Day-ahead market enhancements - flexible ramping product

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Previously, two alternatives have been discussed at 11/30 stakeholder workshop and 12/7 MSC meeting

- Alternative 1
  - Keep current DAM application sequence
    - MPM/IFM – RUC
    - Add FRU/FRD procurement in IFM
    - Additional unit commitment and fixed AS/FRU/FRD in RUC
- Alternative 2
  - Change current DAM application sequence
    - MPM/RUC – MPM/IFM
    - Co-optimize Energy/AS/FRU/FRD in RUC
    - Fixed unit commitment and AS/FRU/FRD in IFM

CAISO plans to move forward with Alternative 1

- Co-optimize Energy/AS/FRU/FRD in IFM
  - Full unit commitment
  - Clear physical supply with virtual and load bids
- Minimal change in RUC
  - Additional unit commitment (no de-commitment)
  - Use availability bids (non-zero for RA Resources, after EDAM) to procure RUC Capacity to meet demand forecast
  - Fixed AS/FRU/FRD awards from IFM
- No changes to deviation settlement except for FRU/FRD/Corrective Capacity (CME)

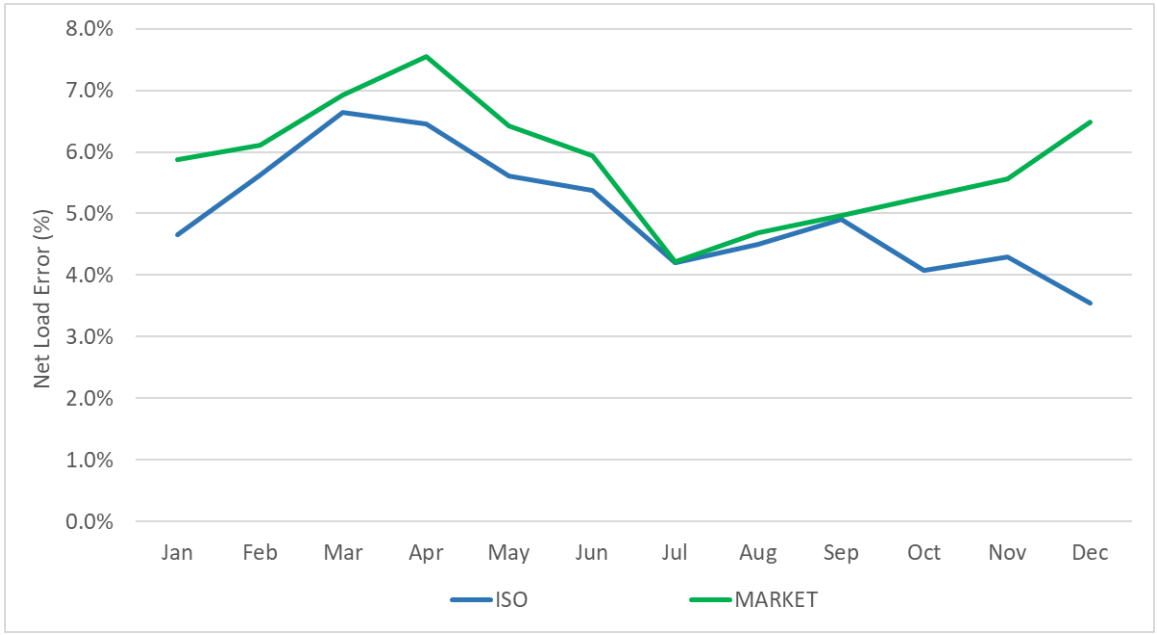
As discussed at previous MSC meeting, ISO is pulling data to evaluate if market or ISO day-ahead forecast is more accurate

- Day Ahead Forecast
  - Cleared bid-in demand – VER cleared + net virtual demand
  - ISO load forecast – ISO VER forecast
- Compare to FMM
  - ISO FMM load forecast – ISO FMM VER forecast
- Evaluation of Accuracy
  - On average
  - Peak days
  - Challenging days

