Price Formation Issues

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Topics

- Price Signals and Consequences
- Reserve Products

Price Signals

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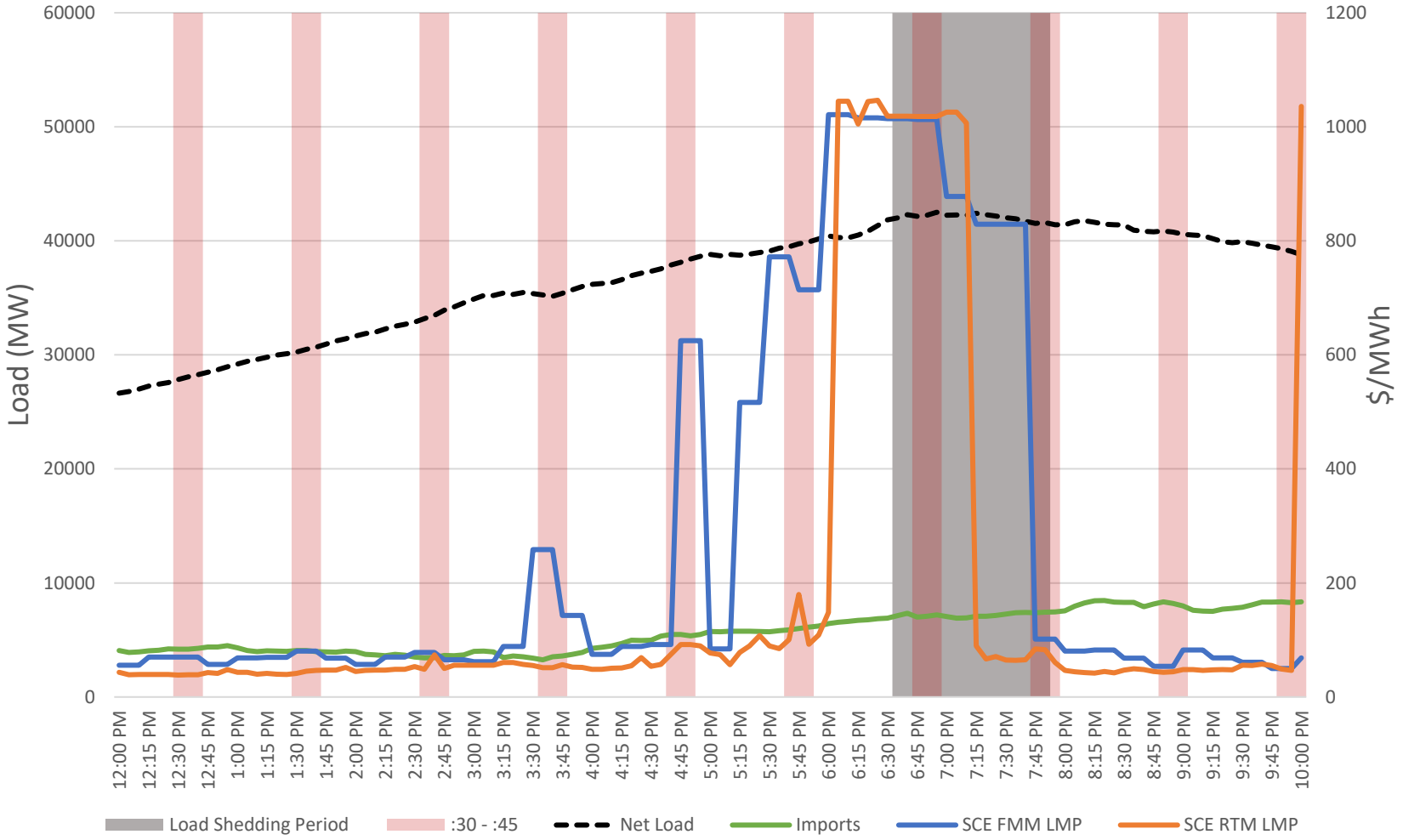

Price Signals

Real-time prices play an important role in directing import supply to the balancing areas that need them most to avoid load shedding.

- Low real-time prices leading into the periods in which hourly imports offers were submitted for the hours with load shedding was part of the problem in August 2020.
- This was not the only problem, but if we have fixed the other problems, do we want high prices, or low prices, in the future when operators have armed load and are dispatching non-spinning reserves to meet load and the next step is load shedding.
- We took the step for summer 2021 of trying to make sure the price would be at the cap, and not a few hundred dollars, if we ever got into the situation of arming load and dispatching non-spinning reserves again. We have gotten into that situation again, and my view is that those rules have worked better than in 2020.
- However, the step when the CAISO arms load and starts dispatching non-spinning reserves will likely come too late for the price signal to directly impact hourly import supply.

Price Signals

Prices also impose consequences. More effective scarcity pricing would be beneficial to the CAISO balancing area, as well as EDAM and Western EIM balancing areas, in incenting efficient behavior by consumers and suppliers throughout the region during shortage conditions.

- CAISO/EDAM suppliers that fail to cover their day-ahead market positions settle their imbalances at the real-time price. A low real-time price during stressed system conditions understates the cost of non-performance. This includes virtual and import suppliers who incur little cost of non-performance when day-ahead market prices are high and real-time prices as well as offers are capped at $1000.
- CAISO/EDAM LSEs whose load exceeds their day-ahead market schedule settle their deviations at the real-time price, as do Western EIM entities relative to their base schedules. A low real-time price during stressed system conditions understates the value of reduced consumption in real-time.

