2018 Interconnection Process Enhancements

Straw Proposal

May 9, 2018

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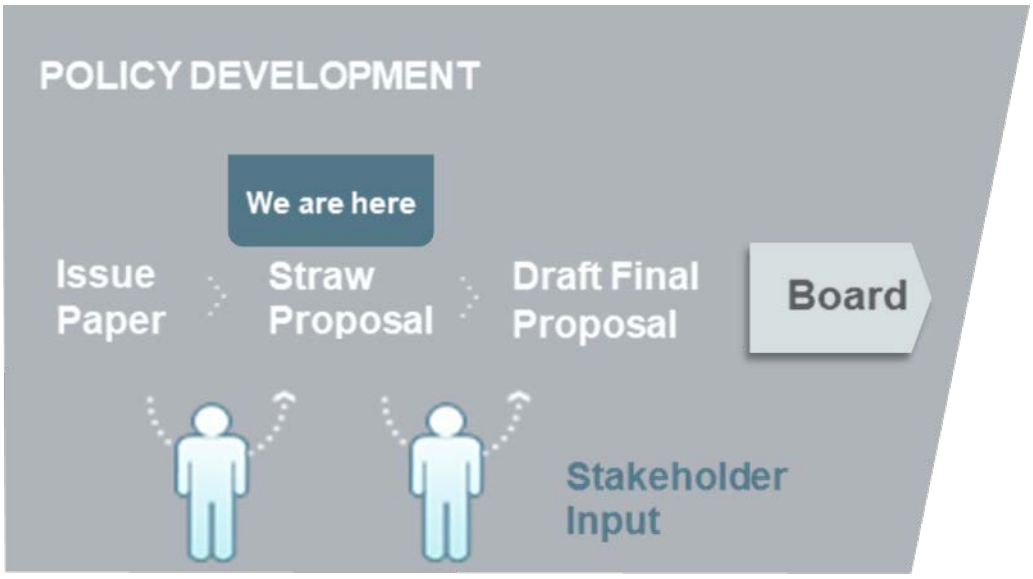
1. Introduction

Previous iterations of the California Independent System Operator Corporation's (CAISO) Interconnection Process Enhancement (IPE) initiative focused on several enhancements to the CAISO's interconnection and deliverability allocation procedures. 2018 IPE will address some substantial concepts, but also a myriad of minor concepts that have not been addressed in some time along with issue that have surfaced since 2015 IPE that need to be resolved. This straw proposal reviews topics currently being proposed for inclusion in this stakeholder initiative and addresses topics from the issue paper that will not be included. The topics fall into six broad categories deliverability, energy storage, generator interconnection agreements, interconnection cost responsibility and financial security, interconnection requests, and modifications.

2. Stakeholder Process

The CAISO is at the "Straw Proposal / Partial Draft Final" stage in the 2018 IPE stakeholder process. Figure 1 below shows the current status within the overall 2018 IPE stakeholder process. The purpose of the straw proposal is to present the scope and proposed solutions to topics related to deliverability, energy storage, generator interconnection agreements, interconnection cost responsibility and financial security, interconnection requests, and modifications. For issues that the stakeholders agreed were complete in the issue paper, this is the draft final proposal. The CAISO has reviewed and considered stakeholder feedback provided through comments submitted on the issue paper and have addressed stakeholder comments on all topics regardless of inclusion in the identified scope of this initiative. In most instances specific proposals are included for topics that are being included in the scope of this initiative, on some topics, however, the CAISO seeks additional input through stakeholder feedback to help facilitate development of a robust proposal.

Figure 1: Stakeholder Process for 2018 IPE Stakeholder Initiative



3. Scope

The CAISO plans to publish a Revised Straw Proposal of the remaining issues early in the third quarter of 2018 and a Draft Final Proposal for the remaining issues during the fourth quarter of 2018. Due to the substantial number of topics in this paper, the CAISO is planning to move forward with topics in three separate tracks. Topic included in the first track are targeted for the July 2018 Board of Governors meeting, topics in the second track are targeted for the September 2018 meeting, and we are targeting the November 2018 meeting for topics in the third track. The table below reflecting the scope for this initiative includes the identification of which Board of Governors meeting for each topic and reflects NA for topics that we are not planning to include in the scope of this initiative.

Category	Topic	Targeted Board of Governors Meeting
Deliverability	Transmission Plan Deliverability Allocation	November 2018
	Balance Sheet Financing	November 2018
	Participating in the Annual Deliverability Allocation	November 2018
	Change in Deliverability Status to Energy Only	September 2018
	Energy Only Projects' Ability to Re-enter the Queue for Full Capacity	November 2018
	Options to Transfer Deliverability	September 2018
	Transparency on Availability of Deliverability	NA
	Commercial Viability Criteria – Continuous Compliance Obligation	NA
	Interim Deliverability Status	NA
	Effective Load Carrying Capacity	NA
	Cancellation or Delay of CAISO Approved Transmission Projects	NA
Energy Storage	Distributed Energy Resources	NA
	Replacing Entire Existing Generator Facilities with Storage	September 2018
	Deliverability Assessment for Energy Storage Facilities	NA
Generator Interconnection Agreements	Suspension Notice	September 2018
	Affected Participating Transmission Owner	September 2018
	Clarify New Resource Interconnection Requirements	September 2018
	Ride-through Requirements for Inverter-based Generation	November 2018
	Affected System Options	NA
	Modeling Data Requirements	NA

Category	Topic	Targeted Board of Governors Meeting
Interconnection Financial Security and Cost Responsibility	Maximum Cost Responsibility for NUs and potential NUs	September 2018
	ITCC for Non-cash Reimbursable NU Costs	NA
	Financial Security Postings and Non-refundable Amounts	NA
	Queue Clearing Measures	NA
	Shared SANU and SANU Posting Criteria Issues	September 2018
	Clarification on Posting Requirements for PTOs	July 2018
	Reliability Network Upgrade Reimbursement Cap	September 2018
	Reimbursement for NUs	NA
	Impact of Modifications on Initial Financial Security Posting (New to Straw Proposal)	September 2018
Interconnection Requests	Study Agreements	July 2018
	Revisions to Queue Entry Requirements	NA
	Master Planned Projects (Open-ended and Serial Projects)	NA
	Project Name Publication	September 2018
	Interconnection Request Application Enhancements	NA
	FERC Order No. 827	NA
Modifications	Timing of Technology Changes	September 2018
	Commercial Viability – PPA Path Clarification	November 2018
	PPA Transparency	July 2018
	Increase Repowering Deposit	July 2018
	Clarify Measure for Modifications After COD	July 2018
	Short Circuit Duty Contribution Criteria for Repower Projects	July 2018
	Material Modifications for Parked Projects	NA

4. Deliverability

4.1 Transmission Plan Deliverability Allocation

Background/Issue

Transmission Plan Deliverability (TPD) is the transmission capacity needed to make a generator's output deliverable to the aggregate of load on the CAISO Controlled Grid during peak conditions. TPD is required for a project to be designated as Full Capacity Deliverability Status (FCDS). As such, TPD is a required for a generator to be eligible to provide Resource Adequacy.

The CAISO allocates TPD, if available, to generating projects according to the interconnection customer's demonstration of having met the criteria identified in Section 8.9.2 of Appendix DD of the CAISO Tariff, namely being far enough along in the status of permitting, project financing and

land acquisition. The project may either have a Power Purchase Agreement (PPA) or balance sheet financing as a key threshold requirement. The current TPD allocation process provides four opportunities for all interconnection customers seeking FCDS – (1) following the Phase II interconnection studies, (2) after 1 year of parking, (3) for projects that qualify after a second year of parking, and (4) the annual full capacity deliverability option. If after exhausting its applicable opportunities a project does not receive a TPD allocation the project must convert to energy only or withdraw.

The TPD allocation process works well during periods that procurement opportunities exist. However, renewable procurement has recently slowed significantly, resulting in few projects meeting the criteria to qualify for a TPD allocation. It is possible that future procurement of renewables will not require FCDS, but until that issue is determined, interconnection customers believe they must have FCDS to compete for a PPA in the procurement processes of load serving entities (LSE).

In the IPE 2018 issue paper, the CAISO discussed several opportunities or concepts of how to improve the allocation of deliverability and commercial viability criteria. Upon review of stakeholder comments and further discussion, the CAISO is proposing to combine some topics into one whereby we create one concise and consistent solution to the allocation of TPD. The CAISO is proposing to include adjustments to the TPD allocation process, replace the Annual Full Capacity Deliverability option, address the topic of allowing energy only projects' the ability to re-enter the CAISO queue for Full Capacity allocation, and address issues with the balance sheet financing option as it related to both TPD and commercial viability criteria (CVC), all within the proposal outlined in this section. As such, Section 4.2 -Balance Sheet Financing, Section 4.3 – Participating in the Annual Full Capacity Deliverability Option, Section 4.5 - Energy Only Projects Ability to Re-enter the Queue for Full Capacity, and Section 9.2 - Commercial Viability – PPA Path Clarification, will be discussed and any proposed revisions will be consolidated and provided within Section 4.1.

Balance Sheet Financing (previously section 4.2)

Interconnection customers seeking a TPD allocation have the option, on the seeking TPD allocation affidavit, to elect that they will balance sheet finance their project, with or without a PPA. A number of stakeholders suggested that the CAISO eliminate interconnection customers' ability to claim their generating facility will be balance-sheet financed or has otherwise received a commitment of project financing, and the interconnection customer is proceeding to commercial operation without a power purchase agreement.

Participating in the Annual Full Capacity Deliverability Option (previously section 4.3)

The annual full capacity deliverability option described in Section 9.2.1 (ii) of Appendix DD of the CAISO tariff allows Option (A) projects that were not allocated TPD in any prior TPD allocation cycle, or that converted to energy only and have GIAs in good standing, to seek TPD for Partial Capacity Deliverability Status (PCDS) or FCDS for the energy only portion of their projects. Various stakeholders have asked the CAISO to consider changes to the annual option, including adoption of additional qualifying criteria. Additionally, stakeholders suggested requiring the same TPD retention criteria as for projects that received a TPD allocation by qualifying for the

allocation in the TPD allocation process, and addressing the potential for gaming.

Energy Only Projects' Ability to Re-enter the CAISO Queue for Full Capacity (previously section 4.5)

Stakeholders have indicated a desire for the CAISO to provide an opportunity for projects to re-enter the queue to obtain deliverability status in addition to the existing Annual Full Capacity Deliverability Option for energy only and PCDS.

Commercial Viability – PPA Path Clarification (previously section 9.2)

The CAISO requires interconnection customers to prove their project meets CVC to extend their milestones beyond the 7/10 year threshold. As such, the existing criteria requires a project to either have an executed power purchase agreement, be pursuing a PPA within a limited grace period of 1 year, or attest that the generating facility will be balance-sheet financed.

In the 2018 IPE Issue Paper, the CAISO proposed to clarify that an interconnection customer's ability to either; a) claim it will balance-sheet finance, or b) pursue additional PPA opportunities during the grace period, will be a binary election that must be made only during the initial MMA assessment to extend the COD past the 7/10 years. In other words, interconnection customers cannot elect to balance-sheet finance after using the one-year safe harbor to pursue a PPA.

Stakeholder Input

Transmission Plan Deliverability Allocation

First Solar, GSCE, and ITC Holdings all believe more can be done to appropriately allocate and provide more opportunity to obtain TPD allocation in light of a changing procurement landscape. ORA does not see a need to make adjustments and suggests that changes should only be considered for projects that support area needs and services that are in addition to energy delivery. SDG&E agrees that the topics should be reviewed and discussed in 2018 IPE.

SCE opposes any proposal for projects to remain in the queue indefinitely to have endless opportunity to seek TPD. Further, they support the methodology of assigning higher priority to those projects that meet the GIDAP Section 8.9.2 (2)a as identified in Section 4.2 below.

Balance Sheet Financing (previously section 4.2)

CalWEA and ITC agree that the topic of balance sheet financing (BSF) deserves attention and suggests the scoring for BSF projects be scored less than those projects with a PPA. First Solar also believe the CAISO should reevaluate the criteria for BSF and create more rigorous criteria that allows validation and enforcement for those selecting to BSF.

GSCE does not support the removal or changes to the BSF criteria.

LSA believes that generation projects are claiming BSF allowing them to (1) receive allocations of scarce TPD in the GIDAP process; and (2) retain their deliverability far beyond a reasonable period. Further, LSA has suggested to eliminate the option entirely and comments that the market reality for larger non-utility projects simply are not being built in California without PPAs, and have not been since the formation of the CAISO. They further suggest, in the event BSF remains an option, that the CAISO play a larger role in policing the validity of a projects financial ability to commit to such a claim or introduce stricter criteria or penalties for those who claim and

proceed with BSF. LSA also recommended an adjustment to the naming and points awarded to projects with executed and regulator-approved PPAs so that such an arrangement counts for more than a financing commitment without a PPA.

SCE suggested that interconnection customers should forfeit financial security if they have accepted TPD allocations and subsequently withdraw, or are converted to energy only for not meeting their retention criteria.

SDG&E, rather than removing the option to BSF, prefers to strengthen the BSF requirements within this section such that projects must provide evidence that they are prepared and able to BSF. Further, SDG&E supports LSA and EDF-RE's suggestion of implementing a minimum forfeit amount for serial projects or increasing postings for cluster projects with low or no network upgrade costs.

Participating in the Annual Full Capacity Deliverability Option (previously section 4.3)

The ORA, PG&E, SCE, and SDG&E support adding additional qualifying criteria for AFC projects seeking an allocation, and to require the same TPD retention criteria as projects that receive an allocation through the standard allocation process based on affidavit scoring.

GSCE wants to ensure that projects seeking deliverability through a secondary process are given a fair opportunity to receive an allocation of deliverability.

ITC supports ensuring that projects remaining in the queue can continue to seek TPD.

LSA does not support a proposal to add qualifying criteria because they believe that the amount of applicable capacity is likely very small with very few projects that have obtained deliverability in this manner. LSA indicates that the process is so long (2+ years) and the outcome is uncertain because these projects would be "last in line" for TPD awards. LSA has no objection to imposing TPD retention criteria after a reasonable amount of time on projects receiving deliverability using this mechanism, e.g., starting two years after the award.

Wellhead believes the current qualifying criteria are adequate and states that additional qualifying criteria are not necessary.

CalWEA states that rather than trying to add features to the annual full capacity deliverability allocation process, CAISO should consider allowing any project to re-enter the queue and apply to increase their deliverability level.

Energy Only Projects' Ability to Re-enter the CAISO Queue for Full Capacity (previously section 4.5)

Stakeholder input was received from CalWEA, First Solar, GSCE, ITC, LSA, NRG, ORA, SCE, SDG&E, and Wellhead. All respondents were in favor of the additional opportunity under certain circumstances with the exception of ORA.

ORA indicated that allowing projects to re-enter the queue for deliverability would create uncertainty surrounding the required upgrades and the responsibility for funding. ORA suggested that if it was allowed then the interconnection customer should bear the entire cost of any needed upgrade; this is also what SCE suggested.

Various other qualifiers for re-entering the queue for deliverability were suggested by

stakeholders. ITC wanted to ensure that no negative impact to others in the queue or avoidance of network upgrade cost responsibilities would result. GSCE stated that the option should be available to projects that had achieved COD as energy only, while CalWEA thought an executed energy only or partial deliverability GIA should be necessary to re-enter the CAISO Queue for deliverability. LSA indicated that if projects were allowed to re-enter the queue that they should be treated the same as any other queued project and pay their share of identified Deliverability Network Upgrades (DNU). SDG&E also indicated that since FERC has deemed network upgrades a benefit to the system that the interconnection customer should be eligible for reimbursement of upgrade costs. First Solar proposed energy only projects should have an opportunity to compete for a TPD allocation annually along with others seeking TPD.

NRG indicated that the Annual Full Capacity process has not worked well for their needs and they are looking to the opportunity to re-enter the queue to be a more viable solution for their projects seeking deliverability.

ORA requested improved access to deliverability information so that interconnection customers can make more informed decisions regarding deliverability.

Commercial Viability – PPA Path Clarification (previously section 9.2)

First Solar, ITS, PG&E, and SDG&E supported the CAISO's proposal for the CVC process.

SCE provided feedback that it did not support the proposal, expressing its view that the current tariff language provides customers flexibility. SCE supported keeping the policy as is, provided the customer's decision to switch did not require further delays in In-Service, Initial Synch, and COD timelines. SCE suggested that the CAISO consider obtaining interconnection customer confirmation of desire to move to BSF if acquiring a PPA was unsuccessful prior to the end of the grace period.

CalWEA expressed a strong preference for the CAISO to retain BSF in the commercial viability framework. LSA, EDF, SPower, and ORA provided feedback that BSF should be eliminated from the commercial viability framework.

CAISO Response and TPD Allocation Proposal

Balance Sheet Financing (previously section 4.2)

Based on stakeholder comments, the CAISO believes there is a need to maintain an option for some interconnection customers to develop their projects regardless of whether they have a PPA. Therefore, the CAISO is proposing to modify the concept of BSF and include stricter restrictions for those who elect to develop regardless of their PPA status.

Participating in the Annual Full Capacity Deliverability Option (previously section 4.3)

The CAISO appreciates the stakeholder feedback received on this topic. While Wellhead believes that the current AFC process does not need enhancement, the majority of interconnection customers do not see the current AFC process as very beneficial, but generally support a continuing need for a process that allows an interconnection customer to seek a TPD allocation after it has exhausted its opportunities through the standard allocation process based on affidavit scoring.

Energy Only Projects' Ability to Re-enter the CAISO Queue for Full Capacity (previously section 4.5)

Based on the majority of stakeholder comments being in favor of a process to allow energy only projects' the ability to obtain FCDS, the CAISO believes the proposal described below allows reasonable opportunity for energy only projects an opportunity to obtain a TPD allocation without re-entering the queue.

