

Technical Bulletin

Generator Interconnection Process

Partial Deliverability Analysis for Generation Interconnection Transition Cluster Phase II Projects

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Executive Summary

Some interconnection customers in the current transition cluster face a multi-year gap between their planned commercial operation dates and the scheduled in-service dates of the transmission upgrades needed to provide them full capacity deliverability status. These customers had requested full capacity delivery status in their interconnection requests in order to be able to contract with load-serving entities to provide resource adequacy (RA) capacity to meet the load-serving entities' RA requirements. Until the transmission upgrades are completed and full capacity can be achieved, and these resources achieve commercial operation, they will not be eligible to receive RA capacity eligibility corresponding to their full facility output. However, under certain conditions described in this technical bulletin these resources may, once they achieve commercial operation, have deliverable partial capacity eligible to be RA capacity.

The current RA counting rules of the California Public Utilities Commission (CPUC) determine a resource's qualifying capacity (QC) value for RA purposes. The net qualifying capacity (NQC) of each resource is then determined by the ISO under ISO Tariff Section 40. This determination is made mid-year for the following RA compliance year, which is a calendar year, and establishes an upper limit on the amount of RA capacity the resource can provide for that year. The CPUC counting rules and the ISO Tariff provisions do not provide for either the QC or NQC determination to be made in advance of the resource's commercial operation or for RA compliance years beyond the next calendar year.

These interconnection customers have indicated to the ISO that the inability to enter into RA capacity supply contracts in advance of the resource's commercial operation and on a multi-year forward basis, and to provide RA capacity for at least a portion of their installed capacity during the years between commercial operation and the completion of the network upgrades requires for full capacity status, will adversely affect their ability to finance and complete their projects. Therefore, they have requested that the ISO find a way to assess their partial deliverability during each of the gap years to enable them to obtain positive RA

capacity ratings, even if these partial amounts are less than the full capacity they will ultimately be able to provide. Moreover, these customers request that such assessments be provided by the ISO as soon as possible. The interconnection customers have indicated a need for the ISO to act promptly on this matter because of deadlines they face regarding eligibility for financial incentives under the American Recovery and Reinvestment Act (ARRA). In particular, they must be able to complete their project financing this fall and commence construction prior to December 31, 2010.

The ISO has considered possible approaches for addressing the needs of these customers, and has determined that the most appropriate approach is to provide an advisory assessment indicating the expected MW amount of deliverable partial capacity for each resource for each of the years between the resource's commercial operation date and completion of the multi-stage transmission upgrades necessary to achieve the generation facility's ultimate full capacity status. This assessment will take the form of an addendum to the interconnection customer's Phase II study report; it will be based on the ISO's engineering analysis and will rely generally on publicly available information on planned commercial operation dates for generation projects, in-service dates for transmission upgrades, and other relevant factors anticipated to affect the ISO grid during those years. The ISO assessment will be advisory only, because its findings will depend on assumptions about future events and conditions that are subject to change. Thus each resource's expected MW amount of deliverable partial capacity as indicated in the assessment will reflect the ISO's estimate of that value at the time the assessment was prepared, but it will only be an estimate. The value will neither take precedence over nor supersede the determination of the resource's QC by the CPUC or NQC by the ISO. Once a resource achieves commercial operation, it must follow the applicable CPUC counting rules and ISO Tariff provisions to obtain a QC and NQC through the normal RA process in order to qualify as RA capacity.

The ISO will perform this assessment and issue a supplement to the Phase II study report one time only in September 2010. The scope of the assessment will be limited to interconnection projects in the transition cluster that requested full capacity status in their interconnection requests and were studied as full capacity in the Phase II interconnection studies. The scope will be further limited to those projects whose planned commercial operation date is at least two years prior to the scheduled in-service date of the complete set of transmission upgrades identified as needed to provide the projects full capacity status. The scope will be limited further to situations where the construction schedule of the required transmission upgrades provides for intermediate milestones that will create transmission capacity that can support some amount of deliverable partial capacity for the associated generation projects.

