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Revised Technical Bulletin

Deliverability Requirements for Queue Clusters 1-4 and Determination of Net Qualifying Capacity

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Market & Infrastructure Development

Revised Technical Bulletin

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Deliverability Requirements for Queue Clusters 1-4 and Determination of Net Qualifying Capacity

1 Executive Summary

This technical bulletin updates and replaces two technical bulletins issued earlier this year by the ISO:¹

- *Generator Interconnection Procedures: Deliverability Requirements for Clusters 1-4*, originally dated January 31, 2012, revised February 2, 2012; and
- *Classification of Generating Facilities as “Existing” or “New” for Determining Net Qualifying Capacity*, dated April 4, 2012.

The prior technical bulletins addressed two main topics:

- (a) The ISO's revised approach for identifying delivery network upgrade requirements for proposed generating facilities participating in queue clusters 1 through 4 of the ISO's generator interconnection procedures; and
- (b) The criteria for classifying generating facilities as “existing” or “new” for the purpose of determining net qualifying capacity (NQC), to be applied in the event that conditions on the ISO controlled grid require reductions to the NQC of generating facilities that have full capacity deliverability status and are located in constrained electrical areas of the grid.

This technical bulletin provides an update and some clarifications regarding item (b) only; it does not modify any aspect of item (a) as originally discussed in the previous technical bulletins.

The new material in this technical bulletin consists of one significant modification to the criteria for classifying generating facilities as “new” or “existing” for NQC determination, and several clarifications regarding the application of this classification and the relationship between a generating facility's deliverability status and the determination of its NQC.

1.1 Modification to the criteria for “existing” versus “new” generating facilities for NQC determination

Regarding item (b) above, the present technical bulletin implements one modification that supersedes the criteria presented in the previous technical bulletins:

¹ Concurrently with the posting of this technical bulletin, the ISO is removing the February 2 and April 4 technical bulletins from its website. A related technical report which the ISO posted on January 31, 2012, *Cluster 1 & 2 Deliverability Analysis without Expensive and Long-Lead Network Upgrades*, is unaffected by the updates and clarifications provided in this technical bulletin and will remain in effect and posted on the ISO website without modification, at the following link:
http://www.caiso.com/Documents/TechnicalReport_cluster1_2DeliverabilityRe-Assessment.pdf

A generating facility will be considered “existing” for determination of net qualifying capacity (NQC) if by December 31, 2012 it either is already in commercial operation or has an executed bilateral contract committing it to provide resource adequacy capacity to an ISO load-serving entity.²

For a generating facility whose qualifying capacity (QC) is greater than the MW capacity amount committed in the relevant bilateral contract that was executed by December 31, 2012, only the contracted amount of capacity will be considered “existing.”

For an affected generating facility that is not in commercial operation by December 31, 2012, the resource owner and the contracting counterparty must demonstrate the applicable bilateral contract by submitting to the ISO (1) affidavits by February 28, 2013 detailing the relevant terms of the contract, and (2) additional affidavits by April 1 of the first year that the generating facility will be included in the ISO’s annual NQC assessment process, to confirm that the same bilateral contract remains in effect for the upcoming resource adequacy year.³ The ISO will provide details regarding submission of the required affidavits in the Business Practices Manual (BPM) for Reliability Requirements.

1.2 Clarifications regarding determination of NQC

This technical bulletin provides several clarifications in response to stakeholder questions about the application of item (b) above, as well as questions about when and how a generating facility formally attains its requested deliverability status (full capacity or partial capacity), and the relationship between a facility’s deliverability status and determination of its NQC.

1. The ISO reiterates the clarification, which was included in the April 4 technical bulletin, that the “existing” versus “new” distinction will apply, subject to the other clarifications provided below, to all generating facilities in the interconnection queue, including those facilities whose interconnection requests were submitted prior to cluster 1, facilities in clusters 1 through 4, plus all generating facilities entering the queue in cluster 5 or a later cluster.
2. ISO clarifies that the “new” versus “existing” distinction will be applied only with respect to transmission constraints for which mitigating network upgrades were initially identified in Phase II studies for clusters 1-2 or clusters 3-4 and then removed from the network upgrade requirements.⁴ Tables 3-4 in the January 31 technical study report listed the

² With this modification, a generating facility’s status on a procurement short-list or in active contract negotiation, as discussed in the April 4 technical bulletin, will no longer be relevant for purposes of the “existing” versus “new” classification.

³ To be included in the ISO’s annual NQC assessment a generating facility must either already be in commercial operation at the time the ISO performs the assessment, or be scheduled and on track to begin commercial operation no later than September 1 of the upcoming resource adequacy year. For example, during the second quarter of 2014 the ISO will perform the NQC assessment for the 2015 resource adequacy year. To be included in that assessment, the facility must be scheduled and on track to begin commercial operation no later than September 1, 2015. For a resource that qualifies as “existing” by having an applicable bilateral contract executed on or before December 31, 2012, the second set of required affidavits will be due to the ISO by April 1, 2014.