Commercial Viability – PPA Path Clarification (previously section 9.2)

The CAISO believes there is a need to redefine BSF in this straw proposal and proposes to shift to a model that allows projects to declare that their business plan is to proceed regardless of whether they obtain a PPA. If this proposal is implemented, electing between a PPA and BSF by this point (a project requesting extension beyond the 7/10 year threshold) will already be made. Thus, the CAISO is proposing that the option to BSF for the purposes of meeting CVC be eliminated.

CAISO TPD Allocation Proposal

Past and current practice have indicated that interconnection customers require a TPD allocation to compete for a PPA that subsequently allows LSE to use the Net Qualifying Capacity (NQC) from the project towards meeting their Resource Adequacy (RA) requirement. In an effort to 1) provide those projects that have an executed or regulator-approved PPA greater opportunity to obtain TPD, 2) better align the allocation process with the power procurement environment, and 3) adjust the existing process based on stakeholder input, the CAISO is proposing to modify the TPD allocation process, including the options of BSF and the AFC. The proposed modified process consists of allocation priority groups, and retains an affidavit ranking process to determine the allocation priority within each group.

Each allocation group will have certain criteria established to receive a TPD allocation. The TPD allocation will occur sequentially during the annual allocation process with all generators that receive an allocation being required to meet the retention criteria, as demonstrated through an affidavit. The CAISO notes that this proposal—like all proposals—would only apply prospectively, and would therefore have no effect on any existing deliverability capacity allocations (or any that occur between now and when such a proposal is in effect). In other words, the CAISO would not reorganize existing allocations into these groups until approval from FERC.

Allocation Group Summary

Allocation Group	Project Status	Commercial Status
1	Study/Parking Process	Executed or regulator-approved PPA or interconnection customer itself is LSE
2	Study/Parking Process	Shortlisted in an RFO process
3	Study Process (Following Ph.II Only)	Proceeding without a PPA (formerly Balance Sheet Financing)
4	Converted to Energy Only	Executed or regulator-approved PPA
5	Converted to Energy Only	Shortlisted in an RFO process
6	Converted to Energy Only	Commercial operation achieved
7	Energy Only	Commercial operation achieved

Allocation Group One includes those projects that are currently in the CAISO's queue cluster study process or following their parking opportunity(s) and have an executed or regulator-approved PPA with an LSE that require the project to be FCDS or projects being developed by an LSE with a regulatory authority to construct such project. In other words, those projects that requested FCDS in their Interconnection Request (IR) and have not been converted to energy only. The parking opportunities for the projects in this group will remain unchanged.

Allocation Group Two includes those projects that are currently in the CAISO's queue cluster study process or following their parking opportunity(s) and are included on a commercially recognized method of preferential ranking of power providers (i.e. shortlisted) by a prospective purchaser (LSE) that require the project to be FCDS. If a shortlisted project receives a TPD allocation, the interconnection customer must execute a PPA by November 30th of the calendar year such allocation was received. If a PPA is executed, the interconnection customer must attest that the PPA has been executed in the retention affidavit, typically due on or around December 1st, to solidify the allocation. Otherwise the TPD is released and becomes available for the next allocation cycle. Further, regulatory approval of such executed PPA must be received by the following year's TPD retention affidavit due date to solidify the allocation. If not, the TPD is released and becomes available for the next allocation cycle.

Allocation Group Three includes those projects that are currently in the CAISO's queue cluster study process and have declared that it is their intent to proceed with developing their project regardless of whether they obtain a PPA. The only point in the GIDAP process a project can proceed in Allocation Group Three is following the project's Phase II Study. More specifically, the only time a project can declare it will proceed without a PPA is in the seeking TPD affidavit and allocation cycle following the project's Phase II study. If a project claims that it will proceed without a PPA and receives an allocation, it must accept the allocation (whether full or partial) or withdraw. If a partial allocation is received, the project may park the remaining portion of the project that did not get TPD and seek TPD in the next allocation cycle, or downsize to the size corresponding with the TPD allocation they previously received. In the event a TPD allocation is

not received, that project may elect to park with their respective queue cluster and seek a TPD allocation in the following allocation cycle.

It is expected that a project that elects to proceed without a PPA will proceed to developing their project in a timely manner. As such, there should be no need by the interconnection customer to delay the negotiations of the GIA, start of construction, or progress towards achieving commercial operation. Therefore, at the time a project has declared it will proceed without a PPA and is allocated TPD, the following requirements would apply to the project:

1. Project must accept the TPD allocation. If the project chooses to not accept the TPD allocation, the project must withdraw from the queue;
2. Project will not be afforded any Suspension provisions in its GIA;
3. Project must proceed to executing a GIA, provide its written notice to proceed to the PTO within 30 calendar days following the execution of its GIA, and post its required Interconnection Financial Security (IFS); and
4. Project agrees that the CAISO and PTO will not consent to COD extensions beyond 7 years in queue under any circumstance.

Allocation Group Four includes those projects that selected FCDS on their interconnection requests, have been converted to energy only following the cluster study and parking opportunities, and have an executed or regulator-approved PPA with a LSE that requires the project to be FCDS. For energy only projects, the CAISO will only allocate TPD provided no new DNUs are required.

Allocation Group Five includes those projects that selected FCDS on their interconnection request application, have been converted to energy only deliverability status following the cluster study and parking opportunities, and are included on a commercially recognized method of preferential ranking of power providers (*i.e.* shortlisted) by an LSE that requires the project to be FCDS. If a shortlisted project receives a TPD allocation, the interconnection customer must execute a PPA by November 30th of the calendar year such allocation was received. If a PPA is executed, the interconnection customer must attest that the PPA has been executed in the retention affidavit to solidify the allocation (e.g. affidavits were due December 1st in 2017). If the steps described here are not completed, the TPD is released and becomes available for the next allocation cycle. Further, regulatory approval of the PPA must be received by the following year's TPD retention affidavit to solidify the allocation. If not, the TPD is released and becomes available for the next allocation cycle. For energy only projects, the CAISO will only allocate TPD provided only where new DNUs are not required.

Allocation Group Six includes those projects that selected FCDS on their interconnection requests and have been converted to energy only following the cluster study and parking opportunities and have achieved commercial operation. For energy only projects, the CAISO will only allocate TPD provided no new DNUs are required.

Allocation Group Seven includes those projects that selected energy only and have achieved commercial operation. For energy only projects, the CAISO will only allocate TPD provided no new DNUs are required.

Allocation Group Summary

Allocation Group	Project Status	Commercial Status	Can Build DNUs for Allocation?	Allocation Rank
1	Study/Parking Process	Executed or regulator-approved PPA requiring FCDS or interconnection customer is Load Serving Entity	Yes	Allocated 1st
2	Study/Parking Process	Shortlisted in a RFO/RFP	Yes	Allocated 2nd
3	Study Process (Following Ph.II Only)	Proceeding without a PPA (PKA, BSF)	Yes	Allocated 3rd
4	Converted to Energy Only	Executed or regulator-approved PPA requiring FCDS	No	Allocated 4th
5	Converted to Energy Only	Shortlisted in a RFO/RFP	No	Allocated 5th
6	Converted to Energy Only	Commercial operation achieved	No	Allocated 6th
7	Energy Only	Commercial operation achieved	No	Allocated 7th

Groups four, five, six, and seven will replace the current AFC deliverability option specified in CAISO tariff Section 9.2.1. These energy only allocation options are intended to serve as the opportunity where stakeholders have requested that a project be able to reenter the queue to seek TPD. While these options do not allow for a project to reenter the queue to seek TPD, (e.g. to be restudied for and allowed to fund additional DNUs) it serves as an opportunity where an energy only project can seek a TPD allocation without triggering new network upgrades.

The CAISO will perform a TPD allocation assessment within the annual reassessment study to determine what projects are eligible receive a TPD allocation. An initial step of the allocation assessment is a process to determine if any energy only projects seeking an allocation are located behind a local constraint. This will ensure that no energy only project seeking a TPD allocation require a Local Delivery Network Upgrade (LDNU) to be deemed deliverable. This process has been used for projects seeking FCDS through the AFC Deliverability Option. To ensure that local deliverability is retained for all FCDS projects, including projects in the most recent Phase I study, the methodology to determine project's impacts on local constraints is to include all active interconnection queue projects seeking FCDS in the study model, including the FCDS projects that have just completed their Phase I study. Additionally, all transmission upgrades approved in the Transmission Planning Process (TPP) and all interconnection related network upgrades that are under construction are modeled. No capacity associated with area deliverability is retained for any projects that have not yet received a TPD allocation. Energy only projects that are not located behind a local constraint are eligible to receive a TPD allocation up to the point where all local deliverability and area deliverability is fully allocated.

All projects seeking a TPD allocation must request to be included and evaluated in the annual

TPD allocation process by submitting a seeking TPD affidavit.

For all projects with an energy only status that submit a seeking TPD affidavit, consistent with the downsizing process, the CAISO will require a $60,000 deposit for each project requesting TPD allocation. The CAISO will utilize this deposit to cover costs associated with the evaluation and TPD allocation process. The CAISO will deposit all TPD allocation deposits in an interest-bearing account at a bank or financial institution designated by the CAISO. The TPD allocation deposit will be applied to pay for prudent costs incurred by the CAISO, the PTOs, or third parties at the direction of the CAISO or PTOs.

CAISO Commercial Viability – Elimination of Balance Sheet Financing Proposal

When interconnection customers request an extension to a project's COD the CAISO evaluates the request under the material modification assessment (MMA) process. The CAISO requires interconnection customers to prove their project meets commercial viability criteria to extend their milestones beyond the 7/10 year threshold, as it applies to project's studies under the cluster study process and serial study process, respectively.[1] The commercial viability criteria are:

- Having, at a minimum, applied for the necessary governmental permits or authorizations and that the permitting authority has deemed such documentation "as data adequate" for the authority to initiate its review process;
- Having an executed power purchase agreement, attesting that the Generating Facilities will be balance-sheet financed, or otherwise receiving a binding commitment of project financing;
- Demonstrating Site Exclusivity for 100% of the property (in lieu of a Site Exclusivity Deposit);
- Having executed a GIA; and
- Being in good standing with its GIA such that neither the PTO nor the CAISO has provided the interconnection customer with a Notice of Breach of the GIA (where the breach has not been cured or the interconnection customer has not commenced sufficient curative actions).
- The CAISO's current commercial viability criteria were designed to complement the TPD allocation criteria. The current commercial viability criteria can be thought about in broad terms as "TPD criteria plus", in other words, commercial viability is as stringent as TPD allocation criteria with respect to Financing and GIA requirements, and is more stringent with respect to Permitting and Site Exclusivity requirements.

The CAISO proposes to eliminate the ability to BSF as part of the commercial viability process.

[1] The In-Service Date ("ISD") for Generating Facilities studied in the serial study process shall not exceed ten (10) years from the date the Interconnection Request is received by the CAISO. For Generating Facilities studied in the cluster study process, the COD shall not exceed seven (7) years from the date the Interconnection Request is received by the CAISO.

In this new proposal, interconnection customers requesting an extension to a project's COD beyond the 7/10 year threshold will have three options:

- The interconnection customer could demonstrate commercial viability criteria with a PPA that provides a later in-service date of such project, then the COD extension would be approved to that delivery date and deliverability is maintained. This option would apply for all projects with a PPA (i.e. if a project received a TPD allocation as part of Group 1 or 4 above) except those that elected to proceed without a PPA (i.e. Group 3 above).
- The project could have a COD extension approved absent commercial viability demonstration, move forward with the project as energy only (if desired), and then seek deliverability through the new processes proposed in Section 4.1 above. This option would apply for all projects except those that elected to proceed without a PPA (i.e. Group 3 above).
- If the PTO is delayed in construction of the network upgrades, then the COD extension would be approved and deliverability is maintained. The extension would consist of a day-for-day slip based on the new in-service date provided by the PTO.

In consideration of and consistent with the revised TPD allocation criteria above, the CAISO proposes to eliminate BSF as an option in the commercial viability process. Therefore, the CAISO is also proposing to modify the commercial viability criteria in Appendix DD, Section 6.7.4 of the CAISO tariff.

4.2 Balance Sheet Financing

The CAISO has decided to include this topic in 2018 IPE and combine this topic with topics 4.1, 4.3, 4.5 and 9.2. This combined topic will seek to enhance the GIDAP in a manner that addresses all five issues under one topic to be addressed in Section 4.1.

4.3 Participating in the Annual Full Capacity Deliverability Option

The CAISO has decided to include this topic in 2018 IPE and combine this topic with topics 4.1, 4.2, 4.5 and 9.2. This combined topic will seek to enhance the GIDAP in a manner that addresses all five issues under one topic to be addressed in Section 4.1.

4.4 Change in Deliverability Status to Energy Only

Background/Issue

The CAISO is seeking to clarify when projects may elect to convert to energy only deliverability status, when the CAISO will convert projects to energy only regardless of customer election, and the consequences for such conversions.

Currently, projects may voluntarily convert from FCDS or PCDS to energy only deliverability status only at certain times during the interconnection process. A project may convert to energy only deliverability status between Phase I and Phase II studies, or immediately following the TPD allocation process (either after the Phase II study or after parking for parked projects). This restriction minimizes impacts on other projects and the PTOs. Projects that convert to energy only deliverability status at these times are no longer responsible for DNU costs going forward.

Although the CAISO tariff is specific on when a project can voluntarily convert to energy only deliverability status, it does not specify whether a project can request energy only deliverability status at other times during the interconnection process, nor does the tariff describe the consequences of such conversion, particularly with regard to financial obligation for DNUs.

Projects are currently required to convert to energy only deliverability status for failure to meet commercial viability or TPD retention criteria. If the CAISO converts a project to energy only deliverability status under these conditions, all DNU costs are removed from the converting project's cost responsibility. However, the CAISO believes that some project developers may seek to utilize the conversion requirements associated with failure to meet CVC and TPD retention criteria to reduce their cost responsibility and then withdraw. The CAISO believes this outcome is problematic because it potentially allows projects to shift costs to other project developers inappropriately or to the PTOs. Failing to be commercially viable effectively becomes an attractive option for interconnection customers contemplating withdrawal.

Stakeholder Input

The CAISO received comments on this issue from CalWEA, ORA, First Solar, GSCE, LSA, PG&E, SCE, and SDG&E. All commenters favored exploring additional opportunities for a project to change from FCDS to energy only deliverability, with the exception of SCE.

CalWEA and ORA comment that the additional opportunities should only be provided after the currently allowed timelines to change to energy only have passed. GSCE suggested that the ability to change to energy only should be allowed at any time.

Nearly all respondents, with the exception of SCE, supported projects changing to energy only for any reason, including not meeting TPD retention criteria or commercial viability, and should have their non-refundable IFS network upgrades amount based on project costs prior to the conversion to energy only. SCE suggested that, in addition to no additional opportunities to change to energy only, projects that withdraw or fail to meet TPD retention criteria after accepting an allocation be required to forfeit 100% of their IFS network upgrade posting.

CAISO Response

The CAISO proposes that projects that change to energy only deliverability status as a result of failure to meet commercial viability or TPD retention criteria will retain the cost responsibility for all DNUs.

The CAISO also proposes that projects may request to change their deliverability status to energy only at any time after the Phase II study. These requests will be evaluated in the annual reassessment study to determine cost responsibility for the project. If the DNUs are still required, the project will be converted to energy only, but will retain the cost responsibility for

those upgrades. If, however, the DNUs are no longer needed, the upgrades will be removed from the project's cost responsibility.

4.5 Energy Only Projects' Ability to Re-enter the CAISO Queue for Full Capacity

The CAISO has decided to include this topic in 2018 IPE and combine this topic with topics 4.1, 4.2, 4.3, and 9.2. This combined topic will seek to enhance the GIDAP in a manner that addresses all five issues under one topic to be addressed in Section 4.1.

4.6 Options to "Transfer" Deliverability[2]

Background/Issue

Currently interconnection customers have some ability to effectively "transfer" deliverability to a different owner through the repower process and the material modification analysis. To be sure, deliverability is not a property right and may not be sold or otherwise assigned; only transferred with an entire interconnection customer itself. In any case, the CAISO calculates deliverability based on the deliverability assessment methodology.

Interconnection customers also may "transfer" their deliverability capacity among their own generating units (new and old) at their generating facility. Adding new generating units is generally done through the behind-the-meter expansion option under an independent study request. Any expansion is energy only unless the capacity expansion uses the same technology as the original generating facility. If it is, the interconnection customer can elect to request to transfer its deliverability from the original generating units to the capacity expansion facility.

As part of 2018 IPE, the CAISO proposes to clarify the methodology of deliverability transfers under various scenarios.

Stakeholder Input

The CAISO received comments on this topic from CalWEA, First Solar, LSA, NRG and SDG&E. All commenters supported the clarification of the deliverability transfer provisions.

CAISO Response

As explained above, deliverability transfer requests are typically reviewed by the CAISO through the repowering process or through a material modification analysis[3]. An interconnection customer will repower its facility to effect a technology change and effect an assignment of the interconnection project itself (along with all rights and obligations). Interconnection customers

[2] Please note that while the CAISO is making this proposal at this time, we are also reviewing FERC's recent Order 845 in Docket No. RM17-8-000 to determine if our proposal is impacted by the order.

[3] See Business Practice Manual for Generator Management, Section 12 – 'Repowering' and Section 6 – 'Overview of Modification Provisions'.
https://bpmcm.caiso.com/BPM%20Document%20Library/Generator%20Management/BPM_for_Generator Management_V21_Clean.docx.

also frequently transfer their deliverability capacity among existing and new generating units after a behind-the-meter expansion. The CAISO explains common scenarios below where deliverability is "transferred" from different generating units or technologies. The CAISO also sets forth its proposal for a new methodology in scenario 4.

