs. The CAISO currently accounts for those load interconnection requests in the annual TPP and to some extent in the CAISO Resource Interconnection Standards (RIS). The CAISO proposes both clarifying and continuing this process in its tariff. In addition, the CAISO proposes enhanced data sharing and process alignment between the CAISO and the PTOs to further streamline the load interconnection request and study process.

As noted earlier in this draft final proposal, the CAISO does not propose changing the allocation of rights and responsibilities for studying large load interconnection requests from the framework in place today: the PTOs will continue to manage the bulk of the study responsibilities. This has been a highly efficient and effective process, to date, and the CAISO expects that it can continue to be so with the influx of large load interconnection requests. The CAISO encourages the PTOs to align their load interconnection study procedures among themselves and with the CAISO resource interconnection standards and TPP for enhanced clarity and consistency for customers. This PTO alignment will enable the CAISO and PTOs to fully capture the transmission system impacts of providing such transmission service by applying consistent study

parameters, and to minimize operational risks to the system through a common study framework.

The CAISO agrees with the Commission and proposes some tariff enhancements to ensure greater coordination and visibility between the CAISO and PTOs regarding the load interconnection study results. This will require continued coordination with the PTOs during the study process and will be particularly important for co-located loads and generation, discussed in Section C of this draft final proposal, as well as with the provision of flexible interim load interconnection (FILI) service, discussed further in Section D of this draft final proposal.

The CAISO acknowledges multiple possible configurations of large loads and co-located loads, each of which may necessitate unique information to fully mitigate operational or reliability concerns. These various configurations are described in Section C of this draft final proposal on co-located loads. Each will have different implications on the CAISO's generator interconnection study requirements. Co-located loads with exporting generation (existing or new), for example, will need parallel review by the CAISO and the relevant PTO.

Thus, the CAISO proposes a new requirement for co-located loads and generation to provide comprehensive information on both the load and generation in the CAISO's resource interconnection process, in addition to the PTO load interconnection application process. The CAISO proposes to establish procedures for the CAISO and PTOs to exchange and compare information to ensure the respective studies of the load and generator are consistent with the customer's requested mode of operation and type of service requested.

In light of the need for coordination between the CAISO's resource interconnection study process (in which the studies are conducted primarily by the PTOs) and load interconnection studies, the CAISO expects PTOs to propose enhanced alignment of their load interconnection request windows and study timelines with the CAISO processes. This is needed for all the information to be communicated back to the CAISO in a timely and consistent manner to inform the CAISO's broader transmission planning, resource interconnection, and deliverability allocation procedures. The CAISO notes that its resource interconnection timeline and transmission planning timelines are relatively bound in its tariff as required by FERC Order Nos. 2023, 1000, and 1920, and the MOU with the California state energy agencies. Therefore, the CAISO expects the PTOs will need to update their tariffs to align study processes with one another and in consideration of other related CAISO processes.

To ensure clarity on behalf of stakeholders, the CAISO encourages the PTOs to establish tariff revisions describing study timelines and procedures for the transmission service needed on behalf of large loads, types of network upgrades considered, and methods to determine required network upgrades to provide the requested transmission service.[27] The CAISO believes that a high degree of consistency would be useful across PTO tariffs to ensure timeline alignment, process efficiencies, and utility of data. In addition, the CAISO proposes to define in its tariff any instances when the CAISO would reject load interconnection study results or decline to consider or approve associated transmission solutions through the TPP; these conditions include instances when PTO study results indicate high operational risk or uncertainty, or would interfere with CAISO compliance with balancing authority, transmission operator, or reliability coordinator reliability standards.

The most effective way to ensure load associated with new large load interconnections is reflected in CAISO's TPP is to work with CEC to reflect this new load in CEC's demand forecast before CEC finalizes its forecast in the December timeframe each year. While the aim is for load forecasts incorporated into CAISO's TPP to include all anticipated load, there are instances where new load seeks to interconnect after development of the demand forecast and CPUC resource portfolios that the CAISO incorporates into its TPP. Currently, to address these instances, the PTOs may submit proposals for the CAISO's concurrence in the transmission plan. The concurrence for load interconnections only considers the transmission component of the load interconnection (*i.e.*, the network upgrades). The CAISO reviews and provides concurrence that the load interconnection and potential network upgrades to interconnect the load meet the transmission reliability requirements and are consistent with the long-term transmission plans in the area.

To address FERC's Order, the CAISO proposes to clarify within its tariff how the concurrence process addresses local network needs associated with large load interconnections. Specifically, the CAISO will conduct an engineering review for reliability and operations of PTO-proposed solutions.

- Proposed solutions with previously-approved network upgrades or upgrades identified in the load interconnection study with an expected in-service date later than the large load interconnection date, would not be eligible to receive firm service until the network upgrade is placed into service. These projects would be candidates for the FILI process.
- Local network upgrades would be identified by the PTO in the load interconnection study with cost responsibility determined pursuant to the applicable PTO tariff.

[27] *Id*. at P 54.

- Area network upgrades would need to be studied in the Transmission Planning Process. If the TPP identifies the need for the upgrade, the large load would be a candidate for FILI.

The CAISO also proposes to specify in its tariff a process for reviewing and documenting load interconnection requests through concurrence in the Transmission Planning Process to ensure reliability and consistency with long-term plans. The CAISO will review potential out-of-cycle transmission additions or upgrades to accommodate Large Loads on a monthly basis, and to fit within the 60-90 day process for PTO load interconnection studies.

In addition, consistent with existing planning processes, the CAISO proposes that it will continue to evaluate transmission system impacts of distribution-connected loads where those loads trigger a need for transmission network upgrades on the CAISO controlled grid. This proposal is consistent with current processes, under which the CAISO studies instances in which load interconnections trigger network upgrades their impacts on the system as part of the TPP via the concurrence process. The proposal affirms this approach, and maintains current roles and responsibilities, regardless of whether the load addition is transmission- or distribution-connected.

As discussed in Section A.2, (Large Load Application Process), the CAISO requests that the PTOs clarify in their tariffs the responsibilities of non-load serving PTOs' facilities receiving load interconnection applications from the LSE, and which party will lead the study process. If a PTO uses this concurrence process, the CAISO also expects the PTO to inform the CEC of its load interconnection so the CEC can account for this load in its demand forecast in subsequent forecast cycles.

Regarding FERC's concerns regarding speculative or duplicative large load interconnection requests, the CAISO agrees that its tariff does not deter such requests *per se* but suggests that the responsibility to do so is more appropriately held by the PTOs and therefore should be addressed through revisions to the PTOs' tariffs. For CAISO planning purposes, the CAISO notes that the CEC's Integrated Energy Policy Report (IEPR) long-term demand forecast includes information on applications for service submitted to utilities and applies adjustments to requested capacity based on utilization factors, confidence levels, and ramping assumptions.[9] Confidence levels are determined based on the status of project applications, and take into account the potential for duplicative requests, among other factors. If projects have signed agreements with the utility for electric service, they are included in the highest confidence group. The CEC demand forecast projects capacity and energy needs of new loads, and these new loads have been incorporated into the statewide planning processes for the past several years. The state's integrated resource planning and the

CAISO's TPP incorporate this information. This is one mechanism to guard against speculative or duplicative large load interconnection requests forming the basis of infrastructure planning in the CAISO. Additional mechanisms may be appropriate in the PTOs' tariffs.

4. Operational Requirements

The Commission preliminarily found in the Order that the CAISO's and PTOs' tariffs appear to be unjust and unreasonable because they lack provisions addressing ongoing operational requirements for Eligible Customers taking transmission service on behalf of large loads.[28] The Commission enumerated specific examples, including the lack of provisions governing hourly forecasts, telemetry data, equipment to enable the CAISO to monitor large loads; requiring the transmission customer to enable the CAISO to remotely disconnect large loads when necessary to maintain reliability; ramp rate or ride-through requirements; and control technologies and/or protection systems that may be necessary to limit Eligible Customer's withdrawals from the transmission system.[29]

Background and Stakeholder Comment

Several stakeholders supported clearly defined operational requirements for large loads where requirements are necessary to support grid operations, including Tesla, Microsoft, Constellation, and BAMx. CalCCA requested that the CAISO clearly articulate the underlying issue these information requirements are proposed to mitigate to allow for a more informed discussion of the appropriate data requirements and best methods for obtaining the data before adopting final requirements, noting that much of the proposed information will originate with the large load customer and may include commercially sensitive operational information. Tesla asked the CAISO to keep requirements performance-based and technology-neutral. LSPGC and DesertLink noted that non-load-serving PTOs may not have access to the information required to be shared with the CAISO in the straw proposal.

The CAISO appreciates stakeholder support for clearly defined operational requirements for large loads. The LLTRWG continues to evaluate and document the technical rationale, intended use, and relevant industry practices supporting each requirement. The LLTRWG will continue to refine the proposed requirements as appropriate, including ensuring that they are performance-based and technology-neutral. The CAISO will continue to seek opportunities for coordination and transparency, as appropriate, without sharing commercially sensitive information.

---

28 Order to Show Cause at P 63.

29 *Id*.

Need for Additional Forecasting, Telemetry, and Operational Visibility Requirements

CDWR, Constellation, Microsoft, KiritiGrid, BAMx, PG&E, and Viridon generally supported CAISO's proposal to establish enhanced forecasting, telemetry, and operational data requirements for large loads, noting that these resources often exhibit characteristics that differ from traditional conforming load and may require additional data to support reliable operations. CDWR specifically supported efforts to address forecasting gaps associated with large loads, while BAMx emphasized that forecasting should reflect the operating characteristics of the service being provided.

The CAISO agrees that large loads require additional operational visibility beyond existing forecasting approaches. As large loads become a more significant component of system demand, the CAISO intends to establish requirements that provide visibility into expected load behavior, outages, operating limits, and operational flexibility while remaining focused on information necessary to support reliable grid operations.

Forecasting Requirements, Data Requirements, and Implementation

CDWR, SCE, Constellation, Trimark, and the CPUC requested additional details regarding forecasting requirements, telemetry specifications, reporting timelines, forecast accuracy expectations, data exchange protocols, and implementation processes. CDWR requested further details regarding forecast requirements and telemetry obligations. SCE sought additional discussion regarding forecast accuracy standards and implementation mechanics. Constellation requested greater clarity regarding integration of forecasts into day-ahead and real-time processes. Trimark requested more specificity regarding telemetry architecture and communications protocols. The CPUC requested additional clarity regarding reporting schedules and coordination processes. The CAISO acknowledges these requests and agrees that additional implementation detail will be necessary as the proposal progresses. While this initiative is intended to establish the operational requirements necessary to address the Commission's concerns, more detailed implementation requirements will be developed through business practice manuals and implementation working groups, including clarification regarding required information, submission timing, and reporting processes.

Roles and Responsibilities for Forecasting and Data Submission

Stakeholders expressed differing views regarding responsibility for providing large load forecasts, telemetry, outage information, and other operational data. Constellation, Viridon, and PG&E generally supported utilizing existing LSE and Scheduling

Coordinator structures for operational forecasting and market-related communications, while NCPA argued that these responsibilities should instead reside with PTOs or large load customers because PTOs generally maintain the contractual relationships necessary to obtain and validate the information. ACP-CA, Lotus, and SDG&E similarly raised concerns regarding responsibilities applicable to non-IOU entities and forecasting submissions.

