



California ISO

2023 Interconnection Process
Enhancements
Issue Paper and Straw Proposal

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1 Introduction

With this issue paper, the California Independent System Operator (ISO) is launching its 2023 Interconnection Process Enhancements initiative, focusing on making significant and transformative improvements regarding coordination of resource planning, transmission planning, interconnection queuing and power procurement to achieve state reliability and policy needs.

In recent years, given California's ambitious decarbonization goals and the large quantities of new clean resources it will take to meet them, the ISO has been receiving hundreds of interconnection requests a year from potential resource developers. Many of these requests are not located in areas considered optimal for additional transmission development, as determined by regulators and load-serving entities. With the ISO's interconnection application queue inundated with applications, current processes need to be re-imagined to ensure resource procurement and queuing are effectively shaped and informed to take advantage of transmission and interconnection capacity that exists or is already planned and under development, and to align with the transmission upgrades necessary for longer-term resource development.

The 2023 Interconnection Process Enhancements initiative is part of a larger set of foundational framework improvements being coordinated among the California Public Utilities Commission (CPUC), the California Energy Commission (CEC), and the ISO. The overall strategic direction is set forth in a joint Memorandum of Understanding¹ (MOU) signed by the three parties in December 2022 to set the direction for tightening linkages among resource and transmission planning activities, interconnection processes and resource procurement. The ISO is now taking on additional reforms to the interconnection queuing process that will leverage the improved coordinated planning resulting from the MOU and help further break down barriers to efficient and timely resource development.

As set out in the MOU, the expectations are that the CPUC will provide clear direction to load-serving entities focusing procurement in the key zones and with the expected quantities enabled by the transmission development being advanced by the ISO's transmission planning process, which was heavily informed by coordinated resource planning with the state agencies. As the ISO has stated in recent months, it is adopting a much more *proactive* approach to transmission planning. This more proactive approach is grounded in the policy and reliability needs of the state and will shape and inform queuing and procurement. Our strategic intent is for the revised interconnection procedures to prioritize interconnection requests that are aligned with priority zones

¹ The MOU (<http://www.caiso.com/Documents/ISO-CEC-and-CPUC-Memorandum-of-Understanding-Dec-2022.pdf>) is an updated version of a 2010 MOU between the parties.

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where transmission capacity exists or is being planned. This will in turn help shape the interconnection queue as the resource development community responds with proposed projects in those areas being enabled by transmission development. This will drive resource development with the operational characteristics and geographic locations consistent with resource planning conducted by the CEC and CPUC and the ISO's transmission planning that is based on that resource planning. While the strategic direction is clear, this initiative will focus on the specific changes necessary to the ISO's cluster study process to achieve these outcomes. The cluster study process generally worked well until recent years when the number of requests accelerated to unsustainable levels. Because the current cluster study process can no longer effectively support the accelerated pace of resource development and project development interest without significant reform, it has become critical to refine the number and location of interconnection requests studied by the ISO and shape and guide interconnection request interest.

Past Interconnection Process Enhancements (IPE) initiatives have been driven by the ISO's ongoing commitment to improve its Generator Interconnection and Deliverability Allocation Procedures (GIDAP) and make process enhancements as resource interconnection needs evolve. The 2021 IPE initiative sought to make process enhancements to provide new criteria and appropriate incentives to limit the excessive levels of new interconnection requests seeking to compete for the increased resource procurement needs.

Two data points have made it clear that additional and likely more extreme measures are needed to make the GIDAP a viable process in light of the state's vastly accelerated new resource procurement targets. The first is the result of an ISO informal survey of developers taken in late 2022 and asking for their estimate of the number of interconnection requests they anticipated submitting into Cluster 15. The tables below show the results of that survey. Since some developers provided a numerical range of requests, the results show a sum of the low and high ends of the estimated requests. The survey results demonstrate that the size of Cluster 15 is expected to be similar to the size of the Cluster 14 Supercluster.