Opportunities to Transfer Deliverability

1. *Deliverability Reservation from Repowering Generators*

   When a generator with Full or Partial Capacity Deliverability Status (FCDS or PCDS) plans to retire, the generator owner may request that the deliverability of its existing generator be preserved for its repowered project. The repowered project is either approved through the repowering process, if the total capability and electrical characteristics of the generating unit remain substantially unchanged, or by submitting it into the generation interconnection queue. As such, deliverability is transferred between the same owner, old and new generating units at the same site and under the same GIA.[4]

2. *Deliverability Transfer among Generating Units*

   Upon request from the generator, the CAISO would transfer deliverability between existing generating units at the same Point of Interconnection (POI), owned by the same generator, and under the same GIA. The CAISO will reduce deliverability from the transfer-from generator and assign to the transfer-to generator using the deliverability transfer calculation below. The transfer-to generator will have:

   - FCDS if the transfer-from generator had FCDS or PCDS and the full deliverability is calculated for the transfer.
   - PCDS if the transfer-from generator had FCDS or PCDS and the partial deliverability is calculated for the transfer.
   - Interim Deliverability Status (IDS) if the transfer-from generator had IDS.

3. *Deliverability Transfer within the Same Interconnection Request*

   The interconnection customer is allowed to shift deliverability between different portions (*i.e.*, generating units) of the same interconnection request based on the deliverability transfer calculation below. This includes deliverability being transferred to energy storage capacity conversions or additions made through the MMA review process. The CAISO will perform a deliverability transfer calculation and notify the interconnection customer of the resulting deliverability for each component of the project.

4. *Deliverability Transfer for Behind-the-Meter Capacity Expansion*

[4] The CAISO notes that for all of these, "generating units" are a generating facility capable of having their output separately metered such that they are able to have separate resource IDs and participate in the CAISO markets separately (where the interconnection customer elects to do so). Typical examples include bifurcations of large solar or wind resources (X turbines/panels are one unit, Y turbines/panels are another) and storage resources paired with any other generator. There are a myriad of other possibilities.

Currently, section 4.2.1.2 of Appendix DD requires that the behind-the-meter capacity expansion is metered separately from the original generating facility and assigned a separate resource ID, unless the expansion is the same technology as the original generating facility. When the behind-the-meter capacity expansion is metered separately, the expansion can only be energy only. The CAISO proposes to allow the interconnection customer to designate all or partial deliverability from the original generating facility to the capacity expansion. The CAISO will perform a deliverability transfer calculation to determine the resulting deliverability for the original generating facility and the capacity expansion.

Calculation of Transferred Deliverability

A major principle of a deliverability transfer is that the transfer results in the same or lower maximum output tested in the deliverability assessment, based on the methodology adopted at the time of the transfer request. The table below shows the maximum output in the deliverability assessment for different type of resources:

Table: Maximum Output Assumptions in Deliverability Assessment

	Existing	New
Non-intermittent Resources	Highest NQC value in last 3-year summer months	Requested Pmax
Intermittent Resources (solar and wind)	CAISO calculated exceedance level expressed as percentage of the interconnection capacity	

The deliverability transferred is calculated as:

$$(Deliverability\ \%)_{transfer-to} = \max\left\{100\%, \frac{(Max\ Deliverability\ Output)_{transfer-from}}{(Max\ Deliverabiity\ Output\ if\ FC)_{transfer-to}}\right\}$$

4.7 Transparency on Availability of Deliverability

Background/Issue

Stakeholders have requested that the CAISO provide insight into how much deliverability is available at different points on the grid, and how much is available before the next significant upgrade would be triggered. The CAISO has stated previously that this information is available in documents on the CAISO public website or Market Participant Portal, such as cluster Phase I and Phase II area study reports, annual TPD allocation reports, and annual transmission plans.

Stakeholder Input

The CAISO received comments from CalWEA, First Solar, ITC, LSA, PG&E and SDG&E. In general, stakeholders agree with the CAISO position that the CAISO already provides sufficient information. First Solar, ITC, and LSA emphasize the importance of such information to the generators. LSA requests that the CAISO post the TPD allocation reports on the public site and include operational deliverability assessment in the annual reassessment.

CAISO Response

The TPD allocation reports include Critical Energy Infrastructure Information (CEII), therefore

they are to have restricted access and therefore are posted on the Market Participant Portal. The CAISO will add on the public website a link to the most recent report on Market Participant Portal. To access the Market Participant Portal, one must complete a non-disclosure agreement. Instructions are located on the CAISO website at: http://www.caiso.com/planning/Pages/TransmissionPlanning/Default.aspx

Regarding LSA's request to include operational deliverability assessment in the annual reassessment, the CAISO does not see the need and could not accommodate another annual operational deliverability assessment update because the operational deliverability assessment is already performed annually for all the existing generators and active generation projects in the queue.

4.8 Commercial Viability Criteria – Continuous Compliance Obligation

Background/Issue

EDF-RE has suggested the CAISO consider implementing a continuous CVC compliance obligation whereby the CAISO would check projects during the year to ensure a project that had met CVC at its last MMA continues to meet CVC established in Section 6.7.4 of Appendix DD of the CAISO tariff, including during instances where a project makes modifications after it has made an initial CVC demonstration but before the annual review process. This issue is being considered in an open proceeding before FERC in docket ER18-156-000. On March 16, 2018, the Commission accepted the Second Amended LGIA for filing and suspended it for a nominal period, to become effective December 25, 2017, subject to refund, and has established hearing and settlement judge procedures.

Stakeholder Input

CalWEA commented that the CAISO's position should be based on its impact on the entirety of the generation interconnection process as opposed to a single FERC proceeding.

LSA, EDF and SPower commented that most compliance obligations under the CAISO tariff requires continuous compliance and there is no reason why compliance with CVC should only be required on the day when the sworn compliance affidavits are due. These stakeholders believe that non-compliance between these dates should not be tolerated. LSA, EDF and SPower stated the CAISO should re-verify CVC compliance between affidavit submissions if the project is modified (even if the modification is not otherwise material), and especially if the CAISO has reason to suspect that the project is not in compliance. SCE supports the CAISO considering the implementation of a continuous CVC compliance obligation, including during instances where a project makes modifications after it has made an initial CVC demonstration but before the annual review process. SCE believes the increased review frequency should be effective towards reducing the time a non-commercially viable project remains in the queue.

PG&E and SDG&E agrees with the CAISO that it would be appropriate to await the outcome of the FERC proceeding and then determine if this topic should be discussed further.

CAISO Response

Stakeholders generally misunderstand the CAISO's position. Interconnection customers are not required to meet the CVC only on the days where they attest to their compliance. The CAISO merely attested that it is unreasonable to require interconnection customers to comply with the CVC for a project modification as a condition of even applying for the modification. The CAISO believes that where a modification would alter its site exclusivity or permitting, it is reasonable to have the modification approved before being required to alter siting and permitting. In any case, the current tariff interpretation is now before FERC. The CAISO will revisit this issue after the case has been resolved.[5]

4.9 Interim Deliverability Status

Background/Issue

Stakeholders have requested clarification of the CAISO's interim deliverability status methodology and further information on decisions related to what projects are awarded available deliverability. The CAISO has previously indicated it provides information regarding interim deliverability in various documents that address the stakeholder requests.

Stakeholder Input

CalWEA and SDG&E agree with the CAISO position that this issue should not be included in the 2018 IPE. LSA requests that the CAISO provide annual updates to the operational deliverability assessment in the annual reassessment.

CAISO Response

The CAISO provides information regarding interim deliverability in various documents that address the requests for clarification and further information and therefore does not believe this issue needs to be a 2018 IPE topic. As discussed in topic 4.7 above, the operational deliverability assessment is performed annually as part of the Phase II interconnection study process and it assesses all the generation projects in the queue. The CAISO does not see the need and could not accommodate another annual operational deliverability assessment update.

4.10 Effective Load Carrying Capacity

Background/Issue

Stakeholders have requested that the CAISO explore the implications of the CPUC's adoption of the Effective Load Carrying Capacity (ELCC) for wind and solar projects on deliverability availability and interconnection studies. The CAISO has shared its review of the potential implications of ELCC and intends for the deliverability methodology review to be considered in a specific effort outside of this IPE 2018 initiative.

[5] This issue is proceeding in FERC Docket No. ER18-156-000.

Stakeholder Input

The CAISO received comments on this topic from CalWEA, First Solar, LSA, ORA, SDG&E, and Wellhead. Theses stakeholders support the CAISO's separate effort to review the deliverability methodology. CalWEA expressed the opinion that studying generation levels above ELCC values will force network upgrades that add no resource adequacy capacity value to the system. LSA urged the CAISO to initiate the effort quickly, aim to conclude it by year-end, and reflect the new methodology in the upcoming interconnection and planning studies.

CAISO Response

The CAISO is actively reviewing the deliverability methodology. Because it is a highly complex technical study, the CAISO must evaluate potential modifications and consequences before proposing a new methodology for stakeholder review and input. The CAISO expects to propose the methodology modification to the stakeholders near the end of 2018 as a separate stakeholder initiative. This topic is not included in the 2018 IPE.

4.11 Cancellation or Delay of CAISO Approved Transmission Projects

Background/Issue

Stakeholders have requested that the CAISO consider expressly including generator deliverability in decisions to delay or cancel transmission projects that have been approved under the CAISO TPP and in mitigation plans to address these actions. Stakeholders also request CAISO provide notice to generation developers of any resulting impacts. The CAISO has responded that it does not cancel a transmission upgrade if the upgrade is required by a generation project active in the interconnection queue. Delays to transmission upgrades could be due to many factors, such as environmental issues in the permitting process, equipment availability, staffing, or project sponsor abandonment. The CAISO updates transmission project status regularly in both the annual transmission plan report and the cluster interconnection study reports. The CAISO also provides updates directly to the interconnection customers when the upgrade affects the deliverability status of the generation projects. For these reasons, the CAISO does not plan to include this issue in the 2018 IPE initiative.

Stakeholder Input

CalWEA, ORA, PG&E, and SDG&E agree with the CAISO position. First Solar, GSCF, and LSA requested that the CAISO include adding a clear statement to this effect in the CAISO practice in BPM or tariff in the 2018 IPE process.

CAISO Response

This issue is being addressed in the CAISO BPM PRR 1027. The CAISO agrees with the point that the CAISO has made references to solution "cancellations" or being "on hold" and as such, should be referenced in BPM for transmission planning Section 4.12.2.3. The CAISO is discussing resolution options with LSA in the BPM change management process. This issue will not be included in the 2018 IPE initiative because it is already being addressed in the BPM

change management process.

5. Energy Storage

5.1 Distributed Energy Resources

Background/Issue

This issue was proposed by stakeholders. Diversified Energy Regulatory Consulting suggested the CAISO provide clarification regarding interconnection, jurisdictional boundaries, market participation and dispatch, and safety requirements for Distributed Energy Resources (DERs) in this stakeholder initiative. In the issue paper, the CAISO clarified that the Energy Storage and Distributed Energy Resources (ESDER) Phase 3 initiative was the appropriate forum to address most of these topics, while others were addressed by the CPUC in its energy storage proceeding, docket R.15-03-011.

Dominion Energy recommended that CAISO consider modifications to the interconnection process to include a notification to distributed energy resources when they potentially meet the North American Electric Reliability Corporation (NERC) Bulk Electric System (BES) definition inclusion 4 (I4) criteria. This criterion establishes that project aggregations of 75 MVA or greater are included in the definition of BES and fall under NERC jurisdiction. In the issue paper the CAISO stated that it is not its role to determine and notify entities if they fall under NERC jurisdiction or may have to meet NERC standards.

Stakeholder Input

The CAISO received comments on this topic from CESA, ORA, and SDG&E. SDG&E agrees that this topic should not be included as part of 2018 IPE. ORA and CESA agree that ESDER Phase 3 is the appropriate forum to address interconnection, jurisdictional boundaries, market participation and dispatch, and safety requirements for DERs. CESA indicated a need to further develop the capabilities for Distributed Energy Resource Aggregations (DERA) to have resource adequacy values. Here again, this issue would best be addressed in ESDER Phase 3.

CAISO Response

The CAISO will not include this topic in 2018 IPE.

5.2 Replacing Entire Existing Generator Facilities with Storage

Background/Issue

Some interconnection customers have sought to replace the entirety of their project or existing generating facility with storage through the CAISO's modification process. The BPM for Generator Management ("GM BPM") Section 6.5.9 provides that projects in the queue may replace a portion of the requested MW with storage, or add storage to the project above the approve project capability, provided it does not increase the total output of the generating facility

to the grid at any time. For existing generating facilities, the GM BPM allows for a portion of the project capacity to be converted to energy storage including the FCDS/PCDS values. In both instances, the CAISO assumes the non-storage portion of the generating unit is available to charge the storage facility if the grid cannot directly provide power to the energy storage unit when necessary. While there is currently no bright-line test to determine how much capacity can be replaced with storage without substantially changing the electrical characteristics of the generating facility, a whole replacement of the generating facility would constitute such a change. To date, the CAISO has only approved up to 10% conversion to battery from an existing project via the modification process.[6] In addition, as discussed further below, the CAISO has allowed projects to add up to 100% of their original studied capacity to the project but requires an automatic tripping scheme to ensure that the actual capacity delivered to the grid is not greater that the studied interconnection capacity. However, if the interconnection customer desires to convert more of their deliverability allocation to the energy storage unit, the value of FCDS/PCDS/IDS will be based on the exceedance factor of the original generating unit.

Replacing some project capacity with storage under the modification process may have significant impacts on grid reliability. First, charging was never studied for a traditional generator. Second, because a whole change from the studied project to storage results in material changes to the electrical characteristics that were studied, the CAISO cannot permit a replacement of 100% of the generating facilities to battery storage through the modification process. Instead, whole change storage replacement requests must go through the cluster study process as a new project.

Stakeholder Input

CESA stated that there is a major opportunity to consider expedited interconnection processes for the complete replacement of an existing generating unit with interconnection service in place, especially in light of policy and market forces driving underutilized interconnection capacity. CESA believes the concept and triggers for needing additional study for energy should link to: (i) whether the generation from the resource could be materially different; and (ii) whether the charging of the resource requires study. For (i), CESA expects the full deliverability and nature of studies for dispatchable fossil plants are such that additional study for dispatchable energy storage discharges may be unnecessary.

CESA also raised an issue where storage is paired with an existing generator and the existing generator retires, what happens to the storage capability? CESA also recommended that the CAISO provide further clarity and transparency on the repowering process around these retirement scenarios, as the current rules and processes may unreasonably cause the repowered energy storage resource to retire along with its paired existing generating facility.

First Solar and GSCE both requested the CAISO to expand on what is possible for energy storage expansions and to evaluate additional possibilities for these types of conversions. In addition, NRG requested that CAISO consider developing expedited interconnection processes

[6] This is not to say that the CAISO would not approve higher percentages. The CAISO is merely saying that of the requested modifications, 10% conversion has been the highest approved. The vast majority of infeasible conversions were approaching 100%.

that leverage this valuable existing infrastructure to promote the deployment of energy storage resources that are a key part of California's energy future. SDG&E requested that the CAISO clearly define the maximum percentage of an existing project that can be replaced with energy storage.

Invenergy comments were similar to First Solar and GSCE but also suggested the CAISO should establish a cutoff date for changes in technology to be tendered through the modification request process that is as late as feasible for CAISO.

CAISO Response[7]

The various facets of energy storage have not been fully addressed in the BPM and should be explored and addressed in this initiative. Specifically, interconnection customers have asked if storage is added to an existing generating facility and the facility retires, what happens to the storage component. Also commenters requested that the CAISO be more transparent on what is allowed for the addition of storage and define better guidelines or "rules of thumb" that could be provided to generation developers, instead of the current vague process.

The CAISO disagrees with CESA comments that additional study for dispatchable energy storage discharges may be unnecessary. A fossil plant is a rotating machine that has inertia that provides voltage and VAR support to the grid whereas the energy storage is inverter based and the electrical characteristics are substantially different. This would not, however, apply to cases of replacing or adding storage to existing inverter-based generation like solar, where dispatchability at any given time of day was neither assumed nor studied in the past interconnection studies. Actually the CAISO has added storage to solar units through the modification process because the electrical characteristics are similar and while CESA is correct, the production of electricity could be at different times than expected, the generation interconnection studies use peak periods for analysis, and the storage can only be dispatched at the CAISO's direction which would not harm the grid.

CESA also questions what should happen to the storage capability when storage is paired with an existing generator and the existing generator retires. The CAISO agrees that this is an outstanding issue and the BPM should be expanded to opine on this issue. CESA also requested the CAISO provide further clarity and transparency on the repowering process around these retirement scenarios. The CAISO has incorporated the impact of repowering and retirements in the BPM for Generator Management section 12, but agrees that the issue of storage combined with these units has not been specifically address and should be included in this initiative. Invenergy also suggested the CAISO should establish a cutoff date for changes in technology to be tendered through the modification request process that is as late as feasible for CAISO. The CAISO tariff already addresses this issue. A modification can be tendered at any time in accordance with Appendix Y, U, and DD Section 6.7.2 before the commercial operation date and after the commercial operation date in accordance with Article 5.19 of the GIA.

CAISO currently allows a generating facility to add 100% of its approved capability to the project

[7] Please note, this response is being made prior to the CAISO considering the impact of FERC's recently released Reform of Generator Interconnection Procedures and Agreements and this response may change due to compliance with the Commission's Order. Docket No. RM17-8-000; Order No. 845.

provided the output of the project does not exceed the interconnection capacity at the POI and the generator has a limiting mechanism to ensure that the additional capacity is not put on to the grid. In addition, if a project desires to decrease the amount of proposed generation and replace it with storage, the CAISO has allowed up to 10% change to date, but the issue of how much replacement can be approved needs to be determined on a case-by-case basis. This is due to the impact to the short circuit duty and assurance that the storage is dispatched for both charging and discharging at the CAISO's direction. Otherwise the storage would be considered a firm load and be required to be studied as firm load by the interconnecting PTO.

