Deliverability Assessment Methodology Revisions

Draft Final Proposal

November 6, 2023

Infrastructure and Operations Planning

Table of Contents

Deliverability Assessment Methodology Draft Final Proposal

1 Executive Summary

The deliverability assessment methodology is a California ISO methodology developed for generation interconnection study purposes pursuant to the ISO tariff, and is used to ensure that the transmission system can reasonably deliver resources providing Resource Adequacy (RA) capacity to serve load during stressed system conditions. The methodology was previously modified to address evolving circumstances, and a comprehensive stakeholder process was conducted in 2019 and 2020. In June 2022, storage dispatch assumptions were adjusted to reflect the evolving nature of the generation fleet.

Given the rapid growth in generation development and procurement, increased diversification of the resource fleet, and the long lead time necessary for development of transmission upgrades, the ISO now proposes the following refinements to its deliverability assessment methodology to provide short-term relief and long-term adjustments, while maintaining system reliability:

- **Study of High System Need (HSN) and Secondary System Need (SSN):** In response to broadly supportive comments on the Straw Proposal, the ISO proposes removing the SSN study from generation interconnection deliverability studies.
- **Dispatch levels:** Some stakeholders have stated that it is inappropriate to study intermittent resources with an output that is different than their Qualifying Capacity (QC) levels determined by the California Public Utilities Commission (CPUC) or other local regulatory authorities (LRAs). The ISO is not proposing any changes to dispatch levels and believes its methodology for determining dispatch levels in the deliverability studies is reasonable.
- **Simultaneous dispatch**: In response to stakeholder comments, the ISO proposes to raise the 5% distribution factor threshold for 500 kV line overload constraints to 10%, which decreases the pool of generators that must wait for the identified transmission upgrades intended to mitigate the constrained path. The ISO expects this to be a more practical threshold for including the generators that have a significant impact on the 500 kV line overload constraint and excluding generators that have an insignificant impact on the high capacity and low impedance 500 kV constraint.
- **Study of n-2 contingencies:** The ISO considered stakeholder feedback on current requirements for the study and mitigation of n-2 contingencies on double-circuit towers. The ISO does not intend to change this practice, to ensure that Resource Adequacy resources are reasonably available during times of stressed system conditions. However, the ISO proposes a risk-based approach and resulting policy changes to provide deliverability while a resource is waiting for the related n-2 deliverability upgrades to be completed if the contingency is not considered always credible in the operations horizon and does not risk cascading outages.

- **ADNU/LDNU guidelines:** In response to stakeholder comments on the Straw Proposal, the ISO proposes to revise the guidelines for identifying Area Deliverability Constraints (ADCs) so there is a potential for more constraints to be identified as Local Deliverability Constraints, enabling them to be addressed through the generation interconnection process.

In summary, the above changes reflect both the continued evolution of grid needs to enable and support the clean energy transition underway in California, as well as careful consideration of risk tolerances in balancing reliability requirements with the need for timely connections of deliverable resources to the grid. These changes are anticipated to make more deliverability available, or make deliverability available earlier than otherwise. In particular, in balancing these needs, relaxing the requirement for mitigations of non-cascading n-2 common tower contingencies to be in service before granting deliverability status is expected to speed new resources achieving deliverability.

Other significant changes include removing the SSN study from the generator interconnection deliverability studies and increasing the distribution factor for a 500 kV line overload constraint to reduce the number of new resources that are delayed by the mitigation of those constraints. Both of these changes can be implemented in the 2024 TPD allocation process and could provide some additional TPD allocations or at least remove some upgrade requirements for certain projects with distribution factors less than 10% on 500 kV line constraints.

Other potential changes were discussed and referred to other more appropriate stakeholder processes for consideration, in particular the concept of decoupling local capacity requirements completely from system capacity requirements, and the concept of granting deliverability notwithstanding transmission owner delays in completing deliverability network upgrades.

The ISO looks forward to continued stakeholder discussions on these proposed changes and expects that they will unlock deliverability while maintaining reliability and upholding the integrity of resource adequacy.

2 Stakeholder Process

The ISO posted a December 12, 2022 Update Paper[1] to initiate a review of the methodology to ensure that the deliverability requirements strike the appropriate balance between reliability and cost containment to ensure that the reliability requirements are not unduly

[1] Deliverability Challenges: An ISO Update. December 12, 2022. Update-Paper-Generation-Deliverability-Methodology-Review-Dec132022.pdf (caiso.com)

burdensome. An Issue Paper[2] was posted on May 31, 2023 and a stakeholder call held on June 8, 2023. A Straw Proposal was posted on August 22, 2023[3], which proposed several revisions to the deliverability study methodology.

The ISO received comments from 21 parties. Comments reflected support for the proposed revisions to the deliverability study methodology, proposed more sweeping changes, and requested additional details on the proposed revisions.

The purpose of this Draft Final Proposal is to summarize and discuss the stakeholder input provided in response to the Straw Proposal and propose solutions and revisions to the deliverability assessment methodology. This initiative is moving forward in parallel but in coordination with the Interconnection Process Enhancements (IPE) process which is also underway and focuses on interconnection process issues that need to be considered more broadly. The deliverability allocation methodology is also related to the ISO's Resource Adequacy initiative which has also started with working group sessions.

3 Background and Issues

The ISO understands the importance of Transmission Planning Deliverability (TPD) capacity for stakeholders. The Issue Paper detailed the current methodology for determining TPD and explored several issues that were raised in stakeholder comments in response to the ISO's Update Paper to generate discussion of potential alternatives regarding revisions of the deliverability assessment methodology.

Stakeholder feedback suggested a lack of common expectations for the RA program and for the deliverability methodology. The ISO provided its description of these programs and processes in the Straw Proposal and also included that description below.[4]

---

[2] Deliverability Assessment Methodology Issue Paper
http://www.caiso.com/InitiativeDocuments/Issue-Paper-Generation-Deliverability-Methodology-Review-May312023.pdf

[3] Deliverability Assessment Methodology Revisions, Straw Proposal
https://www.caiso.com/InitiativeDocuments/Straw-Proposal-Generation-Deliverability-Methodology-Review-Aug292023.pdf

[4] The ISO notes that a tenet set out in the Joint Proposal Framework states "The CAISO has various means of addressing system reliability apart from the deliverability test…

- System reliability is currently addressed by LRA RA Programs, as well as the CAISO Transmission Planning Process (TPP), and the Generation Interconnection Process (GIP) reliability studies, and not from the CAISO deliverability test. If additional reliability concerns remain with the generation interconnection process, additional reliability test scenarios could be added to the generation interconnection study process."

The implications of this difference are discussed in more detail in the following section.

Resource Adequacy

RA is a regulatory construct developed to ensure there will be sufficient electric resources to serve demand in all but the most extreme conditions. Load-serving entities are required to procure a certain amount of Resource Adequacy capacity to meet planning requirements.