The CAISO clarifies that the Scheduling Coordinator representing the LSE's service area for the large load will include the large load in its Bids, Scheduled Demand, and Meter Data, as applicable, for that area. Where permitted by the applicable Local Regulatory Authority, a large load may elect to participate directly through its own Scheduling Coordinator consistent with proposed tariff language.

Coordination Across PTOs, UDCs, LSEs, and Non-IOU Entities

ACP-California, CPUC, Microsoft, Viridon, PG&E, and VEA requested additional clarity regarding coordination and information-sharing responsibilities among PTOs, UDCs, LSEs, Scheduling Coordinators, and large load customers. ACP-California emphasized the need to ensure the requirements are workable for non-LSE PTOs, municipal utilities, and UDCs. The CPUC highlighted the need for transparency and coordination across multiple PTO territories to guard against speculative interconnection requests, Microsoft encouraged coordination and avoidance of duplicative obligations, Viridon and PG&E supported a formal information-sharing framework, and VEA requested flexibility for entities other than the LSE to schedule large load demand.

The CAISO agrees that successful implementation will require coordination among PTOs, UDCs, LSEs, Scheduling Coordinators, and large load customers. The CAISO intends to identify the operational information necessary to support reliable grid operations and establish clear requirements regarding the information that must be provided to the CAISO. The CAISO continues to expect that Scheduling Coordinators and LSEs will be responsible for coordinating the collection and submission of required operational forecasting information within existing market frameworks. The CAISO's objective is to establish clear and consistent information-sharing requirements while avoiding duplicative reporting obligations and ensuring that entities with operational responsibilities have access to the information needed to support reliable system operations.

Alignment Between Forecasting, Flexibility Products, and Planning Assumptions

BAMx, the CPUC, and KiritiGrid argued that forecasting requirements should appropriately reflect the flexibility, curtailment rights, and operating characteristics

associated with the service being provided and maintain consistency with planning and interconnection assumptions. BAMx asserted that forecasting should be aligned with the applicable service type and updated as service characteristics change, KiritiGrid supported forecasting requirements while emphasizing the importance of information regarding expected curtailment exposure, and the CPUC requested additional clarity regarding the relationship between upgrades, planning assumptions, and operational processes. The CAISO agrees that operational forecasting requirements should reflect the operating characteristics of the service being provided, including applicable operating limits, outages, derates, and available flexibility. The CAISO expects submitted schedules to accurately reflect the operational capabilities and constraints applicable to the load, including any flexibility associated with the applicable service type. This information is necessary to support reliable system operations and situational awareness. The CAISO intends to ensure that forecasted operational information accurately reflects expected operating conditions and material changes in load characteristics.

Implementation Timing and Market System Readiness

PG&E, CDWR, and SCE raised concerns regarding implementation timing, software modifications, business process changes, and the ability of existing systems to accommodate new forecasting requirements. PG&E noted that substantial software and process modifications may be required and expressed concerns regarding implementation by 2027, CDWR highlighted existing functionality gaps related to real-time scheduling adjustments, and SCE requested additional discussion regarding implementation pathways and operational impacts. The CAISO acknowledges these concerns and recognizes that some forecasting, telemetry, and operational visibility requirements may require systems development, process enhancements, and additional coordination among market participants. Consistent with stakeholder feedback, the CAISO will further clarify implementation details, including data requirements, submission mechanisms, and implementation timelines. This will be done through business practice manuals and implementation working groups prior to implementation.

General Support for Technical Requirements and Continued Technical Development

BAMx, Constellation, PG&E, SCE, SDG&E, VEA, and Tesla generally supported the technical requirements developed through the LLTRWG, including ride-through capabilities, post-fault active power recovery, ramp-rate limitations, telemetry, monitoring, modeling, commissioning requirements, and future technical development efforts. The CAISO believes the proposed requirements represent an important step toward ensuring the reliable interconnection and operation of large loads. As stated

above, the CAISO intends to continue evaluating implementation considerations as proposal development progresses and will seek practical approaches that achieve the intended reliability benefits while allowing sufficient time for required systems and process modifications. Consistent with stakeholder feedback, the CAISO will further clarify implementation details, including data requirements, submission mechanisms, and implementation timelines, through business practice manuals, and implementation working groups prior to implementation.

Need for Consistency Across PTOs, NERC Standards, Tariffs, and Planning Standards

The CPUC, Constellation, Microsoft, LSPGC and Desert Link, and SDG&E requested that technical requirements be implemented consistently across PTOs and aligned with evolving NERC reliability standards, CAISO tariffs, business practice manuals, and planning standards. The CPUC and Constellation emphasized alignment with NERC standards, Microsoft requested clear documentation and coordination across PTOs, LSPGC and Desert Link recommended incorporation of system-wide requirements into CAISO Planning Standards, and SDG&E requested clarification regarding where requirements would ultimately be codified. The CAISO agrees that consistency, transparency, and coordination are important objectives and intends to continue collaborating with industry reliability efforts while evaluating the appropriate mechanisms for implementation through tariff provisions, business practice manuals, planning processes, and other governing documents as appropriate.

Technical Telemetry, Phasor Measurement Unit (PMU), Communications, and Monitoring Specifications

Trimark, ACP-California, and Microsoft requested additional details regarding telemetry requirements, PMU deployment, monitoring obligations, communications architectures, data protocols, and performance standards. Trimark specifically requested technical specifications regarding telemetry data requirements, communications architecture, redundancy standards, and PMU requirements. ACP-California highlighted implementation and cost recovery considerations associated with monitoring and telemetry equipment, and Microsoft requested that requirements avoid duplicative telemetry and compliance obligations.

The CAISO acknowledges these requests and intends to continue working with PTOs and stakeholders to develop appropriate technical specifications and communications requirements while leveraging existing infrastructure where practical and avoiding unnecessary duplication of monitoring, reporting, or communications obligations.

Cost Allocation for Technical Requirements

BAMx and ACP-California commented that costs associated with technical compliance requirements, monitoring equipment, telemetry, and related infrastructure should generally be assigned to the large load customer creating the need for those requirements. BAMx specifically recommended allocating compliance costs to the large load, while ACP-California highlighted implementation and cost recovery considerations associated with monitoring and telemetry requirements. The CAISO acknowledges these comments and notes that the purpose of this part of the initiative is to establish the technical requirements necessary to support reliable operation of the system.

EMT Studies, Modeling Requirements, and Load Characterization

CDWR requested additional rigor related to EMT studies and sought assurance that changing load characteristics would continue to be accurately represented after interconnection. CDWR encouraged broader application of EMT studies and questioned how load characteristics would continue to be represented when software, hardware, customer composition, or operating practices evolve over time.

The CAISO agrees that accurate modeling and appropriate study methodologies are important to evaluating the reliability impacts of large loads. Consistent with the ongoing technical requirements effort, EMT studies will be performed where warranted based on system conditions, project characteristics, and engineering judgment. The CAISO also agrees that material changes in large load operating characteristics may have reliability implications and intends to maintain sufficient visibility into those characteristics to support ongoing reliability assessments and operational decision-making.

Additional Technical Requirements for Large Loads with FILI Service

Several stakeholders identified additional technical requirements that may be appropriate for FILI and FLIP service. Antora, BAMx, ACP-California and others emphasized the need for clearly defined and enforceable curtailment performance, including response times and operating limits, supported by appropriate telemetry, communications, controls, and verification. Antora also suggested capabilities such as automatic emergency curtailment and remote disconnection, while BAMx emphasized ensuring that the flexibility assumed in planning is consistent with actual operating performance and re-verified when the service arrangement changes. The CAISO appreciates stakeholder feedback regarding additional technical requirements for FILI service, and proposes additional details in the proposal below and in Section D. The CAISO agrees that any flexibility relied upon in planning and operations should be supported by appropriate performance, monitoring, communication, and control capabilities to ensure that curtailment can be implemented and verified when required.

The CAISO will continue to coordinate with the PTOs to determine the appropriate requirements and where those requirements should be established.

Remote Disconnection and Communications Requirements

Stakeholders generally supported maintaining reliable communication channels but expressed differing views regarding whether the CAISO should possess authority or capability to directly disconnect large loads. SDG&E, SCE, and Viridon argued that PTOs, UDCs, or retail service providers should continue to execute physical disconnection actions pursuant to CAISO instructions, citing customer relationships, jurisdictional considerations, and existing operational practices. The CPUC emphasized the importance of reliable communications and control capabilities during major disturbances, while PG&E noted that some large loads may require monitoring, control, and automated load reduction capabilities to support reliable operations. The CAISO agrees that reliable communication channels are important to maintaining system reliability and notes that existing reliability procedures already rely on the CAISO issuing operating instructions while PTOs execute required switching actions. The CAISO does not envision direct physical disconnection of large loads by CAISO personnel and expects any necessary load reduction or disconnection actions to continue to be implemented through established coordination procedures between the CAISO and the applicable PTO or other responsible entity.

Proposal

The CAISO agrees that the operational requirements the Commission identifies in the Order are necessary. The CAISO has been exploring these issues through discussions with PTO representatives in the LLTRWG, and through engagement with NERC. The LLTRWG was established by the CAISO and utilities interconnecting large loads to develop consistent technical requirements for the reliable interconnection and operation of large data center loads connected to the CAISO-controlled grid. The resulting Large Load Technical Requirements Straw Proposal, released on June 15, 2026, focuses on the technical characteristics needed to maintain system reliability as large data center loads, including AI-training data centers, continue to grow within the CAISO footprint.[30] The Large Loads Technical Requirements Straw Proposal complements broader stakeholder efforts addressing planning, transmission service, market, and operational considerations, and is intended to remain aligned with evolving NERC Reliability Standards and industry practices.

[30] *See* Large Load Technical Requirements - Straw Proposal at https://stakeholdercenter.caiso.com/InitiativeDocuments/Large-Load-Technical-Requirements-Straw-Proposal-Jun-15-2026.pdf

The Large Loads Technical Requirements Straw Proposal proposes technical requirements in the following areas, which the CAISO intends to continue to further develop through ongoing discussions with the LLTRWG and based on stakeholder comments in response to the Large Loads Technical Requirements Straw Proposal:

- Frequency ride-through
- Voltage ride-through
- Ramp-rate limitations
- Monitoring and telemetry
- Post-fault active power recovery
- Modeling data requirements
- Commissioning, including data verification and model validation

The Large Loads Technical Requirements Straw Proposal is intended to establish technical reliability requirements for the reliable interconnection and operation of large loads. Many of the proposed requirements address the technical operational concerns the Commission identifies in the Order. The Large Loads Technical Requirements Straw Proposal also identifies areas for which the LLTRWG is currently developing technical requirements that the Commission does not mention in the Order, including low- and high-frequency cycling, constant power operation, power quality, dynamic reactive power support, phase-angle jump ride-through, protection requirements, and other emerging technical considerations.

Based on discussions within the LLTRWG and coordination between the CAISO and participating PTOs, the CAISO proposes that the following requirements be addressed through the CAISO Tariff:

- Establish ramp-rate requirements;
- Establish frequency and voltage ride-through requirements;
- Require hourly forecasts, telemetry, and other operational data necessary to provide the CAISO with sufficient operational visibility;
- Utilize communication protocols for the CAISO to coordinate with the PTO to remotely disconnect large loads when necessary to maintain transmission system reliability, and;
- Establish requirements for maintaining communication channels between the CAISO and transmission customers serving large loads.

The CAISO proposes that the following requirements be addressed through the PTO tariffs:

- Require installation of phasor measurement units (PMUs) or similar high-speed monitoring equipment, with associated costs assigned to the transmission customer, and;

- Establish requirements for control technologies and/or protection systems, when necessary, to limit large load withdrawals from the transmission system.