As noted above, using the modification process does not allow the CAISO or PTO to study whether the change to the generating facility would affect the reliability of the grid. As an example, assume a 100 MW solar generating facility wants to modify its project to 80 MW solar and 20 MW energy storage. The original project was studied for FCDS at 93 MW on-peak and 0 MW off-peak. The project, as an example, could have solar FCDS of 74.4 MW and PCDS of 18.6 MW for energy storage. Since the modification process does not allow for the restudy of a project's deliverability, the CAISO will not know the impact to the grid of discharging the energy storage unit outside of the on-peak period. This is the reason behind the CAISO's requirement that energy storage added through the generator interconnection process, including modifications, must follow CAISO dispatch instructions to ensure reliability of the grid. It is not considered a firm load, it is treated as negative generation.

An additional example helps explain other related requirements. For instance, assume that a 100 MW solar generating facility wants to modify its project by adding 20 MW energy storage under the modification process. In order to ensure that the generating facility meets the established requirement that it does not increase its total MW capability delivered to the grid, the project must install an automatic generator tripping scheme. This automatic generator tripping scheme must be sufficient to ensure that the total output of the generating facility, including the energy storage addition, does not at any time exceed the interconnection request maximum interconnection capacity at the POI. The CAISO will have the authority to trip the generating facility subject to the automatic generator tripping scheme, or take any other necessary actions to limit the output of the generating facility so the total output of the generating facility does not exceed the approved interconnection request capacity at the POI. In addition, the 20 MW energy storage addition is considered energy-only, therefore, adding storage does not impact FCDS. If the project wants to move deliverability to the storage unit from the solar unit then the project would be PCDS.

Others have raised the question if a generator goes through the modification process and is approved and then the generator retires, what happens to the energy storage component? The outcome would depended upon the reliability assessment that is done when the original generator requests retirement. The CAISO and PTOs will assess the impact of the system without the original generating facility and just the energy storage remaining. If there is no reliability issue then the energy storage can stay interconnected and continue to operate and any FCDS or PCDS that is available could be transferred from the retiring unit to the energy storage. If there is a reliability issue, then the generator cannot retire unless a mitigation is determined, or the energy storage may need to be disconnected at the time the unit retires. If a generating facility wants to retire and repower as energy storage, then they would need to go through the

repowering process and the repowering rules will apply, including the potential transfer of FCDS or PCDS if the original generating facility has such status.

5.3 Deliverability Assessment for Energy Storage Facilities

Background/Issue

Stakeholders requested additional information and clarification to help them better understand the deliverability assessment for energy storage facilities. The CAISO has clarified the deliverability methodology for energy storage facilities in the issue paper published in this initiative.

Stakeholder Input

CESA acknowledged the CAISO's clarification of the deliverability assessment for energy storage facilities and requested further clarifications on how deliverability is allocated between system and flexible capacity deliverability.

SDG&E agreed with the CAISO clarification.

CAISO Response

The CAISO believes the issues raised by stakeholders have been addressed through the clarifications provided in the Issue Paper – 2018 Interconnection Process Enhancements and do not require further consideration in 2018 IPE.

Regarding CESA's further comments on flexible capacity deliverability, currently there isn't a separate deliverability assessment for flexible capacity. The effective flexible capacity (EFC) is bundled with the resource Net Qualifying Capacity (NQC). It is assumed that the summer peak condition reasonably represents the stressed operating scenario to deliver the full output of the resource to the CAISO aggregate load. Therefore, the NQC is considered as the upper limit of the EFC. As more and more renewable generation went into operation, the actual data revealed that the highest system ramping needs occur during weekends in the winter, instead of summer peak days. The CAISO believes that the deliverability test under summer peak conditions provides enough assurance that the flexible resources are deliverable at the end of the ramping period during summer months. This issue however, may become a concern if ramping in the winter season is constrained by the available transmission capacity. The current deliverability methodology does not serve the purpose of ensuring flexible capacity is not limited by a transmission constraint when it is needed. Therefore, the CAISO believes that a new methodology might be needed to test the deliverability of flexible capacity, calculate the flexible capacity for each resource and quantify the diminishing impacts of new wind and solar resources on flexibility deliverability. In addition, policies may need to be developed to identify situations that new transmission upgrades shall be pursued to support flexible deliverability and to consider if this analysis should be performed as part of the generation interconnection process. The CAISO plans to investigate in depth the need for flexible deliverability requirement on its own track following the discussion of the deliverability assessment methodology with the stakeholders. This issue is not included in 2018 IPE.

6. Generator Interconnection Agreements

6.1 Suspension of Notice

Background/Issue

The CAISO believes that modifications to the LGIA are needed to allow for request and approval of a project to suspend. Article 5.16 of the LGIA requires interconnection customers to notify the CAISO and PTO if a project will be suspended. This article is not specific in that requests are not required to include a start and end date for the suspension. The provisions also do not provide an opportunity for the CAISO to approve the terms of the suspension to ensure that the project is not in breach of the generator interconnection agreement (GIA) when suspension is requested, and to ensure that the suspension will not impact other interconnection customers.

Stakeholder Input

CalWEA commented that any information about the start and end date for suspension period will likely be highly hypothetical. CalWEA stated the CAISO should consider the usefulness of such hypothetical information if it chooses to require it from the interconnection customer.

LSA/EDF-RE/SPower commented that they do not object to the CAISO's desire to clarify that suspension notices should include start and end dates, or that the CAISO's evaluation of such notices include potential harm to later-queued projects. LSA/EDF-RE/SPower also noted that the CAISO should 1) clarify the process for developers seeking to extend such suspensions, within the limits allowed in the tariff; 2) comply with the Generator Interconnection Provisions (Appendix B) that the CAISO and developers will negotiate new milestones once the project exits suspension, and not require MMA requests for new milestones as a condition of initiating the suspension; and 3) developers seeking to suspend their projects have the opportunity to mitigate harm to later-queued project, *e.g.*, by continuing to fund upgrades needed by later-queued projects or subjugating their deliverability rights to others in their cluster.

NRG raised concerns that the CAISO having approval authority over a LGIA suspension period is very significant and warrants considerable discussion. PG&E also supports having the discussion. The CAISO agrees and believes this stakeholder process will provide that venue.

ORA, SDG&E, and SCE support the requirement for inclusion of start and end dates along with the authority to approve the suspension. SCE notes that this requirement will provide the CAISO with the ability to approve the suspension period, with concurrence from the PTO, by ensuring that the project is in good standing and in determining how the milestones set forth in the GIA and later queued customers may be impacted during the suspension period. In addition, the inclusion of a start and end date will place the CAISO and the PTO in a better position to enforce the termination provision of the GIA if work does not recommence by the end date. In addition, SCE requested the CAISO modify the GIA suspension language to include provisions that would require the interconnection customer or off-taker, upon the recommencement of work, to negotiate in good-faith, new revised milestone dates based on the construction duration period already established in the executed GIA (taking into account the period of suspension). A request by the interconnection customer or off taker to self-build pursuant to Article 5.3 of the

GIA by claiming that the PTO can no longer meet the milestone dates designated in the executed GIA as a result of not taking the period of suspension into account is unreasonable and should be denied.

CAISO Response

CalWEA believes that any requirement for requests to include start and end dates would not be helpful because any dates provided would be highly hypothetical. While the CAISO understands the start and end date information may be hypothetical, providing even hypothetical information can help the CAIS determine the impact on other generators.

LSA/EDF-RE/SPower also wanted clarification on seeking extension of suspensions which don't exceed the three (3) years allowed in the GIA which we will include in the GM BPM Section 10. With respect to their request to negotiate milestones once the project exits suspension without using the MMA process, the CAISO disagrees. The CAISO and PTO need the MMA process to ensure that the dates proposed by the interconnection customer are achievable and that network upgrades are in place for the new timeline.

Based on comments received, the CAISO proposes that article 5.16 of the LGIA be modified to include language such as when the interconnection customer requests suspension, the written notice shall include a start and end date for the suspension. The CAISO shall notify the interconnection customer of its approval which shall not be unreasonably withheld. If there is an impact of the suspension on other queued customers, the interconnection customer has the right to mitigate the impacts provided all Parties agree which shall not be unreasonably. In addition, the article will be modified to include language requiring the interconnection customer to negotiate in good-faith to expeditiously revise the milestone dates.

6.2 Affected Participating Transmission Owner

Background/Issue

Generating facilities interconnecting to the CAISO controlled grid may affect the transmission system of a PTO that is not the PTO at the POI. In these instances, the PTO is referred to as an affected PTO. The current GIDAP does not address how the interconnection customer's financial security postings, cost responsibility, and affected PTO repayment will be disbursed among the interconnecting and affected PTOs.

Stakeholder Input

CalWEA fully supports CAISO's intention to examine this issue in the 2018 IPE. CalWEA suggested the CAISO consider a combined four (or more) party agreement, combining the generator interconnection agreement and the affected PTO upgrade facilities agreement (GIA/UFA). The single agreement would address all interconnection issues among the CAISO, interconnection customer, interconnecting PTO, and all affected PTOs.

LSA, EDF, and SPower commented in support of better clarification and documentation of situations where a PTO other than the interconnecting PTO is impacted by a generator interconnection. They support a structure similar to the "manager" structure for a combined GIA/UFA where the interconnecting PTO would act as the single point-of-contact "manager" and

would be responsible for communication and management of payment distributions to other impacted PTOs. In lieu of that structure, LSA, EDF, and SPower could support CalWEA's proposed four-party GIA, including both the interconnecting and other impacted PTOs.

NRG, PG&E, and ORA support the CAISO clarifying the policies regarding the financial considerations when interconnection customers must contract with two separate PTOs and including this issue in IPE 2018.

In response to a suggestion raised during the January 24 stakeholder meeting that a four-party agreement (between the interconnection customer, interconnecting PTO, affected PTO, and the CAISO) may be used to detail the obligations of all four parties, SCE strongly opposes, in its written comments, this proposal for the following reasons:

1. The affected PTO has no input with respect to the interconnecting PTO's requirements as identified by the reliability studies performed by the interconnecting PTO.
2. The affected PTO has no input with respect to upgrades that may have been identified internal to the interconnecting PTO's electric system.
3. The interconnecting PTO's have no ability to manage and resolve issues on behalf of the interconnection customer that may arise with an affected PTO.
4. Negotiating appropriate agreements among three parties is already a complex time-consuming effort which would grow significantly with each additional party that is added to the agreement.
5. The CASO already oversees agreement negotiations and mediates any stalled negotiations.

SCE supports the continued use of separate agreements in order to properly identify the requisite terms and conditions among only the parties involved. SCE also supports including a pro forma affected PTO's facilities agreement in the GIDAP to assist in the negotiations.

SDG&E is not opposed to clarifying policies for ICs and PTOs regarding financial considerations when ICs must contract with two separate PTOs for the construction of the interconnection facilities and network upgrades.

CAISO Response

Stakeholders generally support adding clarification to the tariff to remove the cost uncertainty when more than one PTO is impacted by an interconnection request. The CAISO proposes to modify the tariff to allow a separate maximum cost responsibility for each PTO. The maximum cost responsibility for each PTO will be documented in the interconnection studies and the GIA or affected PTO upgrade facilities agreement as appropriate. Interconnection customers will make interconnection financial security postings with interconnection financial security instruments to each PTO separately. In addition, interconnection customers will be entitled to receive repayment for their contribution to the cost of network upgrades from each PTO separately. Repayment of amounts advanced for reliability network upgrades will be paid by each PTO up to a combined maximum of $60,000 per MW of generating capacity as specified in

the GIA. Total repayment from both PTO's will be applied proportionately based on the costs of each PTO's RNUs.

Sample Proportional Repayment Calculation

Assumes a 100 MW generating capacity and a $10,000,000 total cost of reliability network upgrades across all PTOs.

	RNU Cost	Proportion of Total Costs Assigned to PTO	100 MW Maximum Repayment
Interconnecting PTO	$ 7,000,000	70%	$ 4,200,000
Affected PTO	$ 3,000,000	30%	$ 1,800,000
Total	$ 10,000,000	100%	$ 6,000,000

CalWEA, LSA, EDF and SPower proposed that the CAISO create a 4 (or more) party agreement among the interconnection customer, CAISO and the two PTOs. Due to joint participation lines, like the Southwest Power Link, the CAISO was involved in a 5-party GIA with the potential that the interconnection customer could decide later whose balancing authority area the point of interconnection was in. This require two studies and two sets of practically every term and condition of the GIA, including the appendices. Moreover, the responsibilities and obligations were confused depending upon the PTO chosen. In addition, the customer became very confused as to which transmission owner was responsible for each obligation and as a non-conforming agreement the customer was concerned that all amendment would need to be filed and approved by FERC prior to implementation. Fortunately, the agreement was never signed as the project decided to not move forward.

In this instance, with the affected PTO, the obligations of the interconnection customer are different with respect to the interconnecting PTO. Moreover, the terms and conditions other than construction, operation and payment do not apply to the affected PTO. Thus, after carefully considered this suggestion, CAISO found that it is too complicated to delineate which provisions of the tariff apply to which participating transmission owners in a single agreement and the obligations in the GIA are much different than the obligations in a utility facilities agreement. This CAISO's intent is that this issue will not be further discussed in IPE 2018.

6.3 Clarify New Resource Interconnection Requirements

Background/Issue

New generators seeking interconnection to the CAISO are required to go through the CAISO generator interconnection process. Generators that pre-existed the CAISO and operate under grandfathered PPAs (typically qualifying facilities (QF)) can convert to a participating generator status under Section 25 of the CAISO tariff upon termination of their PPA, and receive interconnection service under a 3-party GIA with the CAISO and PTO. Besides going through the conversion process, these generators are also required to go through the New Resource Implementation (NRI) process. The CAISO believes that it should clarify these procedures to

make them more transparent in the tariff. Any tariff amendment would be for clarification purpose only, and would not burden generators with any new obligations.

Stakeholder Input

LSA does not believe that a tariff change is needed but will not object to one. LSA also believes that it may be helpful to new developers, or those repowering or converting QF contracts, if better explanatory materials for the New Generator Interconnection Process were developed.

CalWEA, ORA and SDG&E agree with the CAISO's position on this issue.

CAISO Response

Stakeholders are either in support or did not object to this issue. The CAISO believes that providing tariff references to NRI processes will clarify procedures and obviate the need for development of additional explanatory materials. The CAISO will proceed with amending Section 25 of the CAISO Tariff to reference the NRI requirement. To the extent stakeholders believe there is a specific complexity or lack of information in the NRI process, the CAISO would welcome additional feedback provided through stakeholders written comments. In addition, the CAISO has held a Resource Interconnection Fair that explains all steps of the generator interconnection process and posts the slides on the CAISO website for reference. The slides from the 2017 fair can be found at: http://www.caiso.com/informed/Pages/MeetingsEvents/PublicForums/Default.aspx.

6.4 Performance and Diagnostic Minimum Requirements for Inverter based Generation

Background/Issue

Over the past five years, the CAISO controlled grid has expanded substantially in correlation with the state's environmental policies of 33% renewables by 2020 and 50% by 2030. With this expansion, more generating facilities are interconnected with inverters, and the technical characteristics of the inverters are more frequently affecting the system during transmission faults. During recent operations, the CAISO system experienced one transmission fault that ultimately led to 1,100 MW of generation that unnecessarily tripped offline and did not return to service for an extended period of time. These generators tripped for faults on the high voltage transmission system (500 kV and 220 kV) for frequency deviations at the "Instantaneous Trip" level in Attachment 1 of NERC reliability standard PRC-024-2.

PRC-024-2 provides specifications in the form of ride-through voltage and frequency curves that dictate when inverters can and cannot trip, which are the minimum performance requirements. The CAISO is trying to ensure that the inverter trips are based on the equipment manufacturer standards and not at the minimum levels, in order to not exacerbate grid issues that must be mitigated by the CAISO. For example, for several transmission faults that were recently experienced, protective relay systems consistently cleared all faults in four cycles or fewer, obviating the need for these generators to trip at all, and yet very large amounts of inverter based generation immediately dropped offline. Preliminary analysis indicates that many of the inverters tripped instantaneously with frequency or voltage targets as recorded in the inverter codes.

CAISO staff has already worked with generators, PTOs, NERC, WECC, and inverter manufactures to address this current issue. In the meantime, the CAISO is also addressing tripping rules and related inverter settings for inverter-based generation in this initiative.[8] The proposed requirements will be applied to all new generation connected to the CAISO controlled grid going forward.

Appendix H of the LGIA allows asynchronous generating facilities to cease to inject current into the transmission grid during a fault. In CAISO's discussions with manufactures, it is clear that inverters can be designed and programed to continue injecting current into the grid, thereby decreasing the potential of the generating facility tripping and impacting the transmission fault. Moreover, PRC-024-2 establishes the generating facility frequency and voltage regions (labeled as "No Trip" on the frequency and voltage ride through curves) where the generating units must remain connected during defined frequency and voltage excursions. The CAISO needs generating frequency and voltage region protections to apply to all generation connected to the CAISO controlled grid, even if the generating facility is not NERC jurisdictional, to avoid the significant loss of generation discussed above.

Stakeholder Input

CalWEA, NRG, SCE, SDG&E and LSA, EDF-RE and SPower commented that they generally agree with CAISO's position that this reliability issue requires attention—though mainly via enforcement of existing rules on all new generation interconnecting at all voltage levels (including DG resources). All parties urged the CAISO not to eliminate these exemptions for existing asynchronous generators. PG&E supports consideration of this issue.

