



California ISO

Supercluster Interconnection Procedures

Issue Paper & Draft Final Proposal

May 14, 2021

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Supercluster Interconnection Procedures

1 Introduction

Ensuring the safe and reliable interconnection of new resources is an integral part of the CAISO. In the last decade the CAISO has received an average annual number of queue cluster interconnection requests of 113. This year the CAISO received 373. To accommodate this queue “supercluster” and ensure meaningful study results, the CAISO must expand its study timelines and alter its study processes.

The CAISO proposes three principal revisions to its queue cluster interconnection process for Cluster 14 and future queue clusters with 150 interconnection requests or more:

1. Completing both the Phase I and Phase II interconnection studies will take approximately one year longer than typical. This means the next queue cluster window will open in April 2023.
2. Estimated costs and cost allocations in the Phase I interconnection study will be advisory. Only the Phase II interconnection study will set cost caps.
3. Interconnection customers will be eligible for a 100 percent refund of their first interconnection financial security posting if their Phase II interconnection study increases their maximum cost responsibility by 25 percent or more, or extends the longest-duration reliability network upgrade by one year or more.

All other interconnection study procedures would remain in effect for the supercluster.

In consultation with the participating transmission owners, the CAISO considered preserving all current interconnection rules and procedures; however, doing so would have required more than 30 months to complete interconnection studies, thereby delaying the next opportunity for a queue cluster window indefinitely. The CAISO did not believe such a delay was tenable. The CAISO believes its proposal allows interconnection customers to receive their study results as soon as possible while preserving the intent of the interconnection rules the CAISO has worked hard with stakeholders to develop.

To provide stakeholders certainty and transparency, the CAISO plans to take its final proposal to the Board of Governors no later than July, then submit the tariff revisions to the Federal Energy Regulatory Commission immediately thereafter.

2 Stakeholder process

Timely resolution of this stakeholder process is critical to provide interconnection customers, transmission owners, and load-serving entities with transparency and clarity on studying the supercluster. Therefore, the CAISO has set out the following accelerated stakeholder process schedule and appreciates stakeholder understanding and participation in this effort.

Stakeholder process schedule		
Step	Date	Activity
Issue Paper/Draft Final Proposal	May 15, 2021	Post Issue Paper/Straw Proposal
	May 21, 2021	Stakeholder web conference
	May 28, 2021	Stakeholder comments due
Final Proposal and Draft Tariff	June 11, 2021	Post Final Proposal and Draft Tariff
	TBD	Stakeholder web conference
	TBD	Stakeholder comments due
Board approval	July 14-15, 2021	CAISO Board of Governors meeting

3 Background

The CAISO currently begins a new interconnection cluster study each April. The purpose of cluster studies is to identify the interconnection facilities and network upgrades necessary to integrate the new resource seeking interconnection to the transmission system, to estimate the costs of those upgrades, and allocate those costs among interconnection customers sharing upgrades. The cluster study approach has proved an effective way to manage a large number of simultaneous interconnection requests. The CAISO also allows independent study interconnection requests at any time provided that the proposed resource is capable of being studied alone and the cluster study process is insufficient to meet the resource's proposed commercial operation date.

The cluster study methodology used to assess network upgrades necessary to support each cluster of generation layers the new cluster of generation upon all existing generation and all previous interconnection requests that remain active, as well as the network upgrades associated with the active previous interconnection requests or approved through the CAISO's transmission planning process.

The CAISO's interconnection study process is unique among ISO/RTOs in (1) identifying all contingent facilities that could affect an interconnection customer's costs or timing, (2) providing cost estimates for these facilities, and, most critically, (3) creating binding cost caps based on those estimates. If upgrade assignments or cost allocations change after

the interconnection customer has been studied, the interconnection customer cannot inherit any new costs exceeding the cost caps provided in its interconnection studies. Such exceedance would be covered by the interconnecting transmission owner and any non-refundable portion of interconnection financial security of withdrawn interconnection customers allocated to the relevant upgrade. Although to date transmission owners rarely have to cover such costs, interconnection customers' binding cost caps provide crucial transparency to interconnection customers as they develop, market, and finance their projects. The cost caps also obviate any need to conduct serial restudies based on changes in upgrade cost responsibility. Interconnection customers can rely on their interconnection studies without fear of changes late in their projects' development. In the Commission's Order No. 845 proceeding, the American Wind Energy Association, NextEra, and several developers identified the CAISO processes as best practices. NextEra, for example, advocated that the Commission adopt the CAISO's processes nationally "to break endless start and stop restudy cycles" elsewhere.