⁴ The relevant constraints resulting from the cluster 1-2 Phase II studies were identified in the January 31 technical study report mentioned in footnote 1 above. The relevant constraints resulting from the

limiting facilities that were identified as deliverability constraints in the Phase II studies for clusters 1-2. As explained in the February 2 technical bulletin, the removal of network upgrades that were initially identified in the Phase II studies to relieve these constraints from the network upgrade requirements of cluster 1-2 projects means that development of new generation requesting deliverability in the area must stay within ISO-specified MW thresholds to avoid triggering a need to mitigate one or more of the identified constraints. Therefore, if congestion on one or more of these same constraints requires NQC reductions to generating facilities in the same area in a future NQC assessment, the ISO will apply the “new” versus “existing” distinction in performing the needed NQC reductions.⁵

3. The ISO clarifies that in performing the NQC assessment and any needed adjustments, the ISO models import flows consistent with values of maximum import capability (MIC) either as determined through historical data or as targeted for expansion in the transmission planning process (TPP).⁶ In making any needed NQC reductions the ISO will not reduce import flows.
4. The ISO clarifies that a generating facility formally attains its requested (full capacity or partial) deliverability status when the facility attains commercial operation and all the required network upgrades specified in its GIA or identified in its Phase II study report or facilities study report are placed into service. For a generator that initially connects as energy-only and later requests deliverability status under an ISO tariff process, such status is effective upon notification by the ISO that the request has been granted.
5. Full capacity or partial capacity deliverability status does not guarantee that a generator can provide a specific amount of resource adequacy capacity. The maximum amount of resource adequacy capacity a generator can provide in a given resource adequacy year (calendar year) is its NQC as determined by the ISO annually.
6. Following on the previous point, although a generator’s annual NQC, not its deliverability status, ultimately specifies the maximum amount of resource adequacy capacity it can provide in each resource adequacy year, a generator’s deliverability status does affect its NQC in the following way:

A generator’s deliverability status affects how the ISO models the generator in the deliverability study performed for the annual NQC assessment. Specifically:

- The ISO models a full capacity deliverability status generator as producing energy at either:

cluster 3-4 Phase II studies will be identified in a new technical study report, which the ISO will post following the completion of these studies in the fourth quarter of 2012.

⁵ As explained in the February 2 technical bulletin, the only generating facilities that will be considered for NQC reduction in this process, if necessary, will be those that have at least 5 percent flow factor on one or more of the limiting constraints.

⁶ For an intertie whose MIC was targeted for expansion in the TPP, the ISO will model imports equal to the targeted MIC value in the NQC study only to the extent that any transmission upgrades or additions identified in the TPP as needed to support the expanded MIC value are scheduled to be in service by September 1 of the upcoming resource adequacy year.

- The level of its qualifying capacity (QC) for conventional thermal or hydro, or
 - A pre-specified “exceedence” level for a generator whose QC is based on historical or forecasted output during QC assessment hours (e.g., wind, solar).
 - The ISO models a partial capacity deliverability status generator as producing the fraction of the above energy corresponding to its “partial” deliverability status. For example, if a generator has 50 percent partial deliverability status, the ISO will model 50 percent of the generation output that would normally correspond to full capacity status for the generator.
 - The ISO models an energy-only generator as not generating.
7. A generating facility does not have to have achieved its requested deliverability status in order to participate in an annual NQC assessment and receive a positive NQC. A facility must be scheduled to begin commercial operation no later than September 1 of the upcoming resource adequacy year, but it is not necessary that all the required network upgrades be in service by September 1 in order for the facility to participate in the NQC assessment. Such a generating facility will be eligible to receive a positive NQC on a one-year-at-a-time, “as-available” basis, to the extent that the NQC deliverability study indicates that positive NQC is supportable by the grid after providing the required NQC for generating facilities that have already achieved their requested deliverability status or will achieve it by September 1 of the upcoming resource adequacy year. The ISO will model such a generator in accordance with its requested deliverability status in the NQC study, but will reduce the dispatch of such generator to relieve a transmission constraint prior to reducing the dispatch of any generators that have or will have achieved their requested deliverability status.
8. In performing the NQC deliverability study, the ISO models all eligible generators at the output levels described above and identifies any overloads of transmission facilities. If there are no overloads, each generator will receive NQC equal to either its QC (for a full capacity generator) or the appropriate fraction of its QC (for a partial capacity generator). If there are overloads of any transmission constraints, the ISO will reduce the generator dispatch levels using the weighted least squares algorithm until the overloads are eliminated, and will translate the resulting reduced dispatch levels into NQC values. As noted in the previous paragraph, the ISO will reduce dispatch levels first for generators that will have achieved commercial operation but, because all their required network upgrades will not be in service, will not have achieved their requested deliverability status by September 1 of the upcoming resource adequacy year. If transmission overloads still remain after fully curtailing the dispatch levels of these generators, the ISO will next reduce the dispatch levels of generators that have already or will have achieved their requested deliverability status by September 1. Within this latter group, in situations where the limiting transmission constraints indicate that the “existing” versus “new” categories should apply, as discussed above, the ISO will reduce dispatch levels first for the “new” group of generators, also using the weighted least squares algorithm, and will reduce dispatch levels for the “existing” group only if the overloads cannot be eliminated by reducing the dispatch levels of the “new” group to zero.