Survey Estimate of Interconnection Requests Expected for Cluster 15

Estimated Number of Projects (based on low end)	Estimated Number of Projects (based on high end)
279	308

Range of Interconnection Request Submittals per Developer

Estimated Number of Interconnection Request Submittals per Developer	1	2	3	4	5	6	7	8	9	10	12	15	20	25
Number of Developers Estimating this Number of Interconnection Requests	7	9	3	3	5	6	1	1	1	6	1	4	1	1

The second data point came after the posting deadline passed for Cluster 14 projects to enter into the phase II study process. The number of projects that posted and are moving into the Cluster 14 phase II studies is shown below.

Number of Projects Being Studied in Cluster 14 Phase II

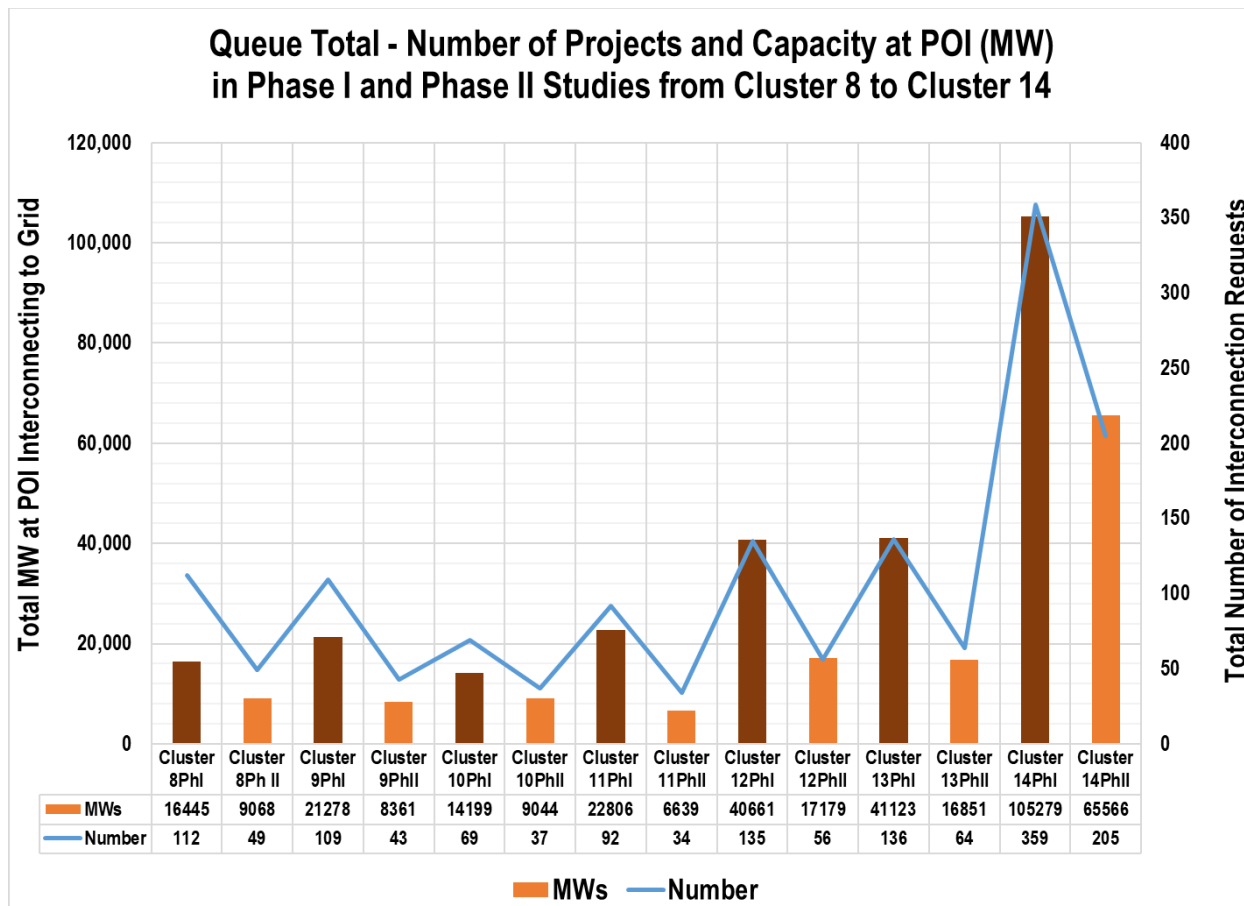
Cluster 14 Phase II	Number	Total Capacity	Capacity at Point of Interconnection
Projects Posted and in Phase II	205	94,421 MW	65,566 MW

