Deliverability Assessment Methodology Revisions Straw Proposal

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Stakeholder Call
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CAISO Policy Initiative Stakeholder Process

We are here

Agenda

- Introduction and summary of key issues
- Discussion and Straw Proposal
- Schedule

What is the purpose of the ISO's deliverability methodology?

- To test that the transmission system can reasonably ensure that resource adequacy capacity can be delivered to load during stressed system conditions.
- These resources first have to meet basic interconnection requirements so that they can be reliably interconnected, and could choose to operate energy-only without providing resource adequacy capacity.

ISO Deliverability Background

- Developed in 2005, accepted by FERC and CPUC, and began use in 2006, with considerable guidance from PJM's model and recognizing MISO uses a similar approach
- A comprehensive review was conducted in 2019 and 2020 in response to the changing resource fleet and peak shift
  - Led the current "high system need" (HSN) and "secondary system need" (SSN) approach
- Other adjustments have been made since:
  - Aligned with a relaxation of a WECC standard, adjusted the dispatch levels for storage.
- Requests for another review were initiated through the ISO policy catalog, raising a number of new concerns not expressed in the earlier review
- The ISO produced an update paper in December 2022, indicating a target of March 31 for an issue paper – subsequently released on May 31.

How are the transmission needs identified and managed?

- The transmission planning process approves larger "area" deliverability upgrades for preferred zones, and that capacity is then allocated among the resources that move forward.
- The generation interconnection process identifies:
  - Smaller "local" deliverability upgrades that depend on the specific resources inside the zone
  - Reliability requirements needed to allow the resource to physically connect and be energized (that alone would provide no assurance that the resources can be relied upon in stressed conditions.)
  - Interconnection requirements

	Summary of Stakeholder Concerns and Requests	ISO Straw Proposal Response
1	**Study of High System Need and Secondary System Need:** Suggestion that the "secondary system need" study is not necessary.	➢ Remove study of the Secondary System Need from generation interconnection deliverability studies.
2	**Dispatch levels:** Suggestion that the ISO should not study intermittent resources with an output that is different than their Qualifying Capacity (QC) levels determined by the CPUC or other Local Regulatory Agencies (LRAs).	The ISO agrees that stressed but not extreme conditions should be assumed in the deliverability studies, however the proposal to only assume QC values for wind and solar generation indicates fundamental difference in understanding of the RA program. ➢ No change to current dispatch levels. The current methodology is reasonable.
3	**Simultaneous dispatch:** Changes to the determination of local deliverability should be discussed as part of this initiative. Also, the simultaneous dispatch study area boundary should be reduced to exclude generators with low impacts on the transmission constraint.	Planned IPE changes should reduce the number of local load areas with deliverability constraints. Consideration of separate local capacity products that cannot also provide system capacity must be considered more holistically. ➢ Raise the 5% distribution factor threshold for 500 kV line overload constraints to 10%.
4	**Study of n-2 contingencies on double circuit towers:** Further discussion of whether to study n-2 contingencies in the generation interconnection deliverability studies or in the Transmission Planning Process.	It would be problematic to establish a bright line between reliability and deliverability studies. ➢ The ISO proposes providing "conditional" deliverability to resources waiting for the n-2 related deliverability upgrades to be completed, assuming they would not cause cascading outages.
5	**ADNU/LDNU Guidelines:** Reevaluate Area Deliverability Constraints (ADC) criteria in effect since the amount of Area Deliverability Network Upgrades (ADNU) identified were restricting generators from Deliverability allocations.	➢ Seeking additional comment on the need to revise guidelines for identifying ADCs.
6	**Delayed deliverability upgrades:** Concern with PTO timelines being extended for deliverability upgrades, disrupting resource PPAs and in-service dates	➢ Provide "conditional" deliverability if deliverability upgrades are delayed by PTO, taking a risk-based approach and respecting reliability needs. Conditional deliverability would not be lost simply because earlier queued projects come online.