Resources seeking to provide Resource Adequacy capacity first have to meet basic interconnection requirements so they can be reliably interconnected. Resources that seek to provide Resource Adequacy capacity must have deliverability. Resources only meeting reliability requirements can operate as energy-only resources, without deliverability and not providing Resource Adequacy capacity.

Each resource has a qualifying capacity (QC) and net qualifying capacity (NQC). Qualifying capacity values are fuel-type specific and are set using methodologies determined by the appropriate local regulatory authority (LRA). This may be the CPUC or another entity for non-CPUC jurisdictional entities. The NQC value is resource-specific and is determined by the ISO based on the QC and the deliverability status of the resource[5].

On-Peak Deliverability Assessment Methodology

The on-peak deliverability assessment tests that the transmission system can reasonably ensure that Resource Adequacy capacity can be delivered to load during stressed system conditions.[6] "Stressed" was generally meant to be where load is high, supply is tight, and loss of load is a risk. Another perspective is that the transmission system needs to provide reasonable certainty that reliable supply can be maintained by relying solely on Resource Adequacy capacity. The need for adequate transmission to support the simultaneous access to Resource Adequacy capacity is a basic tenet of the RA program. The importance of the ability to access this capacity, or deliverability, was clear during extreme stressed conditions in each of the last three summers: August 13 and 14, 2020, July 9, 2021, and September 6, 2022.[7]

Deliverability ensures that under normal transmission system conditions, if resources with deliverability are available and called on, their ability to provide energy to the system at peak load will not be limited by the dispatch of other resources with deliverability in the vicinity. This test does not guarantee that a given resource will be dispatched to produce energy at

---

[5] The NQC value is equal to the QC value if the resource has FCDS deliverability status, but the NQC value can be less than the QC value or zero if the resource has only partially deliverable or energy only deliverability status.

[6] The ISO also engages in an off-peak deliverability assessment that focuses on renewable energy delivery and is used to identify transmission upgrades needed to relieve curtailment. More information is available in the ISO's Dec. 2022 Issue Paper.

[7] From August 31 through September 9, 2022, California and much of the Western United States experienced record-setting heat resulting in all-time high demand for electricity across the region (September 2022 heat wave). The prolonged heat event precipitated an unprecedented number of calls for consumer conservation. This included 10 consecutive days of voluntary Flex Alerts and new state programs that provided non-market resources to address extreme events culminating on September 6, the only day when the ISO system reached its highest emergency alert level.

any given system load condition. Rather, the test's purpose is to demonstrate that the available generation capacity in any electrical area can generate and be delivered simultaneously, at peak load, and that the excess energy above load in that electrical area can be exported to the remainder of the Balancing Authority Area.[8] In short, the test verifies that transmission-constrained capacity conditions will not exist at peak load, limiting the availability and usefulness of Resource Adequacy capacity resources for meeting RA requirements. In actual operating conditions, energy-only resources may displace RA resources in the market's economic dispatch that serves load.

The electrical regions from which generation must be deliverable range from individual buses to all of the available generation in the vicinity of the generator under study. The underlying assumption of the test is that all available capacity in the vicinity of the generator under study is required, therefore the remainder of the system is experiencing a significant reduction in available capacity. However, since localized transmission capacity deficiencies should be tested when evaluating deliverability from the load perspective, the dispatch pattern in the remainder of the system is appropriately distributed. Failure of the generator deliverability test when evaluating a new resource in the generator interconnection study affects the ability of the resource to receive a deliverability allocation and be procured to meet RA needs. If the addition of the resource will cause a deliverability deficiency, then the resource should not be fully counted towards RA requirements until transmission system upgrades are completed to correct the deficiency.

In summary, the goal of the on-peak deliverability study methodology is to determine if the aggregate of available generation output that is counted as RA capacity in a given area can be simultaneously transferred to the remainder of the ISO Balancing Authority Area during resource shortage conditions, considering transmission constraints. Any generators requesting Full or Partial Capacity Deliverability Status[9] in their interconnection request to the ISO-Controlled Grid will be analyzed for "deliverability" to identify the Delivery Network Upgrades (DNU) necessary to obtain this status. This analysis of required DNUs is completed in the queue cluster study process utilizing the deliverability assessment methodology.

At a high level, the test procedure includes the following three steps:

1. The ISO builds the initial power flow base case, dispatching all existing generation, and new generation to balance loads and resources.
2. The ISO uses a commercially available software tool to perform a generation sensitivity analysis to identify potentially limited generation pockets. At the most granular level, the sensitivity analysis identifies the exact generation facilities that

[8] Subject to contingency testing.
[9] Full Capacity Deliverability Status ("FCDS") means that the generator is requesting that its entire output be deliverable. Partial means something less than its entire output. Generating units comprising a single generating facility/interconnection customer/generator interconnection agreement may have separate meters and resource IDs such that the individual generating units may be FCDS even if the entire facility at the point of interconnection is not deliverable.

have the highest flow impact on a particular transmission facility with all other facilities in-service and during forced outages of other facilities.

3. For each potentially limiting generation pocket identified in step 2, the ISO increases a subset of the generation with the highest flow impact on that facility to assess the potential for it to be overloaded under stressed system conditions.

All ISO-controlled facilities are analyzed to determine if they are limiting the deliverability of generation within the ISO deliverability methodology parameters.

In this context, system reliability requires both a reliable and secure transmission system, and sufficient resources ("resource sufficiency") to provide reliable service to customers. The deliverability methodology ensures that those resources can reasonably be delivered to load at stressed system conditions. The deliverability methodology is therefore an inherent component of the overall reliability framework.[10]