The LLTRWG continues to refine the technical requirements based on stakeholder feedback, additional system studies, operating experience, and the ongoing development of NERC Reliability Standards for computational loads. As the work progresses, the CAISO and participating utilities will determine the appropriate implementation mechanisms. Depending on the nature of each requirement, implementation may occur via changes to the CAISO tariff, PTOs' tariffs, utility interconnection handbooks, Business Practices Manuals, and/or future NERC Reliability Standards, providing a coordinated framework for reliable integration of large loads within the CAISO-controlled grid. For example, depending on the results of large load interconnection studies, and the type of service provided to the large load interconnection customer (i.e. firm service or FILI), the CAISO and/or relevant PTO may require additional monitoring, control, or protective systems beyond those required by the CAISO to maintain reliability. Such systems may include automated schemes designed to reduce or disconnect portions of the large load during abnormal system conditions. The CAISO notes that it does not have direct control of switches, so the PTOs would need to make sure they have control at the right level. In other words, these requirements would be implemented at the PTO rather than at the CAISO level.

To ensure the ongoing visibility and operational control necessary to provide reliable transmission service, the CAISO also proposes tariff provisions enabling data exchanges with the PTOs and LSEs to ensure access to the following large load interconnection information. Static information about the large loads will come from the PTOs near the end of the interconnection process (similar to the new resource implementation process for generators). Day-ahead and real-time information will come from the LSE scheduling coordinator responsible for the large load's demand.[31]

For each large load, the CAISO proposes to require the following information from the PTOs during, or at the end of, the interconnection process:

- Information on whether the Eligible Customer is enrolled in a flexible interconnection program, described below in Section D of this draft final proposal;
- Load type;
- Variable or flat load designation;
- Expected hourly operating profile;

[31] The CAISO does *not* propose that the large load be required to have its own scheduling coordinator, nor that large loads be considered as their own LSEs. Rather, large load demand would be scheduled by their LSE similar to non-large load demand, and that same LSE would report any material data for the large load. If the large load participates in a CAISO demand response program, then it would a demand response provider and scheduling coordinator to represent it in the CAISO markets.

- Location of service;
- Point of delivery;
- Connected capacity;
- Minimum operating level;
- Maximum operating level;
- Utility program information;
- Any market participation status or expected participation in demand response programs;
- Maximum operating demand;
- Minimum operating demand;
- Curtailment capability;
- Expected hourly flexibility capability;
- Ramp-up capability;
- Ramp-down capability;
- Expected operating information sufficient to characterize expected load behavior; and
- For co-located generation that is *not* exporting or CAISO-participating, all generation characteristics

The PTO will be expected to inform the CAISO of any material changes after energization. Any co-located participating generators will still go through the CAISO interconnection and new resource implementation process.

Additionally, the CAISO proposes that the large load's load-serving entity's scheduling coordinator will provide the CAISO with the following data specific to each large load:

- Forecast submission requirements,[32] which will be incorporated into applicable balancing authority area demand forecasts and operational studies:
    - Hourly forecasts of expected load consumption for the Operating Day and a rolling 7-day period following the Operating Day
    - Day-Ahead Forecasts to be submitted no later than 0700 prevailing Pacific time on the day prior to the Operating Day
    - Forecasts at the individual large load identifier level
    - The schedules are expected to reflect the resource's anticipated operating capability, including planned outages, forced outages, derates, and applicable operating limits, including operating envelopes, to ensure schedules remain aligned with expected operating conditions.

[32] The CAISO tariff will establish conditions under which an interconnecting transmission operator must obtain a schedule/forecast from the Eligible Customer to provide to the CAISO.

- Real-time forecast updates: Updated forecasts whenever expected consumption of the large load materially deviates from previously submitted day-ahead forecasts, including:
    - Expected energization activities
    - Material changes in operations
    - Curtailments
    - Facility outages
    - Co-located generation impacts on the load forecast
    - Other known events affecting expected consumption
- Telemetry data:
    - Operational status
    - Real-time consumption
- Expected outages:
    - Planned outages
    - Forced outages
    - De-rates
    - Other operating conditions that materially affect expected consumption

As described above, the CAISO generally proposes to obtain large load data from the PTOs during the interconnection process and the load-serving entities representing the large load's demand in market timeframes. The CAISO does not currently propose requiring large loads to have their own scheduling coordinator or other direct relationship with the CAISO; however, this framework may need to change to remain consistent with ultimate NERC requirements for computational loads.

The CAISO also notes that it will require the PTO, load-serving entity (LSE), scheduling coordinators, or other appropriate parties to work with the CAISO to provide all available data on any reliability event. Similar to participating generator requirements, this requirement will ensure the CAISO, utilities, regulators, NERC, and WECC have sufficient data to conduct meaningful post-event analyses.

The CAISO also notes that, to the extent that software changes are necessary, the CAISO may require additional time beyond 2026 to select a vendor and develop, test, and implement the solution. However, the CAISO would seek to begin implementing the necessary software changes in 2027, with automation capabilities deployed on a phased basis and full automation targeted for completion by 2030.

5. Large Load Service Agreements

The Commission preliminarily found in the Order that the CAISO and PTO tariffs lack *pro forma* provisions in a transmission service agreement, or other applicable agreement, to memorialize the technical and operational terms the Order describes.[33]

Background and Stakeholder Comment

In the straw proposal, the CAISO stated its expectation that the PTOs would develop *pro forma* agreements to address large load operations and cost shifting prevention. PG&E supported PTO development of *pro forma* agreements to address large load operations and cost-shifting prevention, noting that for large loads seeking FILI service requests, PTOs could either develop a single study agreement with a flexible service addendum, or separate agreements for firm and flexible interconnection service. The CAISO supports either of these options as long as they are consistently developed among PTOs.

Proposal

The CAISO proposes that the PTOs develop a consistent *pro forma* agreements to memorialize the technical and operational terms the Order describes. At this time, it is not clear whether the CAISO should always be a signatory to a three-party agreement for large load interconnections. For example, the CAISO likely would not have any roles or responsibilities for the financing and construction of simple network upgrades needed for large loads receiving firm interconnection service. Such arrangements could be effectuated through a two-party interconnection agreement between the PTO and the large load developer, as performed today. On the other hand, for a large load requesting non-firm interconnection service, the PTO may need the CAISO to help memorialize and sign on to the operational procedures necessary to provide that service through new *pro forma* non-firm service agreements or utilizing the PTO's two-party interconnection agreement. For co-located large loads with exporting generation, the CAISO will need to be a party to a *pro forma* agreement that bridges the *pro forma* Large Generator Interconnection Agreement (LGIA) with the *pro forma* large load interconnection agreement or negotiate a non-conforming LGIA to account for certain details of the co-located large load interconnection on an individual basis. The developer also would be expected to execute a CAISO *pro forma* Participating

[33] Order to Show Cause at P 64.

Generator Agreement for the generator, but not a Participating Load Agreement for the large load.[34]

B. Cost Shifting Among Transmission Customers

1. Roles and Responsibilities

The Commission laid out key objectives regarding cost allocation of infrastructure needs[35] attributable to Eligible Customers taking transmission service on behalf of large loads: improved transparency regarding the assignment of network upgrades and their associated costs; and development of a *pro forma* cost recovery agreement between the CAISO, the relevant PTO, and the Eligible Customer taking transmission service on behalf of large loads. The Commission states that improved transparency will provide important information to state public utility commissions and other state regulators, enabling them to identify which transmission costs are caused by which transmission customers to appropriately sub-allocate costs at the retail level. According to the Commission, a *pro forma* cost recovery agreement would ensure that Eligible Customers bear the risk and are ultimately responsible for the costs incurred to provide transmission service, including the cost of network upgrades.

Background and Stakeholder Comment

In the straw proposal, CAISO proposed that PTO tariffs should set forth cost allocation rules and that PTOs should lead in the development of *pro forma* agreements regarding assignments of network costs. Further the CAISO emphasized that, coupled with enhanced PTO cost-allocation rules, the existing TAC can sufficiently prevent cost-shifting.

Pro forma agreements and standardized frameworks

IEPA, ACP-California, VEA, CPUC, and Microsoft recommended that there should be a consistent cost-allocation and recovery framework, with IEPA, ACP-California, VEA, and the CPUC stating that the CAISO should develop a framework for allocation of

[34] The Participating Load Agreement is for loads receiving wholesale service, which are not relevant to this initiative at this time.

[35] The FERC Order to Show Cause defined network upgrades as follows: The term network upgrades is used throughout this order to refer to modifications or additions to transmission-related facilities that are integrated with and support the overall transmission system. *See pro forma* OATT § 1.27 (Definitions – Network Upgrades). We note that CAISO's definition of Network Upgrades applies only to additions, modifications, and upgrades required to accommodate the interconnection of generating facilities. *See* CAISO Tariff, app. A (Definitions), Network Upgrades (0.0.0). (Footnote 13)

FERC-jurisdictional transmission costs that the CAISO and PTOs should then implement through their tariffs. The CPUC encouraged the CAISO to establish minimum requirements for determining cost allocation based on causation. Microsoft recommends that a framework should include safeguards against duplicative cost-recovery that disallows PTOs from recovering local upgrades that the large customer already paid for upfront. Viridon noted that not all PTOs have direct relationships with retail ratepayers and that the *pro forma* agreements should have consistent principles to protect customers against cost shifting. Viridon and PG&E agreed with the CAISO's proposal for PTOs to lead the *pro forma* agreement. SDG&E, CDWR, VEA, and the CPUC recommended that the CAISO be a party to *pro forma* cost-recovery agreements for large loads.

The CAISO agrees with stakeholders that there is a need for a consistent approach to cost-allocation and recovery but maintains that these provisions are most appropriately addressed in PTO tariffs. While the CAISO anticipates signing certain *pro forma* agreements involving large loads, as mentioned in the straw proposal, it does not expect to sign every agreement between a PTO and a large load developer. At this time, the CAISO does not intend to establish a cost-recovery and allocation framework for the PTOs to use in their tariffs, though it recognizes that one may become necessary if inconsistencies emerge among PTO tariff provisions. The CAISO additionally recognizes the ultimate need to bring non-FERC jurisdictional PTOs into alignment with the cost allocation framework of the FERC-jurisdictional PTOs. The CAISO proposes to address this framework in a future CAISO stakeholder initiative and filing, once greater certainty exists around the mechanisms the PTOs propose to adopt to prevent cost-shifting under this Order.

Assignment of costs

Stakeholders provided different recommendations for how or whether to assign costs associated with network upgrade costs attributed to large loads. BAMx and NCPA recommended that single large load customers driving network upgrades should be required to pay for those upgrades, and Constellation also supported assigning infrastructure costs to customers whose infrastructure requests cause those costs. CDWR generally supported the CAISO's efforts to ensure new large loads bear equitable responsibility for costs incurred for interconnection and use of the transmission system. Cal Advocates recommended that the CAISO update the straw proposal to reflect that PTOs have not established interconnection terms requiring large loads to pay for network upgrade costs that address cost shifting. The CPUC was concerned that the straw proposal did not lay out upstream mechanisms to allocate costs to large load customers and recommended that the CAISO and PTOs take measures to ensure that cost estimates are accurate and that credit and minimum

contributions align with costs to be incurred serving large loads. Google and Microsoft similarly advocated that customers pay for local upgrades directly driven by large loads, with network upgrades that provide broad system benefits recovered through the TAC. IEPA suggested that the CAISO update the proposal to outline how a large load generator paying for the entirety of a network upgrade that is made available to other users will be reimbursed. Related to the amount that PTOs include into their total revenue requirement, and therefore what's recovered through the TAC, SDG&E and PG&E supported the CAISO's proposal. SCE was still evaluating whether it believes that the CAISO can comply with FERC's Order without modifying its tariff to prevent the socialization of high-voltage transmission network upgrades associated with large loads. NCPA and CDWR encouraged the CAISO to exercise tariff authority to oversee what costs and network upgrades are included in the TAC and in wheeling charges. BAMx recommended the CAISO re-start its 2018 TAC Structure Enhancements.