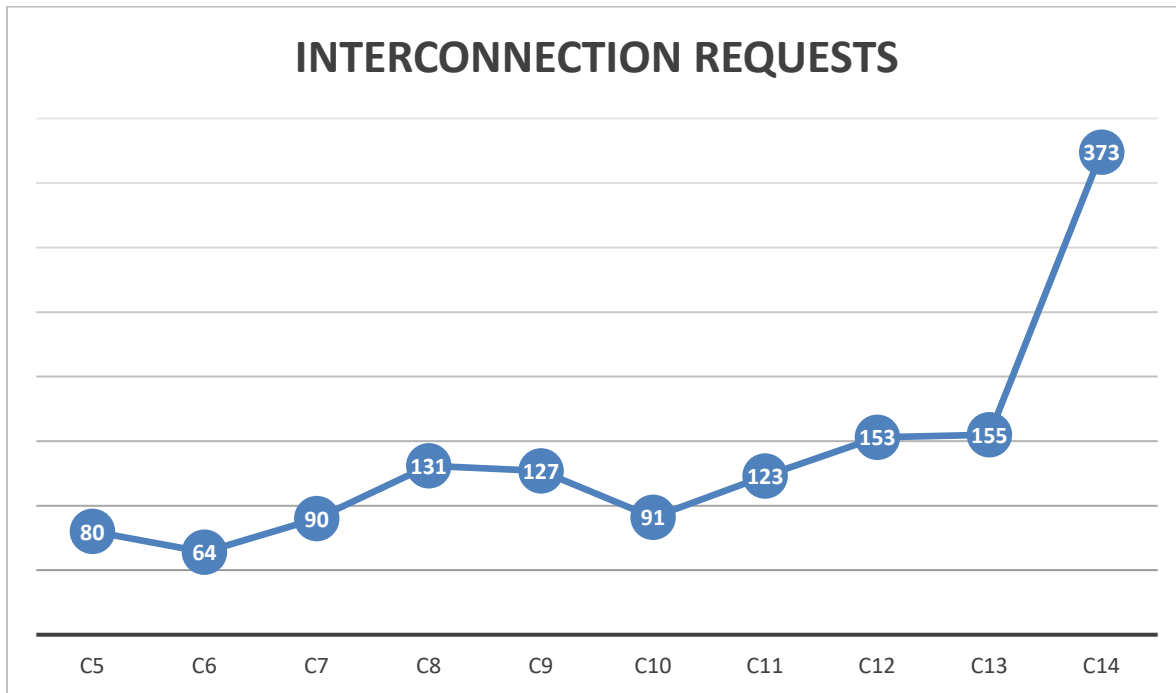
Interconnection study results also provide a cost responsibility estimate used to establish the initial interconnection financial security ("IFS") posting requirements. The IFS postings are critical to the CAISO because only those projects that are financially viable continue in queue. Additionally, the non-refundable portion of IFS postings (generally 50 percent depending on when the customer withdraws) are used to offset any costs that fall to the participating transmission owners ("PTOs") that inherit financing costs when interconnection customers withdraw, their shared network upgrades are still needed for other customers, and those customers cannot receive additional cost allocations because of their cost caps.

Today, interconnection customers post IFS at three queue milestones: 15 percent of their allocated costs after Phase I study results, 30 percent after their Phase II study results, and 100 percent upon the commencement of construction activities. Equally important in the IFS calculus is the percentage of posted IFS eligible to be refunded to the interconnection customer in the event it withdraws from queue. Generally the interconnection customer is eligible to receive a 50 percent refund of its posted IFS until the final IFS posting, at which time 100 percent of the IFS is non-refundable. Non-refundable IFS funds offset the costs of still-needed network upgrades or, if none, the PTO's transmission revenue requirement.

4 Issues and Draft Final Proposal

Study Timeline

The number of interconnection requests in cluster 14 speaks for itself:



Even with the 155 interconnection requests the CAISO received in cluster 13, the CAISO had to issue a market notice to delay the publication of Phase I interconnection study results by one month, and will likely have to do so again for Phase II study results. Cluster 14 is *241 percent* larger than cluster 13. Although the CAISO could rely on its tariff authority to issue market notices to extend study deadlines, doing so would result in an *ad-hoc* process lacking transparency and consistency. Moreover, the CAISO’s transmission planning process, the PTOs’ wholesale distribution access tariff (“WDAT”) interconnection processes, and many load-serving entity (“LSE”) procurement processes depend in part on the consistency—or at least the predictability—of the CAISO’s study timelines.