4 Discussion and Draft Final Proposal

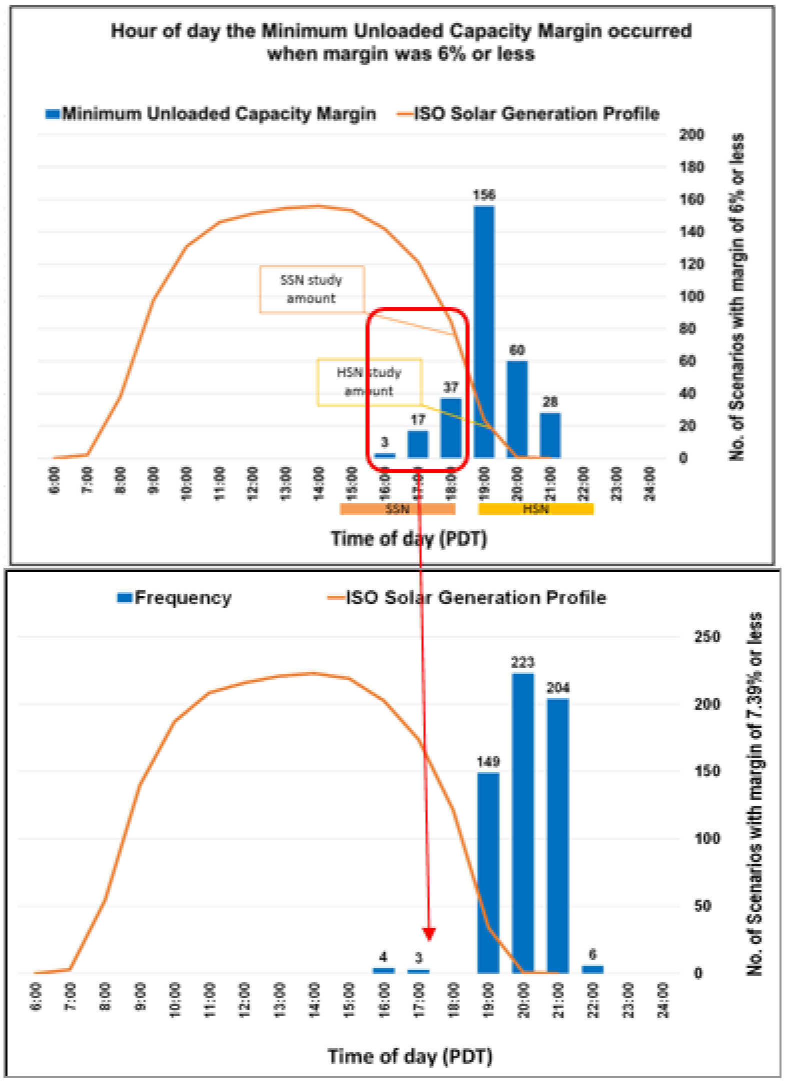
4.1 Study of High System Need (HSN) and Secondary System Need (SSN)

The test methodology currently studies two scenarios: one is the highest system need (HSN) scenario and the other is known as the secondary system need (SSN) under higher gross load conditions when solar is dropping off and other resources are ramping up to compensate. The HSN scenario is tested for all generating resources in the study. The load, generation dispatch, and imports correspond to when the system RA need is the highest during the year based on pre-selected profiles. The highest system need in the past has been the peak gross consumption condition, but that has transitioned to the peak sale condition with growth of behind-the-meter distributed generation (DG).The study is therefore supplemented by the SSN scenario, which focuses on the transition period when the gross load is still high and solar production is dropping off. During this condition, a resource shortage is less likely but could still occur.

The HSN and SSN study scenarios were proposed as a modification to the deliverability methodology in 2018 and implemented in 2020. During that previous stakeholder process, data from the ISO's 2018 Summer Assessment and the CPUC's Loss of Load Expectation analysis demonstrated that resource shortage conditions occur during the SSN as well as the HSN study period.[11] The top figure below provides data from the 2022 Summer

[10] The ISO acknowledges that while the deliverability methodology is an inherent component of the reliability framework, additional NERC reliability standards exist.
[11] http://www.caiso.com/InitiativeDocuments/IssuePaper-GenerationDeliverabilityAssessment.pdf

Assessment, and, for purposes of this analysis, is not much different than the 2018 Summer Assessment data. In this figure, one can see that resource shortage conditions continue to occur during the secondary system need as well as the high system need study period. The bottom figure below provides data from the 2023 Summer Assessment. The 2023 analysis no longer identifies the risk during the ramping period as the fleet evolves – the risk is shifted to the post solar window.



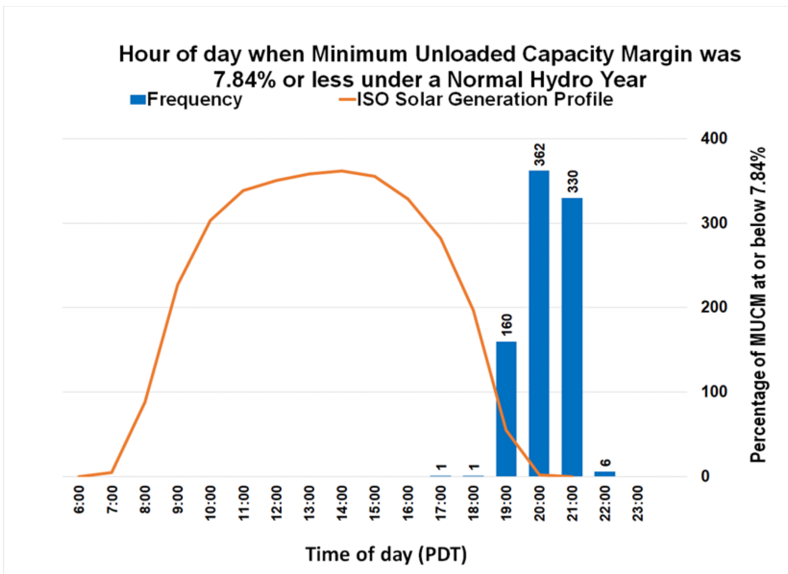
Stakeholder Input

LSA requested that the ISO provide 2023 Summer Assessment study results with normal hydro assumptions, to make sure that the high hydro assumptions used in the initial 2023 analysis provided in the staff proposal did not skew the results.

Middle River Power commented that the ISO should be working to demonstrate that a single HSN analysis can reliably ensure that resources are deliverable to the aggregate of demand for every hour of the day.

Discussion

The ISO has reviewed the concern that the high hydro conditions experienced in 2023 and modeled in the 2023 Summer Assessment studies had a disproportionate impact on the risk shifting to the post-solar window in the 2023 analysis. The ISO notes that in its Summer Assessment analysis, the maximum dispatchable hydro capacity in the 2023 wet hydro year was not significantly different from other years, although the hydro generation energy in dry hydro years would be much lower than wet hydro years. As a result, studying high versus normal hydro conditions was not expected to lead to different results. (Historical representative profiles are used for run of river hydro, and dispatchable hydro resources are modeled as dispatchable in production cost modeling, as water is reserved for summer peak waves by hydro operators). However, to address LSA's concerns, a sensitivity simulation run of 2023 with normal hydro conditions was performed and confirmed that the risk of a resource shortage during the SSN window did not increase by changing the hydro assumptions.



The change in risk profile is largely due to the significantly more battery storage that would help manage the downward solar ramp, leading to the risk reduction in the SSN window.

In response to Middle River Power, the ISO has demonstrated that under the HSN and SSN study paradigm resources are deliverable during resource shortage conditions, based on recent past experience. As described above, the SSN scenario is no longer a critical scenario for generation interconnection study purposes. Also, the ISO can perform the SSN study in the transmission planning process to test if there is an emerging issue; the ISO expects to also monitor overall system performance through the production cost modeling also conducted in each year's transmission planning cycle to detect emerging concerns.

ISO Proposal

The ISO proposes to remove the SSN study from generation interconnection deliverability studies. In addition to the discussion above regarding the decreasing risk of resource shortages during the SSN study period, we also observe that with the update to study storage at 50%, the SSN study is rarely more binding than the HSN study. However, the ISO would still perform the SSN study in the transmission planning process for at least a few years to ensure the ISO does not have an emerging issue with accessing resources across the daily cycle when needed. In addition, the ISO will explore other study conditions such as critical storage charging scenarios in the transmission planning process. With the evolving generation fleet and customer load profile, the ISO will explore study scenarios proactively to identify critical transmission stress conditions before they become a problem and continue to work with stakeholders to address those concerns.