The CAISO appreciates and shares stakeholder concerns around cost-shifting and offers an explanation below of how such cost-shifts can be avoided and that this can be accomplished most effectively without fundamental changes to the CAISO TAC.

The CAISO emphasizes that the PTOs are responsible for establishing tariffs for their customers that do not result in cost-shifting between customers of the PTO, with a particular focus on network costs.

The CAISO also understands that concerns may remain in instances where one PTO with significantly more large load interconnections may incur network costs that drive up the regional high voltage TAC across the CAISO footprint, and describes a solution below, which is available to the CAISO and PTOs under the current structure and CAISO processes.

Stakeholders also provided input on network costs incurred for load that does not materialize as expected, though there was directional alignment among BAMx, SDG&E, SWC, LS Power and DesertLink, Cal Advocates, and PG&E that there should be some mechanisms in place to protect ratepayers in these instances. Cal Advocates and BAMx advocated a longer payback period to recover upfront costs until load materializes. SWC encouraged the CAISO, PTOs, and stakeholders to determine an appropriate payback period and BAMx proposed aligning reimbursement periods with the durability of the load. SDG&E advocated that the CAISO's FERC submission should state that an advanced funding requirement satisfies FERC's requirement that the Eligible Customer is responsible for network upgrades and, specifically, that large loads are responsible for the full costs of the network upgrades if the load doesn't materialize. LSPGC and DesertLink supported large load demand that does not materialize should bear risk and cost responsibility for network upgrades but should be eligible for reimbursement if the

load materializes, with PG&E providing a similar comment that non-large load customers can be protected from cost shifts with financial assurances and monetary protections. Lastly, Google recommended that the PTOs implement standardized ratepayer safeguards, such as minimum demand commitments. As stated earlier, the CAISO shares concerns about cost-shifting that could result from serving large loads, including in cases where a large load's demand does not materialize as expected, potentially exposing other customers to these costs. The CAISO expects that the PTO tariffs will sufficiently address this risk and expects alignment among the different PTO tariffs to account for this risk.

Proposal

The CAISO shares the objectives of the Order to prevent cost shifting among transmission customers and to ensure that large loads bear equitable risk and responsibility for costs incurred to interconnect, including the cost of network upgrades attributed to the large loads. The CAISO understands the importance of maintaining affordability while addressing large load integration.

The CAISO sees value in development of a *pro forma* cost recovery agreement and is working closely with the PTOs, which are leading development of this agreement, and cost allocation rules generally.[36] The CAISO believes it is prudent for cost allocation rules to be set forth in the PTO tariffs rather than the CAISO tariff. As discussed herein, the PTOs will continue to manage large load interconnections through their tariffs. Many of the PTOs also have a direct relationship with their retail ratepayers and the regulators of those ultimate rates, including the CPUC. Additionally, the PTOs have worked on these cost allocation issues and have more expertise in cost allocation than the CAISO, including on large loads. Finally, it is the PTOs that will construct and own the network upgrades if required for the large load interconnection. As such, the CAISO does not propose to issue a new "top-down" cost allocation solution through its own tariff. The CAISO believes that the PTOs may develop their own proposals to address any cost shifting, and that the current transmission revenue requirement and credit mechanisms in the TAC can accommodate those proposals. The CAISO proposes some metering and settlement changes in Section C of the tariff to account for co-located large loads and generation.

The CAISO recognizes the primary role of the PTOs in establishing just and reasonable provisions in their tariffs applicable to the large load customer taking transmission

[36] The cost recovery agreement could be part of the *pro forma* load interconnection agreement. They are discussed separately here because the Order to Show Cause discusses them as separate issues.

service on behalf of the end-use customer in order to prevent cost shifting among customers.

The concern is that, to the extent that one PTO (PTO-A) interconnects more large loads than another PTO (PTO-B), the network upgrade costs attributed to large loads in PTO-A may drive up PTO-A's annual transmission revenue requirement that is then summed with all other PTOs' annual revenue requirements to calculate the CAISO's regional high-voltage TAC that is applied to all UDCs and MSSs equally. This could become inequitable if the contributions or revenues recovered by the UDC or MSS from the end-use customer are not also used to reduce cost recovery from the entire CAISO customer base through the CAISO's TAC. However, the FERC System of Accounts and the requirements in the CAISO tariff already covers this issue.

To manage concerns around cost shifting caused by one PTO having a greater number of large load interconnections than other PTOs, the CAISO proposes the following: All PTOs should take into account the impact of construction contributions, revenues, or other cost offsets[37] associated with network upgrade costs directly attributed to large loads and paid for by the large load customer through the UDC or MSS in determining its transmission revenue requirement and its annual transmission revenue credits. This will ensure that only the revenue requirement net of those contributions or revenue offsets is used to determine the regional high-voltage TAC set by the CAISO and recovered across all loads and exports.

2. Data Transparency

In the Order, the Commission highlighted the need for "the provision of data on CAISO's website in a single location, and in an easily accessible format that is searchable and allows users to filter the data, on transmission service provided to Eligible Customers on behalf of large loads, for network upgrades evaluated in the local transmission planning process that are needed to accommodate transmission service to Eligible Customers on behalf of those large loads, and the costs for those network upgrades."[38]

Background and Stakeholder Comment

In the straw proposal, the CAISO proposed measures to provide additional data to increase transparency related to large loads. Google, NCPA, Viridon, SEIA, KritiGrid, PG&E, and BAMx supported the CAISO's proposal to publicly post additional data related to large loads and to memorialize the changes in the tariff. Those stakeholders,

[37] This includes financial security, minimum demand charges, exit fees, and similar mechanisms the Order mentions.
[38] Order to Show Cause at P 46.

along with CalCCA, requested that the CAISO post additional and more granular data. PG&E recognized that PTOs will have to provide data to the CAISO and expects that data transparency will be similar to the transparency in the generator interconnection process and supports the CAISO proposal to enhance transparency regarding large load interconnections. BAMx supported increased data transparency and requested that the CAISO regularly disclose data so that stakeholders could evaluate cost exposure, including which upgrades are customer-financed and which are recovered via the TAC, the aggregate cost and TAC-recovered portion of each project, and the cumulative interconnection impacts of large load interconnections across PTOs. KritiGrid recommended adding expected curtailment exposure as a fourth category to the proposed data framework. Google requested that the CAISO provide granular, up-to-date data, with the necessary masking needed to protect customer confidentiality. Viridon recommended that large load interconnection requests be visible in the TPP stakeholder process rather than just through the CEC's demand forecast and suggests that affected PTOs should receive notice of large load interconnection requests that could impact the non-load-serving PTO. CalCCA commented that the CAISO should ensure that its processes and procedures are transparent and provide data that are sufficiently granular. CalCCA further requested that the CAISO develop a process that allows CCAs and other stakeholders to access information on proposed load additions to allow external vetting. SDG&E notes that the Order does not require PTOs to maintain spreadsheet with large load additions, noting that it does not plan to develop or maintain a large load interconnection queue spreadsheet.

SCE, CalCCA, Microsoft, SWC, VEA, the CPUC, and Cal Advocates requested additional granularity about large load additions, including when they trigger transmission network upgrades. CalCCA and the CPUC both suggested that CAISO's proposal to use aggregate data is insufficient, with the former asserting that these data may not be adequate to protect against duplicative or speculative load and with the latter stating it does not meet the Order's transparency directive. SCE requested additional details on how the CAISO will determine when planned network upgrades are needed to accommodate large loads, identified by type of equipment and upgrade. VEA requested annual monitoring and public reporting of all large load-driving additions to PTOs' revenue requirements. Related to transmission upgrades, Microsoft suggested that the CAISO identify estimated costs, including the assumptions used to derive those costs, expected construction schedules, and required upgrades. Microsoft further suggested that the CAISO should distinguish project-specific upgrades from broader system upgrades and explain how changes in a project's scope and timing affect customer responsibility.

The CPUC opposed the use of concurrences as currently employed in the TPP, recommending that the CAISO clearly differentiate upgrades that serve specific

customers from those benefiting the greater grid. The CAISO reiterates a fundamental premise of transmission cost allocation: that customers pay transmission costs to the extent they benefit from the transmission. Although a network upgrade may be built as a result of a large load interconnection, the network upgrade itself may benefit a larger class of ratepayers. For high-voltage transmission network upgrades, for example, all CAISO ratepayers may benefit. On the other hand, a network upgrade that does not benefit certain ratepayers should not have its costs allocated to them. Low-voltage transmission network upgrades are only allocated to their PTO territory for this reason.[39] And there are always cases where the CAISO and PTOs may file non-conforming interconnection agreements to reflect that the interconnection customer alone benefits from an upgrade and thus receives all of its costs. Nothing in this initiative proposes to change these fundamental constructs.

SWC encouraged transparency among the CAISO, PTOs, data center developers, and market participants throughout the planning, interconnection, and cost-recovery process to safeguard against cost-shifting. Cal Advocates stated that the CAISO's current proposal does not provide enough transparency to determine if the network upgrade would be required if not for the large load and recommends that the CAISO establish a clear timeline for data releases that align with the TPP or a separate and dedicated process for large loads, the portion of each network upgrade the large load needs for service, and the cost estimate for each upgrade.

The CAISO recognizes stakeholder interest in access to granular data related to large loads additions and supports transparency. The CAISO also notes that forecasting and studying specific large load additions occurs through PTO processes and through the CEC's IEPR process. Lastly, as several stakeholders noted, there are data privacy requirements that limit what project-specific information any entity, including the CAISO, could share. Accordingly, the CAISO's proposed data transparency enhancements, coupled with those mentioned related to the TPP concurrence process, will address most stakeholders requested data additions without violating data privacy requirements, and satisfies FERC's direction on transparency and access. Further, the CAISO continues to encourage the load interconnecting PTOs to maintain sufficient transparency about large load applications to ensure that stakeholders can accurately assess these additions, as called for in the Order.

Proposal

[39] In other words, the transmission access charge is not a single charge, but many: the regional access charge for high-voltage network upgrades(200 kV+), and the many individual local access charges for low-voltage network upgrades.

The CAISO agrees that cost data should be transparent and can be provided on the CAISO website in a searchable format. This is important both to aid large load developers in making efficient siting decisions as well as to provide information critical for state regulators to ensure fair cost allocation at the retail level.

For large load developers, the CAISO notes that for the generator interconnection study process, the CAISO already provides each PTO's per unit cost guide for all network upgrade cost components.[40] These guides are updated and shared with stakeholders annually based on the latest industry cost estimates. The CAISO proposes to use the per unit cost guides or enhance them as needed to ensure large load developers can easily obtain cost data.