Exacerbating the issue, neither the CAISO nor the transmission owners are able to increase staffing levels to mitigate the supercluster impact. After clusters 12 and 13, the PTOs *already* hired additional staff and consultants for cluster 14 in the expectation that cluster 14 would be somewhat consistent with previous large clusters. Additionally, developers themselves retained remaining available consultants to prepare this many interconnection requests for cluster 14, leaving few if any available at this time. In any case, the very nature of the cluster study process requires the cluster to be studied together *en masse*. It is not possible to split up the interconnection requests and outsource their studies such that the CAISO could maintain current interconnection study timelines.

The CAISO also is concerned with the risk of delaying the announcement that it must postpone the cluster 15 interconnection request window. Developers may incur costs to prepare future interconnection requests with the expectation that the CAISO would be able to accommodate cluster 15 interconnection requests next April. But neither the CAISO nor the PTOs are able to accommodate an interconnection request window in 2022. It would not be possible to begin studying such a cluster while studying the interconnection requests currently in queue. The CAISO must weigh its obligation to provide open access to the transmission grid with its obligation to provide meaningful and timely study results for the safe and reliable interconnection of new resources.

The CAISO proposes to extend current interconnection study deadlines in order to accommodate the supercluster. The CAISO notes that these are firm deadlines, and the CAISO will not have flexibility to publish study results beyond these deadlines; however, the CAISO may publish study results earlier if available.

The CAISO proposes the following deadlines. The second column shows the proposed supercluster deadlines. For comparison, the third column shows what would be the deadlines if the CAISO did not exercise its existing tariff authority to expand study deadlines it cannot accommodate:

Deadline	Supercluster Proposal	Typical Cluster
Phase I Study Results Published	September 15, 2022	January 11, 2022
Initial IFS Due	January 13, 2023	April 25, 2022
Cluster 15 Request Window	April 15, 2023	April 15, 2022
Phase II Study Results Published	November 24, 2023	November 20, 2022
TPD Affidavits Due	November 13, 2023	December 1, 2022
TPD Results Published	March 23, 2024	March 14, 2023
Second IFS Due	May 4, 2024	May 19, 2023
Reassessment	August 20, 2024	August 1, 2023

The CAISO is still evaluating all interrelated interconnection procedure timelines such as scoping meetings, results meetings, and customer responses. The CAISO believes it is prudent to extend these deadlines as well to ensure all parties have sufficient time to process study results, make financial commitments, and progress in queue. For example, the CAISO proposes to extend results meeting deadlines from one month from the publication of study results to three months following study results. The CAISO also proposes to extend the time required to tender and negotiate generator interconnection agreements by an additional 30 days.

These revised deadlines would allow the CAISO to study the supercluster to provide meaningful results to interconnection customers and their potential off-takers, while ensuring the safety and reliability of the CAISO controlled grid. The CAISO notes that these deadlines are not conservative estimates. Given the number of interconnection

requests in cluster 14, it will take a concerted effort to meet these revised deadlines. Additionally, the CAISO believes that these deadlines are achievable only provided the other proposed revisions described below. The CAISO and PTOs evaluated their ability to maintain all other study procedures, but doing so would have required more than two years to complete cluster 14 interconnection studies, putting the cluster 15 interconnection request window off indefinitely. The CAISO does not believe it is tenable to postpone study results beyond what the CAISO has proposed here, nor delay cluster 15 beyond 2023.

PTO by PTO Basis for Study Results

The CAISO generally issues interconnection study results simultaneously to the whole cluster. This promotes uniform treatment and allows potential off-takers to review study results at the same time, thereby preventing some interconnection customers from getting an earlier start than others.

To ensure a level playing field, the CAISO proposes to do the same for the supercluster; but, the CAISO welcomes specific stakeholder feedback on this issue. Because the majority of interconnection requests in cluster 14 went to PG&E, it is likely that the CAISO could publish interconnection study results much sooner—even up to several months sooner—in the other PTO service territories. The CAISO is concerned, however, that such a significant jump start on interconnection study results may be an unfair advantage in the RFO process for power purchase agreements.

Phase I study

The historical peak demand in the CAISO reached 50,116 MW on September 1, 2017. Peak demand in 2020 was 47,121 MW on August 18. Cluster 14 consists of approximately 150,000 MW in combined proposed generating capacity, bringing the CAISO generator interconnection queue to 246,000 MW. Even with robust procurement in the future, the potential generation available to off-takers exceeds demand by a significant margin.

The unprecedented volume of generation in Cluster 14 has raised particular concerns that the CAISO's existing study approach will not produce realistic and meaningful results in Phase I interconnection studies, and that there be little, if any, corresponding relationship between the methods of service set forth in the Phase I study results and those in the Phase II study results.

The CAISO proposes to modify how the CAISO and PTOs conduct the Phase I interconnection studies. The CAISO, in coordination with the PTOs, will establish reasonable study scenarios and dispatch assumptions for the steady state (thermal and voltage) analysis. Total generation inside the study area will be limited to produce meaningful study results. The system conditions and generation dispatch are not expected to produce any system-level stability issues and drive reliability network upgrades. Therefore, the stability assessment is not performed in the Phase I interconnection studies.