4.2 Dispatch levels

Initial Base Case Dispatch

Generation is dispatched in the initial base case at close to maximum dependable capacity. The selected percentage dispatch below maximum capacity considers the average forced outage rates of the generators, spinning reserve, and unexpected retirement of generation capacity across the system. For the cluster studies, the ISO dispatches all generation at 80% of maximum dependable capacity. Because we are modeling a resource shortage scenario, it is assumed that all available generation is being dispatched. Due to the assumed shortage condition, the incremental dispatch cost of generation is not affecting the dispatch.

For the cluster studies, the amount of generation in the interconnection queue far exceeds the amount needed to achieve a load and resource balance. Therefore, the queued generation is organized into geographic areas, and eight to ten base cases are built, with each case designed to focus on a particular geographic area. Then the queued generation in these areas is initially dispatched similar to the existing generation (e.g. 80% of dependable capacity).

Identification of Generation Pockets Associated with Individual Transmission Facility Constraints

Each transmission line and transformer is analyzed individually, starting from the initial base case dispatch. A study group is established for each line and transformer that includes all generation with a 5% distribution factor or greater on the particular line or transformer. For each analyzed facility, an electrical circle is drawn which includes all units that have a 5% or greater distribution factor (DFAX) on the facility being analyzed.[12] The 5% circle can also be referred to as the study group for the particular facility being analyzed. Capacity generation dispatch inside the study group is increased to determine the loading on the line or transformer under stressed system conditions. Generation outside the study group is

[12] Includes all generators that have a 5% or greater distribution factor (DFAX) or Flow Impact on the facility being analyzed is referred to as the 5% Circle. The Flow Impact is not considered for DFAX that are less than 2%.

proportionally decreased to maintain the balance between loads and resources. This process is intended to test the ability of available resources inside the study group to be dispatched at full output when various resources across the ISO system are unavailable during a resource shortage condition.

Dispatch of Generators in the Study Group

The outputs of capacity units in the 5% Circle study group are increased starting with units with the largest impact on the transmission facility. The number of units to be increased within a group is limited to an amount of generation that can be reasonably expected to be simultaneously available, and the likelihood of all of the units within a group being available at the same time becomes smaller as the number of units in the group increases. The objective of the ISO deliverability methodology is to ensure that roughly 80% of the time, the transmission system will not constrain the output of generation in a study group during a resource shortage condition. The cumulative availability of 20 units with a 7.5% forced outage rate would be 21%. Therefore, no more than 20 units are increased to their maximum output within a study group. All remaining generation within the ISO balancing area is proportionally displaced to maintain a load and resource balance. The amount of generation increased also needs to be limited because decreasing the remaining generation can cause problems that are more closely related to a generation deficiency in a load pocket rather than a generation pocket deliverability problem. Therefore, no more than a 1500 MW increment of generation is increased within a study group.

For groups where the 20 units with the highest impact on the facility can be increased more than 1500 megawatts (MW), the impact of the remaining amount of generation to be increased will be considered using a Facility Loading Adder. The Facility Loading Adder is calculated by taking the remaining MW amount available from the 20 units with the highest impact times the DFAX for each unit. An equivalent MW amount of generation with negative DFAXs times the DFAX for each unit will also be included in the Facility Loading Adder, up to 20 units. Negative Facility Loading Adders are set to zero.

The test methodology currently studies two scenarios: one is the highest system need scenario and the other is known as the secondary system need under higher gross load conditions when solar is dropping off, as described in the section above.

The highest system need scenario represents when a capacity shortage is most likely to occur. In this scenario, the load is modeled at the peak sales amount with low solar output. The highest system need hours are hours ending 19 to 22 in the summer months with an unloaded capacity margin of less than 6% in the ISO annual summer assessment or identified as loss-of-load hour in the CPUC Equivalent Load Carrying Capacity (ELCC) study for wind and solar resources.

For wind and solar resources, the HSN study values are set to the 20% exceedance level during the selected hours, to ensure a higher certainty of wind and solar being deliverable when capacity shortage risk is highest. The secondary system need hours are hours ending 15 to 18 in the summer months with an unloaded capacity margin less than 6% in the

CAISO annual summer assessment or similar assessments in the long-term planning horizon. The SSN study values are set to the 50% exceedance level during the selected hours, due to a more moderate risk of capacity shortage.

All other resources are studied at their NQC values in both the HSN and SSN studies. However, after a review of storage production levels, it was found that in long-term studies, storage was producing at almost 50% of the available capacity when solar was at the SSN study level. Therefore, for long-term deliverability studies, storage is currently studied at 50% of installed capacity in the SSN study[13].

Stakeholder Input

BAMx commented that it was under the impression that typically a higher level of generation dispatch is modeled in the deliverability assessment due to concerns about congestion and/or renewable curtailments. BAMx suggested addressing such concerns as part of a practical economic assessment to address potentially increasing levels of generation curtailments due to congestion. BAMx also commented that the ISO also should allow for reasonable redispatch to mitigate overloads, particularly for storage resources that can flexibly move from discharging to charging and vice-versa. CalCCA suggests that the dispatch levels for RA resources be set at their NQC levels and no higher. The purpose of the deliverability study is to qualify/validate resource volumes that can be used for RA accounting purposes. While it may be possible for some resources (wind and solar) to achieve an output in excess of their NQC, assuming this in the deliverability study precludes other projects within the area to be allocated capacity. CalWEA noted that CPUC staff have already issued preliminary 24-hourly values and encouraged the ISO to begin contemplating how it will use these values in its dispatch assumptions.

Discussion

The purpose of the On-Peak Deliverability study is to ensure that resources are deliverable during high load and resource shortage conditions. The market impacts of transmission constraints and congestion during ample supply conditions are beyond the scope of the on-peak deliverability study.

In response to the BAMx comment regarding use of generation redispatch to mitigate overloads, as described in the Straw Proposal paper and this paper, overloads are not allowed above applicable emergency facility ratings. Therefore, redispatch must be done before the contingency occurs, so that redispatched amount is not available to serve loads under resource shortage conditions.

In response to CalCCA, as described in section 4.2 of the Straw Proposal paper, the ISO performed a limited scope analysis demonstrating that studying wind resources at their NQC level would result in the RA contribution of the wind generation fleet below its combined

[13] http://www.caiso.com/Documents/Presentation-GenerationDeliverabilityStudyDispatchAssumptions-Jun062022.pdf

NQC level. The ELCC-based NQC values for solar and wind resources are based on stochastic simulations looking at the future operation of all resources during the summer months when resource shortages are most likely. The values represent a theoretical equivalent generator. In the example in the Straw Proposal paper, a 100 MW wind generator is deemed to provide the same average contribution to overall reliability across a period of time as a 14 MW generator that is able to produce 14 MW in all hours. In reality, the individual wind generator will be producing 0 MW in many hours, but many hours it will produce much more than 14 MW. If it were transmission constrained to only 14 MW of output, it would no longer be equivalent to a 14 MW perfect generator which is the basis for the NQC value.