ORA supports the CAISO's effort to address ride-through requirements and requirements to continue injecting current and return online for inverter-based generation. ORA also supports consideration of whether or not it is appropriate to revise the exemption of existing and operational asynchronous generating facilities from the LGIA Appendix H requirements (including low-voltage ride-through, frequency disturbance ride-through, power factor design, supervisory control and data acquisition (SCADA) and power system stabilizers). ORA stated the costs, benefits, and feasibility of updating inverter requirements for existing facilities should be analyzed before reaching a final recommendation whether to update existing Appendix H exemption.

SCE also supports the CAISO addressing voltage and frequency ride-through requirements, including the requirement to continue to inject current during system fault conditions that are cleared within a prescribed time period (i.e., cycles needed for system protection to clear faulted facilities). The need to continue to inject current will ensure MWs associated with these asynchronous resources support system voltage and frequency.

CAISO Response

All stakeholders supported the CAISO's efforts to address this issue. The following description provides additional details of the problems associated with momentary cessation, and the CAISO's proposal to eliminate its use. The CAISO agrees that the obligation would need to be

[8] Because this issue only presents in the form of inverter-based generation, the CAISO does not plan to address tripping or ramping of non-inverter-based generation in this initiative.

on a going forward basis, and only apply to existing resources if projects repower or revise their inverters.

Momentary cessation is an inverter operating condition. In momentary cessation, the inverter ceases to gate the Insulated Gate Bipolar Transistors (IGBTs) but the DC and AC inverter connections remain intact. The conversion of the inverter from AC to DC is through the gate switching. Many inverter manufacturers configure the inverters to enter into momentary cessation whenever there is a significant deviation in the AC voltage observed at the inverter terminals. While values vary, typical inverters will enter into the momentary cessation mode when the AC voltage at the inverter terminals drops below 0.9 PU (Per Unit) or increases above 1.10 PU. It is important to note that since the DC and AC connections remain electrically intact, the inverter can operate in this mode for only very short periods of time, typically only a few seconds.

The CAISO, along with SCE, actively participated in a NERC Task Force to study this problem. The task force identified momentary cessation as a major factor in the loss of inverter based generation. Further, the extensive use of momentary cessation may pose increased risks to the reliability of the grid.

Momentary Low Voltage

The CAISO proposes that momentary cessation will no longer be permitted for new inverter based generation during momentary drops in the system AC voltage. Further, the CAISO proposes that during transient low voltage conditions, the inverters should give priority to reactive current to provide some voltage support to the system.

The amount of reactive current is proportional to the decrease in the AC voltage applied to the inverter terminals. This is a linear relationship, and the slope of this line is often referred to as the “k” factor. Most inverters available today have the capability to provide reactive current support during transient low voltage. Further, these inverters often have adjustable “k” factors. The CAISO proposes to use a “k” factor of 2, which provides for full available reactive current injection when the inverter AC terminal voltage drops to 0.50 PU. Future studies may conclude that higher k factors may be desirable, but the CAISO believes that a factor of 2 is an appropriate requirement at this time.

Inverters must remain in the reactive current injection mode as long as the transient low voltage condition exists. However, if the inverter enters into the trip zone, the inverter will trip off line, generally by opening the inverter’s AC circuit breaker. This trip zone should be based on physical equipment limitations to protect the inverter itself, and not based solely on the PRC-024-2 voltage ride-through curves. The region outside the no trip zone in PRC-024-2 is a “may trip” zone. Many generator owners and operators are incorrectly interpreting this region as a “must trip” zone. The CAISO thus proposes that generator owners reset the trip settings considering the physical equipment limitation.

Momentary High Voltage

The CAISO notes that a large percentage of inverters are configured to trip using instantaneous overvoltage protection, based on the PRC-024-2 high voltage ride-through curve. If inverters use this method, the inverter must filter out the voltage signal for transients on the transmission

system. If not properly filtered, transient high voltages may cause the inverter to instantaneously trip incorrectly for transients caused by transmission switching or fault clearing. The CAISO observed several instances of inverters instantaneously tripping for transient high voltages introduced during the clearing of high voltage transmission line faults.

Momentary cessation is still acceptable during transient high voltage conditions above 1.20 PU, provided that the inverter is using properly filtered AC voltage when determining the level of high voltage. Tripping should be based on physical equipment limitations to protect the inverter itself, and not based solely on the PRC-024-2 voltage ride-through curves. The CAISO proposes that generator owners be required to reset the trip settings considering the physical equipment limitations.

Return Times Following Transient Voltage Deviations

After momentary voltage transients clear, the inverter must return back to its normal operating mode quickly. Failure to do so may decrease the reliability of the grid because inverters may not be injecting real power current into the grid, in essence creating a short term generation deficiency. In its review of several events, the CAISO observed that some inverter based generators were taking many seconds to minutes to return back to normal operation, *i.e.*, injecting real power current.

As voltage recovers, and the inverter transitions from reactive current priority to active power priority (following momentary transient low voltage), or the inverter transitions from momentary cessation (if used for voltages above 1.20 PU) to active power priority following momentary transient high voltage, the inverter must transition fully to normal operating mode in one second or less. To do this, the CAISO proposes at a minimum that the inverter must have a ramp rate—from no output to full output— during this transition of at least 100% per second. If the inverter has a wait time before beginning this transition, the inverter will require a faster ramp rate. The CAISO prefers a ramp of at least 200% per second. This ramp rate should not be confused with the steady state ramp rate that the inverter uses when it first starts up for normal operation.

Many facilities use a central plant controller. After voltage recovers and the AC voltage at the inverter terminals enters a normal operating range, the plant controller will resume normal operation and the individual inverters will respond to signals from the plant controller. The plant controller will then apply the normal ramp rate limits to the inverters. Following return from reactive current injection for transient low voltage or momentary cessation due to transient high voltage, the individual inverter ramp rate to return to normal active current injection should not be impeded by the plant controller. The generator operator must take care to ensure that the plant controller and the individual inverter controls are coordinated to ensure rapid return (*i.e.*, one second maximum) to active (real) power current injection.

Phase Lock Loop Synchronization Issues

Inverters generally use a phase lock loop (PLL) to synchronize the AC output of the inverter to the grid. At very low voltages, the PLL may not function correctly. Some inverters may trip for this condition. Momentary loss of synchronism will not cause direct damage to an inverter, and the inverter should not trip for this condition. Inverters should ride-through this momentary loss of synchronism and continue to inject current into the grid. The inverter controls may lock the

PLL to the last synchronized point and continue to inject current into the grid at that last calculated phase until the PLL can regain synchronism upon voltage recovery (e.g. the transmission system fault clears). The reactive current injection may be limited to protect the inverter. Once synchronism returns, the inverter should stably return to injecting current based on synchronized PLL phase conditions. The CAISO proposes that generators will be required to ensure their PLL is working properly so that the inverter doesn't trip at low voltage. In the event the inverter loses synchronism, the PLL should lock to the last synchronized point and the inverter should continue to inject current into the grid.

Post Inverter Trip Return Time

Most inverters use an internal circuit breaker to isolate the inverter from the AC grid voltage. On occasion, the inverter may need to isolate itself from the grid in order to protect the inverter. Some examples of when the inverter may need to isolate itself include extended transient high or low AC system voltage or system frequency. Typically the inverter will open the internal AC circuit breaker, cease to gate the Insulated Gate Bipolar Transistors (IGBTs), and for solar photovoltaic plants isolate the inverter from the source solar panels. This is defined as an inverter trip condition.

In its review of events involving dropped inverter based generation, the CAISO observed that inverters were returning back to service at various time intervals, ranging from seconds to minutes. Due to a lack of a national or regional standard governing the interconnection of inverters to the bulk electric system, virtually all manufacturers designed the inverters to comply with IEEE 1547. This standard identifies requirements for inverters connected to distribution systems, and was not intended to apply to inverters connected to the bulk electric system. The IEEE standard specified a minimum five-minute wait period before the inverter could attempt to resynchronize to the grid (providing, of course, that normal voltage and frequency conditions were present). Lacking any other guidance, the bulk of the installed inverters were programmed to wait for five minutes before attempting to resynchronize.

The CAISO proposes that inverters have an adjustable time delay to attempt resynchronization following an inverter trip between two and two and a half minutes. The CAISO believes this requirement for two to two and a half minutes to attempt resynchronization following an inverter trip is appropriate because it will minimize the need for system operators to take corrective action for extended generation loss.

Diagnostic Equipment

While conducting investigations into recent system events involving the loss of asynchronous plant generation, the CAISO observed that critical plant data such as fault codes or system alarms were not available because the data was stored for a very short time, or in some cases, never recorded in the first place. Some data, such as inverter fault codes or ride though event details, are critical in order to conduct an accurate and thorough analysis following a system event. These post mortem analyses are critical to understand events and diagnose issues in order to ensure the continued reliable operation of the grid.

Accordingly, the CAISO proposes that as a minimum, the following items are recorded for each asynchronous generating facility:

Plant Level Data

1. Plant three phase voltage, current and power factor;
2. Status of ancillary reactive devices;
3. Status of all plant circuit breakers;
4. Status of plant controller;
5. Plant control set points;
6. Status of main plant transformer no load taps;
7. Status of main plant transformer tap changer (if applicable); and
8. Protective relay trips (relay target data).

Inverter Level Data

1. High and low frequency ride through events;
2. High and low voltage ride through events;
3. Momentary cessation for transient high voltage events;
4. Reactive current injection for transient low voltage events;
5. Phase Lock Loop (PLL) status;
6. Inverter status;
7. AC and DC current; and
8. AC and DC voltage.

When conducting a post event analysis, it is critical to not only have the above referenced data, but also to know when any of the above referenced data points may have changed status. This level of detail is often referred to as a sequence of events. To achieve this, all of the above referenced data points must be time synchronized and time stamped. Further, the level of accuracy of the time stamp must be at least one millisecond.

Following an event involving generation tripping, the CAISO will make reasonable efforts to contact generators to request assistance and obtain data when conducting a post mortem analysis. To ensure that the data is available, the CAISO proposes that all the above referenced data must be stored for a minimum of 30 calendar days. Further, the CAISO proposes that this data must be made available to the CAISO and the interconnecting PTO within ten calendar days upon request.

The CAISO also proposes to require the interconnecting generator to record the above referenced plant and inverter level data. The data shall be time synchronized and time stamped to a one millisecond level of resolution. Further, the CAISO recommends that the interconnecting generator install a Phase angle Measuring Unit (PMU) at the entrance to the generating facility. The PMU must have a sample rate of at least 30 samples per second. The PMU is an economical device that can capture plant level voltage and current, and is available in some protective relays. The generator owner will be required to make the above referenced data

available to the CAISO and/or the interconnecting PTO within 10 calendar days upon request.

6.5 Affected System Options

Background/Issue

The current affected system process includes CAISO outreach to potentially affected systems, who can then choose to be an identified affected system. Interconnection customers are required to coordinate with all identified affected systems and provide documentation of resolution of any reliability issue on the affected system to the CAISO six months in advance of initial synchronization. Coordination between interconnection customers and identified affected systems may include a requirement for an affected system study to determine reliability impacts. While CAISO studies may show flows that could potentially represent impacts to neighboring systems, it is the responsibility of the identified affected system to determine the reliability impacts to their system. At the request of an interconnection customer or an identified affected system operator the CAISO reviews affected system study inputs and results, and looks for potential mitigation on the CAISO system for reliability impacts to identified affected systems.

Stakeholder Input

LSA proposed the inclusion of CAISO-system options to mitigate adverse affected system impacts identified in CAISO interconnection studies. This suggestion intends to eliminate or reduce the need to deal with separate affected system study timelines and financial-impact uncertainty.

Comments submitted by LSA, EDF-RE, and SPower clarified that their original proposal was to allow an additional option whereby an affected system operator could elect to utilize mitigation on the CAISO system to address a reliability impact found on the identified affected system. Section 6.1.4.3 of the GIDAP BPM already allows mitigation within the CAISO controlled grid that would be accompanied with coordination between the CAISO and the affected system operator. LSA, EDF-RE, and SPower also point out that interconnection studies do occasionally indicate potential impacts to affected systems and when they do, the CAISO and PTO should make an effort to identify mitigation on the CAISO system.

First Solar also indicated a need for more coordination between the CAISO and affected system operators, including a CAISO review of study assumptions and a mechanism by which the CAISO would allow interconnection when an affected system is being unreasonable.

ITC Holdings likewise recommends that the CAISO include an affected systems coordination examination in light of EDF Renewable Energy complaint filing at FERC against MISO, PJM, and SPP in Docket EL18-26.

MID, SDG&E, and PG&E supported leaving the current affected system process unchanged.

CAISO Response

When CAISO interconnection studies show flows exiting the CAISO systems that could ultimately cause impacts to affected systems, the CAISO notes this as a potential impact to an affected system in the study results. However, the flows that are seen in the CAISO studies do

not include the identification of reliability impacts to the neighboring systems. It would be premature for the CAISO to identify mitigation for flows that may or may not cause reliability issues on a neighboring system. If the affected system identifies a reliability issue, the CAISO and affected system will determine if a mitigation exists that does not negatively impact other interconnection customers.

Regarding "unreasonable" affected systems, Section 6.1.4.3 of the GIDAP BPM allows the interconnection customer or the identified affected system operator to request that CAISO review the reasonableness of the studies conducted and study results issued by the identified affected system operator. Whenever these parties have requested such review in the past, the CAISO has been involved with the review of the studies assumptions and results, as well as the legitimacy of identified reliability issues, and evaluation of potential mitigation on the CAISO controlled grid required to resolve legitimate reliability issues on the affected system. In terms of allowing interconnection when an affected system is being unreasonable, Section 6.1.4.3 of the GIDAP BPM allows an interconnection customer to proceed without affirmative agreement by an affected system operator if the affected system operator does not move forward on a timely basis, the affected system cannot demonstrate a reliability issue, and the impacts can be mitigated on the CAISO system.

Finally, the CAISO disagrees with ITC Holdings that EDF's complaint against MISO, PJM, and SPP warrant examination of the CAISO's own process. First, to the extent FERC will act, it is prudent to see what that action will be, and Order No. 845 expressly deferred action on affected system coordination. Second, the fact that MISO, PJM, and SPP have significant affected system coordination issues only demonstrates that the CAISO's practice may be the best practice possible for addressing a largely intractable problem. Third, and perhaps most importantly, MISO, PJM, and SPP not only primarily have jurisdictional affected systems, but RTOs. The CAISO, on the other hand, is almost completely surrounded by non-FERC-jurisdictional entities.9 MISO, SPP, and PJM thus make poor analogs for the CAISO.

Given the above, the CAISO does not plan to examine this issue further in this initiative.

6.6 Data Modeling Requirements

Background/Issue

NERC and WECC have implemented MOD-032, which requires generating units connected to the bulk electric system (100 kV and above) and greater than 10 MVA (single unit) or 75 MVA (generating facility) to comply with NERC data standards, and provide updated data at least every 10 years. However, the NERC dynamic data validation standards only apply to generating units 75 MW and above. The CAISO estimates that approximately 30% of the generation in the market is not required to meet the NERC/WECC standard. Nevertheless, the CAISO needs the data to ensure both modeling for planning purposes and reliability of the grid. The lack of validated data compromises the accuracy of power system models utilized to predict the ability of the CAISO system to withstand credible contingencies on the CAISO system. It also

[9] Of 18 affected systems surrounding the CAISO, 16 of them are non-jurisdictional.

compromises the CAISO's ability to maintain accurate models as required by NERC and WECC.

Stakeholder Input

LSA, EDF-RE, and SPower commented that the CAISO receives considerable modeling data with a generation-project Interconnection Request, in the New Resource Implementation Process, and with MMA requests. These stakeholders stated the requirements have become more burdensome in recent years, and data is updated every 10 years for 70% of CAISO generating capacity. These stakeholders state that they do not understand why the current modeling data submission and updates are not sufficient for CAISO modeling purposes. They also object to the imposition of requirements beyond those imposed by NERC/WECC in the absence of compelling reasons, which the CAISO's generally stated concerns do not justify.

ORA, SCE, and SDG&E support the clarification of data requirements. SCE noted that the proposal is to complete technical modeling data from roughly 30% of the generation in the market, which are currently not required to meet the NERC/WECC modeling data standard. This is needed for planning purposes and reliability of the grid, and increased technical data will ensure studies properly reflect current expected system performance. Without such technical data, actual performance cannot be properly simulated, adversely impacting PTOs and the CAISO's ability to properly study overall system reliability.

SDG&E agrees with the CAISO that the lack of validated data compromises the accuracy of power system models utilized to predict the ability of the CAISO system to withstand credible contingencies on the CAISO system. It also compromises the CAISO's ability to maintain accurate models as required for NERC and WECC compliance.

CAISO Response

With response to LSA, EDF, and SPower comments, they are incorrect. While it is true that the substantial majority of units do not meet the NERC and WECC criteria and therefore do not have to provide modeling data information to the CAISO in accordance with those reliability standards, Section 24.8.2 of the CAISO tariff states that "In addition to any information that must be provided to the CAISO under the NERC Reliability Standards, Participating Generators shall provide the CAISO on an annual or periodic basis in accordance with the schedule, procedures and in the form required by the Business Practice Manual any information and data reasonably required by the CAISO to perform the Transmission Planning Process, including, but not limited to: (1) modeling data for short-circuit and stability analysis and (2) data, such as term, and status of any environmental or land use permits or agreements the expiration of which may affect that the operation of the Generating Unit." Therefore the CAISO will be imposing data submission updates similar to NERC and WECC standards on all generators participating in the CAISO markets.

Since the issue paper was published that raised this potential issue, the CAISO has determined that Section 24.8 of the CAISO tariff provides authority for the CAISO to obtain the needed data from generators in the market and will use that authority to obtain the data. The CAISO will further clarify the data requirements in the BPM for transmission planning and will contact the generators directly for the data that is needed from them. This issue will not be addressed further in this initiative.