1.3 Objectives of the original January 31 technical bulletin

In addition to describing the change of the cutoff date for the “new” versus “existing” categories to 12/31/12 and providing the clarifications discussed above, this technical bulletin incorporates the substance of and replaces the January 31 technical bulletin. As such, this technical bulletin:

1. Describes the ISO’s approach for determining the delivery network upgrades (DNU) for which interconnection customers with projects in clusters 1 through 4 of the ISO’s generator interconnection queue will be responsible, in accordance with the generator interconnection procedures (GIP) as specified in the ISO tariff;
2. Identifies those DNU that were determined to be required in the GIP Phase II studies for cluster 1 and 2 projects and will, as a result of the approach described herein, no longer be required for these projects to obtain full capacity deliverability status and execute generator interconnection agreements (GIA) on that basis;
3. Provides estimates of the amount of full capacity deliverability status generation that the ISO-controlled grid can support (in addition to generation already in operation) in each electrical area of the grid affected by the removal of the DNU described above;
4. Identifies additional network upgrades that were assumed in performing the GIP Phase II studies for clusters 1 and 2 but were not included for developing estimates of the MW amount of full capacity deliverability status generation the grid can support in affected electrical areas, in order to minimize the possibility of over-estimating grid capacity in such areas; and
5. Describes how the ISO will address situations, should they arise as a consequence of the approach described herein, where the MW amount of full capacity deliverability status generation in commercial operation in an electrical area of the grid exceeds or is expected to exceed the amount of net qualifying capacity (NQC) that the grid can support in that area.

2 Background

On October 31, 2011, the ISO posted the “Draft Discussion Paper: Cluster 1 and 2 Deliverability Concerns, Provision of Additional Information.”⁷ That paper was prompted by concerns many developers of renewable generation projects and other stakeholders had expressed regarding the impacts of the large cluster size on the ISO network upgrade requirements for full capacity deliverability status (the “delivery network upgrades” or “DNU”). In particular, due to the large volume of projects in these clusters, the ISO’s interconnection studies showed that full capacity deliverability status required costly DNU in some areas that would take until the latter part of this decade to complete. Developers and other parties complained that the high cost and the long wait to obtain full capacity deliverability status were preventing projects from obtaining power purchase agreements (PPAs) and project financing.

⁷

<http://www.caiso.com/Documents/DraftDiscussionPaper-Cluster1-2DeliverabilityConcerns.pdf>

In the October 31 paper the ISO provided information it believed would help address the above concerns. The paper provided engineering estimates of the amount of new generation that could achieve full capacity deliverability status without requiring the high-cost, long lead-time DNU. The concept was that based on this information, load-serving entities (LSEs) could avoid triggering the need for these problematic upgrades by limiting their procurement of renewable PPAs in certain areas of the grid to stay within the amounts indicated by the ISO.

The ISO held a stakeholder conference call to discuss the October 31 paper and then received written comments and other input from stakeholders.⁸ The main message of this input was that provision of the MW threshold information was not sufficient to enable bilateral contracting and project financing to proceed. The remaining problem was that any given interconnection customer could not be sufficiently certain that the high-cost long lead-time DNU would not in fact be triggered, because the outcome ultimately depended on factors outside that interconnection customer's control, specifically, decisions by LSEs to execute PPAs with a large amount of other projects in the same area. This meant that when it came time for a project developer to submit a bid into an LSE's procurement request for offer (RFO) or to negotiate its generation interconnection agreement (GIA), the developer would not know its transmission cost with sufficient certainty either for the RFO process or for project financing.

