Flexi Ramp Product Design Issues

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Topics

- Empirical Questions
- Flexi Ramp Capacity Bids
- Flexi Ramp Pricing

Empirical Questions

RTD, RTUC, and day-ahead market data over the period since implementation of the flexi ramp constraint can provide valuable insights into the benefits from and design of a flexi ramp product.

- Some of the empirical questions that it would be helpful to have answers to as the California ISO elaborates the design of a flexi ramp product are outlined below.

Empirical Questions

RTD intervals with power balance violations:

- Was RTUC able to schedule the target ramp capability for this period?
  - Inability to schedule target ramp capability may indicate a need to commit more capacity day-ahead to provide ramp.
- What portion of ramp capability in RTUC was on units dispatched out of merit in RTUC to provide ramp? (i.e. ramp capability that was not actually available in RTD but could be available with flexi ramp product)
  - Substantial ramp capability on out-of-merit units suggests benefits from implementing the flexi ramp product.

Empirical Questions

RTD intervals with power balance violations:

- How much ramp capability was needed in RTD compared to the RTUC procurement target?
  - Are the continuing power balance violations due to the level of the procurement target?
- Was the power balance violation foreseen in RTUC?
  - Power balance violations in RTUC suggest a need to commit more ramp capability day-ahead.
- Was rampable capacity in RTUC not dispatched up in RTD due to transmission constraints?
  - This would suggest the need to account for congestion in scheduling ramp capability.

Empirical Questions

RTD intervals with power balance violations:

- Were these top of the hour intervals with large ramps?
  - Suggests lack of ramp might be avoided with 15 minute scheduling and smaller top of hour changes in net imports.

Empirical Questions

RTUC / DAM

1) How often could the RTUC ramp target not be met or met only at a cost greater than $50 per megawatt hour?
2) Why?
   - Because the target was too high? e.g. trying to procure lots of ramp up when intermittent output is high?
     - This is not a problem because the ramp would not be needed.
   - Because an atypically low amount of ramp capability was committed in the day-ahead market?
     - If so, this suggests a possible need to commit more capacity providing ramp day-ahead.

Empirical Questions

- Because an atypically low amount of ramp capability was committed in the day-ahead market?
  - Suggests a possible need to commit more capacity providing ramp day-ahead.
- Because an atypically low amount of capacity with 1 hour or shorter start up times was available for commitment after the day-ahead market?
  - Suggests a possible need to schedule 30 minute to 1 hour reserves day-ahead.
- Because the day-ahead load forecast was too low so available ramping capacity was needed to meet load?
  - Suggests the problem was capacity, not ramp capability.

Empirical Questions

- Were these typically non-top of the hour intervals in which net imports were fixed?
  - If so, this would suggest that the ramp shortages might be reduced with 15 minute scheduling.

Real-Time Capacity Bids for Flexi Ramp

What would flexi ramp product capacity bids reflect?

- Wear and tear costs?
  - No, units will be dispatched up or down for energy without regard to these bids.
- Opportunity cost of energy limited resource?
  - No, units will be dispatched up or down for energy without regard to their flexiramp capacity bids, energy limits need to be reflected in energy offer prices.
- Unit's ability to recover investments in ramp capability?
  - No, absent market power, the higher the bid, the lower the returns.
- Opportunity costs in non-California ISO markets?
  - No, these opportunity costs are forgone when resource is made available for real-time dispatch.

Real-Time Capacity Bids for Flexi Ramp

Market impacts of real-time capacity bids for flexi ramp:

- Rampable capacity that is on-line, and is available for dispatch, but is not counted, will:
  - Drive commitment of additional resources to provide ramp capability that is not needed;
  - Cause out of merit energy dispatch, raising energy prices, to provide ramp capability that is not needed.
- A real-time capacity bid for flexi-ramp would be consistent with the real-time capacity bids allowed for spinning reserves, but the market impact of having two such bids may be much greater than the impact of spinning reserve bids.

Prices

There is no operational difference between capacity providing ramp capability to meet the portions of the ramp capability target based on expected or unexpected changes in net load.

- Attempting to pay different prices based on some arbitrary distinction would be complex to implement and would provide another opportunity for “unintended” bad outcomes.

Prices

It would be possible, in a pricing system without capacity bids, to pay each resource its individual opportunity costs.

- This would defeat an important benefit of the flexi ramp design. There would be no returns to developing resources with more dispatchable capability, faster ramp capability, versus inflexible capacity.
- This will put the entire burden of incenting the development and efficient bidding of flexible resources on forward procurement processes.