For state regulators and stakeholders, per the Commission's direction,[41] the CAISO also proposes to clarify in the TPP where network upgrades were needed to accommodate both general load growth and large load interconnection specifically. Large load growth has already been incorporated into the CEC, CPUC, and CAISO forecasting and planning processes, as detailed in the CAISO's Informational Report on Resource Sufficiency already submitted to the Commission.[42] The CAISO also proposes to publicly post:

1. Aggregate amounts of proposed large load additions in the CAISO operating area, including the aggregate amounts in each transmission pricing zone;
2. Planned network upgrades needed to accommodate Eligible Customers taking transmission service on behalf of large loads, identified by type of equipment and network upgrade (*e.g.*, new substation, reconductoring, a new high-voltage transmission line) for each transmission service request; and
3. Cost estimates for each planned network upgrade identified as needed for large loads, as described in (2).[43]

The CAISO proposes to memorialize these transparency requirements in its tariff. The CAISO also encourages the PTOs to memorialize tariff requirements to adopt large load queue spreadsheets as it does for wholesale generator interconnection customers. The

40 *See* CAISO Current cost guides at https://www.caiso.com/library/current-cost-guides.
41 Order to Show Cause at P 72.
42 *See* CAISO Informational Report - Large Loads and Co-located Loads at https://www.caiso.com/documents/jul-20-2026-informational-report-large-loads-and-co-located-loads-el26-71.pdf.
43 Order to Show Cause at P 75.

CAISO likewise proposes to include in its queue report whether the interconnection customer proposes to include a large load, and its capacity.[44]

C. Co-Location Arrangements and Load with Behind-the-Meter Generation

1. Terminology

For purposes of the Order, the Commission defined "co-located load" as "end-use customer load that is physically connected to the facilities of an existing or planned generating facility on the generator interconnection customer's side of the point of interconnection to the RTO/ISO's transmission system."[45] FERC further defined "Behind-the-Meter Generation" as "a generating facility that delivers energy to load without using the transmission system or any distribution facilities."[46] The Commission did not explicitly suggest that the CAISO or PTO tariffs were unjust and unreasonable because they lack definitions of co-located loads or behind-the-meter generation.

Background and Stakeholder Comment

In the straw proposal, the CAISO agreed with the Commission's definitions for co-located load or behind-the-meter generation and did not propose to explicitly define those in its tariff.

Some stakeholders disagreed with the CAISO not creating formal tariff definitions for co-located load or behind-the-meter generation or otherwise requested various clarifications. While PG&E agreed that there was a general understanding of the terms, it encouraged the CAISO to develop a definition that could capture the existing breadth of arrangements to avoid future ambiguities and noted that the Commission may disagree that there is not a need for a tariff definition. AltaGas disagreed with the CAISO that co-located load and behind-the-meter generation have plain meanings that did not require formal tariff definitions and stated there was no reason to restrict co-location to a single site if the large load and resource share the same interconnection facility. The CPUC asserted that some terms remained undefined or unclear, including date of service, time of installation, and operator of co-located generation. The CAISO recognizes that there is no stakeholder consensus on creating formal tariff definitions for co-located loads or behind-the-meter generation and notes that strictly defining those could exclude future large load co-location arrangements. Thus, at this time, the CAISO

---

44 *See* CAISO Generator interconnection at https://www.caiso.com/generation-transmission/generation/generator-interconnection.

45 Order to Show Cause at P 88.

46 *Id*. at P 89.

does not find it prudent to formally define these in its tariff. To the extent that terms remain unclear and could confuse co-location arrangements, the CAISO will address those in the future.

ACP-California and SDG&E commented that they saw value in the CAISO including additional examples of how co-located load and generation arrangements would be treated through CAISO interconnection process and recommends that the CAISO provide more descriptions of arrangements that could work under the CAISO's tariff. As stated at the August 19th stakeholder workshop, the CAISO welcomes stakeholders with specific questions about co-location arrangements reaching out to the CAISO. The CAISO agrees that further clarity could be helpful, especially between the PTO and CAISO interaction and proposes that, for co-location arrangements, the CAISO tariff will apply to the generation, and the PTO tariff will apply to the load.

Several stakeholders recommended specific clarifications or asked for changes to parts of the proposals related to co-located agreements. ACP-California and NextEra requested continued coordination between CAISO and PTOs to ensure that load and generation interconnection work does not create redundant network upgrades. SEIA disagreed with the CAISO omitting a Bring Your Own Generation (BYOG) proposal and recommended that the CAISO either update that framing or adopt a BYOG framework modeled on Southwest Power Pool's (SPP) High Impact Large Load Generation Assessment (HILLGA). Google recommended that the CAISO adopt an established surplus and provisional interconnection mechanism to allow large loads to pair with co-located clean energy. The CAISO appreciates the recommendation and has updated the proposal to reflect details the CAISO can provide at this time. However, the CAISO reiterates that many of the fundamental details of the load interconnection application and study process, including the process for co-located loads, need to be articulated by the PTOs. The CAISO looks forward to working with PTOs and seeing these details in the coming weeks as all parties develop their filings for the Commission. Regarding the suggestion that the CAISO impose a BYOG requirement, the CAISO highlights California's unique planning structure and MOU with the state agencies and clarifies that it does not have procurement authority to consider such a requirement at this time. In addition, CAISO does not see evidence of a need for a BYOG requirement at this time given the state's forward resource, transmission, and procurement planning regime. Regarding the recommendation to establish provisional interconnection mechanism, the CAISO recognizes that there are multiple co-location arrangements, including potential arrangements that could be considered. The CAISO expects to continue conversations with the PTOs about this, as well as to consider the potential for these arrangements in a future stakeholder process.

Proposal

The CAISO generally agrees with both definitions proposed by the Commission; however, the CAISO would exclude from discussion station power load and the generation that exclusively serves station power load. The CAISO believes the Commission is focused on typical end-user loads and not loads facilitating wholesale power.[47] The CAISO does not believe it is necessary to create formal tariff definitions for co-located load or behind-the-meter generation and is not proposing to do so. Both terms already have plain meanings, and behind-the-meter is already used frequently throughout the CAISO tariff, including for different configurations based on whether the meter is a CAISO meter or a retail end-user meter. Thus, providing a definition may have inadvertent consequences to the extent it differs in any meaningful respect from the use of these terms currently. The CAISO may provide clarifications if needed in its business practice manuals.

2. Serving Co-Located Loads

The Commission stated in the Order that the CAISO's tariff does not contain provisions addressing with sufficient clarity and consistency the rates, terms, and conditions of service that apply to interconnection customers serving co-located load.[48] The Commission included, "the scope of the analyses CAISO performs as part of its existing study process to evaluate the impacts of co-location arrangements, which may need to account for any potential dynamic impacts of co-located load and any potential impacts of requests to modify an existing generating facility's interconnection service level to serve co-located load on transmission system reliability."[49] The Commission noted that in one of its recent orders on co-located load in the PJM Interconnection (PJM), it found that it was necessary to clarify that interconnection customers seeking to use new generating facilities to serve co-located load may: (1) request interconnection service at a level below the generating facility's maximum facility output; (2) use existing procedures to accelerate interconnection requests that satisfy certain tariff criteria; and (3) request provisional interconnection service and surplus interconnection service.[50] The Commission additionally noted that interconnection customers should have a

---

47 The CAISO will continue to expect station power load to be metered separately from other loads and generation, consistent with local regulatory authority requirements.

48 Order to Show Cause at P 93. The Order to Show Cause has similar discussions of co-located loads in Section E, Interconnection Customers Serving Electrically Proximate Large Load and Co-Located Load; however, the CAISO includes all co-location-related proposals here for concision.

49 *Id*. at P 96.

50 *PJM Interconnection, L.L.C.*, 193 FERC ¶ 61,217 at PP 231-235 (2025) (PJM Co-Location Order). PJM's compliance filing proposing revisions in response to these directives was accepted in part on April 16, 2026. *PJM Interconnection, L.L.C.*, 195 FERC ¶ 61,030 (2026).

means of knowing the appropriate mechanism for setting forth the terms and conditions of co-location arrangements. The Commission also expressed concern that "without an Eligible Customer designated to take transmission service on behalf of a co-located load, there is no mechanism for CAISO to address situations in which a co-located load withdraws energy from the transmission system."[51]

Background and Stakeholder Comment

The CAISO initially proposed clarifying how co-located large loads and generation could interconnect and operate within the CAISO-controlled grid and included proposed data requirements and other process updates that could be required to accommodate these arrangements.

Large loads co-location framework

PG&E, IEPA, ACP-California, Pattern, SCE, and Google generally agreed with the CAISO's co-location framework, while requesting clarifications and modifications to the CAISO's proposal on co-located generation and load going through the CAISO's interconnection process. PG&E supported the CAISO's proposal and seeks clarification on the sequencing of the load and generation study components of co-location agreements, recommending that the two studies be conducted concurrently. PG&E further recommended that the CAISO require that new or existing large loads proposing to co-locate with new generation that may export to the grid to require a CAISO interconnection study under the CAISO's Resource Interconnection Standards. The CAISO agrees that there is a need to work closely with PTOs on timing and sequencing for studying load and generation and expects to work closely with these entities to align processes.

Study process for co-located arrangements

Some stakeholders either requested specific clarifications on CAISO's proposal to study co-located generation and load or otherwise requested changes to the proposal that load and generation stay together through the study process or otherwise re-enter the queue if there are changes. ACP-California and NextEra urged the CAISO to identify points in the generator interconnection process when a load could be removed from the study process without the associated generator losing its spot in the queue. PG&E sought clarification regarding the scope of the restriction on request modifications, including whether changes to a large load that increase the co-located facility's net megawatt exports to the CAISO-controlled grid would be prohibited or otherwise subject

[51] Order to Show Cause at P 96.

to the restriction. ACP-California further recommended that the CAISO look at ways to improve the study process and procedures for co-located generation and load and IEPA proposed that the CAISO initiate a dedicated initiative to study load and generation interconnection process to ensure maximum coordination with the PTOs. SCE requested that the CAISO clarify the study or restudy process if the owner of a co-located generator changes from non-exporting to exporting and states that the CAISO Tariff should not allow necessary short circuit studies to be bypassed even if the generator is not injecting into the CAISO controlled grid. The CAISO recognizes that large load co-location arrangements could change and proposes allowing Interconnection Customers to remove co-located loads from an interconnection request in the study process if that removal does not increase the request Interconnection Service level. The CAISO and PTO would evaluate whether the requested change is a Material Modification in determining whether it can accommodate the request as is or whether that project would have to re-enter the queue.

Large loads co-located with existing generation

Stakeholders requested clarifications or refinements to the CAISO proposal for generators currently interconnected to the CAISO-controlled grid that would serve large loads. Constellation supported CAISO's proposal to not apply a rigid framework to co-location arrangements and should clarify the pathway via tariff changes. Specifically, Constellation proposed that the CAISO update its tariff to clarify the circumstances under which a generator serving co-located load would lose, retain, or partially retain wholesale market participation rights; whether Retirement Scenario 3 applies where a generator continues providing wholesale services; how co-located load will be treated if the associated large load reduces consumption; whether interruptible or dispatchable co-located load may participate through a CAISO market construct or as demand response; how verified load flexibility will affect interconnection and market participation rights; whether existing amendment and modification processes can accommodate these arrangements; and the applicable study, operational, metering, telemetry, and verification requirements. IEPA, similarly, encouraged the CAISO to establish a tariff pathway for existing generation resources seeking to serve co-located load with continuing to provide wholesale energy and reliability service and to provide greater clarity on how existing interconnection, amendment, and modification processes may be used to accommodate large loads. The CPUC recommended that the state discourages pairing large loads with existing generation while AltaGas advocated that there is a benefit to the CAISO system by locating large loads at existing generation interconnection sites. AltaGas noted that the co-located configurations offer the opportunity to consider a different model: generators that primarily serve associated load but (through curtailment of the load or other means) may offer into the market and/or follow CAISO Dispatch Instructions when needed and thus may be permitted to

retain their net qualifying capacity list and resource adequacy (RA) status. Microsoft stated that the CAISO should preserve workable co-location options and avoid rules that foreclose future onsite generation or storage configurations. Trimark recommended that the CAISO provide additional clarification regarding how the New Resource Implementation (NRI) process, including which part of the NRI process applies to co-located large loads, whether a separate resource ID will be required, whether a separate points list will be created for the large load portion of a co-location application, and what telemetry points will be required for large loads.