ISO Proposal

The ISO is not proposing any changes to dispatch levels and believes that its exceedance-based methodology for determining dispatch levels for intermittent resources in the deliverability studies is reasonable and supports the objective of ensuring that resources can be delivered under stressed system conditions. However, the dispatch levels do need to be monitored and updated periodically. The ISO notes that the CPUC is developing exceedance values as part of its slice-of-day implementation. The ISO will continue to review the CPUC’s analysis, as well as any changes to other local regulatory authorities’ resource valuation methodologies, and reevaluate the deliverability assumptions as needed.

4.3 DFAX threshold of 5% and 10%

In response to stakeholder comments on the Straw Proposal, the ISO proposed to raise the current 5% DFAX threshold for 500 kV line overload constraints to 10%. This is expected to be a more practical threshold for including the generators that have a significant impact on the 500 kV line overload constraint and exclude generators that have an insignificant impact on the high capacity and low impedance 500 kV constraint.

Stakeholder Inputs

CalCCA agreed with the ISO that raising the DFAX from five percent to ten percent for 500 kV lines provides a more practical threshold. Further, CalCCA suggested that this be expanded to include transformers (500 kV high side banks) that may be experiencing overloading as these are generally key elements in delivering energy from transmission-constrained areas to load centers. SB Energy commented that there is not clarity on why 230 kV deliverability constraints are ineligible for this DFAX threshold update.

Discussion

The rating of 500/230 kV transformers are typically around 1100 MVA, and the rating of 230 kV lines are typically less than 1000 MVA. The rating of 500 kV lines are typically over 2000 MVA. In addition, the impedance of 500/230 kV transformers and 230 kV lines tend to be significantly higher than 500 kV lines. The reasoning for increasing the DFAX for 500 kV lines is because of their low impedance and high ratings. The same reasoning does not equally apply to 500/230 kV transformers or 230 kV lines.

ISO Proposal

The ISO proposes to raise the 5% DFAX threshold for 500 kV line overload constraints to 10%. This is expected to be a more practical threshold for including the generators that have a significant impact on the 500 kV line overload constraint and exclude generators that have an insignificant impact on the high capacity and low impedance 500 kV constraint.

4.4 The study of n-2 contingencies

The Straw Proposal recommended continuing with the study of n-2 contingencies as is done today, and to shift the application of those results on a risk-based approach to better balance the need to reasonable access Resource Adequacy capacity during shortfall situations and to avoid additional delays associated with the time required to mitigate n-2 contingencies.

The ISO proposed to continue requiring identification and mitigation of n-2 contingencies for the limited set of contingencies set out for study in North American Electric Reliability Corporation (NERC) standards (i.e. common outages on double circuit towers or both poles of a DC line on a single tower) but not delay awarding deliverability status to resources where the contingency consequences have a low risk of cascading should the outage occur. N-2 outages that could lead to cascading and potential system collapse would still require mitigation, because the pre-contingency dispatch of the resources downward that would otherwise be needed precludes them reasonably being available during stressed system conditions.

NERC Standard TPL-001 requires the analysis and mitigation of n-2 contingencies. The ISO process relies on the deliverability studies and reliability studies to meet the NERC standards and to ensure deliverability. Both the operations and planning criteria do not allow cascading[14] outages following an n-2 contingency. Therefore, if a cascading outage risk is identified or if the n-2 contingency is considered always credible in the operations horizon, then the mitigation for that contingency would be required before additional generation projects behind that constraint could become deliverable. However, if the n-2 contingency results in an overloaded facility, but not cascading outages, upgrades would be required but would not prohibit additional generation projects from becoming deliverable. The additional generation projects would be eligible for deliverability status during the development period of the transmission upgrades necessary to mitigate the n-2 contingency, assuming that no other constraints are binding. This stands in contrast to year-by-year interim deliverability, which could be lost because earlier queued projects come online.

[14] See explanation of cascading in Section L. http://www.caiso.com/Documents/RC0610.pdf

The ISO explained the basis for the continued need to consider n-2 outages in light of the expectations for study conditions in complying with NERC standards, and the role of deliverable resource capacity in providing service during stressed conditions. The ISO on-peak deliverability assessment methodology currently includes n-1 and n-2 contingencies. NERC Reliability Standard FAC 002, Facility Interconnection Studies, is an applicable reliability standard for generation interconnection studies. It requires steady state, short-circuit, and dynamics studies to evaluate system performance under both normal and contingency conditions in accordance with Reliability Standard TPL-001. NERC Reliability Standard TPL-001 requires common mode n-2 contingency analysis. The generator interconnection and deliverability allocation procedures (GIDAP) tariff language requires a reliability study which consists of steady state, short-circuit, and dynamics studies and deliverability studies which consist of a steady state study of a comprehensive variety of severely stressed conditions.[15] Mitigation plans are identified for reliability concerns found in the dynamics and short-circuit study. Mitigation plans are also identified for steady state concerns. The reliability studies tend to be an assessment of the maximum output of the generation in the interconnection study and are almost always studying more stressed system conditions than the deliverability studies. N-1 contingency overloads identified in the reliability studies, which are more severe than the deliverability study results, are addressed by congestion management. N-2 contingency overloads in the reliability studies are also almost always more severe than in the deliverability studies. However, congestion management is not a feasible mitigation for most n-2 contingencies because there are limits to the ability of the market to manage all n-2 contingencies simultaneously. As a result, they can only be considered during real-time operation selectively during periods of elevated risk of the n-2 outage occurring. Protecting for an n-2 contingency through this vehicle is therefore not acceptable if the consequences of the n-2 contingency are too severe.

Additionally, excessive reductions of output on a sustained basis to manage the risk of an n-2 contingency contradict the premise that the resources should be available to serve load. Therefore, remedial action schemes (RAS) or system upgrades are needed to mitigate n-2 contingencies. The deliverability study assumptions are designed to be plausible and reasonable; however, the dispatch of resources in the reliability studies are considered to represent a worst-case scenario. RAS will be utilized to mitigate n-2 constraints identified in both the reliability and the deliverability studies. If RAS is not sufficient, system upgrades are identified as needed in the planning horizon based on the deliverability study.

Stakeholder Input

The majority of stakeholders supported the proposed changes to treatment of n-2 contingencies and mitigation requirements as described in the Straw Proposal. However, some stakeholders repeated comments that n-2 contingencies should only be considered in the transmission planning process. Some stakeholders commented that n-2 contingencies should only be considered in the reliability studies in the transmission planning process and in the generation interconnection process. Some stakeholders supported the consideration

[15] Appendix DD of the CAISO Tariff

of n-2 contingencies in the deliverability studies, but only in the transmission planning process and not in the deliverability studies in the generation interconnection process. Some stakeholders suggested that benefit to cost studies should inform consideration of n-2 contingencies, and that other non-resource adequacy capacity can be relied upon, or the planning reserve margin be increased to mitigate the risk of RA capacity not being available.