Based on this input and further consideration of possible alternatives, the ISO developed a more effective way to address the identified concerns, and described it in a revised discussion paper posted on January 10, 2012, which was discussed at a stakeholder meeting on January 17.⁹ That approach, which was finalized in the January 31 technical bulletin, involves revising the DNU requirements for cluster 1 and 2 projects that were originally identified in the GIP Phase II studies to eliminate the high-cost, long lead-time DNU that have impeded PPA and GIA negotiation and project financing. The rationale for eliminating these upgrades is the commonly accepted fact that the generation interconnection queue contains three to four times as much generating capacity as is needed and could be commercially viable. If the actual financing, construction and commercial operation of new generation remains in line with the amount actually needed to meet renewable targets and load growth, these eliminated transmission facilities will most likely not be needed, and therefore should not be included in the network upgrade requirements or cost estimates of the generation projects.

The approach described here does not fully eliminate the possibility that new generation could develop in a given electrical area of the grid in a total amount that exceeds the capability of the grid to support full capacity deliverability status for all projects in that area. Indeed, this could occur in a particular area of the grid, even though the total amount of development system-wide does not exceed what is needed to meet renewable targets. Under the approach described here, such an outcome (which would be apparent from approved PPAs and generation project construction activities well before all the projects achieve commercial operation) could lead the

⁸ See <http://www.caiso.com/informed/Pages/StakeholderProcesses/GeneratorInterconnectionProceduresCluster1-2DeliverabilityConcerns.aspx> for information on the ISO's stakeholder efforts with respect to cluster 1 and 2 deliverability concerns.

⁹ http://www.caiso.com/Documents/RevisedDiscussionPaper-GenerationInterconnectionProceduresCluster1_2DeliverabilityConcerns.pdf

ISO to identify additional public policy-driven transmission elements in the transmission planning process, but would not cause the generation projects to face DNU costs beyond what were specified in their GIAs. This approach thus eliminates uncertainty for project developers about potential increases in financial posting or cost responsibilities if a need for additional network upgrades is triggered.

One remaining risk that LSEs and developers would need to recognize is the potential for some generating resources in this circumstance to receive less net qualifying capacity (NQC) for one or more resource adequacy compliance years than the full value of their deliverability status would indicate. This risk exists today due to the distinction in the ISO tariff between a resource's deliverability status, which is a stable attribute of the resource, and its NQC, which is determined annually through an ISO deliverability analysis in advance of each resource adequacy (RA) compliance year.

Section 3 of this bulletin discusses the approach with regard to clusters 1 and 2. Since the ISO has already completed the analysis of the results for projects in these clusters, section 3 specifies the DNU that were removed from the requirements that were stated in the original GIP Phase II study results for these projects, as well as estimates of the amount of full capacity deliverability status generation the grid can support in electrical areas affected by the removal of these DNU. Section 4 of this technical bulletin explains how the ISO will use the approach for cluster 3 and 4 projects, whose GIP Phase II studies are currently in progress. Section 5 describes how the ISO will address situations where generation development in an area actually exceeds the threshold amount that triggers the need for a network upgrade that was previously determined not to be needed.

3 Cluster 1 and 2 approach

The ISO has reassessed the cluster 1 and 2 Phase II study results with regard to those delivery network upgrades (DNU) that: (1) are costly and will require large postings by cluster 1 and 2 projects, (2) will take many years to be built, thus delaying deliverability for these projects and adversely affecting their ability to provide RA capacity as required by their PPAs, and (3) are not likely to be needed based on the amount of new generation expected to actually receive PPAs and become commercially viable. The reassessment assumed that the amount of new generating capacity in each study area will not exceed the amount that will be deliverable based on the transmission system as reflected in the 2011/2012 transmission plan without requiring the problematic DNU as characterized above. For example, in the Desert Area¹⁰ the ISO assumed that no more than about 9,300 MW of new generating capacity will actually achieve commercial operation out of the roughly 11,300 MW in the existing queue (up to and including clusters 1 and 2). On this basis the ISO provided addenda to the cluster 1 and 2 Phase II study results, which provided to the affected cluster 1 and 2 generation projects the reduced DNU requirements and associated cost responsibilities. Those interconnection customers were then

¹⁰ The Desert Area refers to generating resources electrically located in the following renewable energy zones: Pisgah, Mountain Pass, Nevada C, New Mexico, Palm Springs, Riverside East, San Diego South, Imperial, and Arizona.

able to proceed to negotiate GIAs that provide their requested deliverability status without requiring the problematic DNU. Additional technical detail on this element of the proposal is provided in the next sub-section.

One potential outcome of this approach is that, if more than the assumed amount of generation in any given study area actually gets PPAs and achieves commercial operation (e.g., if more than about 9,300 MW gets built and comes on-line in the Desert Area), the transmission grid as planned at the time the cluster 1 and 2 projects signed GIAs would not actually support the full capacity deliverability status of all projects. Section 5 below discusses the implications of this situation if it occurs.