Number of Cluster 14 Phase II Projects by PTO

Participating Transmission Owner	Number of Cluster 14 Projects in Phase II
DCR Transmission	5
GridLiance West	5
Pacific Gas & Electric	105
Southern California Edison	64
San Diego Gas & Electric	23
Valley Electric Association	3
Total	205

The chart below provides the historical number of projects and the requested capacity at their point of interconnection (POI) for the phase I and phase II cluster studies since Cluster 8.

Trend in the Number of Projects and Project Capacity in Cluster Studies



When the schedule for the Cluster 14 Supercluster was developed, the ISO assumed that the unprecedented number of projects studied in phase I would, for a number of reasons, result in a large percentage of projects withdrawing. That would have made for a much more reasonable number of projects needing to be studied in Cluster 14 phase II. The chart clearly shows that the anticipated high project withdrawal rate following the phase I study did not materialize. In fact, the percentage of projects proceeding into phase II is higher than normal.

The 205 projects proceeding into phase II studies creates a significant burden on all Participating Transmission Owners (PTOs): There are 105 projects in the Pacific Gas and Electric (PG&E) area alone. This even greater burden on PG&E creates a challenge for meeting the Cluster 14 Supercluster phase 11 study timeline.

Simply layering a massive influx of new Cluster 15 interconnection requests on top of the existing queue and the Cluster 14 projects in the queue is not an effective way to advance interconnection proposals. To do so would exacerbate an already unworkable situation. The ISO and PTOs will not be able to provide meaningful information to

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developers and load-serving entities seeking to develop and procure new generation because the excessive queue and interconnection request volumes distort study results, cost allocation, and construction schedules.

Clearly, refinements to the GIDAP in IPE 2021 have not sufficiently reduced the number or capacity of interconnection requests to a manageable or meaningful level to support the pace of new resource development that must be sustained in the years ahead. Such large volumes of interconnection requests have dramatically increased the time required to process the requests and perform the phase I and phase II studies. They have also undermined the accuracy, relevance and usefulness of the resulting studies. That is why the ISO has been focusing in recent months on adopting a much more *proactive* approach to transmission planning that is grounded in the policy and reliability needs of the state and that can shape and inform queuing and procurement. Simply put, without transformational changes to the GIDAP in the 2023 IPE initiative, we will not be able to accommodate the rapidly accelerating pace of new resources that must be connected to the grid to achieve SB100 goals in a reliable and cost-effective fashion. These more fundamental changes will focus primarily on further synchronizing and tightening linkages between resource and transmission planning activities, interconnection and resource procurement processes.

The process changes made in IPE 2021 intended to reduce the number of interconnection requests coming into future cluster windows were valuable upgrades to our procedures. But they were also somewhat limited in scope out of necessity to avoid getting too far ahead of the FERC Notice of Proposed Rulemaking on Improvements to Generator Interconnection Procedures and Agreements that was published on June 16, 2022.² To some extent, the same concern could complicate this IPE 2023 effort. However, the ISO's need to move forward with further process modifications for the current requirements takes precedence. Other ISO/RTOs facing similar and worse circumstances have done the same.³ The ISO will respond to any order that results from the FERC Notice of Proposed Rulemaking if and when it is issued.