The ISO also received comments requesting details on the logistics and terms of "conditional" deliverability. Several stakeholders requested additional system capacity information, such as the amount of deliverability that could be made available through the relaxation of non-cascading n-2 mitigating requirements, or the amount of additional deliverability that could be made available by relaxing n-2 constraints altogether.

One stakeholder suggested temporarily relaxing mitigation requirements for other "low risk" contingencies beyond the proposed non-cascading n-2 contingencies.

Discussion

To respond to the range of stakeholder comments and feedback on this topic, the ISO first seeks to clarify the role of planning requirements in considering deliverability, and how they interact with operational requirements. Inherent in the purpose of the Resource Adequacy program and resulting requirements for the transmission system is the need for the system to reliably meet customer requirements, and be capable of delivering generation to load. The ISO's consideration of the deliverability methodology requirements has consistently been based on the purpose of the Resource Adequacy program ensuring the capability to provide service in all but the most extreme conditions – and without relying on non-RA resources.

Several stakeholder comments question the applicability of NERC standards – and transmission planning standard in particular – to the overall issue of deliverability, given that NERC standards do not refer specifically to RA and related deliverability requirements. NERC standards, however, do apply to the requirements of the transmission system to enable resources to serve load, and necessitate consideration given the role Resource Adequacy capacity fills. NERC TPL-001-5 states the following as its purpose: "Transmission system planning performance requirements within the planning horizon to develop a Bulk Electric System (BES) that will operate reliably over a broad spectrum of System conditions and following a wide range of probable contingencies (sic)." The standard also requires as a general performance requirement: "The System shall remain stable. Cascading and uncontrolled islanding shall not occur."

For all n-2 outages, under studied conditions, planning must ensure there are mitigations in place, or have been identified and are moving forward, to avoid widespread cascading outages *and* uncontrolled loss of load. To meet basic reliability requirements for energy-only resources, these mitigations can include use of remedial action schemes to take action when the contingency occurs, or "congestion management" which essentially is re-dispatching the generation down to a lower output level so that the n-2 contingency does not result in unacceptable outages. As the ISO noted in its Straw Proposal:

> NERC Transmission Planning Standard TPL-001-5, Table 1 states that “Planned System adjustments such as transmission configuration changes and re-dispatch of generation are allowed if such adjustments are executable within the time duration applicable to the Facility Ratings.” Therefore, redispatch of resources needed to mitigate flows above short-term emergency facility ratings must be done before the contingency occurs (precontingency redispatch).

Relying on pre-contingency curtailment means the full amount of generation is not accessible to load during those times, which detracts from the role RA capacity is specifically intended to serve.

Different planning entities may apply standards that are more demanding (but not less demanding) than NERC standards. In particular, the ISO notes that MISO, the Midcontinent Independent System Operator, does not depend on remedial action schemes or congestion management in addressing n-2 contingencies, but actually requires transmission development to mitigate n-2 contingency consequences in its reliability analysis.

In considering the balance of needing to maintain reasonable access to deliverable RA capacity, and the need to move forward with interconnections as expeditiously as possible, the ISO considered n-2 outages in planning by categorizing the n-2 outages; those that risk cascading and can lead to broader network collapse, and those that would result in limited local system disruption without a material risk of cascading. The ISO has proposed interim treatment that would apply to n-2 contingencies that do not pose a cascading risk. Stakeholders have questioned the basis for different treatment, suggesting that it creates undue discrimination. The ISO’s view is that differences can be applied, because they represent different risk profiles based in part on how they can also be treated differently in operations without violating operating standards.

Planning standards call on planners to develop a system can that can meet reasonable worst-case conditions – that options to manage those conditions are available in the operating theater. Operating standards, however, do not call on operations staff to operate to the level the system is planned, as operators have to deal with a far more diverse set of conditions than can be considered in planning studies.

Operational Considerations

In market operations, the ISO does not monitor and enforce at all times every n-2 outage for which congestion management (e.g. re-dispatch to lower levels) was identified as the mitigation in planning. The capability to do so for each n-2 outage must be in place, however, as operators respect those operating constraints when there is an elevated risk of the n-2 outage occurring. For example, an unfortunately more common risk occurring over the last decade is the increasing risk caused by smoke from wildfires that can contaminate insulators even if the wildfire is not in the immediate proximity of the transmission corridor. (This assumes conditions have not reached the risk level that would prompt even more demanding action, e.g. the transmission owner removing the lines from service as a public safety power shutoff measure).

Mitigating the constraint through market operation necessitates that other resources are available to replace the lost production from the generation that is dispatched down pre-contingency.

The question then arises as to how the system is operated if the system is “tight” and no replacement resources are available.

For n-2 outages that have local consequences only and are not a cascading risk, the judgement would be to avoid the re-dispatch, maintain service to customers, and accept that there will be customer disruption if the outage actually occurs.

For n-2 outages that would risk cascading and system collapse, the constraint would be activated if the risk is sufficient to warrant action, despite potentially leaving the system in an overall supply shortfall situation.

Impact of Operational Considerations on ISO Proposal

This backdrop is fundamental to the ISO’s overall proposal and expectations for Resource Adequacy capacity underpinning the proposal, and also the proposal to allow deliverability status to be awarded to resources waiting for mitigations for non-cascading n-2 outages

Stakeholders expressed concerns that it would be inconsistent and unduly discriminatory to temporarily relax the requirements for non-cascading outage mitigations while not also relaxing the requirements for cascading outages. However the two distinct sets of circumstances are different, the consequences are different, and the operational considerations and alternatives available to operating staff are also different.

For stakeholders suggesting the ISO should also allow resources to receive deliverability status waiting for mitigations for potential cascading n-2 outages, the ISO sees two different sets of possible rationales underpinning those suggestions. First, the ISO does not believe that anyone is suggesting a more cavalier treatment of potential system collapse actions in operating the grid, so it appears the suggestions are based on a second rationale related to the expectations for the role of the Resource Adequacy capacity and that congestion management to pre-dispatch down the affected resources should always be an option – and that other resources are available to backfill the curtailed generation. As the ISO notes above, however, relying on pre-dispatch renders some amount of capacity unavailable. While operations staff may make the decision to risk the lesser consequences of the n-2 outage for non-cascading outages during tight supply conditions, they will not take that risk for n-2 outages that risk cascading and system collapse. The difference of opinion on this therefore comes back to dissimilar opinions regarding the role of Resource Adequacy capacity and the service it is intended to provide.

Stakeholders have also suggested that the ISO’s reasoning is inconsistent in its application of the NERC planning standard by offering deliverability for resources waiting for non-cascading n-2 contingency mitigations measures to be developed. However, this is not the case: TPL-001-5 specifically anticipates that corrective action plans cannot always be put in place in the required timeframe, and that Non-Consequential Load Loss and curtailment of

Firm Transmission Service to correct the situation is allowed that would normally not be permitted under the standard, provided that the Transmission Planner or Planning Coordinator documents that they are taking actions to resolve the situation.