Background

In general, generation interconnection customers with renewable projects in the ISO's transition cluster that have applied for ARRA cash grants in lieu of tax credits have indicated that they require executed large generator interconnection agreements (LGIAs) by approximately the end of September 2010, to enable them to enter bilateral contracts with load-serving entities to provide energy and capacity, which will in turn enable them to obtain project financing and initiate construction prior to December 31, 2010.¹ Some of these interconnection customers with full capacity deliverability status² projects have identified that a key need for their potential financiers is a showing of some level of deliverability in order to be eligible to provide RA capacity during the years between the generating facility commercial operation date and the completion of construction of the transmission network upgrades required for full capacity status. While deliverability is not an explicit subject of the LGIA, the execution of this agreement specifies key information for discussion between the generation developer and its financiers regarding the resource's business model and revenue streams. In particular, the LGIA specifies the construction schedule on which the Participating Transmission Owner intends to construct the interconnection infrastructure components, including the network upgrades required for full capacity deliverability status.

The problem that some full capacity interconnection customers in the transition cluster have identified is an expected multi-year gap between the planned commercial operation date for the generating facility and the scheduled completion and in-service dates of the multi-stage transmission network upgrades that are required for their full capacity status. The CPUC counting rules and applicable ISO Tariff provisions do not provide for a resource's QC or NQC to be determined in advance of the resource's commercial operation date or for RA compliance years beyond the next calendar year. Thus, although the executed LGIA would indicate when the resource's full capacity status will be achieved, there is no basis on which to provide the resource a positive QC or NQC rating this far in advance for the years prior to full capacity status. Because a resource's NQC defines the maximum amount of capacity that a load-serving entity can count towards its resource adequacy requirement, NQC can be an important consideration for pricing and structuring of bilateral contracts between the resource and the load-serving entity, which in turn can have a significant impact on the resource's future revenue stream.

Some full capacity interconnection customers in the transition cluster are indicating that they cannot finance their projects if they are unable to sell RA capacity while waiting for completion of the multi-stage network upgrades. In this regard, their inability to enter into RA capacity supply contracts in advance of the resource's commercial operation and on a multi-year forward basis will adversely

¹ As required by the Department of Energy and the Department of the Treasury.

² Full Capacity Deliverability Status is defined in the ISO tariff (Appendix A) as "the condition whereby a Large Generating Facility interconnected with the ISO Controlled Grid, under coincident ISO Balancing Authority Area Peak Demand and a variety of severely stressed system conditions, can deliver the Large Generating Facility's full output to the aggregate of Load on the ISO Controlled Grid, consistent with the ISO's Reliability Criteria and procedures and the ISO On-Peak Deliverability Assessment."

affect their ability to finance and complete their projects. More precisely, they have indicated a need for some capacity value to be identified for the generating facility, even if that value is less than their eventual full capacity value, between:

- the time that the generating facility has achieved its commercial operation date and can deliver output to the grid; and
- the time that all of the multi-stage transmission network upgrades are completed and in service to provide the full capacity deliverability status that the interconnection customer elected in its interconnection request.

Although interconnection customers would desire to have full capacity deliverability status immediately upon achieving commercial operation (i.e., as soon as the plant is operational and ready to deliver its energy output to the grid), the reality in many cases is that the transmission build-out will take longer to complete, and so there will be an interim period during which deliverability of the plant's full capacity is not yet feasible. These customers have therefore requested that the ISO assess the partial deliverability of each resource for each of the gap years so that they have some type of RA capacity rating, even if that amount is less than the full capacity they will ultimately be able to provide, in order to begin the bilateral contracting process.

ISO Advisory Course of Construction Partial Deliverability Assessment as Supplement to Certain Transition Cluster Phase II Interconnection Studies

Based on the earlier considerations, the ISO has developed an approach for assessing the expected MW amount of deliverable partial capacity for each resource that could be provided to those full capacity projects in the transition cluster that are affected by a multi-year gap between their commercial operation dates and the completion of the multi-stage transmission upgrades required for full capacity. The ISO will perform an assessment and issue an advisory "Course of Construction Partial Deliverability" report that estimates the expected MW amount of deliverable partial capacity for each such resource during each year of the gap period. The ISO will provide this assessment as an addendum to each such customer's Phase II interconnection study report. This technical bulletin explains how the ISO will perform this assessment and estimate course of construction partial deliverability for these resources, and discusses the limitations and appropriate interpretation of these advisory estimates.

