System market power trends and issues

Department of Market Monitoring

California Independent System Operator

July 15, 2019

Local market power mitigation provisions do not mitigate system market power in CAISO.

- When bid mitigation is triggered by congestion within CAISO, the system marginal energy cost (SMEC) from the market power mitigation run of software is used to set a <u>floor</u> for mitigated bids.

- This provision is based on explicit assumption that SMEC is <u>competitive.</u>

- When SMEC rises higher than Default Energy Bid of gas units, bids are not lowered by bid mitigation even when congestion occurs.

California ISO

LMP decomposition used in mitigation

- LMPs for each unit (j) from MPM run are *decomposed* into (1) energy, (2) losses, (3) competitive congestion and (4) non-competitive congestion.

- Non-competitive congestion is based on shadow prices for non-competitive constraints (λ_{nc}) in BAA that have RSI < 1.

$$p_j = SMEC + loss_j + \sum_c (-SF_{c,j}) * \lambda_c + \sum_{nc} (-SF_{nc,j}) * \lambda_{nc}$$

Congestion on competitive constraints
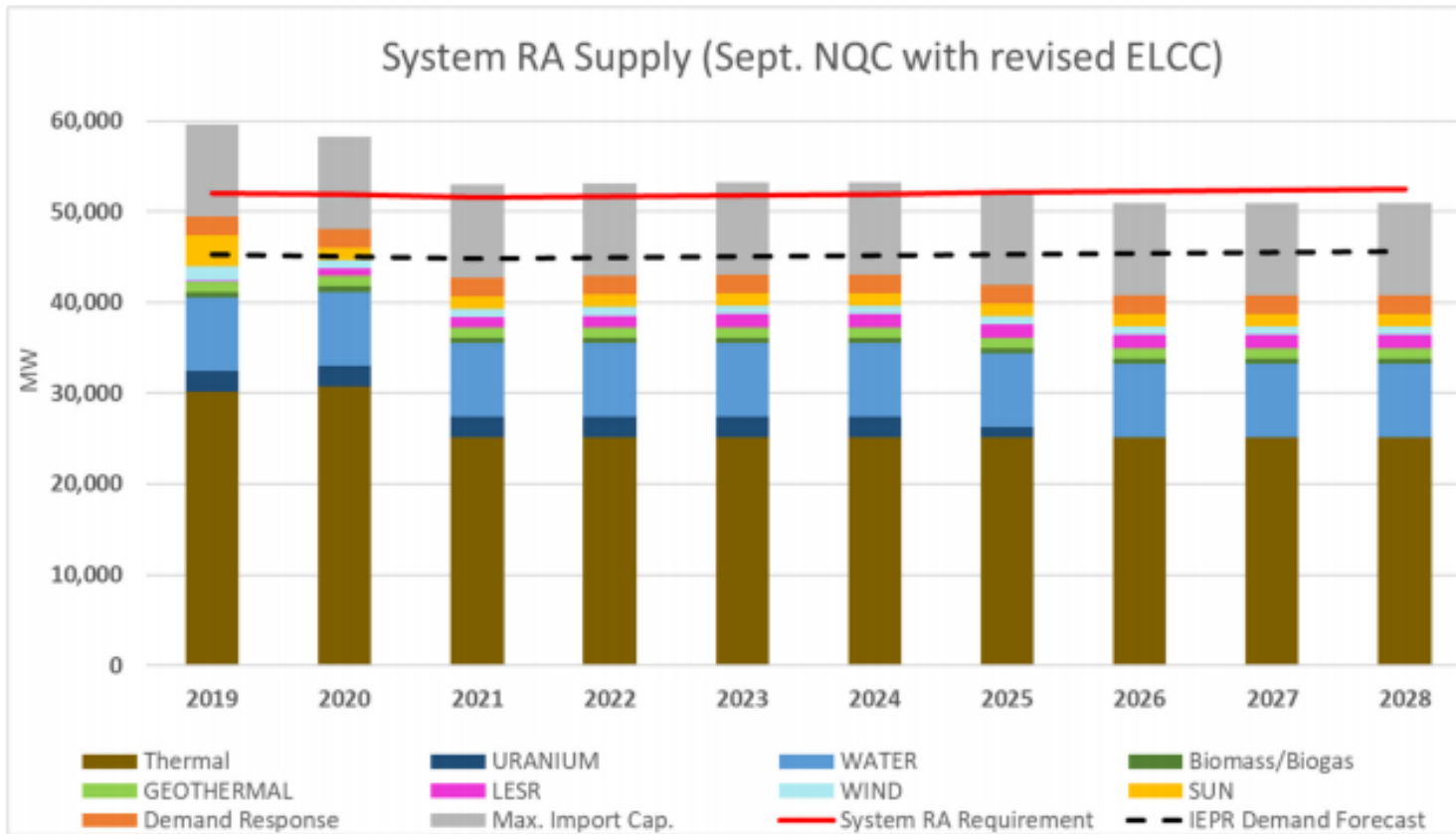
Congestion on non-competitive constraints

- If sum of congestion from *non-competitive* constraints is positive, then the resource is subject to potential bid mitigation.