Expectations for Resource Adequacy Capacity during Tight Supply Conditions:

In three of the past four years, the ISO has had to call on all available capacity – RA and otherwise – in high-load events. All three times, with load levels driven by high temperatures, wildfires have also been a factor, elevating the threat to transmission corridors. In this context, it is very difficult for the ISO to ignore the likelihood of wildfires coinciding with high-load events and tight supply conditions.

Individual plant outage rates are higher than transmission outage rates – however, pre-contingency dispatch doesn't require the contingency to actually occur, and also, an n-2 contingency may affect an entire pocket of generation resources, not an individual unit or plant. This also ties to dispatch assumptions – citing MISO and others using less demanding dispatch assumptions based on RA and non-RA resources, and expected output levels based on economic market operation. Note the trade-off on acceptable mitigations that gives additional cushion and would have far broader implications on cost and schedule for resources connecting to the grid.

Consideration in transmission planning process

Stakeholders have also suggested that the n-2 issues should be addressed in the transmission planning process. The ISO highlighted its concerns in the Straw Proposal by leaving these issues to the transmission planning process regarding both timing of identifying and implementing contingency mitigation measures (particularly where cascading outages may be at risk) and appropriate cost allocation.

Several stakeholders continued to express concerns about the appropriateness of the ISO's streamlined process of studying and addressing certain reliability needs in the deliverability analysis, and suggested that separate analysis should be conducted in both analytical stages.

The ISO's current reliability and deliverability studies are required to ensure the reliability and deliverability of the resources interconnected. Establishing a bright line between the two studies can be challenging to ensure that there are no gaps.

NERC Transmission Planning Standard TPL-001-5, Table 1 states that "Planned System adjustments such as transmission configuration changes and re-dispatch of generation are allowed if such adjustments are executable within the time duration applicable to the Facility Ratings." Therefore, redispatch of resources needed to mitigate flows above short-term emergency facility ratings must be done before the contingency occurs (precontingency redispatch). As a result, in the reliability studies, resources cannot be relied upon in the planning horizon for any amounts that require precontingency redispatch. The ISO agrees that generation dispatch similar to the framework used in the TPP reliability studies is a reasonable approach. However, unlimited precontingency redispatch as a mitigation is not reasonable. The deliverability studies ensure that precontingency redispatch is not unlimited. Removing n-2 contingencies from the deliverability studies would require major revisions to the reliability studies to ensure that precontingency redispatch is not unlimited, and attempting these process changes would inevitably raise duplication of effort between the reliability studies and deliverability studies. The ISO notes this is less of a concern in jurisdictions that do not allow remedial action schemes (RAS) or congestion management as mitigations in their reliability analysis. TPL-001-5 also states that “Applicable Facility Ratings shall not be exceeded”. Therefore, with these two statements from TPL-001-5, any contingency overloads identified in well-reasoned base case dispatch assumptions are intended to be mitigated in the long-term transmission planning horizon by transmission upgrades. Deliverability studies provide a systematic and transparent method for producing a well-reasoned base case dispatch for local generation pockets. The ISO process relies on both the deliverability studies and reliability studies to meet the standards and to ensure deliverability. This ensures that the transmission system is sufficient and RA capacity can reasonably meet its intended purpose.

Based on stakeholder feedback, the ISO is proposing clarifications to the deliverability and reliability studies to ensure that it continues to maintain reliability and deliverability without creating gaps. The revision to the reliability studies adds to the study scope, for clarification, to assess the potential for cascading outages in the analysis and determination of the delivery network upgrades needed for n-2 contingencies.

Clarifying “Conditional” Deliverability

Several stakeholders also raised a number of questions about the ISO’s use of the new term “conditional deliverability” in the Straw Proposal, and asked questions about how it would apply.

In reviewing the comments and with further review of the ISO processes, the ISO can provide additional clarity and simplification. The ISO’s initial use of the term focused on the additional conditions – the n-2 mitigations for non-cascading outages – that would need to be fulfilled, even if the resource is allowed to count for Resource Adequacy capacity prior to those mitigation measures being placed in service.

With further review of the overall construct, the ISO agrees that it is not necessary to introduce a new term, as the approach is addressed through the methodology. As described below, the resource would receive Full Capacity Deliverability Status during the period where the only pending mitigation is for a non-cascading n-2 outage. The conditions and funding requirements associated with the mitigation would already be set out in the resource’s interconnection agreement, and presumably already fulfilled by the time the resource is moving forward.

Additional Studies

Several stakeholders requested different types of deliverability studies to ascertain the impact of some of the proposed changes. These study requests generally involve what would be significant undertakings potentially adding many months to the process timeline and require diverting staff from current interconnection and transmission planning study processes. Accordingly, the ISO is not undertaking deliverability studies of different scenarios.

ISO Proposal

Consistent with the Straw Proposal, the ISO proposes to adopt a risk-based approach and resulting policy changes to provide deliverability for resources while waiting for the related n-2 deliverability upgrades to be completed. This award could only be considered in cases where reliability concerns do not exist, e.g. not risking a cascading situation.

For example, assume a project requires two upgrades: (1) an n-2 upgrade that will be complete six years after the planned COD ("Year 6"); and (2) an n-1 upgrade that will be complete three years after COD ("Year 3"). Currently, the project would not get Full Capacity Deliverability Status until Year 6 and could only possibly be awarded Interim Deliverability for years 1-6.

Under the SO's proposal, the project could get FCDS for Years 4-6 while the n-2 upgrade is still under development but would still only potentially be awarded Interim Deliverability for Years 1-3 (i.e., while the n-1 upgrade is still under development).

This approach will allow resources to provide Resource Adequacy capacity as soon as possible, giving operators reasonable comfort those resources can be accessed in tight supply conditions, taking into account practical operational considerations. This also alleviates the concern that the grid may be dependent on resources that cannot reliably be accessed without taking undue system cascading risk. The ISO considers this a balanced risk-based approach taking into account the role Resource Adequacy capacity is expected to fulfill during tight supply conditions, the relevant transmission planning standards applicable in studying stressed system conditions, operational flexibility, and the urgent need for new resources to be connected to the system.