3.1 Technical details of the GIP Phase II study reassessment

This section describes two aspects of the technical reassessment of GIP Phase II study results. The first aspect is to specify criteria for identifying which DNU that resulted from the current cluster's Phase II study should be removed for purposes of determining each generation project's cost responsibility and related provisions of its GIA. The second aspect is to estimate the amount of full capacity deliverability status generation that the grid can support in each grid area affected by the removal of these DNU. For this purpose the ISO also considers whether any network upgrades associated with earlier queued generation projects, and those generation projects as well, should be removed from the assessment of available deliverability. This is important because, in areas where there is significant risk that the generation projects driving the need for these previously identified network upgrades will not be completed, the ISO might over-estimate the amount of available deliverability by including these upgrades.

The criteria specified here for cluster 1 and 2 for the purposes described above will be applied again in the context of clusters 3 and 4, as discussed in section 4 of this technical bulletin.

3.1.1 Criteria for identifying upgrades to be removed

A delivery network upgrade originally identified during the GIP Phase II interconnection study process for the current cluster (i.e., clusters 1 and 2) may be removed from the Phase II study results if the upgrade is not needed in the current transmission plan and satisfies at least one of the following criteria:

- (a) The network upgrade consists of new transmission lines 200 kV or above, and has capital costs of \$100 million or greater; or
- (b) The network upgrade has a capital cost of \$200 million or more.

For purposes of this assessment, "not needed in the current transmission plan" entails all of the following:

1. The upgrade was not modeled in the base case for the current planning cycle;
2. The upgrade was not approved in the final comprehensive transmission plan for the current planning cycle; and

3. The need for the upgrade was driven by a quantity of new generation that is far in excess of the amount needed to achieve the public policy requirement specified as an objective in the current planning cycle.

The specific network upgrades associated with cluster 1 and 2 projects that meet these criteria are identified in the next section. The ISO has removed them from the Phase II interconnection study DNU requirements for clusters 1 and 2, and reflected their removal in the financial posting requirements for these generation projects and in the terms of their GIAs.

For purposes of calculating the amount of deliverability that is available without triggering the DNU identified under the criteria above, the ISO may also remove a network upgrade that was needed by earlier-queued generation projects and was assumed in-service in the original GIP Phase II interconnection study for the current cluster, if the upgrade is not needed in the current transmission plan and satisfies at least one of the following criteria (a) and (b), plus criterion (c):

- (a) The upgrade consists of new transmission lines 200 kV or above, and has capital costs of \$100 million or greater; or
- (b) The upgrade has a capital cost of \$200 million or more; and
- (c) Funding for the network upgrade is at risk because the generation project responsible for its funding or for triggering the need is at risk of not being developed. The ISO will determine such risk based on publicly available information regarding permitting, commercial issues and delays in development timeline.

The ISO would, of course, also remove the earlier queued generation projects associated with any network upgrades removed from the deliverability study on this basis and would reflect their removal in the supplementary deliverability study results for cluster 1 and 2 projects.

It is important to emphasize that the removal of certain earlier queued generation projects and the network upgrades associated with them is only for the purpose of estimating the amount of new full capacity deliverability status generation the grid can support in the electrical area in question without additional upgrades. The removal of these network upgrades and associated generation projects for purposes of this estimation has no impact on the status of the upgrades, the earlier-queued generation projects or their GIAs. The ISO is removing the network upgrades for this estimation because not to do so could lead to unrealistic over-estimation of the amount of deliverability the grid will be able to support, given current status information indicating reasonable doubt that the generation projects will be completed.

Once the two groups of delivery network upgrades are removed from the assumptions for this aspect of the approach, the ISO will determine how much deliverability the network will provide in each study area without these upgrades.

3.1.2 Application of the criteria to clusters 1 and 2

Applying the criteria above for identifying upgrades to be removed from the cluster 1 and 2 deliverability studies leads to removal of the following network upgrades:

1. Mohave–Lugo 500 kV line loop-in Pisgah 500 kV Substation and series capacitor banks on both Pisgah–Nipton and Pisgah–Mohave 500 kV lines;

2. Colorado River–Red Bluff No.3 line; and
3. Red Bluff–Valley 500 kV line.

In addition, applying the criteria above for identifying upgrades associated with earlier queued generation projects for purposes of the estimation of available deliverability leads to the removal of the following:

4. Upgrade of Pisgah 230kV substation to 500kV substation, teardown of existing Pisgah – Lugo 230 kV No.1 line and replacement with new Pisgah – Lugo 500 kV No. 1 line, and Lugo–Eldorado 500kV line loop-in at Pisgah 500kV bus; and
5. Q72 and associated upgrades (dual 500 kV generation tie-lines connecting to SCE and SDG&E systems near Valley and Talega substations respectively).

The removal of these additional upgrades introduces additional deliverability constraints, which affect the amount of deliverability available in certain study areas, as described below.