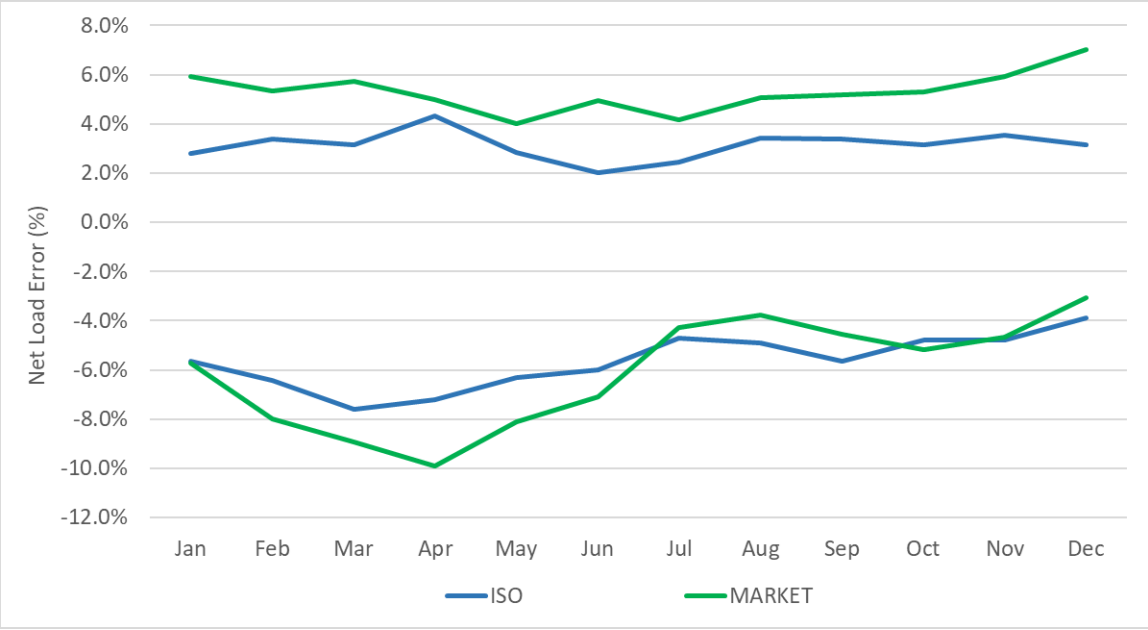
Monthly Average Net Load Error

ISO = (Real-Time Net Load – RUC Net Load)

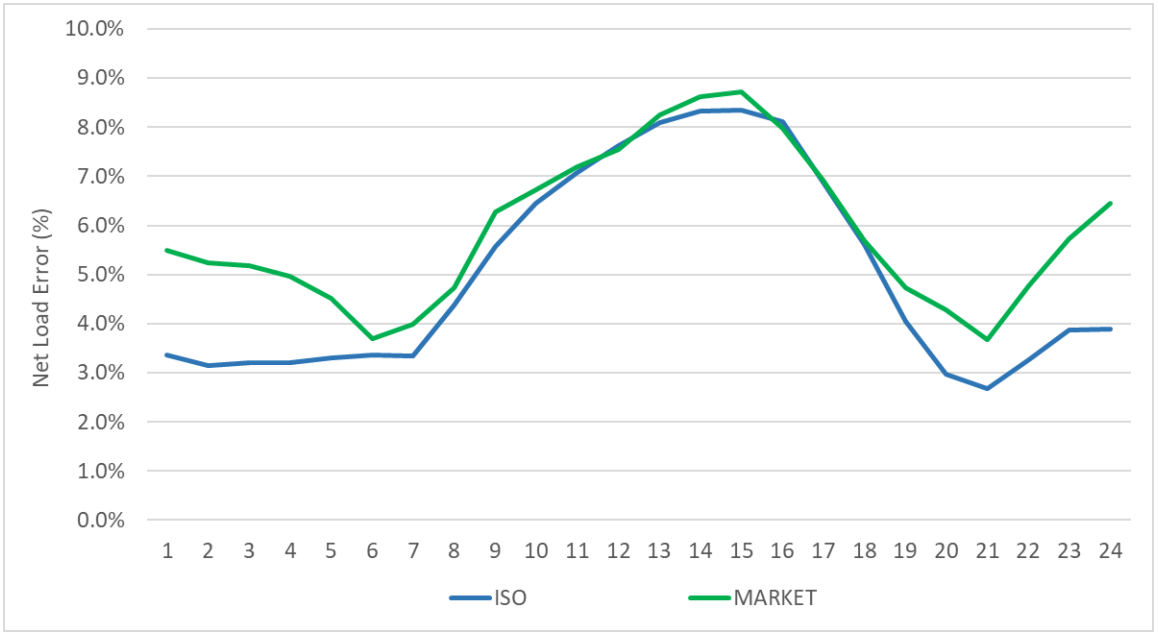
MARKET = (Real-Time Net Load – [IFM Net Load + Net Virtual Demand])