The CAISO agrees that continued market participation of generators is one of several options but confirms that existing generators "leaving the grid" to serve associated loads must go through the CAISO resource retirement process so that the CAISO can prevent any adverse RA impacts. The CAISO would consider continued market participation and RA eligibility in that process. Related to market participation for existing generators co-locating with a new large load addition, the CAISO notes that resource adequacy requirements are addressed under existing rules and any future modifications would be considered through resource adequacy policy initiatives. Potential enhancements to large load market participation, including participation through demand response, price-responsive load, and other market mechanisms, are being explored through the DDEMI initiative. As noted in other parts of this draft final proposal, the CAISO further recognizes that there are implementation details that will likely require additional coordination among the CAISO, PTOs, large load developers, and others. In the coordination that will continue after the CAISO files its proposed tariff changes, the CAISO may consider if additional clarity is needed for specific co-location arrangements as projects materialize.

Accounting for co-location agreements

CDWR and the CPUC raised a related point on co-location: CDWR noted that the straw proposal does not address how large loads co-located with generation would be treated if that generation is not available and stating that the CAISO should have a mechanism in place that ensures that the full load has been studied and costs assessed consistently with load take generation beyond the co-location addition. The CPUC and CDWR questioned instances where generation co-located with large loads does not serve load as expected. The CPUC advocated for the CAISO to demonstrate that its planning processes account for the possibility that co-located generation could go offline and expose the full load to the transmission system, including resource adequacy exposure. CDWR encouraged the CAISO to have mechanisms in place to ensure that the full load, regardless of co-location agreement, has been studied to determine what transmission services are needed for these loads. The CAISO agrees with the need to

ensure that load is backed with sufficient resources and will continue coordinating with the CPUC and other local regulatory agencies on resource adequacy.

Operational considerations

The CPUC and IGNIS raised concerns regarding co-located generation and large load arrangements. The CPUC expressed concern that such configurations could introduce operational complexity, reliability risks, safety concerns, and incentives for the return of retired generation facilities, while IGNIS cautioned against the future introduction of site-definition criteria based on physical proximity or other factors that may not be reflected in existing regulatory definitions. The CAISO recognizes that co-located generation and large load configurations can present unique operational, planning, and reliability considerations. However, the purpose of this initiative is not to establish a comprehensive framework governing co-location arrangements or modify existing regulatory definitions. The CAISO will continue to monitor developments in this area and evaluate associated reliability implications through ongoing stakeholder and reliability processes.

Proposal

The CAISO proposes to clarify how co-located large loads and generation may interconnect to and operate within the CAISO-controlled grid. Such clarifications will require discussion and agreement with the PTOs. The CAISO reiterates that the PTOs will continue to govern and study all load interconnection requests pursuant to their tariffs. The CAISO, likewise, will continue to govern and study wholesale generation interconnection requests. Despite the Commission's concerns, large loads and co-located configurations have materialized in California under the current tariffs.

Nevertheless, the CAISO proposes to clarify in its tariff co-location arrangements that would not require a CAISO resource interconnection request and could be accommodated through applicable PTO or CPUC-jurisdictional retail interconnection tariffs, such as Rule 21.[52] These would include large loads with back-up generation only to be used during outages or islanding, and large loads with non-exporting behind-the-meter generation.[53] The CAISO notes that both categories would require sufficient control technologies to ensure they do not impact the transmission grid.

[52] *See* CPUC's Electric Rule 21: Generating Facility Interconnections for more information on each CPUC jurisdictional LSEs' Rule 21 tariff at https://www.cpuc.ca.gov/Rule21/.

[53] The sequencing likewise would not impact whether a CAISO interconnection study would be required.

The CAISO proposes that new or existing large loads seeking to co-locate with new generation that may export energy to the transmission grid[54] will require a CAISO interconnection study under the CAISO's Resource Interconnection Standards, Appendix KK to the CAISO tariff. This means that such resource interconnection requests would be screened and compete for capacity in the next cluster study based on the CAISO's scoring criteria.[55] However, all scoring, financial requirements, and study results would be based on the requested capacity figures the developer provides, so the developer may significantly limit the generation potentially to be exported based on how much generation will serve the large load. The CAISO tariff will require it to work with the PTOs to produce study results that reflect the combined impact of the co-located large load and generation, as requested by the developer. This is a simple extension of current rules that allow interconnection customers to be studied for a specific interconnection capacity even if their generating capacity is higher. Interconnection requests with co-located large loads may avail themselves of all rights under the Resource Interconnection Standards, including surplus interconnection service, grid enhancing technologies, phasing, etc.

Despite the ubiquity of co-located resources in California, to date, the CAISO has not received any interconnection requests for co-located load with exporting or participating generation, nor has any developer asked for such an option. The CAISO may be in a different situation than other regions that needed to impose bring-your-own generation requirements to address capacity market issues. Because the CAISO does not have a bring-your-own generation requirement and LSEs are not required to procure new capacity to interconnect new loads, developers have been less interested in co-locating load and participating generation. Additionally, to the extent large loads have brought generation to serve onsite load, they have elected to do so through tariffs for net energy metering, obviating the need for a CAISO interconnection request.

In addition to the information required in the CAISO resource interconnection request process, and the large load operational requirements discussed in Section A.4, the CAISO may require the following operational information for co-located resources, if applicable:

- Expected presence of co-located load;
- Range of energy consumption characteristics of the load;
- Minimum and maximum generator operating capabilities;
- Generator operating characteristics when the load is at its minimum level;
- Market participation status, if any; and,

[54] Frequently, constantly, or even rarely, such as in the event the Large Load is offline.

[55] As Energy Only or Deliverable. Energy Only interconnection customers not seeking reimbursement for network upgrades are not screened and proceed directly to the cluster study.

- Any load services requested when the generator is off-line

For co-located large loads and wholesale energy storage, the CAISO notes that the storage and large loads would need to be separate operationally, and all study results would reflect the same. Energy storage resources are fully dispatchable and have separate wholesale meters and settlement. Their energy could not be commingled with the large load such that the large load could take power effectively at a wholesale rate. The large load could otherwise net its withdrawals against behind-the-meter/non-participating generation and storage.[56]

All network upgrade commercial readiness deposit and generator interconnection agreement deposit requirements would treat all network upgrades and interconnection facilities as if they were required for the generation only. However, the PTO also may apply any unique deposit or financing requirements for the network upgrades and facilities required for large loads, as discussed in Section B.1 regarding cost allocation.

The CAISO also proposes to require co-located load and exporting generation studies to begin the cluster study process with the large load assumptions, but to allow Interconnection Customers interconnection customers to request removal of large load changes for the PTOs and the CAISO to evaluate whether the requested change is a material modification. (The removal or change to the Large Load would be under the PTO tariff.) In other words, after the commencement of the cluster study, the interconnection customer may request to remove the large load as a modification, and the CAISO and PTOs will evaluate whether the requested change can be accommodated. Likewise, interconnection customers already in the queue could request to add large loads as modifications, subject to PTO and CAISO evaluation, including through downsizing requests as necessary. The CAISO and PTO will assess whether either change would require complete re-studies and could not be accommodated during the study process, or if the requested modifications are material. This is not to say that the CAISO proposes to prohibit the addition of large loads to existing generation or in-progress interconnection requests; only that the interconnection customer would need to do so through the PTO tariff, and the generation interconnection study results may not be able to reflect the combined configuration if changed substantially after studies commence.

If an online CAISO generator seeks to add a large load to its site, the developer would submit the large load interconnection request to the PTO pursuant to its tariff. When ready to reflect the large load, the interconnection customer could request a post-

[56] In other words, the CAISO does not propose any change to the *status quo* for separating wholesale generation/storage and retail load or net energy metering generation/storage.

commercial operation date (COD) modification[57] or use the Master File change process as needed to assess and capture changes currently allowed under these processes.[58] The CAISO, PTO, and interconnection customer could likewise amend the generator interconnection agreement to reflect the large load and any configuration changes.

The CAISO reiterates its policy recently approved by the CAISO Board of Governors in the Interconnection Service Capacity and Deliverability Retention for Non-Operating Generating Facilities stakeholder initiative:[59]

> The ISO considers any generation that is subject to a [Participating Generator Agreement] and intends to terminate participation in the ISO wholesale market but continues generating to serve load through applicable retail programs, to also be subject to the retirement process as a generator that is permanently retiring (Retirement Scenario 3). This would include, for example, distribution-connected or transmission-connected participating resources that wish to exit from the ISO markets to serve onsite load. Although such generators will continue to produce electricity, their exit from the wholesale markets will be treated as a retirement, including triggering a reliability-must-run review.

The CAISO does not propose to change its current constructs under Order No. 888 for eligible customers to obtain transmission service. The CAISO does not have a forward capacity market, nor are LSEs required to procure capacity to obtain transmission service. Transmission service will thus continue to be assumed through an interconnection request, accounting for the large load's ability to limit its energy withdrawals or injections.[60] The large load's LSE will schedule the large load's demand with the rest of the LSE's demand through the CAISO markets, just as it does today. This will continue to enable large loads, co-located or not, to interconnect rapidly and without extra steps for transmission service. No large load developer to date has requested otherwise.

The CAISO notes that both loads and generation associated with co-located loads can be eligible for resource adequacy or demand response programs pursuant to current

---

57 Section 25.5 of the CAISO tariff.

58 *See* CAISO Master File at https://www.caiso.com/systems-applications/portals-applications/master-file.

59 *See* CAISO's Interconnection service capacity and deliverability retention for non-operating generating facilities initiative at https://stakeholdercenter.caiso.com/StakeholderInitiatives/Interconnection-Service-Capacity-Deliverability-Retention-for-Non-Operating-Generating-Facilities.

60 Order to Show Cause at P 94.

program rules.[61] The CAISO does not propose changes to the eligibility criteria for participation in any of these programs. Participation in demand response programs remains a possibility for large loads. The CAISO is exploring such opportunities in the DDEMI initiative.

3. Cost Allocation for Co-Located Loads

Background and Stakeholder Comment

In the straw proposal, the CAISO included a proposal to appropriately meter and assess regulation and black start services for co-located loads, opted not to revise the current construct for behind-the-meter generation, gross load, and the TAC, and proposed enabling flexibility for large loads to take transmission services that align with their use of the transmission system (addressed in Section D).