Scope of This Effort: A One-Time Assessment

In September 2010 the ISO will perform a one-time assessment for full capacity interconnection customers within the transition cluster, for which the ISO has already completed the Phase II interconnection studies. The ISO will perform this assessment only for projects that meet all of the following criteria:

1. Full Capacity Interconnection. The customer requested full capacity deliverability status in its interconnection request.
2. Minimum two-year gap between generating facility commercial operation and in service date for last of the multi-stage network upgrades. There is a

- gap of at least two years, based on currently available information, between the stated commercial operation date of the project (or at least the first phase of the project) and the scheduled in-service date of the transmission upgrades required to achieve full capacity deliverability status for the project.
3. Constructing the transmission upgrades will be multi-stage and take at least two years to complete. The construction schedule of the full capacity-related transmission upgrades, based on currently available information, includes intermediate milestones whereby some transmission facilities will be placed in service at least two years prior to the completion of the entire set of transmission upgrades, and these facilities will provide additional transmission capacity to support some amount of deliverable partial capacity for the associated transition cluster group.
 4. Customer provides statement of need. In its request, the customer must describe the circumstances that give rise to its need for the ISO to provide it the assessment.
 5. Customer provides information supporting commercial operation date. The interconnection customer's request must include a statement affirming the expected commercial operation date of their project, and describe the progress and status of development project and its permitting process that supports its commercial operation date.

This assessment will be provided only for each year during the course of construction of the full capacity-related transmission upgrades in the interim period between the start of commercial operation of a transition cluster generating facility and the completion of the transmission network upgrades that have been identified as necessary for that facility to have full capacity deliverability status.

The assessment described in this Technical Bulletin has no connection and should not be confused with the proposal, currently under discussion in the ISO's Generator Interconnection Procedures stakeholder initiative, to enable existing energy-only generating facilities or pending energy-only interconnection requests to obtain some level of deliverability based on existing transmission capacity or to convert to full or partial deliverability status. The assessment described here applies only to interconnection customers in the transition cluster that requested full capacity deliverability status in their interconnection requests and were studied as full capacity facilities in the Phase II studies.

Nature and Limitations of the Advisory Assessment

Upon completing the assessment described here, the ISO will issue an advisory "Course of Construction Partial Deliverability" report for the affected transition cluster projects. The assessment report will indicate the expected MW amount of deliverable partial capacity for each of the affected resources for each of the years between each resource's commercial operation date and its ultimate full capacity status. This assessment will reflect the ISO's engineering analysis of the transfer capacity available for partial deliverability and will rely on publicly available information on planned commercial operation dates of other generation

projects, in-service dates for transmission upgrades, and other relevant factors expected to affect the ISO grid during those years. The ISO assessment will be advisory only, because its projections will rely on assumptions about future events and conditions that are subject to change. Accordingly, the assessment will be informational only, and not a determination or guarantee of actual deliverability. Nor will the assessment convey or bestow any right or priority with regard to use of transmission capacity on any interconnection customer. The assessment will simply project each resource's yearly expected MW amount of deliverable partial capacity, as indicated in the assessment; it will be an estimate at the time of preparation and not a commitment by the ISO to any specific level of deliverability or any amount of net qualifying capacity for any specific transition cluster generator. Each resource that sells RA capacity will still be subject to all of the provisions of ISO Tariff applicable to RA resources, including the annual determination of NQC for each compliance year following commercial operation.

In performing the assessment, the ISO will utilize the commercial operation dates of generators as indicated in the ISO's interconnection queue, posted on the ISO website.³ For a multi-phase project, the ISO will use the commercial operation date and associated MW capacity value for the phase that will achieve commercial operation first. If more than one phase of a multi-phase generating facility is planned to achieve commercial operation during the time horizon of this assessment and is otherwise eligible per the criteria stated above, the ISO will assess the expected partial deliverability of each such phase. This will provide each such resource an annual estimate of deliverable partial capacity from the start of commercial operation to the end-state full capacity deliverability status for the pertinent transition cluster projects.

Because this assessment is intended to apply for the years prior to completion of the upgrades needed for full capacity status for these generators, the ISO expects that there will be less transmission capacity available for partial deliverability than may be desired by the eligible projects. For purposes of estimating the expected MW amount of deliverable partial capacity for each resource, the ISO will take interconnection queue position into account. Because of the way the serial queue and transition cluster were formed, each of the full-capacity serial queue projects has a unique queue position, and the serial projects collectively have higher queue positions than the transition cluster projects.⁴ All the transition cluster projects have a common queue position, by definition of the cluster.

