Technical Bulletin

2010-01-02

Minimum Online Commitment Constraint

January 11, 2010

Technical Bulletin
2010-01-02

Minimum Online Commitment Constraint

I. Background:

In order to improve the efficiency of the market and reduce the need for certain Exceptional Dispatch, the ISO is expanding its constraint modeling capability in IFM and RTM to address the operational needs of certain operating procedures listed below that require a minimum quantity of committed online resources in order to maintain reliability. Based on existing operating procedures, there are requirements for a minimum quantity of online commitment from a specific group of resources in a defined area. This required minimum online commitment does not reflect a minimum energy production or an amount of 10 minute operating reserve. Rather these requirements are described in terms of a minimum set of online resources, by name or by total quantity of operating capability based on the resources Maximum Operating level (Pmax) or an effective MW equivalent based on the units VAR support and/or location. Currently no minimum online commitment constraints are enforced in the DAM and RTM software. Enforcing these online commitment constraints using an energy requirement constraint would unnecessarily commit energy if enforced in the Integrated Forward Market. Currently, in the short-term, the ISO can achieve the commitment necessary to maintain reliability out of the DAM by enforcing the online commitment requirements using energy based nomogram constraint in the Residual Unit Commitment (RUC) process only. These measures have reduced the need for Exceptional Dispatch that would otherwise be necessary to commit the resources required under the specified operating procedures and outages. However, enforcing commitment requirements in RUC creates the potential for incremental over-procurement of energy, by adding the minimum energy of the resources committed in RUC to the IFM schedules. To prevent the potential for over-procurement, the ISO has adopted the following minimum online commitment method, which also incorporates an additional constraint that can be consistently enforced in all passes of the markets (MPM, IFM, RUC and RTN). In addition, the minimum online commitment constraint increases the market solutions efficiency because the same set of resources committed in IFM to satisfy the minimum online constraint would also be ready for dispatch or be awarded ancillary services in the market co-optimization.

II. Constraint Formulation:

The ISO is incorporating the following additional nomogram type constraint equation capability into the market solution:

In general, minimum online generation commitment (MOC) requirement is a constraint binding a group of market resources (generators) by the following relation:

$$\sum_{i \in G} a_i \, Y_{i,t} \, P_{i,t}^{\max} \geq P_{G,t}^{moc} \qquad \forall t, G \qquad (1)$$

Where:

$P_{G,t}^{moc}$ is the minimum total online commitment required for interval *t* for the defined set of generating resources *G*.

a_i is a multiplier representing effectiveness for the resource *i* in meeting Minimum Online Commitment requirement

$Y_{i,t}$ is the commitment status for market resource *i* for interval *t*

$P_{i,t}^{\max}$ is the total maximum operating limit of the market resource *i* and interval *t*, as derated by SLIC of the resource (if appropriate)

Minimum Online Commitment Requirement (MW) is the minimum total online commitment required for interval *t* for the defined set of resources able to participate in the satisfying the constraint. This quantity may differ by interval (by hour in DAM) with the amount of load within designated local areas. This formulation recognizes that the variation of required commitment versus the local load may not be linear.

Multiple constraint equations can be defined to incorporate different groups of resources depending on the procedure or outage that is being represented. A resource may participate in more than one minimum online commitment requirement constraint equation. The shadow prices of these constraints are not incorporated directly into any pricing calculations. The expectation is that adding these constraint equations will commit an appropriate set of resources that satisfies the minimum amount of commitment online required in the market processes to satisfy the operating procedural and outage requirements that are currently satisfied in part by either through Exceptional Dispatch or nomogram enforcement in RUC, thus reducing the potential for over-commitment in RUC. If the constraint cannot be satisfied, the constraint will be violated at some configurable penalty value in the market optimization that is set to avoid under-procurement when resources are indeed available

III. Application

The minimum online commitment constraint will be utilized initially for the following operating procedures, which are now considered in RUC but not IFM:

G-217: South-of-Lugo Generation Requirements
G-219: SCE Local Area Generation Requirement for Orange County

Other candidate operating procedures for which the minimum online commitment constraint may be a candidate are as follows:

G-206: San Diego Area Generation Requirements
G-233: Bay Area Generation Commitment
T-103: SCIT

By approximately the end of January 2010 the minimum online commitment constraint will be enforced for procedures G-217 and G-219. Estimate dates when the minimum online commitment constraint for other procedures has not been determined but a Market Notice will be issued in advance of application of the minimum online commitment constraint relative to a specific procedure.

Use of this functionality may also be considered for equipment outages that have a commitment requirement to return the system to normal steady state limits following contingencies or a commitment requirement to provide the necessary voltage support.