DISCUSSION AND STRAW PROPOSAL

Overview

1. Study of High System Need (HSN) and Secondary System Need (SSN)
2. Dispatch levels
3. Simultaneous dispatch within a study area
4. The study of n-2 contingencies
5. ADNU/LDNU guidelines
6. Delayed deliverability upgrades

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

Currently two study scenarios:

- highest system need (HSN) scenario
  - The load, generation dispatch, and imports correspond to when the system RA need is the highest during the year
- secondary system need (SSN)
  - under higher gross load conditions when solar is dropping off

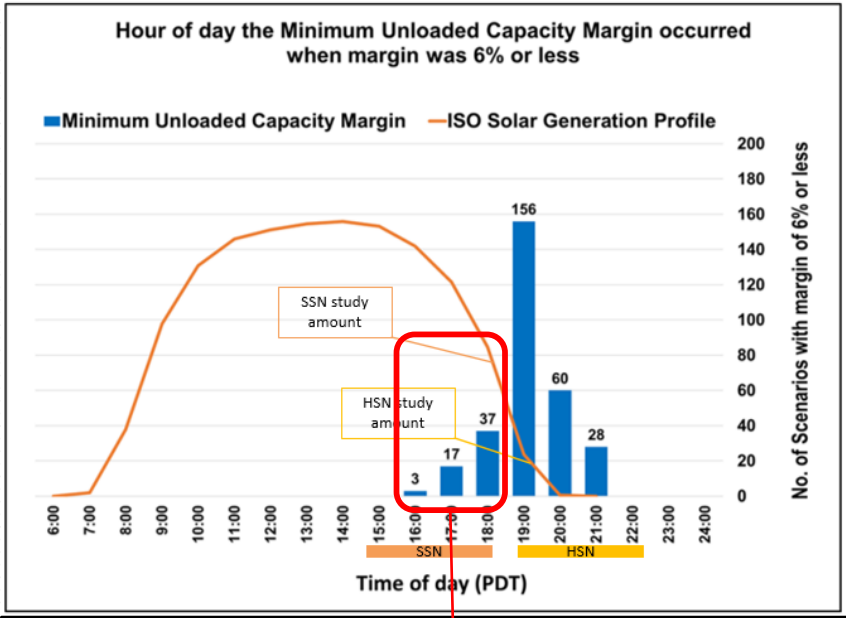
Stakeholder Input on the SSN

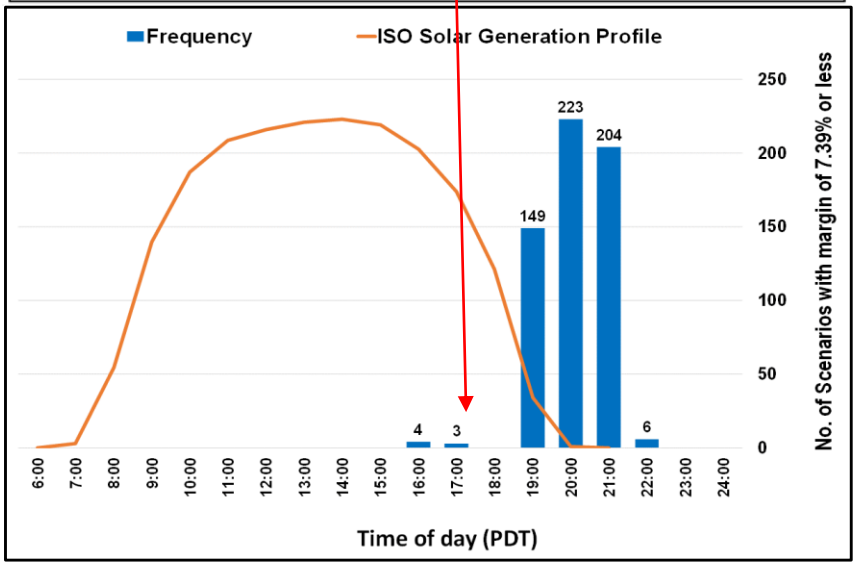
- Battery dispatch assumption is too high (e.g. reduce from 50% to 30%

- During the SSN time frame (hours 15-18) only congestion is a concern--resource adequacy is not a concern

Original basis for HSN and SSN Scenarios has shifted:

- Original 2019, 2020 analysis saw risk in the post solar window as well as in the ramping period.
- The 2023 analysis no longer identifies the risk during the ramping period as the fleet evolves – the risk is shifted out to the post solar window.





Discussion and Proposal on the SSN study

- The 2018 and 2022 Summer Assessment analysis, showed that resource shortage conditions do occur during the SSN study period.
- The 2023 Summer Assessment indicated that the risk of resource shortages during the SSN period may be less of a concern.
- The ISO proposes to remove the SSN study from generation interconnection deliverability studies.
- The ISO proposes continuing to perform the SSN study in the TPP as a screening tool for further analysis.

Dispatch levels

- Generation is dispatched in the initial base case at close to maximum dependable capacity.
- A study group is established for each line and transformer that includes all generation with a 5% distribution factor or greater.
- The output of a subset generators in the study group are incrementally increased to the full study amount.
- Wind and solar generators are dispatched up to their 20% exceedance level in the HSN study.
- Other generators are dispatched up to their NQC level.