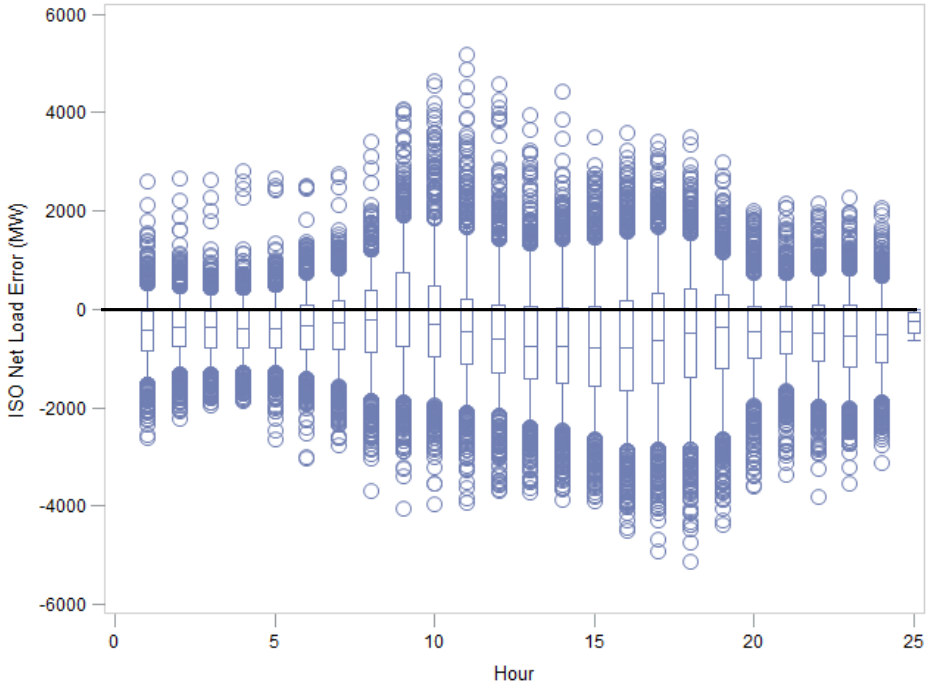
Monthly Net Load Error by Direction of Error