Methodology

The ISO will utilize the information from transition cluster Phase II studies to determine the potential generation projects that meet the established criteria. A linear analysis technique using distribution factors to assess deliverable capacity

³ The interconnection queue is posted at <http://www.caiso.com/14e9/14e9ddda1ebf0.pdf>.

⁴ All of the serial queue full capacity projects are expected to have full capacity deliverability status by their commercial operation dates, so there is no need for any partial deliverability assessment for these resources.

of each generation project under different system conditions will be used during the course of the study. The estimated MW amount of deliverable partial capacity will be determined by the output from generation projects in the transition cluster that could cause a transmission overload under the scenario (year) being studied. This section will discuss three key components of the proposed methodology: (1) study year(s) selection, (2) modeling requirements, and (3) study approach.

(1) Study Year(s) Selection

It is possible that the commercial operation date of a generating facility and the complete transmission build out required for full capacity status can be several years apart. The assessment will only be done for the interim year(s) that major changes in system conditions could result in significant change in deliverable capacity of generators in the study area. Therefore, minor changes in system conditions such as demand level may not be sufficient to trigger additional study. The ISO proposes all the criteria must be met before any interim year can be studied in addition to the commercial operation date year of the project.

Example: A 100 MW generator requesting full capacity in transition cluster Phase II has an expected commercial operation date of May 2013. The study results identify that this project is responsible for three delivery network upgrades (A, B, C) that are scheduled to be in service in 2015, 2017, and 2018 (full capacity build out). Therefore, only the request for 2015 and 2017 scenarios will be considered since they represent significant changes in system conditions. The 2016 scenario will not be studied because no significant change in system conditions is expected at that time.⁵ The 2018 scenario will not be studied because it is already reflected in the transition cluster Phase II study results for the project to receive full capacity.

(2) Modeling Requirements

The assessment assumes that the required reliability network upgrades identified in the transition cluster Phase II studies are completed by the expected commercial operation date and that the commercial operation date of each generation project is accurate. Starting from the ISO deliverability base case for the transition cluster Phase II study, applicable deliverability network upgrades identified from the transition cluster with the online date on or before the year being studied are modeled in the base case, as are new generators that will achieve commercial operation on or before the study year. Loads are scaled to represent the year being studied based upon the latest available load forecast.

(3) Method for Allocating Deliverable Partial Capacity

⁵ It is possible that one of the full capacity serial queue projects may be scheduled to achieve commercial operation in 2016 and that this serial project would rely upon some of the same transmission that provided partial deliverability for the transition cluster generator in 2015. In that case the ISO would include 2016 in the study.

Assuming that system conditions cannot accommodate the full deliverability of all generators in the study area that want to receive a deliverable partial capacity rating, partial deliverability of each generator is allocated as a function of the generator's size and its flow impact on the transmission constraint that is binding in the deliverability power flow. In a case where the generation project will be implemented in phases, the allocation will be based on the MW size of the phase that will be in commercial operation for the study year in question.

For example, generators A, B, and C are located in the same study area and are scheduled to begin commercial operation in the same year. In the power flow to test for full deliverability of these generators transmission line T is overloaded, whereas in the power flow without these generators there is 30 MW available flow capacity on line T. Table 1 illustrates the proposed methodology. The first step is to allocate the 30 MW available on line T in proportion to the size of the generation projects. The deliverability allocation is then calculated by dividing the line flow allocation by the distribution factor for each generation project.

Table 1: Allocation of Deliverable Partial Capacity

	MW Capacity	Capacity-based Allocation Factor	Allocated Available Line T Capacity	Distribution Factor (Flow Impact)	Deliverability Allocation (MW)
Project A	600	44%	13.3	0.2	66.7
Project B	250	19%	5.6	0.3	18.5
Project C	500	37%	11.1	0.4	27.8
Total	1350		30		

Assuming that approximately 30 MW of transfer capability on facility T is available before projects A, B, and C are connected to the grid and that all three generators will achieve commercial operation in the same year, using this approach, 13.3 MW, 5.6 MW, and 11.1 MW of available transfer capability on line T are allocated to projects A, B, and C, respectively.

To determine deliverable partial capacity of each project, the allocated available capacity of each project on line T is divided by its distribution factor. Consequently, deliverable capacity of generators A, B, and C are 66.7 MW, 18.5 MW, and 27.8 MW, respectively.