Stakeholder Input on Dispatch Levels

- Generators should not be studied above their NQC values.
- A stakeholder example showed a 100 MW wind generator behind a 56 MW transmission constraint, and then added a 30 MW battery suggesting that both resources should receive full RA credit.
  - In effect, only 14 MW of available transmission should be needed for a 100 MW wind farm to be fully deliverable.
- Not all generators in the queue will be built, so dispatch levels should be discounted.

Discussion on Dispatch Levels

- In the HSN study, the solar study amounts are approximately 10% of their maximum capability.
- Stakeholder concerns seem to be focused primarily on the wind generation study amounts.
- Though the HSN wind study amounts are higher than the NQC values, wind production levels are more variable on a temporal and geographic basis.
- The proposal to study only up to the NQC values for wind and solar generation has a fundamental gap as it relates to the RA program.

Discussion on Dispatch Levels

- The ELCC-based NQC values for solar and wind resources are based on stochastic simulations.
- The values represent a theoretical equivalent generator.
- For example, 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, e.g. putting the 100 MW wind generator behind a 14 MW transmission line, it would no longer be equivalent to a 14 MW perfect generator.

Discussion and Proposal on Dispatch Levels

- The CPUC adopted a decision to replace the ELCC approach with a “Slice of Day” approach and an exceedance methodology.
- The ISO will continue to monitor development of NQC values, and evaluate the need for further updates to its deliverability methodology.
- If there is more generation in the queue than in the TPP resource portfolio, that constraint is typically identified as an Area Constraint and the associated upgrade costs are not assigned to the interconnection customers.
- The ISO is not proposing any changes to dispatch levels and believes that its methodology for determining dispatch levels in the deliverability studies is reasonable.

Simultaneous dispatch within a study area

- The purpose of the ISO's deliverability test is to demonstrate that the available generation capacity in any electrical area can be run and 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.

- The electrical areas are determined by which generators cause significant flows on the transmission constraint based on distribution factors (DFAX).

Stakeholder Input on Simultaneous dispatch within a study area

- While it is true that during the August 2020 and August and December 2022 stressed system conditions, the ISO needed access to all available resources, this was due to a lack of generation capacity, not a lack of transmission capacity.
- PJM uses a 5% DFAX for all constrained transmission lines up to 500 kV and 10% DFAX for all constrained transmission lines at 500 kV and above.
- Many of the technical criteria for determining local deliverability designation should be addressed as part of this initiative due to its highly technical content that is dependent on transmission-related studies.

Discussion and Proposal on Simultaneous dispatch within a study area

- The first stakeholder observation actually supports the premise that the deliverability methodology was “doing its job” – that even under stressed conditions, when all RA resources were being called upon, that the transmission system was adequate and not a barrier to accessing those resources.
- With the 5% DFAX currently used as the threshold for 500 kV line overloads, the electrical and geographic area captured within the group can include multiple interconnection study areas.
  - 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.

Discussion and Proposal on Simultaneous dispatch within a study area (continued)

- In the rare cases where application volumes are so high in a local capacity area that flows not only reverse out of the area, but also exceed transmission capacity out of the area,
  - the ISO is looking to the interconnection process enhancements to better address the intake of new interconnection requests.
  - the ISO will have transmission planning engineers participating in the RA capacity initiative, who will be able to address issues with highly technical content.

The study of n-2 contingencies

- Pursuant to NERC Reliability Standard FAC 002 and TPL-001 common mode n-2 contingency analysis and corresponding mitigation is required in generation interconnection studies.
- 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.
- If RAS is not sufficient, system upgrades are identified as needed in the planning horizon based on the deliverability study.

Stakeholder input on the study of n-2 contingencies

- The deliverability study methodology is beyond NERC requirements.
- Reliability upgrades that currently come out of the generation interconnection procedures (GIP) are limited as they are based on a very limited set of reliability studies.
- To address any concerns about reliability not currently addressed in GIP, an additional reliability test with an expanded scope could be added to the GIP.
- Such reliability studies should use generation dispatch similar to the one used in TPP reliability studies, including re-dispatch of resources.

Discussion on the study of n-2 contingencies

- NERC TPL-001-5 requires that transmission system be planned to operate reliably over a broad spectrum of System conditions and following a wide range of probable Contingencies.
  - N-2 contingences are within that wide range of probable contingencies, as shown in Table 1 of the standard.
- Within the NERC prescribed criterion, it is prudent to analyze peak load conditions when all available resources within a limited area are needed to meet overall system load
- The ISO agrees that generation dispatch similar to the framework used in the TPP reliability studies is a reasonable approach.
  - However, unlimited pre-contingency redispatch is not reasonable.
  - The deliverability studies ensure that pre-contingency redispatch is not unlimited.
- Removing n-2 contingencies from the deliverability studies would require major revisions to the reliability studies to ensure that pre-contingency redispatch is not unlimited.