This increasingly urgent need for foundational change to the ISO's interconnection queuing processes appears to be generally acknowledged within the industry. The ISO has received informal feedback through 2022 from a number of industry participants who agree that foundational improvements to study processes may be a higher priority than opening the next application window and further undermining the effectiveness of transmission planning.

² <https://www.ferc.gov/media/rm22-14-000>

³ See, e.g., *PJM Interconnection*, 181 FERC ¶ 61,162 (2022).

Accordingly, the ISO is launching this initiative with two tracks that commence *immediately* with the release of this issue paper:

- Track 1 will focus on immediate adjustments to the Cluster 15 study schedule (discussed in detail in Section 3 of this paper).
- Track 2 will focus on targeted modifications to the interconnection process. At this time, the ISO expects these modifications will be in place when the Cluster 15 studies resume, so that they can be applied to those studies.

We look forward to further engaging our stakeholders in this timely and important conversation.

2 Track 1: Straw proposal for immediate adjustments to the schedule for processing Cluster 15 interconnection requests

Track 1 of this initiative will focus on immediate adjustments needed to the schedule for processing and studying Cluster 15 interconnection requests to allow the Cluster 14 Phase II study process to proceed. This would also provide time for this stakeholder initiative to develop and put in place the longer-term solutions that will be applied to Cluster 15. The ISO considers completing the Cluster 14 phase II studies a high priority because it will allow LSEs to have a large pool for procurement. Although the ISO and transmission owners have added staff, contractors, and consultants, these additional resources cannot sufficiently address the projected size of the queue and workload associated with both Cluster 15 Phase I and Cluster 14 Phase II studies. The modified cluster study process developed in Track 2 will need to be approved by the ISO Board and FERC, and any pre-study implementation procedures in place prior to studying Cluster 15 projects.

For Cluster 15, the ISO considered delaying opening the request window altogether but believes it would be disruptive to industry to prohibit interconnection requests already developed for this April. Developers have spent significant time and money in developing projects for Cluster 15. Holding the Cluster 15 Interconnection Request window as scheduled will allow projects ready for submission now to establish their position in this cluster. The ISO also recognizes that each time it waits longer than anticipated to open the request window, the volume of requests only increases, perpetuating the cycle. The ISO proposes the following high-level modifications to the standard interconnection request processing and for starting the study process for Cluster 15:

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1. Accept Cluster 15 interconnection requests during the normal April 3 – April 17 open window.
2. Perform the interconnection request completeness review of interconnection requests received during the open window, and finalize the list of interconnection requests that are deemed complete by May 1, 2023.
3. Postpone the validation of Cluster 15 interconnection requests and the project scoping meetings.

This means the ISO will postpone the Cluster 15 interconnection request validation and scoping meetings until the Cluster 14 phase II studies and results meetings have been completed. Both the validation and the scoping meeting processes take significant time, even for a typical sized cluster. At least one PTO has expressed concerns to the ISO about completing the Cluster 14 Phase II studies on schedule while having to validate the Cluster 15 interconnection requests, even if no scoping meetings were conducted.

Once the Cluster 14 phase II studies and results meetings are complete, the Cluster 15 interconnection request validation and scoping meeting processes can begin. The current Cluster 14 Supercluster schedule for publishing the phase II interconnection studies is by November 24, 2023. The phase II study results meetings must be completed within 90 days of publication: February 22, 2024.

As such, the ISO does not anticipate resuming Cluster 15 until 2024. Although the details will be determined after the ISO pauses Cluster 15, the ISO anticipates implementing tariff revisions that will allow Cluster 15 interconnection customers to: (a) “refresh” their interconnection request, which could include making certain modifications to the original interconnection request, and (b) withdraw for minimal or no cost at any time until study work begins. Detailed Cluster 15 schedules for validation, studies, postings, etc. will be determined in Track 2.