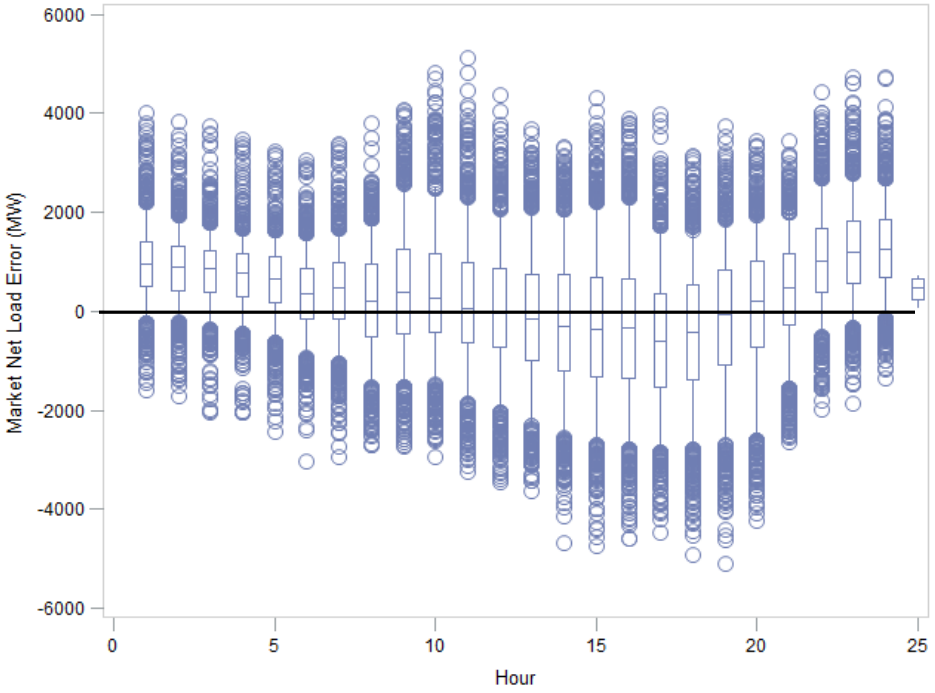


Hourly Net Load Error



Hourly Distribution of Net Load Errors in MW

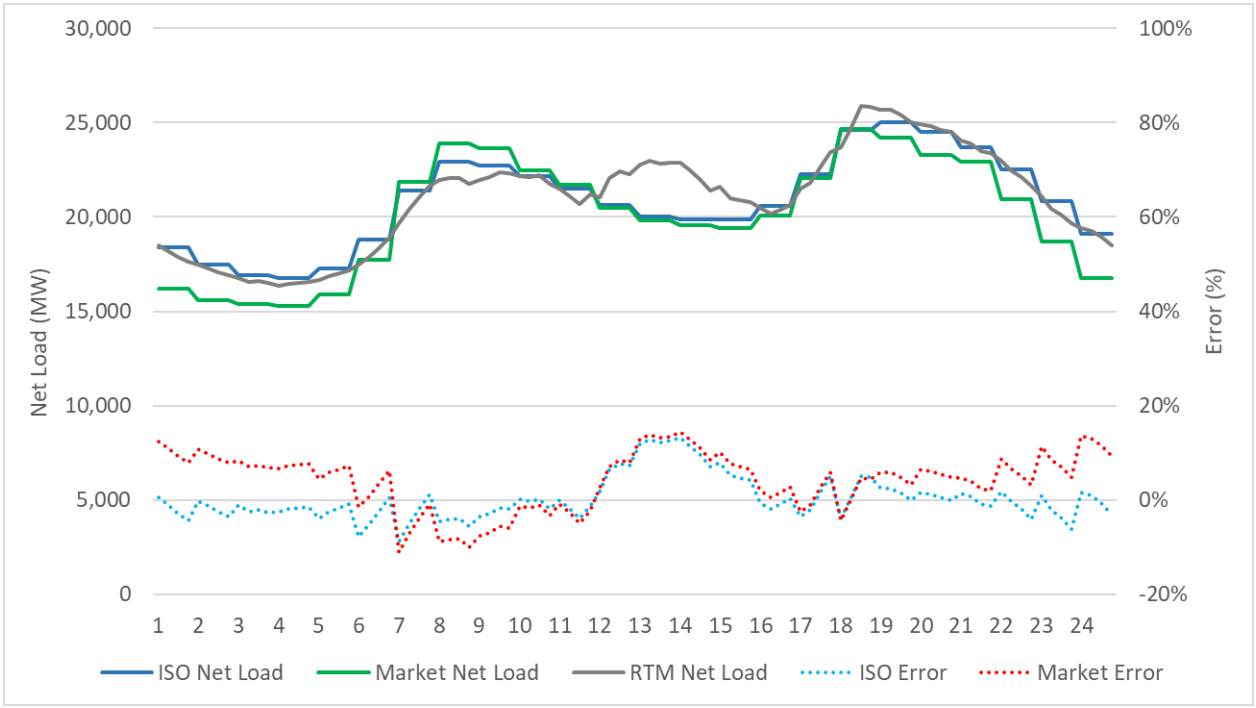




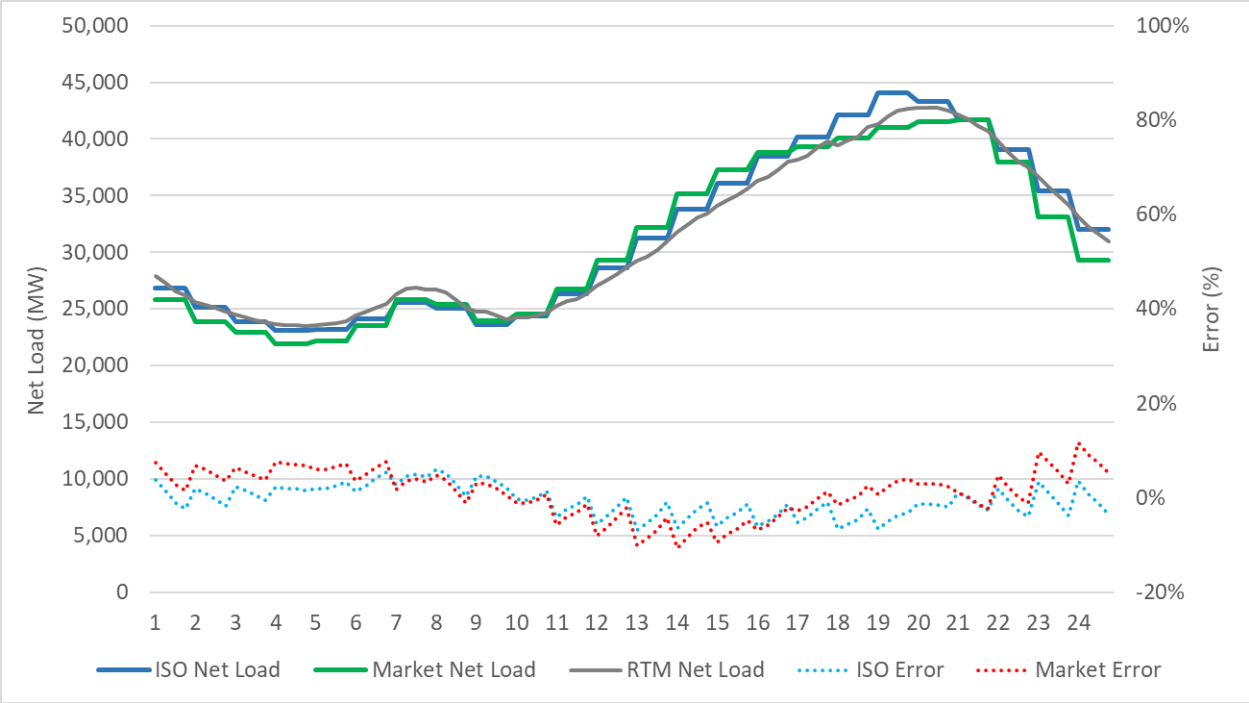
Positive: RT > DA

Negative: DA > RT

Day with challenging Solar Forecast



Day with challenging Load Forecast



Could the data analysis change how the day-ahead requirement is determined?

- Market uncertainty
  - FRP covers difference between IFM cleared net load and ISO FMM net load forecast
- ISO forecast uncertainty
  - FRP covers the difference between ISO DA net load forecast and ISO FMM net load forecast
  - RUC covers shortages between IFM cleared net load and ISO DA net load forecast
- In addition to uncertainty, need sufficient real time bids to meet FMM FRP requirement

With the introduction of FRP, does the role RUC play change?

- Is there a difference between a RUC availability bid and FRU bid?
- If IFM net load cleared below ISO forecast, then buy more FRU?
  - Allocate same as RUC awards today
- If IFM net load cleared above ISO forecast, then buy more FRD?
  - Don’t need to de-commit a resource, but do need additional bids below IFM schedule. New cost allocation.
- Does RUC need to be performed within existing DA market timeline?

Propose to allow bidding for all day-ahead products

- Energy
- Regulation Up
- Spinning Reserve
- Non-Spinning Reserve
- Flexible Ramping Product Up (NEW)
- RUC Availability Up (NEW)
- Corrective Capacity Up (NEW)
- Regulation Down
- Flexible Ramping Product Down (NEW)
- RUC Availability Down (NEW)
- Corrective Capacity Down (NEW)

Day-ahead bids for dispatch products should reflect the cost of being available in the real-time market

- Upward dispatch products
  - Flexible Ramping Product Up
  - RUC Availability Up
  - Corrective Capacity Up
- Downward dispatch products
  - Flexible Ramping Product Down