Desert Area Constraints – Preliminary Results

The ISO performed a deliverability analysis following its existing study procedures to determine how much of cluster 1 and 2 and earlier queued generation would be deliverable without the DNU listed above. The ISO queue up to and including clusters 1 and 2 contains approximately 11,300 MW¹¹ of generation in the Desert Area that will have significant flows across the deliverability constraints listed in the two tables below, for the SCE and SDG&E PTO service territories respectively. Of these, approximately 6,000 MW to 9,300 MW can be accommodated as fully deliverable without the need for the major upgrades listed above. As a comparison, the renewable resource portfolios under study in the 2011/2012 ISO transmission planning process have no more than approximately 5000 MW to 7000 MW of renewable generation that have significant flows across these constraints.

The following table lists all the deliverability constraints identified in the SCE area study.

Contingency	Limiting Facility
Normal condition	Lugo - Pisgah 230 kV No. 2
Lugo - Jasper 230 kV No. 1 & Lugo - Pisgah 230 kV No. 2	Pisgah - Cima - Eldorado 230 kV No. 1
	Pisgah - Eldorado 230 kV No. 2
	Kramer - Lockhart 230 kV No. 1
Devers - Red Bluff 500 kV No. 1 & No. 2	N. Gila - Imperial Valley 500 kV No. 1
	Lugo - Victorville 500 kV No. 1
Red Bluff - Colorado River 500 kV No. 1 & No. 2	N. Gila - Imperial Valley 500 kV No. 1
	Lugo - Victorville 500 kV No. 1

¹¹ The January 10, 2012 discussion paper stated this number as 12,000 MW. The reduction to 11,300 MW is due to project withdrawals and updates to the queue information. This change in the project modeling also affected the range of deliverable MW amounts slightly.

The ISO queue contains approximately 3,800 MW of generation that have significant flows across the SDG&E system deliverability constraint identified below, of which approximately 2,400 MW to 3,200 MW can be accommodated as fully deliverable without the need for major upgrades. As a comparison, the renewable resource portfolios under study in the 2011/2012 ISO transmission planning process have no more than approximately 1,000 MW to 2,000 MW of generation with significant flows across this constraint.

The following table lists all the deliverability constraints identified in the SDG&E area study.

Contingency	Limiting Facility
Normal condition	Path 43 (North of SONGS) path rating

The amount of MW that would be deliverable is stated as a range rather than a single amount because the exact amount depends on which of the generation projects in the queue actually proceed to commercial operation, as different project locations will have different flow impacts on the constraints. For the Desert Area, an additional source of uncertainty exists since the existing series capacitor at Lugo substation on the Eldorado/Nipton-Lugo 500 kV line has a low rating and is normally by-passed. In the study the ISO initially assumed that the Lugo series cap was bypassed, and then performed a sensitivity study with the series cap upgraded and in-service. For the San Diego area, an additional source of uncertainty regarding the exact amount of deliverable new generation is the uncertainty about how Encina units 4, 5 and GT (644 MW total) and Cabrillo II generation (188 MW) will address the once-through cooling requirements; i.e., whether they will retire due to once-through cooling compliance requirements and site lease expirations, or will be retrofitted, repowered or renewed. If these units choose to be retrofitted, repowered, or renewed then their deliverability will need to be preserved. These uncertainties are reflected in the ranges provided above for the amount of available deliverability.

3.2 Phase II report addenda provided to cluster 1 and 2 projects

Following the posting of the January 31 technical bulletin, the ISO issued an addendum to each cluster 1 and 2 interconnection customer's Phase II Interconnection Study Report. The addendum provided updates to the report to identify the final DNU requirements based upon stated levels of MW generating capacity additions in electrical areas of the ISO-controlled grid, as described above. The updated DNU identified in the report addendum served as the operative DNU for purposes of setting the interconnection customer's cost responsibility and to be specified in the interconnection customer's GIA.

4 Cluster 3 and 4 approach

The GIP Phase II process for clusters 3 and 4 will be comparable to the approach described above for clusters 1 and 2. The main difference to be noted is the fact that the Phase II process for clusters 3 and 4 is still in progress, and can therefore the results of applying the approach

described in this technical bulletin can be incorporated into the Phase II study reports, rather than requiring report addenda subsequent to Phase II study reports as was the case for clusters 1 and 2. The Phase II study for clusters 3 and 4 will maintain the currently planned Phase II study time line (i.e., start in April 2012 and complete around end of October).

The following steps describe the cluster 3 and 4 approach.