To maintain the integrated nature of the Generation Interconnection and Deliverability Allocation process and the transmission planning process, restarting the review and study of Cluster 15 applications on April 1, 2024 seems ideal⁴. This would provide a reasonable amount of time to complete the Cluster 14 phase II studies before planning and engineering staff shift to Cluster 15 studies. It would also allow time to develop and finalize the major changes in Track 2 as those will need to be completed and in effect before Cluster 15 phase I studies begin.

⁴ The current GIDAP schedule for opening the annual interconnection request window is April 1 of each year.

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While the proposed schedule for restarting Cluster 15 studies should provide a reasonable amount of time to complete the broader reforms anticipated in Track 2 based on past IPE initiatives, Track 2 will need to move at a robust pace to ensure that it is completed in time to support the Cluster 15 schedule described above.

This proposed schedule assumes that the Cluster 14 phase II studies and results meetings would be completed within the current tariff schedule for completing the Cluster 14 phase II studies and results meetings. It is possible that one or more PTOs may determine that the current tariff schedule cannot be maintained. The above schedule may need to be revised to accommodate Cluster 14. The ISO is seeking input from the PTOs on this issue.

Other Issues for Consideration

Although the vast majority of resources in the interconnection queue and those expected to apply in Cluster 15 are similar in technology and face similar pressures regarding siting, interconnections, and obtaining power purchase agreements, there are also several types of resources facing unique challenges that may warrant additional consideration, such as offshore and out-of-state wind. State policies and CPUC planning activities have identified the need for both types of resources and for transmission planning to address their needs. Both types of resources have long lead times and large scale that create challenges in obtaining timely power purchase agreements with resource procurement responsibilities spread over 40 load-serving entities in the ISO footprint. Offshore wind development is also challenged with the need for massive new supply chain development and construction infrastructure requiring state-level attention. While the ISO is supporting the various state agency efforts to address these issues, these timeline challenges are unique compared to the more quickly sited and constructed solar and storage projects that make up the bulk of interconnection requests.

Due to these challenges, the delayed Cluster 15 schedule may impair the development of these resources and California's policy objectives for supply diversity and reliability. The ISO wants to ensure it does not negatively affect federal and state processes for specific resource development.

Since the Cluster 14 application window opened in April 2021, the U.S. Bureau of Ocean Energy Management conducted the first offshore wind energy auction for the Pacific region for five leases covering 373,268 total acres off central and northern California. The results announced on December 7, 2022 by the U.S. Department of the Interior drew competitive high bids from five companies totaling \$757.1 million. The leased areas were assessed to have the potential to produce more than 4.6 gigawatts of offshore wind energy. Although some level of transmission capacity exists in the Central

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Coast area,⁵ the ISO is exploring transmission to support material amounts of offshore wind development in the North Coast in the 2022-2023 and 2023-2024 transmission planning cycles and through efforts coordinated with state agencies.⁶ It is unclear at this time what the impacts would be of delaying any interconnection requests associated with these resources. Accordingly, the ISO will explore this issue, including whether it is conceivable to study offshore wind separately, or at least to identify initial long-lead network upgrades.

Regarding out-of-state wind, the ISO has been working to develop a “subscriber participating transmission owner” model, which the TransWest Express project intends to use to connect significant amounts of wind to the ISO. This model will provide important operational benefits to streamline development without driving up transmission rates inside the ISO footprint. Further, the in-state network transmission to achieve out-of-state imports is being developed through the transmission planning process as state policy through CPUC resource plans transmitted to the ISO. An additional point of emphasis calls for the intra-state transmission capacity to be above and beyond unused existing and planned capacity that has already been allocated to other projects earlier in the queue that would rely on the same transmission paths.⁷ Not being able to proceed in Cluster 15 on a timely basis, notwithstanding the network upgrades being developed incremental to other resource development, could interfere with the already challenging procurement of these resources.

Accordingly, the ISO will continue to explore whether certain potential Cluster 15 interconnection requests require a separate study timeline or process and is seeking stakeholder input on this issue.