7. Interconnection Financial Security and Cost Responsibility

7.1 Maximum Cost Responsibility for Network Upgrades and Potential Network Upgrades

Background/Issue

Maximum cost responsibility is established from the Phase I and Phase II study reports. The combined costs for all network upgrades in the Phase I and Phase II study reports are compared and the lower of the cost for all network upgrades between the two reports sets the maximum cost responsibility for network upgrades for the project. However, an interconnection customer's current cost responsibility is used to calculate the required Interconnection Financial Security (IFS). This latter figure can change as the result of customers withdrawing from the queue. The CAISO is aware that the reassessment related cost responsibility changes and the increased appearance of potential network upgrade costs in project's study reports has created confusion around how the maximum cost responsibility plays out in practice. The CAISO also has observed that there is confusion regarding when a provided figure relates to the maximum cost responsibility or the current cost responsibility. The CAISO is hoping that the addition of the proposed cost responsibility definitions will provide more clarity on how potential network upgrades from prior clusters where GIAs have not been executed yet affect cost responsibility.

Stakeholder Input

CalWEA, ITC Holdings, ORA, and PG&E all agree that clarifying the terms for cost responsibility is needed, and agree with the cost terms proposed.

LSA, EDF, and SPower strongly oppose the CAISO's proposal to redefine the "cost caps" in the tariff to include the potential network upgrades.10 They suggest raising the cost cap to include potential network upgrade costs, should those allocations fall to a later queued cluster. They also stated that the interconnection studies should only include upgrades triggered by the cluster under the study. They suggested an alternative, to initially not have the cost of a potential network upgrade included in the maximum cost responsibility. If at a later point in the process all interconnection customers who were responsible for funding the network upgrade withdraw without signing a GIA, then raise the maximum cost responsibility at that time to include potential network upgrade cost.

SCE stated that the maximum cost responsibility should include the potential network upgrades and the maximum cost responsibility should not be adjusted if these upgrades disappear. They recommend that any changes should result in adjustments to the current cost responsibility not the maximum cost responsibility.

SDG&E agrees that clarification to the cost responsibility principles are needed. They believe

[10] As explained below, the CAISO notes here that this would not constitute a change, but is, in fact, the *status quo*.

that the trigger to construct a Network Upgrade should be that an adequate amount of projects responsible for Network Upgrades must have signed a GIA, provided a third posting, and a written authorization to proceed. This view has been incorporated into a revision they made to the potential network upgrades definition. SDG&E also recommended additional language to the definition of the Potential Network Upgrades, adding the requirement that a project must provide a third Interconnection Financial Security Posting and written authorization to proceed for the Potential Network Upgrade.

CAISO Response

The CAISO will continue to include potential network upgrades in the maximum cost responsibility. This protects the PTO from being financially responsible for network upgrades when projects assigned those network upgrades withdraw prior to executing a GIA.

Additionally, the CAISO notes that defining "Contingent Upgrades" is a compliance requirement in Order No. 845. Many of the issues here may be partially predetermined or moot as a result of that order, which the CAISO must comply with before it can stakeholder this issue in IPE. The CAISO may adjust its proposal as it develops its compliance plan for Order No. 845.

The CAISO disagrees with LSA, EDF and SPower's portrayal of the CAISO's proposed definition as redefining the maximum cost responsibility to include potential network upgrades. The proposed definition is based wholly on current practices. They suggest an alternative, which is to initially not have the cost of a potential network upgrade included in the maximum cost responsibility. If at a later point in the process all interconnection customers who were responsible for funding the network upgrade withdraw without signing a GIA, raise the maximum cost responsibility at that time to include potential network upgrade cost. The CAISO has concerns with this approach being problematic if the maximum cost responsibility is raised for an interconnection customer relatively late in the interconnection customer's lifecycle in the interconnection process. The CAISO will continue to propose the definition of the maximum cost responsibility essentially as originally proposed, but is interested in stakeholder providing comments on the LSA, EDF and SPower suggest an alternative in comments on this Straw Proposal.

The CAISO does not agree with SCE that the maximum cost responsibility should not be adjusted when a potential network upgrade is no longer needed. Section 7.4.3(i) of Appendix DD allows for the adjustment of the maximum cost responsibility as part of the reassessment process. The CAISO believes that an interconnection customer should not be penalized for projects in a prior cluster delaying the signing of their GIA. Once a project in a prior cluster signs its GIA then any projects with a potential network upgrade from that project should have their maximum cost responsibility reduced by the amount of the potential network upgrade. The CAISO believes it is important to provide as much visibility into the type of network upgrades the interconnection customer will be responsible for. By allowing "headroom" related to a potential network upgrade in the maximum cost responsibility, the interconnection customer is at higher risk for paying for more costs in the reassessment cost reallocation process than interconnection customers without a potential network upgrade

The proposed definition to the Maximum Cost Responsibility for Network Upgrades remains the

same as presented previously, namely:

> The total costs allocated for all Network Upgrades assigned to an interconnection customer, based on the lesser of the costs for such Network Upgrades assigned to the interconnection customer in the final Phase I Interconnection Study, or the final Phase II Interconnection Study and will include the cost of Potential Network Upgrades. The Maximum Cost Responsibility for Network Upgrades shall be subject to further adjustment based on the results of the annual reassessment and the criteria for changes to the Maximum Cost Responsibility in the reassessment process provisions in Appendix DD.

The proposed definition to the Current Cost Responsibility also remains the same as presented previously:

> The cost for Network Upgrades used to calculate the Interconnection Financial Security requirement when the Interconnection Financial Security requirement is due, which does not include the cost of Potential Network Upgrades.

The CAISO proposes the below change (in red) from the original proposed definition to the Potential Network Upgrade definition in the Issue paper:

> 9. Network Upgrades that are required by a project for its selected level of service whose cost responsibility is assigned to one or more prior cluster projects where at the time that a study report is completed none of those prior cluster projects have executed a Generator Interconnection Agreement, including Stand Alone Network Upgrades (SANU). If a prior cluster project executes a Generator Interconnection Agreement that contains a Network Upgrade that is identified as a Potential Network Upgrades in a later cluster project's study report, then that later cluster project will no longer have cost responsibility for that Network Upgrade. A Network Upgrade stops being a Potential Network Upgrade and the cost responsibility becomes the responsibility of a project when all prior cluster projects assigned a cost responsibility allocation for the Network Upgrade withdraw without having executed a Generator Interconnection Agreement. This will also cause the costs for this Network Upgrade to be included in the project's Current Cost Responsibility for Network Upgrades, up to the project's Maximum Cost Responsibility at that time.

With regard to SDG&E's recommendation on potential network upgrades, the CAISO believes this change is out of scope for this topic because there currently is no language in the tariff that requires a project to execute a GIA and submit a written authorization to proceed for a potential network upgrade. Adding additional requirements to the definitions rather than clarifications will necessitate changes to sections of the tariff that the CAISO will not be addressing in this topic.

7.2 ITCC for Non-cash Reimbursement Network Upgrade Costs

Background/Issue

ITCC is the income tax component of contribution that is equal to the estimated tax liability for the interconnection facilities paid to the PTO. The ITCC is included in the project cost responsibility. CalWEA has requested the treatment of ITCC for non-cash reimbursable network upgrade costs (e.g., RNU cost above $60K/MW) be reviewed in the 2018 IPE initiative. CalWEA suggested that the CAISO consider if the non-cash reimbursable network upgrade costs be reimbursed though another instrument such as CRRs. CalWEA also suggested the CAISO consider if non-cash reimbursable network upgrades should be subject to ITCC.

Stakeholder Input

CalWEA argues that ITCC is a form of "gift tax" that a PTO may become responsible for whenever an interconnection customer pays for some transmission facilities that may become owned by the PTO without the interconnection customer receiving compensation from the PTO. Hence, some PTOs collect a deposit equivalent to the size of that potential "gift tax" to cover that potential situation. CalWEA specifically stated that:

- Per established FERC policy, PTOs do not collect ITCC for "cash-reimbursable" RNUs related to the high voltage transmission system (e.g., 230 kV and above). Cash reimbursements to the interconnection customer for such RNUs are funded by the TAC, for which all load-serving entities (not the specific Participating TO) are financially responsible. Non-cash reimbursements in the form of CRRs are also funded by all LSEs. Thus, even though the direct source of the non-cash reimbursement is CAISO through a CRR, as opposed to the PTO via cash, ultimate financial responsibility for the two are the same, warranting identical treatment regarding ITCC.
- In almost all other RTOs, except for ERCOT, the reimbursement of network upgrades funded by an interconnection customers is in non-cash form, typically in the form of CRRs or equivalent, provided by the RTO and not the PTO. Based on CalWEA's research, network upgrades in these jurisdictions are not subject to ITCC even though the reimbursement is not in cash form from the RTO. CalWEA encourages the CAISO to conduct its own research.

LSA, EDF, and SPower agreed with CalWEA that, if a developer receives compensation through Congestion Revenue Rights (CRRs) for these investments, they should not be subject to ITCC.

SCE stated that the issue of non-reimbursable network upgrade costs subject to posting security for ITCC should not be addressed in a CAISO stakeholder proceeding and recommends that participants seeking clarification on this issue reach out to the Internal Revenue Service (IRS). SDG&E also notes that the "non-cash reimbursable" network upgrades could be subject to ITCCA, depending on whether the interconnection customer's funding advances meet the Safe Harbor guidelines for being deemed taxable or non-taxable, as provided by the IRS notices on ITCCA.

CAISO Response

The CAISO agrees that the CAISO is not the appropriate arbiter here, and that resolution of this

issue through the CAISO tariff would likely be futile. As such, the CAISO will not include this issue in 2018 IPE. If interconnection customers want to seek a letter ruling from the IRS on this issue and provide the results of that opinion with the CAISO, the CAISO would then consider how the tariff may need to incorporate such an opinion in a future initiative.

7.3 Financial Security Postings and Non-Refundable Amounts

Background/Issue

Pursuant to Section 11.4 of Appendix DD to the CAISO tariff, an interconnection customer can withdraw its interconnection request and recoup a partial amount of the interconnection financial security posted if it meets certain criteria. The CAISO currently requires a project to meet conditions for partial recovery of the interconnection financial security of network upgrades. Once proof is submitted by an interconnection customer and approved by the CAISO, the CAISO can refund the network upgrades financial security posting to the project. There are different calculations depending on the timing of the project withdrawal, but often the interconnection financial security amount refunded is fifty percent of the amount posted. Non-refundable funds are disbursed first to PTOs to help pay for network upgrades that the withdrawing projects have a cost responsibility for and are still needed by other projects, up to the withdrawing projects obligation; and if funds are still available to the PTO's to decrease the cost of the transmission revenue requirement in that Transmission Access Charge which is paid by ratepayers (loads and exports).

Interconnection customers have expressed concern that the non-refundable amounts are punitive towards projects that withdrew due to market conditions outside their control. These interconnection customers have requested that the CAISO reevaluate the non-refundable amounts process.

Stakeholder Input

CalWEA recommended that the non-refundable portion of the interconnection financial security deposit should be first assigned towards network upgrades triggered by the same queue cluster of the withdrawing project rather than the general TAC.

First Solar, GSCE, LSA, EDF, and SPower stated that the current process with high forfeiture amounts gives non-viable projects incentive to stay in the queue or forfeit substantial security postings for conditions outside of their control.

First Solar also commented that the forfeiture amounts is especially burdensome when there is a lack of available information on deliverability.

GSCE stated that the current procurement environment has limited the ability of interconnection customers to sign PPAs in the short amount of time allowed for projects to be eligible to receive deliverability. GSCE also stated that requiring high forfeiture amounts is especially punitive towards interconnection customers that face these conditions.

ORA stated that the current non-refundable financial security amounts for interconnection

requests are appropriate. ORA requested CAISO provide an explanation on how the non-refundable amounts are applied between TAC and network upgrades that are still needed. This will assist with understanding PG&E's request for a portion of the funds to be assigned to upgrades no longer deemed needed due to reassessment, but where the PTO has already incurred costs or irrevocably committed funds to the project.

SCE supported PG&E's proposal to have a portion of non-refundable financial security postings assigned to upgrades that are no longer deemed needed due to reassessment, but where the PTO has already incurred costs or irrevocably committed funds to the project. SCE stated that there needs to be a change in the CAISO tariff such that the transmission-building entity is eligible for recovery of 100% of prudently incurred costs of a transmission facility or network upgrade approved by the CAISO which is subsequently cancelled by the CAISO through no fault of the PTO.

SDGE supports the CAISO's position that the current non-refundable amounts are appropriate. SDG&E agrees that financial security postings and non-refundable amounts should not be included for consideration in the 2018 IPE.

CAISO Response

The CAISO continues to believe that the current non-refundable amounts process is fair and benefits interconnection customers with serious intentions for the completion of their projects. The CAISO believes that the elimination or reduction of the non-refundable amounts would only undermine the interconnection process by increasing speculative requests and decreasing the validity of the study results for projects.

CalWEA recommended that the non-refundable amounts be assigned to network upgrades triggered by the same cluster and not just to the general TAC. The current process is that non-refundable amounts are first allocated to still needed upgrades and if the threshold requirements are met then the remaining funds are applied to TAC.

SCE stated that a transmission building entity should be able to recover 100% of the costs of a transmission facility or network upgrades that is approved and subsequently cancelled by the CAISO. The CAISO does not have the authority to approve or cancel generation-driven upgrades. The CAISO can only cancel transmission planning process projects when they are determined to no longer be needed which we would not do if a generator required the transmission project. In addition, interconnection financial security posted by interconnection customers cannot be used to cover costs for transmission planning process upgrades.

The CAISO has considered First Solar's comment that some projects may withdraw more quickly if they are not faced with significant forfeitures upon withdrawal; however, the CAISO believes that beginning a study process with projects prepared to fund financial security postings amounts will create a more viable group of projects from the outset, and that this concern is paramount.

The CAISO proposes to eliminate the conditions for partial recovery of interconnection financial security upon withdrawal of interconnection request or termination of GIA as detailed in section 11.4.1 of Appendix DD. The CAISO believes that by removing this requirement, it will eliminate the administrative effort of searching for documents that prove a project meets the requirement (which virtually all eligible interconnection customers can eventually produce), and this also will

avoid further delays in the refund process of the interconnection financial security. The CAISO also believes that by posting interconnection financial security an interconnection customer has already made a considerable effort in developing the project. The CAISO's intent is to make the withdrawal process easier for these interconnection customers. The refundable portion amount will remain the same; however, all projects, will qualify for partial recovery of the Interconnection Financial Security.

The CAISO will not pursue an alternative for the application of non-refundable amounts. The CAISO believes the current disbursement process for non-refundable amounts that has been in place for three years has been working adequately and has benefited ratepayers. In the current disbursement process, the CAISO first disburses the non-refundable amounts to still needed network upgrades, and any other funds are applied to offset the regional and local transmission revenue requirements. The CAISO believes this process works adequately and will not be pursuing an alternative for the application of non-refundable amounts in 2018 IPE.

7.4 Queue Clearing Measures

Background/Issue

In IPE 2015, CAISO established numerous measures to clear the queue and have decreased the pre-Cluster 6 projects that existed in 2013 of 324 to 45 project today and a few of those project, while currently listed in the queue, have partially achieved commercial operation. LSA has suggested that the CAISO consider exploring additional measures to reduce the number of projects with "questionable viability" in the interconnection queue. LSA suggested potential queue clearing measures, including continuous demonstration of CVC and a one-time security-forfeit holiday.

Stakeholder Input

LSA, EDF, SPower, and First Solar believe that the CAISO should explore additional measures to clear the queue of non-viable projects. They support a one-time exemption or "holiday" from forfeitures. These stakeholders stated that this would be especially beneficial to projects without executed GIAs that may be less inclined to withdraw at this earlier point due to the high forfeiture amounts, though it otherwise would be the best decision. LSA, EDF, SPower, and First Solar also suggested that the CAISO could offer to forgive the forfeit and/or facilitate voluntary payment by those later-queued project to induce the generation project to drop out of the queue. In addition, they qualified their proposal that if the CAISO adopts the proposals to eliminate or validate balance sheet financing affidavit submittals, and enforce continuous commercial viability criteria compliance obligations, then those measures will provide strong tools to force non-viable generators from the queue or, at a minimum, require them to relinquish their scarce deliverability. As such, the proposed queue clearing measures would not be needed.

ITC requested that the CAISO remain open to considering additional requirements in the scope related to demonstrations that projects are commercially viable and moving forward.

ORA, PG&E, and SDG&E do not support a one-time interconnection financial security forfeiture holiday because they stated it is not an effective tool for managing the queue and the financial

security funds are used to refund ratepayers and PTOs for the costs of considering and completing upgrades that are triggered by projects that later withdraw. These stakeholders stated the already-executed enhancements should be allowed to work on the interconnection queue before additional reforms are considered or implemented.

CAISO Response

The CAISO agrees with the ORA, PG&E, and SDG&E that the existing mechanisms in place should be allowed to work on the interconnection queue before additional reforms are considered or implemented. While the commercial viability criteria is only used when a project wants to extend beyond the 7/10 years allowed in the tariff, the CAISO requires projects to provide quarterly detailed reports of the project status so that if a project is not progressing, the CAISO can work with them early as possible to get the project back on track or withdrawn. Moreover, the CAISO believes that its deliverability proposal in Section 4.1, above, should help curb speculative projects remaining in queue. As such, the CAISO does not believe an additional compliance demonstration is warranted.