Reserve Products

Previous discussions have identified a number of contexts in which a reserve product such as 30 or 60 minute reserve product for the CAISO balancing area would be valuable from an operational perspective. The addition of such a product would be consistent with the trend in designs in other North American ISOs.

- These comments are directed at the California ISO balancing area, because the California ISO balancing area does not clear any reserve capacity in addition to mandatory WECC reserves. Utilities in other Western EIM balancing areas can commit capacity and/or schedule firm imports beyond those needed to meet WECC mandatory reserve requirements and need not offer all supply in the market.
- Absent additional reserves, the California ISO balancing area's only step before shedding load would be to arm load as reserves. This is different from other Western EIM balancing areas that can schedule more capacity in real-time than is needed to meet the WECC mandatory reserve targets.

Probably for this reason, CAISO operators use load conformance, and perhaps out of market purchases of imports, to in effect schedule additional reserves to provide a buffer that avoids the need to constantly arm load and risk load shedding any time there is net load forecast error.

Reserve Products

In the long-run the CAISO balancing area should introduce a reserve product with a start up and notification time longer than the 15 minutes used for flexiramp.

- This start-up and notification time might be 30 minutes, an hour, or perhaps longer.
- The start up and notification period should be determined by CAISO and stakeholders based on an assessment of the time frame in which net load uncertainty is resolved and operators see the need to schedule or commit additional resources over the operating day.
    - If the start-up and notification time is too long, operators will need to start resources providing reserves before the operators know they are needed or risk adverse reliability outcomes.
    - If the start-up and notification time is shorter than it needs to be, this will inflate the cost of the reserves, potentially by a lot.
    - To strike the right balance between cost and reliability the CAISO may evolve to having more than one type of reserves with differing start-up and notification time lines.

Reserve Products

Such a new reserve product should:

- Have a demand curve with many steps, so that the price of reserves rises gradually with reductions in available supply;
- Be co-optimized with energy so reserve shortages are reflected in energy prices;
- Settle deviations between day-ahead market schedules and real-time reserve supply at real-time prices.

For example, the NYISO 30 minute reserve product has 10 price steps NYISO MST section 15.4.5:

Shortage > 655MW = $750

Shortage of 600-655mw = $625

Shortage of 545-600MW = $500

Shortage of 490-545MW = $375

Shortage of 435-490MW = $300

Shortage of 380-435MW = $225

Shortage of 325-380MW = $175

Shortage of 200-325MW = $100

Shortage >0, <200MW = $40

Target or above = $0

Reserve Products

In assessing the cost of a “new” reserve product such as 30 or 60 minute reserves, my view is that we should recognize that the California ISO balancing area would not be adding a reserve product, it would be replacing an expensive reserve product.

- The California ISO would be replacing the purchase of thousands of megawatts of excess energy (load conformance) in FMM with the purchase of a reserve product.
- The net cost of the reserves provided by load conformance is the difference between the price of the energy purchased in the FMM and the imbalance price in RTD. This cost can be very high.

Introduction of a new reserve product is unlikely to reduce load conformance and load conformance costs unless the reserve capacity is available and deliverable.

Reserve Products

Some potential benefits from replacing load conformance with an explicit 30 or 60 minute reserve product would be:

- Load conformance is procured with a very high penalty price. If operators miscalculate, reserves in the form of load conformance can be procured at the price cap, even when the value of incremental capacity is much lower.
- Load conformance in HASP may not schedule flexible resources, it may schedule hourly interchange that flows even if it is not needed.
- Load conformance is modeled as located at the distributed load bus. This can overstate the amount of capacity that needs to be located close to load. Net load uncertainty may be realized at the location of intermittent resources as the CAISO attempts to model for procurement of flexiramp and imbalance reserves.

An explicit reserve product for the California balancing area would potentially allow more accurate treatment of the CAISO supply balance in Western EIM and EDAM load shedding evaluations.

Reserve Products

In my view there are important problems that exist with the current flexiramp and imbalance reserve implementations that would also exist with a new reserve product. It would be best if these problems were addressed before the CAISO introduces a new product with the same problmes.

- Because of the large amount of battery storage capacity operating in the CAISO balancing area, the CAISO needs to develop a method for accounting for battery (and perhaps other types of short duration storage) state of charge over the day when evaluating reserve adequacy.
- The CAISO needs to improve the implementation of the nodal delivery test to reduce the likelihood that the capacity scheduled to meet any new reserve product could not be delivered.
- The CAISO needs to develop a way to test the deliverability of the diversity benefit, which will also exist, although in a different form, with new reserve products.
- The CAISO needs to improve the interaction between locational demand curves and overall reserve demand curves, and evaluate and improve the locational modeling of net load uncertainty.

Reserve Products

These and other design or implementation issues/limitations/flaws that exist with the current flexiramp and imbalance reserve designs and implementation will not be simple to resolve.

- The CAISO and stakeholders need to start working now on the needed design changes because they will likely take years to develop before any changes can move into implementation.
- If we wait years to start, implementation would slide back even further.
- The problems new reserve products would address will not wait until we are ready. Failing to start soon may lock the CAISO into a sequence of poor choices that are costly, but are all that can be implemented near-term.