3 Track 2: Interconnection Process Reforms for Cluster 15 and beyond

Track 2 of this initiative will focus on the transformative changes to the interconnection process needed to achieve the strategic direction set out in the MOU.

⁵ The 2021-2022 Transmission Plan identified approximately 5,300 MW of offshore wind could interconnect to the 500 kV transmission assuming the retirement of the Diablo Canyon Power Plant and would be about 3,000 MW if the Diablo Canyon Power Plant remains in-service.
[BoardApproved_2021-2022TransmissionPlan.pdf](#).

⁶ <https://www.energy.ca.gov/publications/2022/offshore-wind-energy-development-california-coast-maximum-feasible-capacity-and>

⁷ Letter to Elliot Mainzer ISO President and Chief Executive Officer from CPUC President Reynolds, CPUC Commissioner Rechtschaffen, and CEC Vice Chair Gunda, July 1, 2022 “Transmittal Letter to ISO for 2022-23 TPP High Electrification Portfolio” <http://www.caiso.com/InitiativeDocuments/2022-2023TransmissionPlanningProcess-PortfolioTransmittalLetter.pdf>

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To achieve the necessary changes to the interconnection process and coordinated resource development overall, certain process redesign parameters or objectives must be considered:

- Ultimately, priority must be given to resource projects that seek to utilize available capacity and that are in zones where there are planned capacity additions coming out of the ISO transmission planning process based on state resource planning. Projects that seek to interconnect in places where no capacity exists currently and no future transmission planning process projects are planned should be given a lower priority in the study process, if studied at all.
- Even within the zones that are a priority, the volume of interconnection requests receiving detailed study and interconnection requirement results must be tempered by the state agencies' resource plans. The immediate and long-term need for new resources is not served by studying thousands of megawatts above the current and future capacity on the ISO grid at levels not supported by CPUC portfolios. Although the ISO has historically studied all interconnection requests validated in a given cluster, this IPE will explore how to limit the project capacity studied to reasonable amounts that support the state's resource planning. This will help achieve study timelines for significant levels of resource additions without studying quantities of resources that bear no relationship to the actual level of forecasted demand.
- The needs of the resource procurement functions within load-serving entities also need to be revisited and evaluated. Do the detailed and individualized results of the current phase 1 and phase 2 study processes provide truly useful information to those procurement functions given how local network upgrades evolve as the queue "shakes out" closer to projects ultimately moving to construction? Alternatively, would more timely and actionable results based on a more generic study process better meet their needs, especially considering the bulk of network upgrade costs are ultimately refunded to interconnection customers and recovered through transmission rates and capacity contracts?

The ISO has fleshed out several potential design element proposals to achieve these needed changes and results. The following proposed elements can be considered together or individually, and the ISO will also seek stakeholder input on alternative elements that can be considered.

3.1 Element 1: Accept or process only Interconnection Requests where the transmission system has available existing or planned capacity, identified in the ISO's transmission plans based on CPUC portfolios

Limiting the study process to zones on the transmission system that have available capacity, either existing or planned, would focus project development

on areas where transmission has already been approved and is moving forward to accommodate new resources. The ISO expects that further clarity in its transmission plans identifying areas or zones where transmission is being planned to meet the resource plans in the CPUC portfolios, coupled with clear prioritization of those zones in the interconnection process, will shape future interconnection request activity by encouraging developers to focus on those areas. We believe that clearer direction from the CPUC to load-serving entities to focus procurement activities in those preferred zones will also drive greater overall resource development efficacy as described in the MOU.