Google and PG&E generally supported CAISO's proposal for cost allocation for co-located loads. CDWR commented that the CAISO did not address how netting behind-the-meter generation against load for TAC assessments interacts with how co-located loads are studied and assessed for interconnection service. The CPUC asserted that the CAISO did not address FERC's direction for how netting rules for behind-the-meter generation for systems greater than 50 MW should be changed in the TAC. The CAISO appreciates the complexities and concerns around cost-allocation, which extend to co-location arrangements. As mentioned in Section B, the CAISO recognizes that PTOs will be responsible for establishing tariffs that prevent cost-shifting among customers, including for co-location arrangements, while the CAISO transmission revenue requirement and TAC will continue to uphold equitable accounting and prevent cost-shifting between PTOs.

a) Ancillary Service Charges

In the Order, the Commission stated that the CAISO tariff does not appear to include a mechanism to charge large loads, and co-located loads in particular, for ancillary services commensurate with their use of such services, particularly if such customers do not withdraw energy from the transmission system.[62] Specifically, the Commission noted that co-located loads may unjustly benefit from regulation and black start services.[63]

---

61 Section 40 of the CAISO tariff establishes rules about eligible capacity and uses criteria provided by the CPUC and other Local Regulatory Authorities determine what projects are RA-eligible.

62 Order to Show Cause at PP 98-99 ("As noted in the PJM Co-Location Order, this introduces the risk that costs may be allocated entirely to other transmission customers and passed through to residential customers, among others").

63 *Id*.

Proposal

The CAISO agrees that assessing ancillary service costs on a net $/MWh basis to LSEs' measured demand would enable a large load co-located with behind-the-meter generation to avoid an appropriate share of its costs for regulation and black start services.[64] That said, the CAISO already has separate rates to assess regulation[65] and black start services.[66] The issue thus becomes how to appropriately meter and assess those rates onto co-located large loads. The CAISO proposes to address this issue by requiring the PTOs to sub-meter each co-located large load independent of any onsite generation.[67] Scheduling coordinators for the LSEs serving those loads would then be required to report those meter values separately for the relevant charge codes. Each large load with co-located generation would thus pay on a gross load basis for regulation and black start services. This solution not only results in just and reasonable cost allocation, it is also relatively simple to implement because the CAISO and PTOs would not be required to calculate and assess new rates, nor would the CAISO need to create new settlement charge codes.

b) Transmission Access Charges

The Commission preliminarily found in the Order that the CAISO tariff may be unjust and unreasonable because it allows load with behind-the-meter generation to net its generation against its load for purposes of calculating Regional Access Charges.[68] The Commission explained its thinking based on the PJM co-location proceeding:

> In the PJM Co-Location Order, the Commission found that PJM's BTMG rules, which allowed load-serving entities that provide service to loads with qualifying BTMG to reduce their costs by netting output from BTMG in the calculation of their peak demand for the purpose of determining NITS charges, were unjust and unreasonable. The Commission concluded that PJM's BTMG rules were no longer consistent with cost causation principles because large loads configured in a BTMG arrangement with significant generation will raise cost shifting concerns

[64] Likewise, if the rate were assessed on a net meter basis to co-located load and participating generation, the result would be the same.

[65] Section 11.10.2.1 of the CAISO tariff.

[66] Section 11.4.2 of the CAISO tariff. The PTOs assess the costs of black start services through their PTO tariffs.

[67] The CAISO could have an exemption for co-located loads connected behind generators subject to the CAISO's Net Scheduled Participating Generator Agreement (PGA) or Qualifying Facility PGA.

[68] Order to Show Cause at P 102.

> compared to loads pursuing smaller amounts of netting. The Commission also found that such rules could lead to reliability and resource adequacy risks because PJM is obligated to serve transmission customers using BTMG but does not consider such customers in transmission and resource adequacy planning.[69]

The Commission then noted that it is "similarly concerned that CAISO's Tariff allows Eligible Customers that provide service to loads with BTMG to reduce their network service charges because the definition of gross load,[70] which is used to calculate the Regional Access Charge, excludes load of a retail customer served by its own onsite generating unit or energy storage device." The Commission directed the CAISO to explain whether the tariff remains just and reasonable even though it allows netting of behind-the-meter generation from gross load for purposes of determining Regional Access Charges for loads with behind-the-meter generation, or to propose tariff revisions. The Commission also stated the CAISO may explain why it remains just and reasonable for customers that fall below a new megawatt materiality threshold for the amount of load at a particular electrical location that network customers may net using behind-the-meter generation.[71]

Proposal

The CAISO does not propose to revise its current constructs for behind-the-meter generation, gross load, and the transmission access charges.[72] Behind-the-meter generation is far more abundant in California than in PJM, so the CAISO and California policymakers have considered this issue far more extensively. For example, in 2020, FERC approved the CAISO's proposal to amend its definition of Gross Load – the billing

---

69 *Id*.

70 Appendix A to the CAISO tariff defines Gross Load as "Demand (adjusted for distribution losses) of End-Use Customer Loads directly connected to the transmission facilities or directly connected to the Distribution System of a Utility Distribution Company or MSS Operator located in a PTO Service Territory, or End Use Customer Loads directly connected to the Distribution System or transmission facilities of an EDAM Transmission Service Provider in an EDAM Entity Balancing Authority Area. Gross Load includes Load served by Excess Behind the Meter Production. Excess Behind the Meter Production shall not be netted against End-Use Customer Load in determining Gross Load." The definition also provides a list of certain loads excluded, including "Load of an individual retail customer served by its own onsite Generating Unit or energy storage device, or as authorized by Section 218 of the California Public Utilities Code;" and "Onsite Load served by a qualifying small power production facility or qualifying cogeneration facility, as those terms are defined in the FERC's regulations implementing Section 201 of the Public Utility Regulatory Policies Act of 1978."

71 Order to Show Cause at P 102.

72 Although the Commission focuses on the regional access charge, the same logic could apply to the local access charge as well.

determinant for transmission access charges – to include load served by excess behind-the-meter production, *i.e.,* behind-the-meter energy that exceeds the onsite load.[73] The CAISO amended this policy to ensure uniform settlement practices, and to ensure LSEs were allocated the correct costs of their use of the transmission system, which includes use by excess behind-the-meter generation.

The CAISO did not propose to assess transmission access charges based on gross load figures that included load served onsite by its own behind-the-meter generation. Neither the CAISO nor stakeholders in 2020 believed such loads use the transmission grid in proportion to those load figures. To the contrary, a benefit rooftop solar, onsite storage, and other behind-the-meter generation is to reduce the use of the grid and the generation across it. The CAISO does not believe this rationale has changed in light of large loads.

Perhaps more critically, the CAISO's transmission access charges are fundamentally different than the PJM transmission charges that concerned the Commission. PJM calculates and assesses its transmission charges based on certain peak demand figures. A large load with behind-the-meter generation thus could mask all of its transmission usage simply by producing generation equal to its demand during that peak period. In contrast, the CAISO assesses its transmission access charges 24/7 to each UDC based on their gross load, which consists of total end-user demand accounting for losses and excess behind-the-meter production. As such, the CAISO would allocate costs to each large load with behind-the-meter generation to the extent the large load used the transmission system, as reflected by its metered load. In other words, any energy withdrawal by the large load would be reflected in the gross load. The LSE can then easily pass down the costs of that use in the retail bill, just as every Californian with rooftop solar or home storage is billed today. Thus, the CAISO does not believe that changes to its tariff are needed to address concerns raised by FERC in the Order.

c) Transmission Service Charges

The Commission preliminarily found in the Order that the CAISO tariff lacks transmission services that would reflect the ability of Eligible Customers on behalf of large loads to take transmission services that align with their use of the transmission system, which may result in inefficient and costly transmission buildout and costs paid by transmission customers.[74]

---

73 *Cal. Indep. Sys. Operator Corp.,* Docket No. ER21-190-000 (Dec. 23, 2020).

74 Order to Show Cause at P 102.

Proposal

The CAISO agrees that enabling flexibility will offer cost savings by avoiding unnecessary network upgrades, both on an interim and permanent basis. The CAISO discusses its proposed new service options in Section D, below.

D. Extending New Transmission Services to Eligible Customers Taking Service on Behalf of Flexible Large Loads

In the Order, the Commission preliminarily found that the CAISO tariff may be unjust and unreasonable because it does not include transmission services that reflect Eligible Customers taking transmission service on behalf of flexible large loads that are willing and able to limit their use of the transmission system under certain conditions, suggesting that "firm use" is essentially the only type of transmission service available in the CAISO. The Commission encouraged new transmission services be made available to reflect the operational reality that large loads may use the transmission system to differing extents and certain large loads are willing and able to limit their use of the transmission system under certain conditions.[75] At the same time, the Commission stated, "In the alternative, CAISO may explain whether, given that CAISO does not offer the transmission services required by Order No. 888, CAISO's existing transmission service framework addresses the concerns described herein, or explain what specific changes to its existing transmission service framework would effectively provide the same range of transmission service options for flexible large loads as in the PJM Co-Location Order."[76] The Commission then explained that the customer "must have necessary control technologies and/or protection systems, which may include a special protection scheme, to limit its energy withdrawals to its approved level," which are typical elements of interconnection service.[77]

Background and Stakeholder Comment

In the straw proposal, the CAISO proposed creation of two new flexible interconnection service offerings – one offered on an interim basis and one offered for permanent use, to shorten interconnection timelines and reduce interconnection costs, respectively. ACP-California, Constellation, IEPA, Microsoft, NextEra, PG&E, SCE, SEIA, Viridon, Pattern, and BAMx all expressed support for the flexible interconnection concepts. KritiGrid noted that comments on the CAISO's Issue Paper indicated significant support

75 *Id*. at P 104.
76 *Id*. at P 103.
77 *Id*.

for exploration of flexible transmission service products. Generally, stakeholders supported both the interim and permanent flexible interconnection service concepts, with stakeholders expressing more comfort with and need for the FILI option and suggesting that the CAISO continue to explore phasing in a more permanent option in the future. KritiGrid and BAMx both expressed caution with the permanent offering, such as how such load interconnections would be financed and concern that developers would seek to transition from the permanent option to firm service as a means to reduce interconnection costs. SDG&E and PG&E shared these concerns.

The CAISO agrees that both offerings are worth pursuing, however only proposes to advance the interim option within this stakeholder initiative. The CAISO agrees with Microsoft, PG&E, SDG&E, and SCE that it should prioritize the interim option before the permanent option. The CAISO still sees potential in the permanent offering and commits to exploring it in a future initiative.

Many stakeholders, including ACP-California, Constellation, IEPA, and Microsoft, suggested additional details on the roles and responsibilities associated with implementing a flexible interconnection service, the study process for flexible interconnection, curtailment rules and obligations, operational requirements, control technologies, and cost allocation protections prior to implementation. Microsoft noted that development of a flexible service product should not divert time or resources from the higher-priority issues of study timelines, PTO coordination, energization certainty, and cost transparency. The CAISO sees value in development of this approach but applies this rationale to the decision to defer the permanent offering to a future initiative.

While SDG&E agreed to continue exploring the flexible offerings, SDG&E noted that the FERC Order did not identify deficiencies in PTO tariffs, so the CAISO should not indicate that the PTOs will create new flexible load interconnection services. SDG&E noted that it can already provide transmission-level interim load interconnection arrangements through its existing processes and suggested further consideration of the implications of compensation for accepting flexible service.

