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Date Raised

Late 2002.

Description

The real-time unconstrained (market) and the real-time constrained (dispatch) sequences calculate the dispatch of bids and offers that minimises the cost of satisfying the energy and operating reserve requirements for each 5 minute interval. In the original design of the Dispatch Schedule Optimizer (DSO), this calculation was performed without any knowledge of future interval expectations of supply or demand. As a consequence of this “myopic” approach, dispatchable resources are not positioned to factor in system requirements for the future intervals beyond the current dispatch interval. Due to dispatchable resources ramp limitations, more volatile dispatches and prices occur and operator intervention may be required to ensure that reliability can be maintained in meeting future system requirements during periods of large demand change.

Background

Market Rules appendix 7.5 initially specified that the unconstrained and the constrained sequences will calculate the dispatches and prices for one 5 minute interval. Prior to market launch, the ramp rate of dispatchable resources was effectively multiplied by twelve in the unconstrained sequence to remove the price volatility during periods of large demand change. The IMO control supervisors manually constrain resources on/off to ensure that the dispatchable resources are positioned to meet the future demand.

As a part of the Market Evolution Program (MEP), the Multi-Interval Optimization (MIO) project was started January 2003 to calculate dispatches in the constrained sequence by minimizing the weighted cost of meeting the system requirements over a study period of up to 55 minutes. The planned in service date of this project is June 2004. The implementation of this project will reduce the periods where expensive resources are dispatched and the periods where the system requirements are not satisfied.

Why a Pricing Issue

With MIO in service, the unconstrained sequence will be calculating prices to minimise the cost of meeting system requirements for one interval using 12 times ramp. The constrained sequence will be calculating dispatches to minimise the weighted average cost of meeting the system requirements for up to 11 intervals using one times ramp.

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If the MIO process were extended to the unconstrained sequence and used to calculate market clearing prices, the following issues would need to be addressed:

- Which dispatchable resource(s) can/can't set the Market Clearing Price.
- Compensation for resources that are constrained on/off ahead of time in order to meet future requirements. With both the constrained and the unconstrained sequences using the MIO process, these units will not be identifiable as constrained on/off and will require a different type of compensation (if any).
- Which resource/system constraints should be enforced in the unconstrained MIO sequence.
- The timing of running the unconstrained MIO sequence (same as constrained, after the dispatch interval or at the end of the study period).

Impact of Issue

Market Impact

The use of MIO impacts the principles of efficiency and transparency. Optimizing over a study period of up to 11 intervals will ensure that the ramp-limited resources are positioned ahead of time to meet the future requirements. This allows the most economical resources to be dispatched to meet the requirements and to set the prices. It will also reduce the price volatility. When the IMO control supervisors forecast possible energy and/or operating reserve shortages, the current practice is for them to manually position the resources by constraining them on/off. The introduction of MIO in the constrained sequence will automate this process (more transparent) and extend it to factor in economic positioning of the resources. The use of MIO in the unconstrained sequence would produce prices that are consistent with the dispatches produced by the constrained sequence. The CMSC payments would be reduced due to the reduced differences between the constrained and the unconstrained dispatches.

Participant Impact

[To be developed]

IMO Processes and Procedures Impact

The unconstrained sequence will need to be changed to minimise the cost of meeting the system requirements over a study period of up to 11 intervals. This requires a Market Rule change and tool changes with significant expense.

Related Issues

004: Use of 12-Times Ramp rate in the Dispatch Unconstrained Algorithm.

005: Simultaneous Use of Ramping Generation Units for Energy and Operating Reserve.

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027: Difference in Inputs Between Unconstrained and Constrained Real-Time Sequences.

Options Considered

[To be developed]

Selected References

[To be developed]