3.2 Element 2: Limit the number of interconnection requests in a study area based on the transmission capacity being planned for that area

The ISO anticipates that even if the interconnection request intake and study processes focus exclusively on zones where there is available existing and planned transmission capacity, an excessive number of interconnection requests is still likely to continue even in those areas unless other steps are taken. Additional methods would need to be employed to limit the number and MW quantity of interconnection requests analyzed in each of the study areas to an amount based on the available existing or planned transmission capacity:

- Could screening criteria created or supported by the PTOs and the resource procurement community be developed to filter the list of projects down to only those that will receive detailed analysis? It is possible that screening criteria alone would not reduce the eligible capacity to a level determined to be acceptable for each study area and it is likely that additional methods for reducing capacity would need to be employed.
- Methods such as auctions have been considered for reducing the project capacity to levels that are commensurate with the amount of currently available or future capacity in each zone based on the ISO's transmission plan. The use of an auction could be an effective method for reducing the amount to acceptable levels. However, any proposed auction would have to fit within the timelines of the integrated GIDAP and transmission planning processes and not add significant complexity to the GIDAP.
- Could generic study results from previous or current studies be provided to projects not selected through screening in lieu of performing more

thorough studies for such projects? These generic results, for example, could be derived from averaging results for projects that did get detailed analysis, either from previous or current studies.

- Could projects not selected through screening be rejected and not studied at all? Alternatively, could projects not selected be studied in a slower, lower priority process?

The ISO seeks stakeholder input on suggested methods for reducing the number of interconnection requests to capacity levels that would be appropriate for phase I studies.

3.3 Element 3: Require projects to have a PPA or be shortlisted to proceed to phase II studies

Requiring at a minimum that projects are shortlisted for a power purchase agreement focuses the phase II study process on projects that are most ready. This will help limit the required upgrades to what are truly needed and provide more precise construction timelines. Screening criteria with this requirement would provide LSEs information related to a project's ability to receive an allocation of transmission plan deliverability (TPD) earlier in the process, further aligning the TPD allocation process with the procurement protocols of the LSEs.

The ISO intends to engage LSEs in discussions regarding the viability of this approach. One concern is whether enough time could be allocated between the phase I and phase II studies to accommodate the time needed for LSEs to perform the procurement processes.

The ISO seeks specific stakeholder input on these and other elements required to make this approach feasible.

3.4 Element 4: Only open a new Interconnection Request window when warranted

Today the ISO tariff contemplates opening the Interconnection Request window annually, regardless of procurement, capacity in queue, or any factor beyond the date. Instead, the ISO could only open Interconnection Request windows when warranted. The ISO intends to explore criteria that would warrant allowing any new interconnection requests at all. Examples for this could be that a new Interconnection Request window would not open until the capacity in queue is

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below a predefined amount (e.g, 100 GW, 100 active interconnection requests, etc.), or base the opening of a new window on a figure such as interconnection request capacity that has not executed a generation interconnection agreement (GIA). As of February 22, 2023 the total capacity of active projects in the queue is 187,886 MW (126,749 MW at the point of interconnection).

This concept, coupled with criteria for limiting the time that projects can remain in the queue if not meeting criteria that demonstrate a project is advancing in its development, could help manage the queue size, maintain study schedules, and prioritize projects already well underway. A smaller and more nimble queue could help in meeting the state’s new resource requirements, and relieve unrealistic PTO study burdens, thus enabling a sharper focus on transmission construction and bringing resources online.

The ISO seeks specific stakeholder input on this concept.

4 Stakeholder engagement

The schedule for stakeholder engagement is provided below. The ISO will present its proposal for Track 1 to the Board of Governors in May 2023.

Date	Event
Track 1	
3/6/2023	Issue paper and straw proposal published
3/13/2023	Stakeholder conference call on issue paper and straw proposal
3/27/2023	Stakeholder comments due
4/10/2023	Publish draft tariff language & final proposal
4/24/2023	Stakeholder comments due on draft tariff language & final proposal
5/1/2023	Stakeholder conference call on tariff language & final proposal
5/17/2023	Board of Governors meeting

The schedule for Track 2 will be developed once stakeholder feedback is received on this issue paper, but it is anticipated that to meet the proposed schedule for implementing process changes ahead of commencing Cluster 15 phase I studies, Track 2 would need to be presented to the Board of Governors in December 2023.