The CAISO and PTOs will also modify the short circuit duty study methodology. The total online capacity in the evaluation will be limited to produce meaningful study results.

Regardless of these changes to methodology, the Phase I interconnection studies will still include short circuit/fault duty, and steady state (thermal and voltage) analyses. The Phase I studies will identify direct interconnection facilities and required reliability network upgrades necessary to interconnect the generating facility, mitigate thermal overloads and voltage violations, and address short circuit, and reliability issues associated with the requested interconnection service. The Phase I studies also will identify the costs and cost allocations for all required reliability network upgrades (“RNUs”) and—for customers requesting deliverability—delivery network upgrades (“DNUs”).

Cost Caps and Initial Interconnection Financial Security

Due to the large amount of interconnection request withdrawals typical between Phase I and Phase II, interconnection customers’ projected cost estimates generally go down in Phase II. However, because the CAISO and PTOs will use a revised methodology in Phase I interconnection studies, the CAISO and PTOs are concerned that Phase I results could produce anomalous results that lead to a higher rate (though still rare) of cost increases in Phase II. Additionally, it is reasonable to expect a higher degree of churn within the queue, leading to other cost shifts between Phase I and Phase II.

Currently, the CAISO tariff provides that the *lower* of Phase I and Phase II allocated costs sets the interconnection customer’s maximum cost responsibility. As such, if an interconnection customer’s costs go up in Phase II, the interconnection customer can only assume cost responsibility up to the Phase I study results, leaving the interconnecting PTO with any actual costs above the maximum cost responsibility.

Because a supercluster’s Phase I interconnection study results rely on a different study process than in a typical year, the CAISO proposes that those results do not impact the ultimate maximum cost responsibility. Instead, only the Phase II study will set the maximum cost responsibility above which the PTO would bear any costs for financing network upgrades or interconnection facilities.

Phase I study results still will provide a current cost responsibility used to establish the initial IFS posting requirement. The initial IFS posting is a critical milestone in the CAISO queue that ensures only those projects that are financially viable continue in queue. Additionally, the non-refundable portion of IFS postings (generally 50 percent depending on when the customer withdraws) offsets the PTOs that inherit financing costs when interconnection customers withdraw, their shared network upgrades are still needed for other customers, and those customers cannot receive additional cost allocations because of their cost caps. Nevertheless, the CAISO recognizes that facing higher costs in Phase II can be just as disruptive to interconnection customers, especially if the Phase II study alone sets the cost cap.

The CAISO proposes that interconnection customers whose maximum cost responsibility goes up by 25 percent or more between Phase I and Phase II would be eligible for a 100 percent refund of their initial IFS posting if they withdraw before their second IFS posting is due. These costs would not include costs imposed by affected systems, which the CAISO does not consider. Additionally, the interconnection customer would be eligible for the same refund if the Phase II study extends the longest-duration RNU by one year or more. Other ISO/RTOs use these rules today, and the CAISO believes they are sensible in the supercluster context given the other changes the CAISO has proposed.

Under the CAISO's proposal, interconnection study deposits would still be refunded based on current procedures, which would refund any deposit funds remaining.

The CAISO believes these changes reflect the risk cluster 14 faces between Phase I and Phase II, and carefully balance the need for customers, PTOs, and LSEs to have meaningful results with the need for their financial protection from unexpected cost increases.

Superclusters in the Future

The CAISO proposes to use these procedures in the future when the CAISO receives 150 or more interconnection requests. This proposed figure is based on the CAISO's experience with cluster 13, which had 155 requests and required the CAISO to extend interconnection study results. The CAISO does not expect each instance to require the maximum time allotted to a supercluster. The CAISO only seeks the flexibility to use supercluster procedures to alter timelines to some degree and use the other proposals described above in the event of another supercluster, and without re-seeking regulatory approval.

The CAISO understands that some stakeholders have sought full IFS refunds for cost or timing increases (including to DNU's) in the normal cluster study process. The CAISO is not prepared to offer such at this time, but will examine the issue in the next iteration of its Interconnection Process Enhancements stakeholder initiative.

5 Next steps

As a next step, the CAISO will conduct a conference call to discuss this issue paper and draft final proposal on May 21, 2021. The CAISO then invites stakeholders to submit comments by May 28, 2021. Comments should be submitted to InitiativeComments@caiso.com.

Following review and evaluation of the comments received, the CAISO will consider potential revisions to its proposal and issue a Final Proposal in June, which it will take to the Board of Governors no later than the July meeting.