4.5 ADNU/LDNU guidelines

Section 6.1.1.3 in the GIDAP Business Practice Manual_and Section 6.3.2.1.1 of the GIDAP tariff language_show that transmission constraints identified in the On-Peak deliverability study are classified as Area Deliverability Constraints (ADC) and Local Deliverability Constraints (LDC). In that framework, constraints with large amounts of generation behind them that trigger large, high-cost network upgrades are classified as Area Constraints, and corresponding Area Delivery Network Upgrades (ADNU) are identified. This framework is designed to avoid the identification of excessive delivery network upgrades that would be considered required and allocated among all the interconnection customers in the area in that application window despite only being needed for generation amounts far beyond the expected amount of generation development in the ISO's long-term transmission planning process based on state agency input. Section 6.1.1.4 of the GIDAP Business Practices Manual (BPM) provides the guidelines for determining which constraints are Area Constraints. This section was updated in the July 2020 BPM change management process.[16] The general direction of the updates was to lower the guideline parameters so that high cost Local Delivery Network Upgrades (LDNUs) would be classified as ADNUs. For example, the cost threshold in guideline ADC-C3 was lowered from $100 M to $50 M. Also, a new guideline ADC-C4 was added that if a constraint impacts 10 or more new and existing generators, and the mitigation costs more than $20 million, that would be an Area Constraint. This has, as expected, reduced the number of LDNUs and increased the number of Area Constraints identified. One stakeholder recommended that the ISO re-evaluate the Area Deliverability Constraints criteria in effect (BPM GIDAP 6.1.1.4), in particular guideline ADC-C4, since the amount of Area Delivery Network Upgrades identified were restricting generators from Deliverability allocation, without the opportunity to upfront fund the upgrades as local network upgrades. Therefore the ISO requested additional stakeholder comments on the need for revising the guidelines for identifying ADCs, in particular guideline ADC-C4.

Stakeholder Input

Intersect Power commented that the ISO should update all the dollar limits in the LDNU/ADNU criteria to account for construction inflation since they were adopted; and (2) set up an automatic annual increase based on construction inflation in the future. The index applied to the RNU reimbursement limit could be used for this purpose as well. The desirability of further increases can be better assessed if the CAISO would provide further information about the number and cost of upgrades that would be reclassified from ADNUs to LDNUs, perhaps based on recent historical experience.

Also, developer tolerance for LDNU financing is based not so much on the number of projects but more on the MW size. For example, financing a $30 million upgrade might be difficult for a 50 MW project alone, but not for a 500 MW project. Since the ADNU cost allocations are based on MWs, and it's the MWs themselves (and not the number of projects) that largely trigger the need for upgrades, perhaps there should be a $/MW threshold.

Discussion

The RNU reimbursement limit determines how much of the allocated cost of an upgrade would be directly refunded to an interconnection customer. The ADNU/LDNU guidelines determine which upgrades are funded by interconnection customers and fully reimbursed and which upgrades are assessed for need in the open stakeholder transmission planning process. It is not a reimbursement limit. Also, the ADNU/LDNU metrics are intended to be guidelines, so continually updating them for inflation is not aligned with the idea that they are guidelines. The Transmission Capability Estimates information posted on the ISO website

---

[16] http://www.caiso.com/Documents/Presentation-BusinessPracticeManualChangeManagementJul282020.pdf

provide the cost of ADNU's from Cluster 14, Phase I as described in the paper and shown in the attachment[17].

The ISO interprets this $/MW comment as proposing to change ADC-C4 so that the $20 M limit should be changed to $60K/MW for the total LDNU cost to be assigned to the projects in that Cluster and adjusted with the RNU reimbursement limit described in section 14.3.2(1) of GIDAP, Appendix DD.

ISO Proposal

The ISO agrees with the $/MW stakeholder comment and proposes to change ADC-C4 as follows:

- ADC-C4: All of the following are met:
    - There are more than 10 generating units contributing to the constraint.
    - The total MW amount of the new generation exceeds the MW amount of the renewable base portfolio mapped within the 5% circle[18] as defined in on-peak deliverability assessment methodology;
    - The constraint is caused by a contingency on the Bulk Electric System;
    - The mitigation would cost more than ~~$20M~~ $60,000/MW for the total delivery network upgrade cost to be assigned to the projects in that Cluster and adjusted with the RNU reimbursement limit described in section 14.3.2(1) of GIDAP, Appendix DD.

For example, assume the first three bullet items are met, and there are 500 MW of projects behind the constraint that would be assigned the cost of the upgrade. Assuming the current RNU reimbursement is approximately $80,000/MW then if the delivery network upgrade is estimated to cost over $40 M then it would be an ADNU. If the cost is less than $40M it would be an LDNU.

The ISO may also revisit criteria for delineating area deliverability network upgrades and local network upgrades in the concurrent interconnection process enhancements stakeholder process, which may result in further proposed changes. If so, the ISO would seek to aggregate recommendations from both processes to move through the BPM change management process.

4.6 Delayed deliverability upgrades

Currently, a generator must wait for all reliability and deliverability network upgrades to be in-service before it can receive FCDS. As stated in the Straw Proposal paper, the ISO

[17] Transmission Capability Estimates for use in the CPUC's Resource Planning Process, June 28, 2023: http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=03DCF912-0ECF-4CF9-A304-A05F4ED5B2CD

[18] The "5% DFAX" circle used by the overall deliverability methodology is proposed to be modified in this paper to 10% for 500 kV lines.

understands the disruptions resulting from delayed participating transmission owner (PTO) timelines for deliverability upgrades, and will explore the provision of some form of interim deliverability to projects affected by delayed network upgrades through a risk-based approach. In the straw proposal, the ISO proposed the idea of providing "conditional" deliverability when delivery network upgrades are delayed beyond their originally identified in-service date.

Stakeholder Input

Generally, stakeholders supported the idea of providing deliverability when delivery network upgrades are delayed beyond their originally identified in-service date, and asked the ISO to provide more details on how this would be implemented.

Discussion

The ISO understands that delays to in-service dates for transmission upgrades needed for achieving deliverability status can sometimes result in resource development owners missing deadlines under their power purchase agreements (PPA). This can also result in the PPA counterparty not meeting RA requirements, forcing it to procure a different alternative resource at higher costs. The ISO is concerned about the impact of these delays on the robustness of the resource development process. However, the issue of delayed network upgrades beyond their originally identified in-service date includes reliability network upgrades and is not limited to delivery network upgrades. Further internal discussion and legal review within the ISO revealed that this is not simply a technical issue that is within the scope of the deliverability study methodology review initiative as the proposal inherently relaxed not only the criteria for deliverability, but in effect relaxed the need for the Resource Adequacy resources to meet minimum operational delivery needs.

ISO Proposal

The issue of delayed reliability and delivery network upgrades delayed beyond their originally identified in-service date should be explored in the interconnection process enhancements, and will need to be coordinated with other policy venues and industry efforts to address concerns with the pace of resource and transmission development.

5 Next Steps

In this Draft Final Proposal, the ISO has summarized stakeholder's comments and proposed revisions to the deliverability assessment to address stakeholders' concerns regarding the methodology. The ISO will hold the third stakeholder meeting on November 13, 2023 to review this draft final proposal and solicit input.

None of the changes proposed above require Board of Governor approval, as most of the proposed changes to the deliverability methodology are ISO management functions. The ISO anticipates needing limited changes to the GIDAP Business Practice Manual.

Date	Milestone
November 6, 2023	Draft final proposal posting
November 13, 2023	Stakeholder call on draft final proposal
November 27, 2023	Comments due on draft final proposal
Winter 2023*	Board of Governors approval