The CAISO also does not agree that it would be reasonable to offer a one-time security-non-refundable amounts exemption or holiday. The CAISO believes that the cost of such an event would outweigh the benefits, especially to ratepayers. The CAISO believes that the measures that are currently in place for queue management, including the review for commercial viability, are sufficient to ensure that projects are moving forward. The CAISO is therefore removing this topic from 2018 IPE**.**

7.5 Shared SANU and SANU Posting Criteria Issues

Background/Issue

The CAISO tariff defines a SANU as Network Upgrades or tasks (e.g., telecommunications, environmental, or property work) that an interconnection customer may construct without affecting day-to-day operations of the CAISO Controlled Grid or Affected Systems during their construction. The Participating TO, the CAISO, and the interconnection customer must agree as to what constitutes Stand Alone Network Upgrades and identify them in Appendix A to the Large Generator Interconnection Agreement.

The CAISO tariff allows a SANU to be built by an interconnection customer when the CAISO and the PTO agree that it qualifies as a SANU and agree to allow the interconnection customer to build the SANU. The CAISO GIDAP BPM currently requires that 100% of the cost responsibility for the network upgrade must be assigned to the interconnection customer as indicated in the study reports to qualify as a SANU. The CAISO has received requests to remove the 100% cost responsibility requirement because it is stated in the BPM, but not is the tariff. By removing the 100% of the cost responsibility requirement stakeholders seek to allow two or more projects to share construction and cost responsibility for a SANU.

Stakeholder Input

CALWEA recommended that the CAISO explore measures to prevent gaming strategies and allow projects that share a SANU to post financial security depending on their share of the SANU

cost.

LSA, EDF, and SPower stated that the tariff has no prohibitions for sharing financial costs for shared SANU. LSA, EDF, and SPower also stated that postings and cost responsibility for SANUs should be shared among the projects in the same cluster, similar to all other upgrades.

ORA and SDG&E recommended revising the BPM to allow for shared cost allocation of SANU.

PG&E supported the CAISO's position not to include the topic in 2018 IPE.

SCE stated that the current policy where each project assigned a SANU posts for 100% of the associated costs should remain intact.

SDG&E supported the CAISO position that it is not appropriate to create specific criteria on what SANU an interconnection customer will be allowed to build.

CAISO Response

The CAISO agrees that clarification is needed in the GIDAP BPM to address the issue that a SANU can be shared by more than one generator, and also agrees that consistency is needed within the tariff, which does not prohibit generators from sharing a SANU (assuming it is otherwise "stand-alone"). The CAISO believes that splitting the cost responsibility for a SANU would unnecessarily put the PTO at risk if a project sharing the SANU withdraws. Nevertheless, this risk is the PTOs, and the CAISO therefore proposes to allow PTOs to make this determination on a case by case basis, or to establish their own criteria for SANU cost allocation. The CAISO will remove the requirement in the BPM that each project seeking to self-build a SANU be assigned 100% of the cost.

7.6 Clarification on Posting Requirements for PTOs

Background/Issue

Interconnection customers currently post interconnection financial security (IFS) to PTOs for the construction of their network upgrades and interconnection facilities. There currently is no distinction in the tariff for projects where the interconnection customer itself is also the PTO. PG&E proposed that PTOs should not have to post financial security to themselves when they develop new generation projects interconnecting to their own areas. PG&E has noted that the PTOs have already successfully petitioned FERC for case-by-case waivers on this issue, which FERC has granted.[11]

Stakeholder Input

Other than CalWEA, who recommends that PTOs be required to continue to seek waivers at FERC on a case-by-case basis, all stakeholders agree that PTOs should not be required to post IFS to themselves.

CAISO Response

The CAISO proposes to exempt the PTOs from posting to themselves in these situations;

[11] *See, e.g.,* FERC Docket No. ER18-859-000.

however, the CAISO will develop a tariff mechanism that would require a PTO that withdraws an interconnection project after the initial and subsequent posting due dates to provide appropriate non-refundable funds to the CAISO in accordance with the tariff requirement. This will obviate the issue of a PTO being required to post IFS to itself while also ensuring fair and equal treatment for interconnection customers, and proper protection to ratepayers.

7.7 Reliability Network Upgrade Reimbursement Cap

Background/Issue

Section 14.3.2.1 of the GIDAP provides that PTOs will reimburse an interconnection customer's cost responsibility for Reliability Network Upgrades (RNUs) only up to $60,000 per MW of the interconnection customer's generating capacity, as specified in its GIA.[12] This policy was designed to ensure that ratepayers only incur costs for RNUs commensurate with the benefits they receive from the new generator. The repayment limit of $60,000 per MW for RNUs assigned to a project was determined to result in full cash repayment for RNUs for the vast majority of projects, and provides an incentive for interconnection customers to avoid siting projects in locations where the costs of RNUs needed to support the interconnections would be inappropriately high.

The CAISO has found that the $60k/MW maximum reimbursement amount for an RNU for funds advanced for network upgrades has the potential to be circumvented in instances where earlier-queued projects withdraw from the queue but the upgrades are still needed. For example, assume a 100 MW project in cluster 8 with an executed GIA has a required RNU whose cost exceeds the $60k/MW limit. Also assume a cluster 10 project, also 100 MW, has the same RNU as a requirement for interconnection as a precursor project. If the cluster 8 project that triggered the RNU withdraws, the PTO must fund the construction costs for the cluster 10 project.[13] In this example the PTO is responsible for funding the entire cost of the RNU, including the portion over $60k/MW, and will ultimately put the entire cost of the RNU into its Transmission Revenue Requirement and ratepayers will ultimately have to pay for the entire cost of the RNU.

Stakeholder Input

CalWEA suggested that the cost cap should be eliminated. LSA likewise suggested that in the rare case the issue does occur as explained in the example, then the non-refundable funds mechanism should cover the amount over $60k/MW.

ORA, SCE, and SDG&E have each individually suggested that if a project withdraws after executing a GIA whose RNU costs exceed the $60k/MW cap, the cost responsibility for the amount in excess of the $60k/MW cap should fall to the later cluster projects needing the RNUs, in the fashion of a potential NU, but not be reimbursable.

CAISO Response

[12] Reimbursement beyond the cost cap would come in the form of Merchant Transmission Congestion Revenue Rights.

[13] *See* Section 14.2 of Appendix DD to the CAISO tariff.

In response to CalWEA's suggestion to eliminate the cost cap, the CAISO continues to believe that reimbursement cap is appropriate and has not been presented with evidence to the contrary. The CAISO does not agree that sufficient funds are always available from the non-refundable funds process to cover the amount over $60k/MW, nor does the CAISO believe they should be.

The CAISO considers the solution by ORA, SCE, and SDG&E to be simple to implement and would be appropriate. This solution would ensure that ratepayers do not get the burden of the amount over $60k/MW cap, and interconnection customers in later clusters that locate their project in an area that triggers high cost RNUs are exposed to the potential cost implications of that choice. The CAISO proposes that if a project withdraws after executing a GIA whose RNU costs exceed the $60k/MW cap, the cost responsibility for the amount exceeding the $60k/MW cap will fall to the later cluster projects needing the RNUs, in the fashion of a potential NU, but not be reimbursable. These costs will thus be included as contingent upgrades in the interconnection customers' study reports.

7.8 Reimbursement for Network Upgrades

Background/Issue

Interconnection customers finance the construction of network upgrades. Upon commercial operation, PTOs then reimburse the interconnection customers for those costs, and the PTOs then include the costs in their Transmission Revenue Requirement(s) to be recovered through the CAISO Transmission Access Charge(s). In many of the areas of the country, interconnection customers are not reimbursed through cost-based rates like they are in the CAISO. Interconnection customers may include their costs in their capacity contract, and also are reimbursed in the form of transmission or congestion revenue rights. Generators also could recover some costs by increasing their energy bids in the markets.

Six Cities suggested that the CAISO consider whether the current allocation methodology for the cost of network upgrades needed to interconnect new (or functionally modified) resources should be revised to allocate such costs to interconnection customers. This would essentially change the recovery mechanism for network upgrades from the TAC to some combination of capacity contracts and bids to supply power.

Stakeholder Input

CalWEA, LSA and SDG&E agree with the CAISO's proposal to not include this topic in the straw proposal as it represent a fundamental paradigm shift in the CAISO's generator interconnection process and a huge shift in policy.

ORA recommends that the CAISO include this proposal in the 2018 IPE initiative because it would address the unresolved interconnection upgrade cost responsibility issues that arise when interconnection projects that trigger interconnection upgrades later withdraw. These issues are also discussed in further detail in sections 4.4, 4.5, and 7.7 of this document.

CAISO Response

The CAISO understands ORA's recommendation, but believes that the issues it raises can be addressed and resolved in a more straightforward manner, rather than with such a large policy change that would affect virtually all of the CAISO's other processes. Changing the process for reimbursing interconnection customers for network upgrades would make a number of current interconnection procedures infeasible, including meaningful cost caps for interconnection customers, non-cascading costs across clusters, and the annual reassessment.14 It would also lead to the creation of numerous new merchant transmission congestion revenue rights. While these are not insurmountable obstacles, they would represent a fundamental paradigm shift in the CAISO's generator interconnection process. At this time, CAISO is not willing to consider such a shift without vociferous stakeholder support. This topic will not be included in 2018 IPE.

7.9 Impact of Modifications on Initial Financial Security Posting

Background/Issue

This proposal is an item that CAISO has identified and has been added as a result of discussions from the Cluster 10 Phase I results meetings. It was not included in the 2018 IPE issue paper and was not submitted by external stakeholders.

Between the end of the Phase I study and the due date for the Initial Interconnection Financial Security (IFS) postings, the CAISO has found that due to changes in the CAISO queue, such as project withdrawals or other system changes, there may be network upgrades or PTO interconnection facilities that may no longer be needed. If a facility is known to be no longer needed after the completion of the Phase I studies, then that will be reflected in the Phase II studies and no changes are made to the Phase I study report. The CAISO believes that if engineering judgement can definitively determine that a required upgrade in an interconnection customer's Phase I study report is no longer needed due to the withdrawal or changes to earlier queued projects or other system changes, and that determination is made in advance of the initial IFS posting due date, the interconnection customer should not be required to post IFS for that upgrade. Currently, a project may only qualify for this initial interconnection facilities adjustment if they have modified the project, such as a reduction in electrical output of the facility or changed deliverability status.[15]

This proposal will not change the requirement that any adjustments in the initial interconnection financial postings due to Sections 6.7.3 and 11.2.7 will not result in a maximum cost responsibility adjustment and will not include any restudies.

[14] Where interconnection customers would inherit costs instead of the PTOs, interconnection customers would require immediate notification and restudy.

[15] Cite to DD section.

Stakeholder Input

The CAISO will solicit stakeholder input with the publication of this paper.

8. Interconnection Request

8.1 Study Agreement

Background/Issue

CAISO staff is proposing to incorporate Appendix 3 of Appendix DD, the generation interconnection study process agreement (GIPSA), into the interconnection request so that it is executed when the interconnection customer submits an interconnection request.[16] To achieve this efficiency, the interconnection request form would be changed slightly to incorporate the documentation required by the GIPSA.

Stakeholder Input

CalWEA, CESA, First Solar, GSCE, LSA, ORA, SDGE, Wellhead, and PG&E supported this topic being included in the scope of the IPE 2018 stakeholder initiative to improve the efficiency of the interconnection request and Generator Interconnection Process Study Agreement (GIPSA) submissions for developers.

CAISO Response

The CAISO proposes to establish the following requirements for interconnection customers to agree to the study agreement terms and conditions within the interconnection request: (1) The interconnection request will be expanded to include the modified GIPSA; and (2) interconnection requests can only be submitted by an authorized signatory of the interconnection customer.

The CAISO will update the GIPSA to remove repetitive and/or ambiguous language as well as add applicable language for the execution, effectiveness and termination, modify the interconnection request to incorporate the GIPSA, and update Appendix DD Section 6.1.1 such that when the interconnection request is submitted the interconnection customer is agreeing to the terms and conditions of the GIPSA, the interconnection customer is responsible for the actual cost of the interconnection studies, including reasonable administrative costs, and all requirements of this GIDAP; and within 3 business days of the scoping meeting the interconnection customer shall submit to the CAISO Appendix A to the Generator Interconnection Study Process Agreement, which includes the Point of Interconnection and requested Deliverability status for the Phase I Interconnection. In addition, the interconnection request will not be valid unless the deposit or other interconnection financial security pursuant to Section 3.5.1 of the GIDAP, then the interconnection request will be deemed withdrawn upon the interconnection customer's receipt of written notice by the CAISO pursuant to Section 3.8 of the GIDAP.

The CAISO also proposes to clarify Section 3.5 of Appendix DD to ensure that developers

[16] http://www.caiso.com/Documents/AppendixDD_GeneratorInterconnectionAndDeliverabiltyAllocationProcess_asof_Mar8_2016.pdf

understand that they must submit the $150,000 Interconnection study deposit within the interconnection request window. Absent the deposit, the CAISO does not have funds to process and validate the interconnection request. As such, the CAISO intends to clarify that the lack of an interconnection study deposit is not a deficiency that can be cured by May 31. Interconnection requests that lack a deposit by the close of the window will be rejected without opportunity to cure. (The CAISO notes that this clarification is not true for Site Exclusivity Deposits. Often interconnection customers submit site exclusivity documentation that is deemed insufficient. Interconnection customers will continue to have the opportunity to cure this deficiency with either further documentation or submitting a $250,000 deposit within the cure window.)

8.2 Revisions to Queue Entry Requirements

Background/Issue

Westlands Solar Park suggested that the CAISO consider enhancements to queue entry requirements. Westlands stated that more stringent information requirements for projects to enter the queue will help ensure that only viable projects seek interconnection. Westlands suggested that the CAISO consider requiring additional information for projects entering the CAISO queue to demonstrate viability will also discourage the speculative "testing" that occurs in instances where project developers hope to have the CAISO do the study work to determine available transmission capacity without doing their own upfront engineering work before applying.

Stakeholder Input

CalWEA, LSA and SDG&E agreed that this issue should not be considered for IPE 2018. GSCE and ITC suggested that the CAISO should remain open to specific proposals that would meet the limitations set by FERC. The ORA recommended that the CAISO provide the deliverability status in the proposed project area as an immediate response to interconnection requests and that the issue should be included in the 2018 IPE initiative.

CAISO Response

Stakeholders did not submit any specific, concrete proposals for CAISO consideration. Moreover, the CAISO believes that it is unlikely that it would be feasible to revise the queue entry requirements in any meaningful way that would be acceptable to FERC and it would be difficult for stakeholders to reach any consensus. As such, the CAISO is removing this issue in the 2018 IPE initiative.

8.3 Master Planned Projects (Open Ended and Serial Projects)

Background/Issue

Westlands Solar Park requested that the CAISO consider the unique status of open-ended and serial projects, specifically master planned renewable energy projects such as the Westlands

Solar Park. Westlands stated that the CAISO should recognize these types of master planned projects in the interconnection process because they could be more viable and may provide the CAISO with a better understanding of when and how much renewable generation will come online in specified areas at specific times. This enhanced knowledge could decrease the potential for stranded costs because it can allow utilities to plan long-term upgrades around these projects and the related transmission upgrades may provide multiple benefits.

Stakeholder Input

CalWEA LSA, ORA and PG&E recommended the issue not be pursued in IPE. LSA stated that the issue is complex and if the CAISO decides to pursue it, these complexities would require another separate effort. ORA agrees with the CAISO that phased projects should not receive a unique status as proposed. PG&E is concerned that creating an open-ended interconnection project undermines the current cluster process of studying and developing mitigations to the impacts of new generation interconnecting to the transmission system.

GCSE requests this issue be included in IPE 2018 to encourage the planning of master-planned projects that will provide benefits to the system and ratepayers, and encourage more environmentally-beneficial development decisions. Where the state of California has spent time and energy to develop renewable energy development zones and portfolios based on those zones, the CAISO's interconnection processes should account for this work and remove any barriers to planning and developing transmission to these master planned areas to meet the state's RPS goals.

GCSE requests that the CAISO include this issue in the 2018 IPE. We believe that doing so may encourage the planning of other master-planned projects that will provide benefits to the system and to ratepayers and encourage more environmentally-beneficial development decisions.

SDG&E stated that all PTOs have had to work with the unique status of open-ended and serial projects, specifically master planned renewable energy projects. Although the CAISO's clarification on the current GIDAP provisions (which allow for phased generation facilities, decreases in capacity and project modifications) accommodates some of these issues, SDG&E recommended that this should be explored further in the 2018 IPE initiative. SDG&E stated that there could be potential improvements to better manage open-ended and serial projects.

CAISO Response

SDG&E agrees with the CAISO that the GIDAP accommodates some of the issues raised related to open-ended, serial, and master planned renewable energy projects. Although there is no current mechanism to accommodate open-ended projects as suggested, the CAISO does not believe modifications should be made to the study process to accommodate this request because of the significant complexity and planning obstacles that open-ended projects such as the master planned project described above would present. The CAISO also believes that studying such projects and retaining their interconnection and deliverability capacity only would exacerbate speculation and hoarding in the queue.

The CAISO has responded in the past to the state of California's identification of renewable energy development zones and portfolios based on those zones, as GCSE recommended. Further, the CAISO's transmission planning process continually works with the state to plan and

developing transmission to meet the state's RPS goals. Specifically, the CAISO does not believe the timing is right to embark on this topic at this time. In following the passage of the 50% RPS, the state has yet to make decisions on whether to increase deliverability above the 33% RPS level to accommodate the 50% requirement. Moreover, the CPUC Integrated Planning Process has not progressed to the point of providing actionable guidance to the jurisdictional utilities or the CAISO. Additionally, the California Legislature is considering increasing the RPS above 50%, which could have a dramatic impact on the transmission planning assumptions and direction. The CAISO does not believe the level of information needed to proceed with this topic is available and does not intend to consider this topic in 2018 IPE, especially where the vast majority of stakeholders oppose the proposal.

8.4 Project Name Publication

Background/Issue

The CAISO's public interconnection queue currently provides a variety of project information by queue number (*e.g.,* POI area, PTO, capacity, GIA status). It does not list project names or developer names. The CAISO proposes to modify the current confidentiality requirements for project names so that in the future they will be publicly available through the interconnection queue report accessible on the CAISO's public website.