  - RUC Availability Down
  - Corrective Capacity Down
- Can the same bid be used for upward products, downward products, or all dispatch products? Spinning reserves? Non-spinning reserves?

Propose to re-optimize all products in the real-time market

- No bids submitted for dispatch products in the real-time market
- Are real-time bids needed for spinning reserves and non-spinning reserves?
  - No. Opportunity cost only with energy.
- Are real-time bids needed for regulation up/regulation down?
  - Yes. Cost of regulation energy settlement.

By allowing day-ahead bidding for dispatch products are market power mitigation rules needed?

- Corrective capacity is procured nodal – Yes
- RUC availability is transmission feasible – Yes
- FRP to be procured by sub-regions
  - No, assumes sub-region is competitive
  - Yes, if more granular procurement needed to improve deliverability in the future
- Ancillary services are procured by sub-regions
  - Same as FRP

Current “mitigation” is based on relaxation parameters

- Non-spinning reserves are relaxed at $250 (bid cap)
- Corrective capacity will be relaxed before non-spinning reserve at ~$247
- FRU will be relaxed before corrective capacity at ~$244
  - Demand curve is capped by the relaxation parameter
- Regulation down is relaxed at ($155)
- FRD is relaxed before regulation down at ($147)
  - Demand curve is capped by the relaxation parameter

Discussion on market power mitigation for “capacity” products?

- How can a default “capacity” bids be calculated?
  - Does it differ by fuel type?
    - Cost of ability to procure and/or dispose of gas in real-time
    - Cost to modify hydro system from day-ahead schedule
    - Cost of preparation for demand response
- Can a soft bid cap be implemented with similar adjustments as FERC Order No. 831 for energy between $1000 and $2000?
- Other approaches?