Discussion on the study of n-2 contingencies (cont.)

- 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.
- The 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 NERC standards and to ensure deliverability.

Proposal on the study of n-2 contingencies

- As stated, the ISO is required by NERC to study n-2 contingencies on double-circuit towers, as are other ISOs such as MISO and PJM. Therefore, the ISO does not intend to change this practice.
- If an n-2 contingency results in an overloaded facility, but not cascading outages, then upgrades would be required but would not delay additional generation projects from becoming deliverable.
- 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.
- Additional generation projects would be eligible for a conditional deliverability status during the development period of the transmission upgrades necessary to mitigate the n-2 contingency, assuming that no other constraints are binding.
- Unlike interim deliverability, conditional deliverability would not be lost just because earlier queued projects come on-line, assuming that no other constraints are binding.

ADNU/LDNU guidelines

- Transmission constraints identified in the On-Peak deliverability study are classified as Area Deliverability Constraints (ADC) and Local Deliverability Constraints.
- In that framework, constraints with large amounts of generation behind them that trigger large, high-cost network upgrades are classified as ADC, and corresponding Area Delivery Network Upgrades (ADNUs) 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.

Stakeholder input on ADNU/LDNU guidelines

- Recommend that CAISO re-evaluate the Area Deliverability Constraints criteria
- Once all ADCs are identified, the generators behind an ADNU are not required to build the network upgrade, so there is no pathway for the Interconnection Customers (ICs) who are willing to fund the upgrade and acquire the deliverability.

Discussion of ADNU/LDNU guidelines

- One of the considerations behind the local constraint classification guidelines was to improve transparency:
  - process the approval of all major transmission upgrades through the ISO's open TPP stakeholder process, and for upgrades costing more than $50 million to obtain ISO Board Approval.
- This was expected to facilitate construction permitting.
- Another consideration was to remove the financial burden of high-cost transmission projects from generation developers.

Proposal on the ADNU/LDNU guidelines

The following options are under consideration for comments and discussion:

- Option 1: Raise the cost threshold in the Area Constraint guideline for ADC-C4 to $25 M in current dollars.
- Option 2: Raise the cost threshold in the Area Constraint guideline for ADC-C4 to $35 M in current dollars.
- Option 3: Eliminate the Area Constraint guideline ADC-C4.

The ISO is not proposing changes in the straw proposal as the topic was not raised in earlier issue papers – but seeks stakeholder input at this time.

Delayed deliverability upgrades

- Currently, a generator must wait for all reliability and deliverability network upgrades to be in-service before it can receive FCDS.

Stakeholder input on delayed deliverability upgrades

- Network upgrade timelines are being continuously delayed, sometimes for eight years or more.
- This puts the state's clean- energy goals, mid-term procurement, and reliability goals at risk.
- CAISO must modify its deliverability methodology to grant deliverability when the barriers to preventing deliverability assignment are highly unlikely to occur or harm reliability.

Discussion and proposal on delayed deliverability upgrades

- 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 proposes to provide conditional deliverability based on the original schedules, accepting the risk of deliverability constraints for the interim period, rather than disrupting the resource procurement cycle.
- Unlike interim deliverability, for the transmission constraint that would be mitigated by the delayed transmission project, conditional deliverability would not be lost simply because earlier queued projects come online.

Initiative Schedule

Date	Milestone
May 31, 2023	Issue paper posting
June 08, 2023	Stakeholder call on issue paper
June 22, 2023	Comments due
August 22, 2023	Straw proposal posting
August 29, 2023	Stakeholder call on straw proposal
September 12, 2023	Comments due on straw proposal
October 9, 2023	Draft final proposal posting
October 16, 2023	Stakeholder call on draft final proposal
October 30, 2023	Comments due on draft final proposal
Winter 2023*	Board of Governors meeting

The schedule considers progress of the IPE Track 2 initiative due to overlapping issues.

Additional information

- Written comments are due by end of day **September 12, 2023**. Please submit your comments using the comment template available on the initiative webpage: https://stakeholdercenter.caiso.com/StakeholderInitiatives/Generator-deliverability-methodology-review

- Visit initiative webpage for more information: https://stakeholdercenter.caiso.com/StakeholderInitiatives/transmission-planning-process-phase-3-revise-competitive-solicitation-project-proposal-fee

- If you have any questions, please contact isostakeholderaffairs@caiso.com