Stakeholder Input

ORA and SDG&E support the proposal. CALWEA, LSA, EDF-RE, and SPower indicate no objection, but state that permission should be provided by each customer.

CAISO Response

The CAISO maintains its proposal to publish project names as part of the interconnection queue report. The CAISO believes that providing project names will provide more transparency to interconnection customers, PTOs, and LSEs. However, it is not clear to the CAISO why permission from individual projects should be required. The CAISO requests clarification from interested stakeholders on this issue. The CAISO also will solicit stakeholder feedback on whether the project name itself is sufficient to achieve the necessary transparency, or whether the CAISO also should publish the name of the developer/interconnection customer (as many project names are as enigmatic as queue numbers).

8.5 Interconnection Request Application Enhancements

Background/Issue

In the 2018 IPE Issue Paper, the CAISO discussed four topics that PG&E raised regarding interconnection requests: project naming, standardized technical data, changes to technical data, and FERC Order No. 827, which requires all newly interconnecting non-synchronous generators to provide reactive power at the high-side of the generator substation as a condition of interconnection.[17] We have moved FERC Order No. 827 to a new, separate topic, in Section

[17] This was already a general requirement, but FERC eliminated the exemption previously provided to wind

8.6.

First, PG&E states that there has been some confusion with project naming selections during the application process, resulting in increased renaming. PG&E suggests that new requirements be established to mitigate such confusion and need for renaming.

The second topic suggested that the CAISO consider updating the interconnection request application to improve efficiency, consistency, and accuracy between the interconnection request and supporting technical data provided by the interconnection customer.

The third topic asked the CAISO to consider defining the cut-off date for allowable changes to a project's technical data or system design specifications prior to the start of the Phase I Study process.

Stakeholder Input

LSA, EDF, and SPower had no specific comments but generally supported the CAISO's efforts to streamline the application process. SDG&E and the ORA supported the CAISO's proposed improvements to the interconnection request application, including data collected on Attachment 1 to Appendix A.

CalWEA raised the question of using the scoping meeting to modify some of project's technical data, including its POI, and emphasizes the value of the information received at the scoping meeting. CalWEA recommends that the length of the time allowed for the modification of the project interconnection application be increased to five BDs from the current three BDs.

CAISO Response

Regarding the first topic, as noted in the 2018 IPE Issue Paper, in the spring of 2017, prior to the opening of the cluster 10 application window, Section 5.2 was added to the GIDAP BPM and the prohibited project name list (PPNL) was posted to caiso.com. The CAISO and stakeholders had an opportunity to utilize these resources during the cluster 10 application and validation process, but there were many valuable lessons learned and CAISO believes more time may be necessary to evaluate the impact and improvement to these project-naming provisions. The CAISO does not believe this issue requires any CAISO tariff changes at this time. If updates or changes are deemed necessary in the future, CAISO believes they can be resolved through the GIDAP BPM Change Management process.

Regarding the second topic, since the 2018 IPE Issue Paper, the CAISO has developed and deployed a new Microsoft Excel version of the Attachment A to Appendix 1 portion of the interconnection request application for the cluster 11 interconnection application window. The CAISO believes this enhancement does not require tariff changes and can be resolved outside of the 2018 IPE initiative.

Regarding the third topic, as noted in the 2018 IPE Issue Paper, the CAISO expects that all project data and project details be locked-in following the scoping meeting, however, changes

generators.

beyond that may be allowable, on a limited case-by-case basis, based on the particular circumstance and the ability to accommodate the change before the Phase I study base case development begins. CAISO believes that the current case-by-case consideration provisions are appropriate and no further tariff clarification is necessary at this time.

In response to CalWEA's question about adjusting the time allowed for project modifications following the scoping meeting from 3 to 5 days; the CAISO believes this requirement needs to remain at 3 days. This timeline was previously 5 days and through a historical process was shortened to 3 days due to the timing of the study process and a need to ensure the process continues moving forward.

Overall, stakeholders generally agree and understand the efforts the CAISO is making outside of the 2018 IPE process to address the tariff requirements to improve the project naming guidelines, modifications to the technical details, and method CAISO uses to collect such data in the interconnection request applications. Thus, the CAISO will not include these topics in the 2018 IPE.

8.6 FERC Order No. 827

Background/Issue

FERC Order No. 827 requires that non-synchronous generators design their generating facilities to maintain a composite power delivery at continuous rated power output at the high-side of the generator substation. Non-synchronous generators must provide dynamic reactive power within the power factor range of 0.95 leading to 0.95 lagging, unless the transmission provider has established a different power factor range. Non-synchronous generators may meet the dynamic reactive power requirement by utilizing a combination of the inherent dynamic reactive power capability of the inverter, dynamic reactive power devices (*e.g.*, Static VAR Compensators), and static reactive power devices (*e.g.*, capacitors) to make up for losses. Since FERC Order No. 827 became effective, the CAISO and PTOs have been evaluating the reactive power capability for each new interconnection request in the interconnection request review and validation and interconnection studies. Stakeholders asked the CAISO to develop a standardized methodology and test among all the CAISO and PTOs. The CAISO, in coordination with the PTOs, will develop a methodology to evaluate generation project's capability of meeting such requirement during the interconnection study process.

Stakeholder Input

ORA supports the CAISO's position to develop an approach to evaluate the reactive power capacity in the interconnection studies through the BPM change management process.

CAISO Response

The CAISO, in coordination with the PTOs, has developed a white paper on reactive power capability evaluation. The white paper will be incorporated into the BPM for generation interconnection and deliverability allocation procedure through the BPM change management process. As such, the CAISO will include this issue in the 2018 IPE.

9. Modifications

9.1 Timing of Technology Changes

Background/Issue

Because the CAISO provides a fairly open-ended ability to modify their projects, current tariff provisions do not provide detailed limitations on the timing or types of technology and fuel type changes that an interconnection customer may request. Interconnection customers may request changes to the technology and fuel type of projects between the Phase I and Phase II process, and after the Phase II results. Moreover, the CAISO does not review a project's time-in-queue or commercial viability status for technology/fuel type changes. Commercial viability reviews are only performed for extensions of commercial operation date beyond the 7/10 year threshold.

The CAISO frequently receives requests for technology and fuel changes and historically, the CAISO has denied many technology and fuel type change requests because they result in changes in electrical characteristics that would cause reliability issues that would have to be mitigated by a network upgrade. Of the requests received, the CAISO estimates at least 25% of active projects in the queue beyond the 7/10 year threshold have changed their fuel type or technology.[18] The remaining 75% most frequently occur after the Phase II results activities and after the project has been in the queue five or more years.

Due to increased overall system reliability associated with transmission upgrades and topology changes, if the CAISO retains its current evaluation framework, the CAISO anticipates approving more technology and fuel change requests later in the project development cycle. Interconnection customers have reported that observing the highest-queued projects receive approval for changes in technology after being in the queue for over 10 years seems unfair.

The CAISO proposes that projects not be allowed to request technology changes that change the project fuel, including adding storage, after the 7/10 year threshold.

Stakeholder Input

The CAISO received comments from CESA, LSA, EDF-RE, SPower, SDG&E PG&E, SCE, and Wellhead on this topic. All but Wellhead supported including the topic in the 2018 IPE. PG&E and SCE expressed some concern that implementing a true moratorium (a temporary ban to be lifted at a future date) would create additional issues or remove some of the interconnection processes existing flexibility.

CAISO Response

The CAISO proposes to create an absolute prohibition on technology changes that change the project fuel type for interconnection customers that have (or are requesting) a commercial operation date beyond the 7/10 year threshold anticipated by the CAISO tariff.[19] Additionally, if

[18] CAISO Queue comparison (8/26/2011 vs. 12/5/2017)

[19] Project will still be allowed to request transformer, inverter, and other technical equipment changes for the existing fuel type.

stakeholders are supportive, the CAISO is also willing to consider changing the MMA process to evaluate commercial viability criteria for every MMA requested by a project where the project milestones are beyond the 7/10 year threshold[20].

As noted above, SCE and PG&E both expressed some reluctance for a moratorium on technology changes for interconnection customers. The CAISO clarifies that it intended to propose a complete prohibition, and did not mean to suggest a temporary moratorium. The CAISO also recognizes the need for a limited exception to this policy that allows customers with projects that have not yet declared commercial operation to retain their fuel type and update their technology to the best available (*e.g.*, a change to the number, type, or manufacturer for project inverters.) The prohibition would apply to both requests to change technology as well as requests for additive technology. For example, a 100 MW combined cycle gas interconnection request that has been in the queue for 11 years would not be allowed to:

- Change any amount of MW of gas for solar PV, while retaining a 100 MW limit at the POI, nor
- Add any amount of MW of energy storage while retaining a 100 MW limit at the POI.

Furthermore, all interconnection customers requesting technology changes, regardless of time in queue, will need to demonstrate that they are able to construct the project with the proposed new technology/fuel configuration within the 7/10 year threshold, otherwise the request will be denied. For example, if a 20 MW wind project that has been in the queue for 6.5 years, but has a COD occurring in 5 months submits an MMA to transform into a 20 MW solar PV project, that project would be required to prove it has the site exclusivity and permitting to achieve COD by its existing COD, otherwise the MMA would be denied.

Currently, the CAISO verifies CVC for requests only to extend project milestones beyond the 7/10 year threshold. CAISO also receives confirmation from the customer to confirm that its commercial viability criteria has been maintained annually. The CAISO also proposes to change the MMA process to evaluate commercial viability criteria for every MMA requested by a project where the project milestones are beyond the 7/10 year threshold. For example, a 50 MW solar PV interconnection request that has been in the queue for 11 years would be required to reconfirm it meets commercial viability criteria in the event it wants to alter its gen-tie route, add project phasing, or change its project site.

9.2 Commercial Viability – PPA Path Clarification

Due to the nature and relationship of CVC and the TPD allocation process, the CAISO has decided to include this topic in 2018 IPE and combine this topic with topics 4.1, 4.2, 4.3, and 4.5. This combined topic will seek to enhance the GIDAP in a manner that addresses all five issues under one topic to be addressed in Section 4.1.

[20] Currently the CAISO reviews commercial viability for milestone related MMAs only.

9.3 PPA Transparency

Background/Issue

The CAISO requires interconnection customers demonstrating commercial viability criteria with a PPA to provide a copy of the PPA so the CAISO can verify that the project and the PPA match.[21] This requirement ensures accurate project-to-PPA data relationships and a robust and transparent commercial viability process. In order for interconnection customers with PPAs to modify the project's COD, the PPA must have the following in common with the proposed generating facility in the GIA:

- the point of interconnection;
- MW capacity (allowing differences in utility defined project size before transformation and line losses);
- fuel type and technology; and
- site location

The CAISO proposes no changes to this process, but intends to move the requirement from the BPM to the tariff for greater transparency.[22]

Stakeholder Input

The CAISO received comments from CalWEA, ITC, LSA, EDF-RE, SPower, ORA, PG&E, SCE, and SDG&E. All comments were supportive.

CAISO Response

Because there is healthy stakeholder support for this proposal, no further discussion is warranted and the CAISO will submit for Board approval as soon as practical.

9.4 Increase Repowering and Serial Re-Study Deposit

Background/Issue

With the increase in repowering and serial re-studies, the current $10,000 deposit is insufficient for covering the study costs. Based on experience, the CAISO proposes to increase the study deposit for repowering and restudy of serial projects to $50,000.

Stakeholder Input

CalWEA generally agreed with the CAISO on this issue. However, CalWEA recommended that the repower deposit be raised to a median historical cost number (~$25,000) instead of the

[21] BPM for GM section 6.5.2.2

[22] The PPA-to-GIA relationship may be many-to-one. However, a PPA cannot be used to support deliverability for more than the capacity specified in the PPA. Interconnection customers are free to redact sensitive financial data. Interconnection customers are not required to provide PPAs to the PTO, and the CAISO does not share the PPA with the PTO. The CAISO only positively affirms with the PTO that the customer has indeed met commercial viability criteria.

maximum historical cost number ($50,000). ORA, PG&E, SDG&E, and SCE all supported raising the amount to $50,000.

CAISO Response

The CAISO selected the $50,000 amount because the repower and serial re-studies are generally over $25,000. Selecting a lower amount would continue to result in significant shortfalls for the PTOs and the CAISO. Moreover, projects often withdraw from the queue and dissolve their LLCs before paying these shortfalls, leaving the shortfall with the PTOs and CAISO. In addition, if there is any money to be refunded, the refund includes interest. As such, the CAISO believes that a $50,000 deposit is prudent and will eliminate the need to re-raise the deposit in the imminent future. The CAISO thus proposes to revise all references to $10,000 to $50,000 in sections 25.1.2 of the tariff, Appendix U Sections 6.4, 7.6, 8.5, 10.1 and 12.2.4.

9.5 Clarify Measure for Modifications After COD

Background/Issue

Interconnection customers frequently struggle to understand the test to determine whether a modification will be approved. Specifically, this confusion may depend on whether the project is in the interconnection process or has already achieved commercial operation. The GIA confounds this issue in Article 5.19 by stating that approval of all modifications will be based on the Material Modification in accordance with the GIDAP which in essence determines the approval of the modification based on whether it impacts the scope, schedule or budget of a project in the queue. During the interconnection process modifications are generally approved unless they are material, as explained in Section 9.1 above. On the other hand, existing, online generating units may request modifications to their generating facility if the total MW capability of the generating facility and its electrical characteristics do not change in accordance with Section 25 of the CAISO tariff. Both requirements are intended to prevent changes that will affect reliability and other projects studied or connected to the grid.

Stakeholder Input

CalWEA agrees with CAISO position on this issue. LSA, EDF-RE and SPower have no objection and ORA, PG&E and SDG&E support the clarification. LSA, EDF-RE and SPower also want to include the potential for downsizing generation projects after COD.

CAISO Response

The CAISO proposes to clarify in the LGIA and SCIA that modifications requested prior to COD will be approved based on the material modification assessment in the GIDAP, and modifications requested after COD will be approved based on the criteria in Section 25 of the CAISO tariff. The CAISO also supports the ability to downsize generation projects after COD. With no opposition to this issue, the CAISO intends to take this to the Board as soon as practical.

9.6 Short Circuit Duty Contribution Criteria for Repower Projects

Background/Issue

The criteria used to test whether there is a substantial change in short circuit duty contribution due to a repower project request is more stringent than that used for a material modification request.

The short circuit duty test for repower projects requires that the repowered project must produce the same or less short circuit duty as compared with the original generating unit. This framework is also used to evaluate post-COD modification requests. A small increase of short circuit duty would fail the test, even if the system still has a high breaker capacity margin.

For modification requests for projects active in the interconnection queue, the CAISO will consider changes to project equipment and transformers to be non-material if the new equipment is substantially similar and does not cause significant electrical changes, including changes to short circuit duty or reactive support. Evaluating changes to short circuit duty follows the general principle of no adverse impact to later queued generation project and the PTO. If the requested change causes only a small increase of short circuit duty, the modification could be considered non-material if the increase causes no breaker capacity concerns.

The CAISO proposes to consider applying more consistent criteria in short circuit duty tests for repower and modification requests.

Stakeholder Input

The CAISO received comments from CalWEA, CESA, LSA, ORA, SCE, and SDG&E. All supported the CAISO's proposal. SCE recommended that the individual PTOs define and determine the appropriate thresholds and methods.

CAISO Response

The CAISO proposes the following criteria to determine the short circuit duty impact of a repowering request in Section 12 of the BPM for Generator Management:

> Any reduction in the short circuit duty of the repowered Generating Unit, as compared with the original Generating Unit, will not be considered an adverse impact and will not be considered a substantial change to the unit's electrical characteristics. An increase in the short circuit duty of the repowered Generating Unit as compared with the original Generating Unit will not be considered an adverse impact if both of the following conditions are met:
>
> 1. Increase of the short circuit duty at network breakers that require upgrades in the generation interconnection study is less than the amount that would be flagged by the Participating TO as meaningful contribution; and
> 2. The total short circuit duty from the repowered Generating Unit and all the active generation projects in the queue at network breakers that do not require upgrades in the generation interconnection study does not exceed

the breaker capacity.

The CAISO also proposes to use the same criteria to test material modification including energy storage capacity addition requests.

9.7 Material Modification for Parked Projects

Background/Issue

The CAISO believes the intent of parking is to postpone a project's obligations and provide an opportunity for projects to seek TPD in the next allocation cycle. In the IPE 2018 Issue Paper, the CAISO proposed restricting all work while a project is parked including modification requests. Similar to not working on the GIA while a project is parked, the CAISO previously indicated it believes it may be appropriate to postpone processing any modification requests for parked projects.

Stakeholder Input

Invenergy, Wellhead, ORA, and LSA objected to the proposed change to limit material modification assessments while parked. The general belief suggests there are often reasonable business needs to make project adjustments while parked and believe that they should retain that opportunity.

Alternatively, SDG&E, PG&E, SCE, and ITC stated that the intent of parked projects is to postpone certain obligations of all parties, and they supported including removal of the opportunity for projects to request material changes while parked.

CAISO Response

Upon further review, the CAISO agrees that some projects may have a business necessity to submit a material modification request while parked. Further, the MMAs are paid entirely by the interconnection customer. Therefore, the CAISO proposes that interconnection customers maintain the opportunity to modify a project while parked and this topic will be removed from 2018 IPE.

10. Additional Comments

No additional issues were submitted by stakeholders.

11. Final Proposals

The following topics are considered final and the CAISO plans to seek approval at the July 2018 Board of Governors meeting:

- Clarification on Posting Requirements for PTOs
- Study Agreements

- PPA Transparency
- Increase Repowering Deposit
- Clarify Measure for Modifications After COD
- Short Circuit Duty Contribution Criteria for Repower Projects