

Order 764 Market Design, Flexiramp and Ancillary Services

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Critical thinking at the critical time™

TOPICS

- Flexiramp Constraint and RTD
- Flexiramp Constraint and Order 764 Market Design
- Flexiramp Product and Ancillary Service Market Design

FLEXIRAMP CONSTRAINT AND RTD

It may be helpful in understanding how the flexiramp constraint impacts prices in the California ISO 764 market design to review the current implementation of the flexiramp constraint.

- At present the flexiramp constraint in RTPD can be satisfied in three ways: 1) undispached capacity of on-line generation that is uneconomic to dispatch in RTPD; 2) off-line generation that is committed in RTPD and is available to ramp; 3) on-line generation dispatched down out of merit in RTPD to create additional ramping capability relative to the resources' upper limits.

FLEXIRAMP CONSTRAINT AND RTD

- The out-of-merit “dispatch” of generation in RTPD creates ramp capability to satisfy the flexiramp constraint in RTPD but creates no ramp in RTD, because the generation is not actually dispatched out of merit in RTD.
- It is this phantom out-of-merit dispatch in RTPD that determines the flexiramp shadow price, impacts the cost of other ancillary services, and impacts the price of energy in RTPD.

FLEXIRAMP CONSTRAINT AND RTD

The California ISO can adjust the amount of ramp created by the flexiramp constraint by varying the ramp capability target, the cap on the flexiramp shadow price, or both.

- Because (some, most, nearly all?) of the additional ramp capability counted in RTPD does not actually exist in real-time, in order to get the amount of ramp capability it wants, the CAISO currently needs to set the ramp target higher in RTPD than it would if there were a flexiramp product in RTD.
- Lowering the flexiramp target will lower the shadow price of flexiramp and also reduce the price of ancillary services that compete with the flexiramp constraint to use ramp capability in RTPD.

FLEXIRAMP CONSTRAINT AND RTD

- Lowering the flexiramp target will also reduce the available ramp to the extent that fewer units are committed in RTPD to provide ramp.
- It is unclear how much additional ramp capability is actually made available by flexiramp product and hence unclear what the impact would be of reducing the flexiramp target.
- With implementation of a flexiramp product, there would be a much stronger relationship between the ramp calculated in RTPD and the ramp available in RTD.

FLEXIRAMP CONSTRAINT AND RTD

The CAISO has pointed out it is very difficult to determine whether a unit was committed in RTPD because of the flexiramp constraint or for other reasons.

- It is possible to determine how many units are committed in RTPD that were not self-committed or committed in the day-ahead market.
- It should also be possible to determine how much of the ramp created in RTPD is phantom ramp, by totaling the amount of ramp capability on capacity dispatched down out of merit in RTPD relative to the price at its location.

FLEXIRAMP CONSTRAINT AND RTD

It is important for the California ISO to analyze the impact the flexiramp constraint is having on the availability of ramp in RTD to aid in setting better targets for flexiramp procurement and to aid in assessing how to manage variations in net load at lower cost.

- This entails analysis of how locational constraints impact the availability of ramp capability as well as understanding how much of the incremental ramp is phantom ramp.
- This would also entail analysis of the extent to which ramp constraints in RTD arise from the location at which ancillary services were scheduled in RTPD.
- Analysis of how the probability of upward and downward ramp constraints is related to system conditions will allow use of more optimal ramp capability targets.

FLEXIRAMP AND ORDER 764 MARKET DESIGN

The flexiramp constraint will interact with the 764 market design in several ways:

- RTPD will be able to satisfy the flexiramp constraint by increasing imports rather than just dispatching up internal generation or committing new internal generation. This may increase the amount of ramp capability available at a given cost, lowering the shadow price of flexiramp in RTPD.
- The flexiramp constraint inflates the price of energy in RTPD relative to RTD. Generation is given schedules in RTPD reflecting a hypothetical schedule in which it would be dispatched up on its bid curve in order to move other resources down to create ramp.
- The generation dispatched up to create ramp capability in RTPD is not dispatched up in RTD because there is no flexiramp constraint in RTD.

FLEXIRAMP AND ORDER 764 MARKET DESIGN

- Generation dispatched up in RTPD will sell its incremental output at the 15 minute price in RTPD, then buy the schedule back in RTD at a lower price, reflecting the absence of the flexiramp constraint in RTD.
- 15 minute imports will be dispatched up like internal generation in RTPD to create ramp but will not be dispatched up or down in real-time.
- 15 minute imports and exports will be scheduled consistent with RTPD prices, which will reflect the cost of dispatching generation up to create ramp capability.
- The 15 minute prices used to settle imports and exports, like the 15 minute prices for internal generation, may not be consistent with RTD prices and may differ systematically when the flexiramp constraint is binding in RTPD.

FLEXIRAMP AND ANCILLARY SERVICE DESIGN:

These issues with RTPD and RTD prices can be addressed by the California ISO moving forward with design and implementation of a flexiramp product in RTD, consistent with the flexiramp constraint in RTPD.

- This will better enable the California ISO to manage the variability of intermittent resource output by providing it with more actual ramp capability in real-time and less phantom ramp capability.
- Implementation of the flexiramp product in RTD will enable the California ISO to reduce its procurement target for flexiramp, because it will actually get the ramp capability it procures.
- Reducing the flexiramp procurement target will reduce the clearing prices in RTPD for flexiramp, for ancillary services that compete for ramp with flexiramp, and for energy.

FLEXIRAMP AND ANCILLARY SERVICE DESIGN:

Design and implementation of a flexiramp product with locational targets should be combined with a reevaluation of the ancillary service design.

- Locking down ancillary service schedules by resource in RTPD, reduces the ability of the system to respond to variations in net load in RTD that were not forecast in RTPD.
- The flexiramp constraint in RTPD and flexiramp product in RTD need to define locational ramp targets.
- A downward flexiramp constraint should also be included in RTPD and RTD. The amount of imports and exports scheduled in RTPD can have an important impact on the likelihood of downward price spikes.

FLEXIRAMP AND ANCILLARY SERVICE DESIGN:

- A design for real-time optimization of energy and ancillary services similar to those used in MISO and NYISO, that can shift the location of ancillary services in RTD, may reduce ramp induced price spikes due to variations in net load within local areas.
- A design in which the same shortage prices are used for ancillary services in RTD as in RTPD would help preserve consistent outcomes between RTD and RTPD and between capacity providing reserves and flexiramp during tight market conditions.

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