1. Adjust the study assumptions regarding the prior queue (up through cluster 2) to reflect the removal of the problematic DNU that were removed in the revised cluster 1 and 2 GIP Phase II study results and the amounts of deliverable generation that are consistent with the removal of those DNU.
2. Apply the full amount of cluster 3 and 4 generation initially, to determine the transmission required to interconnect all projects in these clusters at their requested deliverability status.
3. As was done for clusters 1 and 2 and using the same criteria described in section 2.1.1 above, identify the DNU that can be removed from the initial cluster 3 and 4 Phase II results. Determine the amount of deliverability in each study area that is supported by the revised results without requiring the problematic DNU. This information would be made available to LSEs and their regulatory authorities, along with cost information about the DNU that were removed from the results, to inform procurement decisions.
4. Issue Phase II study reports to cluster 3 and 4 interconnection customers based on results of the previous step, so that they can proceed to negotiate GIAs and make their required postings without having to be concerned with the problematic delivery DNU.

As with the cluster 1 and 2 approach, the risk remains that more generating capacity than was assumed will actually be built and achieve commercial operation in a particular study area and will require the DNU that were removed from the revised GIP Phase II study reports or other new transmission in the area.

5 Impacts of over-building of generation in an area

This section discusses two possible implications in cases where the amount of new generating capacity that actually achieves commercial operation in a particular study area is greater than the amount that was anticipated in reassessing the Phase II interconnection study results and executing GIAs based on the revised results. If this happens, the amount of new generating capacity that was designated as full capacity deliverability status and has executed GIAs will exceed the amount of deliverability that is supported by the transmission system assumed at that time. The potential for this situation exists by design, because in revising the Phase II study results the ISO explicitly assumed that the amount of new generation that will actually achieve commercial operation in the study area is below the threshold that triggers the removed DNU, even though there is a larger amount of generation in the interconnection queue in the area. Clearly, if more new generation actually proceeds and achieves commercial operation, that assumption is no longer valid.

It is important to recognize that LSEs and their regulatory authorities can minimize the likelihood of this situation occurring by coordinating their procurement activities so as to avoid aggregate procurement that exceeds the threshold to trigger the removed DNU in any grid area. The information the ISO provides under this approach will include the specific DNU that were removed from the initial Phase II study results, the limiting transmission facilities that the removed DNU were intended to mitigate, and the estimated amount of new generating capacity that would be fully deliverable without the removed DNU (equivalent to the threshold of new generating capacity that would trigger the need for the removed DNU).¹²

The first implication of over-building of generation in an area is the potential for resources to receive lower NQC values in the ISO's annual NQC assessment than the full equivalent to their full capacity deliverability status. This would mean that the maximum amount of resource adequacy capacity the resource could provide for the coming year would be less than its full capacity-based qualifying capacity. The second implication is that the situation could provide the basis for the ISO to identify and approve new transmission upgrades in the ISO transmission planning process (TPP). These two possible outcomes are not mutually exclusive. Even if the ISO does approve new transmission to mitigate the reduction of NQC in an area, there may be a gap between the time the generating resources achieve commercial operation and the time all the needed network upgrades are placed in service, during which the annual reductions in NQC would need to be applied. These two implications are discussed in more detail in the two sub-sections below.

5.1 Annual assessment of net qualifying capacity

The ISO's annual NQC process is governed by section 40 of the ISO tariff. Pursuant to section 40.4.6.1 of the tariff, the ISO determines NQC values for generating resources in each grid area that are consistent with the capability of the transmission system in that area. The ISO performs this determination roughly six months prior to the start of each resource adequacy compliance year (i.e., each calendar year), and it is based on the transmission network and the generating facilities expected to be in service on or before September 1 of the upcoming resource adequacy year. The implication of this assessment is that resources in an area that is "over-subscribed" in the sense of this section may receive NQC values that are lower than their full capacity deliverability status and their qualifying capacity (QC) values would imply.

Under tariff section 40.4.6.1 such NQC adjustments, if needed, could be applied to all generating resources eligible for NQC for the upcoming resource adequacy year that have significant flow impacts on the binding transmission constraints.¹³ To best align with the approach described in this bulletin for determining required DNU for cluster 1 through 4 projects, the ISO will distinguish between two tiers of generating resources – "new" and "existing" – in

¹² In Rulemaking 11-05-005 currently in progress at the California Public Utilities Commission (CPUC), an Assigned Commissioner Ruling issued on April 4, 2012 sets forth a proposal for coordinating the procurement activities of CPUC-jurisdictional load-serving entities in order to stay within such ISO-specified thresholds that would trigger these network upgrades. Interested parties should consult the procedural schedule provided in Attachment A to that ruling for opportunities to provide comments.