SCE broadly agreed that PTOs should offer some version of interim flexible service under their respective tariffs. PG&E noted that as part of this stakeholder process, the CAISO and PTOs that will offer a FILI service should determine what data, information, and operational control, if any, the CAISO should receive or exercise to facilitate the CAISO's role in ensuring transmission system reliability. The CAISO agrees with PG&E that the PTOs will offer the service and expects consistent implementation details across the PTO Tariffs. Specifically, PG&E expected PTOs to develop the following details of FILI:

- An overall framework in the PTO's and CAISO's respective tariffs, as appropriate, that identifies the roles and responsibilities for all impacted parties;
- A *pro forma* Flexible Interconnection Service Addendum to the *pro forma* Large Load Interconnection Agreement (or, alternatively, a *standalone pro forma* Flexible Interconnection Agreement) that identifies the roles and responsibilities for impacted parties that will identify customer- and site-specific equipment and systems necessary to operationalize FILI service;
- Study methodologies that recognize the unique operational characteristics of flexible large loads;
- Operational requirements, including curtailment implementation mechanisms and data reporting;
- Cost responsibility provisions, including any financial security during the conditional service period;
- Transition-to-firm provisions for FILI that specify the automatic conversion to firm service upon network upgrade completion;
- Coordination mechanisms between flexible interconnection service and the PTO study process; and
- Operational requirements to manage longer-duration curtailments (to be explored by the CAISO and PTOs).

The CAISO generally agrees with PG&E's characterization of PTO responsibilities as it relates to FILI and suggests additional clarity below for consideration by the PTOs in development of their tariffs.

Viridon suggested that curtailment obligations must be enforceable and the chain of authority clear: the CAISO directs, the UDC/LSE implements the curtailment with the end-use customer, and the interconnecting PTO acts only pursuant to CAISO or Reliability Coordinator operating instructions. The CAISO agrees that further clarification of roles is required and provides additional detail below. In addition, the CAISO expects to convene a working group to implement these concepts after filing with the Commission.

BAMx supported a cap on the FILI service to avoid it becoming a permanent substitute for needed transmission upgrades. The CAISO is reluctant to place a one-sized-fits-all time limitation on what is intended to be a bespoke solution tied to the specific development timeline of the associated network upgrade but expects that the load will begin receiving transmission service as soon as the associated network upgrades are complete. The CAISO points to its Transmission Development Forum and other

statewide efforts to ensure timely completion of network upgrades as a means to track network upgrade completion and ensure continued progress.

Constellation and IEPA noted that while the offerings are intended to be customized to specific load interconnection requests, the following details will be helpful:

- Curtailment triggers and operating conditions;
- How curtailment parameters will be established;
- Deployment priorities;
- Scheduling treatment;
- The relationship between operational restrictions and study assumptions;
- Potential interactions with scheduling, dispatch, and price formation; and
- How the FILI (and FLIP) may apply to co-located load arrangements and existing generation resources, particularly where load flexibility can reduce transmission impacts or support continued wholesale market participation.

Costs

The CPUC noted that CAISO has not committed to modeling market impacts of flexible vs. non-flexible large loads, which is important for the CPUC to accurately assess locational marginal price upward shifts, congestion cost increases, or local ancillary service procurement costs driven by non-flexible data center demands. Both class revenue allocation and non-compliance penalty design require detailed market impact information beyond what the CAISO has committed to providing in its straw proposal.

Control measures

Cal Advocates noted that the CAISO did not propose requirements necessary to ensure benefits materialize from flexible agreements and flow to system users. Cal Advocates states that any non-firm service agreement between the CAISO and a PTO or large load should establish the curtailable amount of a customer's load and include control requirements for the curtailment to be implemented.

Proposal

The CAISO proposes to create a new flexible interconnection service option that will enable large loads and co-located loads to limit their energy withdrawals or injections until their network upgrades are placed into service. The CAISO believes this will provide large load developers with the option to interconnect quickly through enforceable physical and operational controls to prevent transmission congestion. PTOs will play a key role in defining and implementing this interconnection service offering.

The CAISO does not propose to create new "transmission services" or more responsibilities around eligible customers, which would require redesigning transmission and interconnection service entirely. The CAISO does not believe such a redesign is warranted, and the Commission expressly invites the CAISO to explain alternative service frameworks that may enable similar flexibility.[78]

Moreover, in real time, LSEs can schedule demand as needed, including for customers limiting their use of the transmission system. With the operational data and process described in Section A.4, the CAISO can accommodate flexible loads without creating new separate classes of transmission service. This would also enable the PTOs to provide bespoke interconnection configurations for large loads, saving ratepayers from the costs of network upgrades that conform to specific "transmission services." The CAISO believes this course of action is consistent with developers' desires to interconnect quickly and affordably.

In addition to the CAISO's current generic firm service, the CAISO proposes to create a new Flexible Interim Load Interconnection (FILI) service to be implemented in close coordination with the PTOs, that will enable faster interconnections while mitigating transmission constraints. The CAISO clarifies that this interconnection service offering is not intended to address supply constraints.

The proposed FILI offering would enable large loads to interconnect flexibly and receive service up to a certain level based on grid conditions and constraints until network upgrades are complete, at which time the large load would switch over to receiving firm service. This will likely be a tailored option for each large load based on its point of interconnection and the constraints it faces, and to be developed through a contractual agreement with the PTO. For example, some FILIs may require little flexibility for a limited time because there are few, less probable contingencies. Others may require more flexibility because of transmission constraints that require network upgrades with longer timelines. The FILI option provides flexibility to the PTOs, CAISO, and developers to customize solutions. For this reason, CAISO declines to propose any kind of temporal or capacity cap on this interconnection service offering.

- This flexible interconnection service may include a number of tools or measures, including but not limited to a Remedial Action Scheme (RAS), PTO operator curtailment, or managing to a present schedule. The PTO may request automated schemes, such as a RAS, for FILI that are limited by the transmission overload under N-1-1, with CAISO and Reliability Coordinator (RC) concurrence, or

[78] *Id.* at P 101.

- The PTO will do its own load curtailment for FILI that is limited by transmission overload under N-1-1 after the first N-1 were to occur.
- If a RAS is considered but cannot be reliably operated, or is found to have significant market implications, the CAISO will not enable that option.

The CAISO plans to continue to address a number of market implications of the FILI approach in a continued stakeholder initiative, including the following.

- Visibility of FILI service to the CAISO to prevent unintended market interactions.
- Requirements for data exchange to maintain communication protocols between the CAISO and the PTOs serving large loads.

To manage coordination of development of this interconnection service offering, the CAISO will convene working groups with the PTOs, large load customers, and other interested stakeholders to maximize consistency and clarify roles and responsibilities.

The CAISO does propose control technologies and/or protection systems associated with this new service offering, which are discussed in Section A.4.

Although the CAISO is not proposing to advance the permanent flexible interconnection offering, FLIP, in this draft final proposal, the CAISO does commit to further exploration of this permanent offering in a future stakeholder initiative.

The CAISO does propose control technologies and/or protection systems associated with this new service offering, which are discussed in Section A.4.

E. Interconnection Customers Serving Electrically Proximate Large Load and Co-Located Load

The Commission preliminarily found in the Order that the CAISO tariff appears to be unjust and unreasonable because it does not contain provisions allowing an interconnection customer to seek the generator interconnection service(s) that reflects the operational dynamics of serving either: (1) an electrically proximate large load; or (2) a co-located load, as defined in the Order, that has a high peak load (i.e., large co-located loads that are 50 MW or greater).[79] The Commission defined an “electrically proximate large load” as a large load “sufficiently electrically close to the interconnection customer’s requested point of interconnection, such that the impact on the transmission system of the combination of the generating facility and the load, with the exception of the transmission facilities between the two, will be effectively the same as if they were

[79] Order to Show Cause at P 113.

located at the same substation (e.g., large load that is located no more than two substations from the generating facility)."[80]

Background and Stakeholder Comment

In the straw proposal, the CAISO did not propose creation of new provisions for interconnection customers to serve electrically proximate large loads. PG&E, SDG&E, and Microsoft agreed with this approach. The CPUC recommended that the CAISO adopt a process for jointly evaluating proximate load and generation in order to avoid costly network upgrades while preserving system reliability and providing operational benefits. Other stakeholders, primarily in the generation development community, urged the CAISO to consider service to electrically proximate loads. Developers such as AltaGas, NextEra, and SEIA noted that that large load development is in its early stages and will evolve and suggested that enabling interconnection customers to serve proximate loads would increase customer optionality, reduce transmission impacts, and accelerate service to large loads. Nearly all stakeholders suggested consideration of this pathway in a future related initiative.

The CAISO notes that it currently has a process for connecting generator interconnection request applications to non-load-serving entities (e.g. commercial and industrial consumers) in its generator interconnection process, which awards "points" in the interconnection scoring process to projects that have a commercial arrangement with a non-load-serving entity off-taker. While this process does not require any electrical or geographic requirements, it seeks to tie generation projects to loads to the extent that they have a commercial arrangement with the goal of enabling large loads to procure generation. The CAISO agrees with many stakeholders that it is worth continuing to explore the potential benefits of proximate loads, however the CAISO does not propose development of this option in this paper.

Proposal

The CAISO proposes considering provisions for interconnection customers to serve electrically proximate large loads in a future stakeholder initiative. The CAISO intends to prioritize the more common stand-alone and co-located load and generator interconnections with this proposal and filing and will focus on proximate load and generation arrangements once the process for co-location is underway.

---

80 *Id*. at P 112.

2. Initiative Timeline and Next Steps

The CAISO's Large Loads Stakeholder Initiative is the primary vehicle for developing the CAISO tariff revisions necessary to comply with the Commission's Order. The CAISO refocused the initiative on the issues the Commission identified. Given the timeline described in the Order, the CAISO expedited the stakeholder initiative. The CAISO will seek Board of Governors approval at the CAISO Board's October 28, 2026 meeting. While the stakeholder initiative will be expedited, the CAISO is hosting workshops and soliciting stakeholder feedback on the proposals to better inform the policy outcomes.

Action	Tentative date
Post Straw Proposal	August 12, 2026
Stakeholder workshop	August 19, 2026
Comments due	September 2, 2026
Post Draft Final Proposal	September 24, 2026
Stakeholder workshop	October 1, 2026
Comments due	October 15, 2026
CAISO Board of Governors Decision	October 28, 2026

3. Decisional Classification

This initiative proposes certain tariff amendments to enhance the process for studying and approving interconnection requests. CAISO staff believe that these proposed tariff changes will go to the Board of Governors only and that the Western Energy Markets (WEM) Governing Body will have no role in the decision.

The WEM Governing Body has primary authority over any

> proposal to change or establish a tariff rule applicable to the WEIM/EDAM Entity balancing authority areas, WEIM/EDAM Entities, or other market participants within the WEIM/EDAM Entity balancing authority areas, in their capacity as participants in WEIM/EDAM… The scope of this joint authority excludes, without limitation, any other proposals to change or establish tariff rule(s) applicable only to the CAISO balancing authority area or to the CAISO-controlled grid.[81]

[81] Charter for WEIM and EDAM Governance § 2.2.1.

The tariff changes proposed here would not be “applicable to the WEIM/EDAM Entity balancing authority areas, WEIM/EDAM Entities, or other market participants within the WEIM/EDAM Entity balancing authority areas, in their capacity as participants in WEIM/EDAM.” Rather, they would be applicable “only to … the CAISO-controlled grid.”

Accordingly, these proposed changes to implement these enhancements would fall outside the scope of the WEM Governing Body’s primary authority. The WEM Governing Body also has an advisory role that extends to any “proposals to change or establish tariff rules that would apply to the real-time and/or day-ahead market but are not within the scope of its primary authority.” This initiative, however, does not propose changes to the rules of the real-time or day-ahead markets. Stakeholders are encouraged to submit a response in their written comments to the proposed classification as described above, particularly if they have concerns or questions.