¹³ The ISO study process considers flow factors equal to or greater than five percent to be significant for this purpose.

applying any NQC adjustments that may be needed as a result of removing DNU requirements for those projects. In such cases the ISO will first curtail generators seeking “as available” positive NQC values.¹⁴ But if curtailment of these generators is not sufficient to relieve binding constraints, and if any of the constraints involved are ones that were identified in cluster 1-4 Phase II studies as requiring DNUs that were later removed from the requirements of cluster 1-4 generating facilities, the ISO will next curtail only those “new” generating resources that have at least five percent flow distribution factor on one or more of the relevant binding constraints. If the amount of generation in the “new” tier is not sufficient to relieve the binding constraints, the ISO will then utilize the second tier and apply NQC adjustments to “existing” generation with at least five percent flow factor on a binding constraint. In such a situation the ISO will reduce the NQC values of the “new” generating facilities as far as possible (i.e., in the worst case, down to zero), and then will reduce the NQC values of effective “existing” resources as needed to fully relieve the identified transmission overloads. Thus the classification of a generating facility as “existing” does not guarantee that it will be immune to NQC reduction; it only places the facility into a second tier for NQC reduction which will be utilized only if the facilities in the first tier are not sufficient to relieve the identified transmission facility overloads.

For purposes of these potential NQC adjustments, “existing” generation is defined to include resources that either are already in commercial operation or have executed bilateral contracts (specifically, a PPA or an RA contract committing the resource to provide RA capacity in an amount equivalent to its full capacity deliverability status in the GIP) no later than December 31, 2012. All other resources will be classified as “new.” For a generating facility whose qualifying capacity (QC) is greater than the MW capacity amount committed in the relevant bilateral contract that was executed by December 31, 2012, only the contracted amount of capacity will be considered “existing.”

For an affected generating facility that is not in commercial operation by December 31, 2012, the resource owner and the contracting counterparty must demonstrate the applicable bilateral contract by submitting to the ISO (1) affidavits by February 28, 2013 detailing the relevant terms of the contract, and (2) additional affidavits by April 1 of the first year that the generating facility will be included in the ISO’s annual NQC assessment process, to confirm that the same bilateral contract remains in effect for the upcoming resource adequacy year.¹⁵ The ISO will provide

¹⁴ As noted earlier in this technical bulletin, there may be some generating facilities included in the NQC study that will not have all the network upgrades in service by September 1 of the upcoming resource adequacy year that are needed to provide the requested deliverability status, and as such are requesting one-year-at-a-time, “as available” positive NQC values. If dispatch reductions are required in an area, these resources will be reduced first, before the ISO applies any reductions to generators that are expected to have achieved their requested deliverability status by the September 1 cutoff date.

¹⁵ To be included in the ISO’s annual NQC assessment a generating facility must either already be in commercial operation at the time the ISO performs the assessment, or be scheduled and on track to begin commercial operation no later than September 1 of the upcoming resource adequacy year. For example, during the second quarter of 2014 the ISO will perform the NQC assessment for the 2015 resource adequacy year. To be included in that assessment, the facility must be scheduled and on track to begin commercial operation no later than September 1, 2015. For a resource that qualifies as “existing” by having an applicable bilateral contract executed on or before December 31, 2012, the second set of required affidavits will be due to the ISO by April 1, 2014.

details regarding submission of the required affidavits in the Business Practices Manual (BPM) for Reliability Requirements.

In applying NQC adjustments to resources in a constrained area of the grid, the ISO will utilize a weighted least squares algorithm similar to the algorithm used in the allocation of congestion revenue rights to eligible load-serving entities.¹⁶ The weighted least squares algorithm is an equitable and effective way to distribute the NQC reductions over all resources that have flow factors above the five percent threshold, rather than concentrating such reductions on only the resources that have the highest flow factors. The ISO will include the technical details for this algorithm as applied to NQC adjustments in the Business Practices Manual for Reliability Requirements.

5.2 Additional transmission expansion through the TPP

Another potential consequence if more than the assumed amount of generation actually develops in any given area is that the ISO could approve additional policy-driven transmission in the TPP. This would occur through an expansion of the base resource portfolio formulated for the public policy TPP assessment to reflect the increased amount of generating capacity with full capacity deliverability status that is being developed in the area. Under the ISO's existing tariff provisions, the transmission elements approved to meet the deliverability needs of the expanded portfolio may be subject to a solicitation process in which non-incumbent transmission developers could compete to build and own the policy-driven transmission element (with certain exceptions per tariff section 24.5.2). Even if the ISO does approve additional transmission under the TPP to provide the needed capacity for all the full capacity resources in the area, it may still be necessary to apply NQC adjustments for the years before the new transmission facilities are placed in service.

¹⁶ The Business Practices Manual for Congestion Revenue Rights, starting on page 101, provides technical details on the weighted least squares algorithm used in that context, and can be found at: <https://bpm.caiso.com/bpm/bpm/version/000000000000152>