Competitive LMP is used as floor in bid mitigation

- Competitive LMP from MPM run includes SMUC plus congestion on competitive constraints.

$$p_j = SMEC + loss_j + \sum_c (-SF_{c,j}) * \lambda_c + \sum_{nc} (-SF_{nc,j}) * \lambda_{nc}$$

Competitive LMP$_j$

Congestion on
non-competitive constraints

- For each unit *j* subject to mitigation:

    Unit bid cap$_j$ = Max(Competitive LMP$_j$, DEB$_j$)

Potential for system level market power in CAISO increasing due to numerous trends.
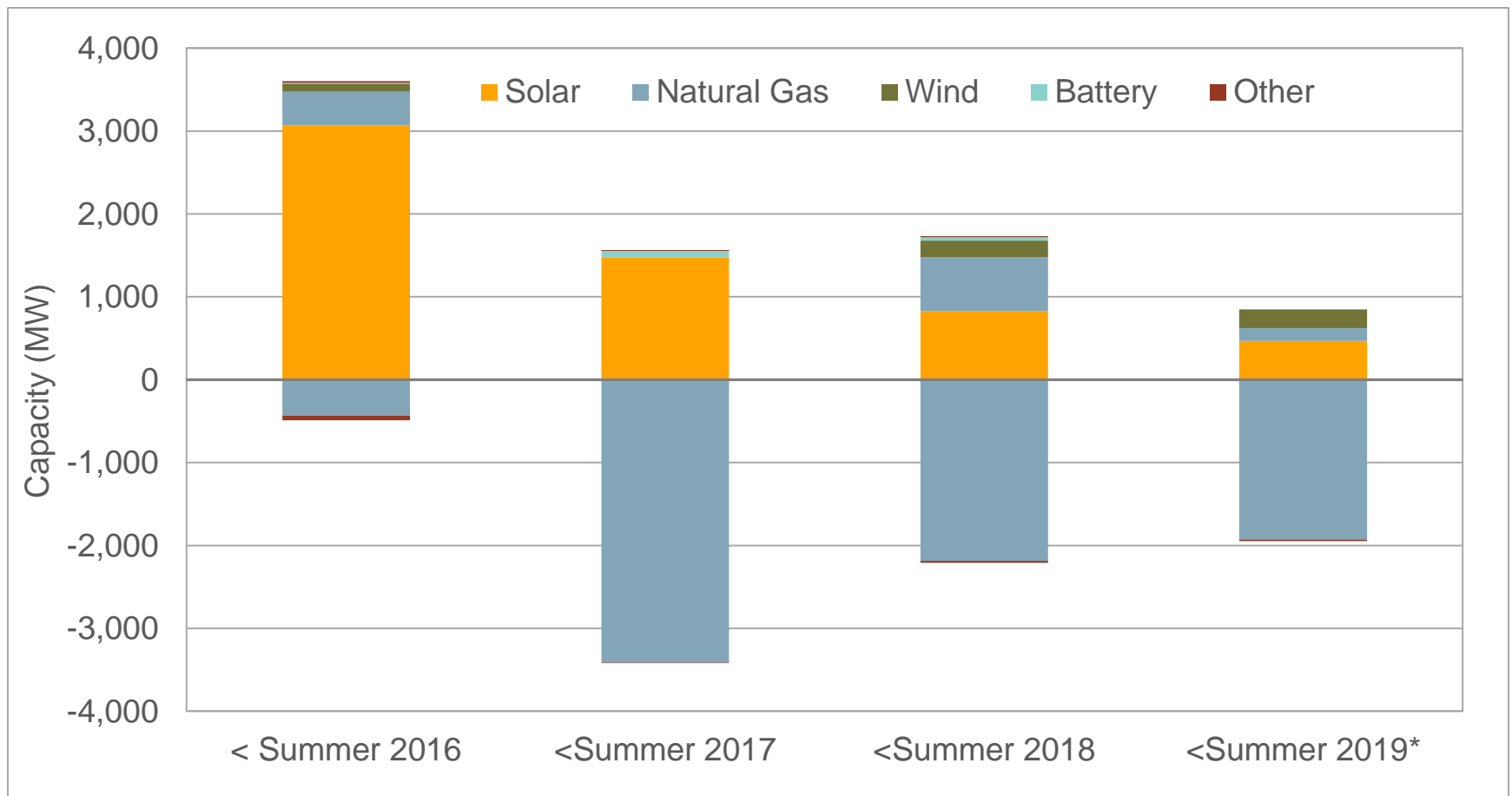
- Retirement of gas capacity.

- Increasing portion of resource adequacy requirements being met by solar/wind vs. gas-fired generation.

- Fewer energy tolling contracts between LSEs and gas units within CAISO.

- Increasing portion of resource adequacy requirements met by imports not backed by energy contracts or physical resources.

- Tightening regional supply conditions.

- Increasing portion of load being served by Community Choice Aggregators (CCAs).

  - More fragmented longer term bilateral supply and procurement process previously done by major IOUs under PUC guidance/jurisdiction.

# Increased reliance on imports likely in order to meet resource adequacy requirements as gas capacity declines

System RA Supply (Sept. NQC with revised ELCC)

Legend: Thermal, URANIUM, WATER, Biomass/Biogas, GEOTHERMAL, LESR, WIND, SUN, Demand Response, Max. Import Cap., System RA Requirement, IEPR Demand Forecast

Source: CPUC http://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=302942332

California ISO

CAISO - Public

Gas capacity exiting market is being largely replaced with renewables (mainly solar).

Legend: Solar, Natural Gas, Wind, Battery, Other

Y-axis: Capacity (MW), ranging from -4,000 to 4,000

X-axis categories: < Summer 2016, <Summer 2017, <Summer 2018, <Summer 2019*

Actual solar and wind output during peak "net load" hours is well below resource adequacy capacity rating.
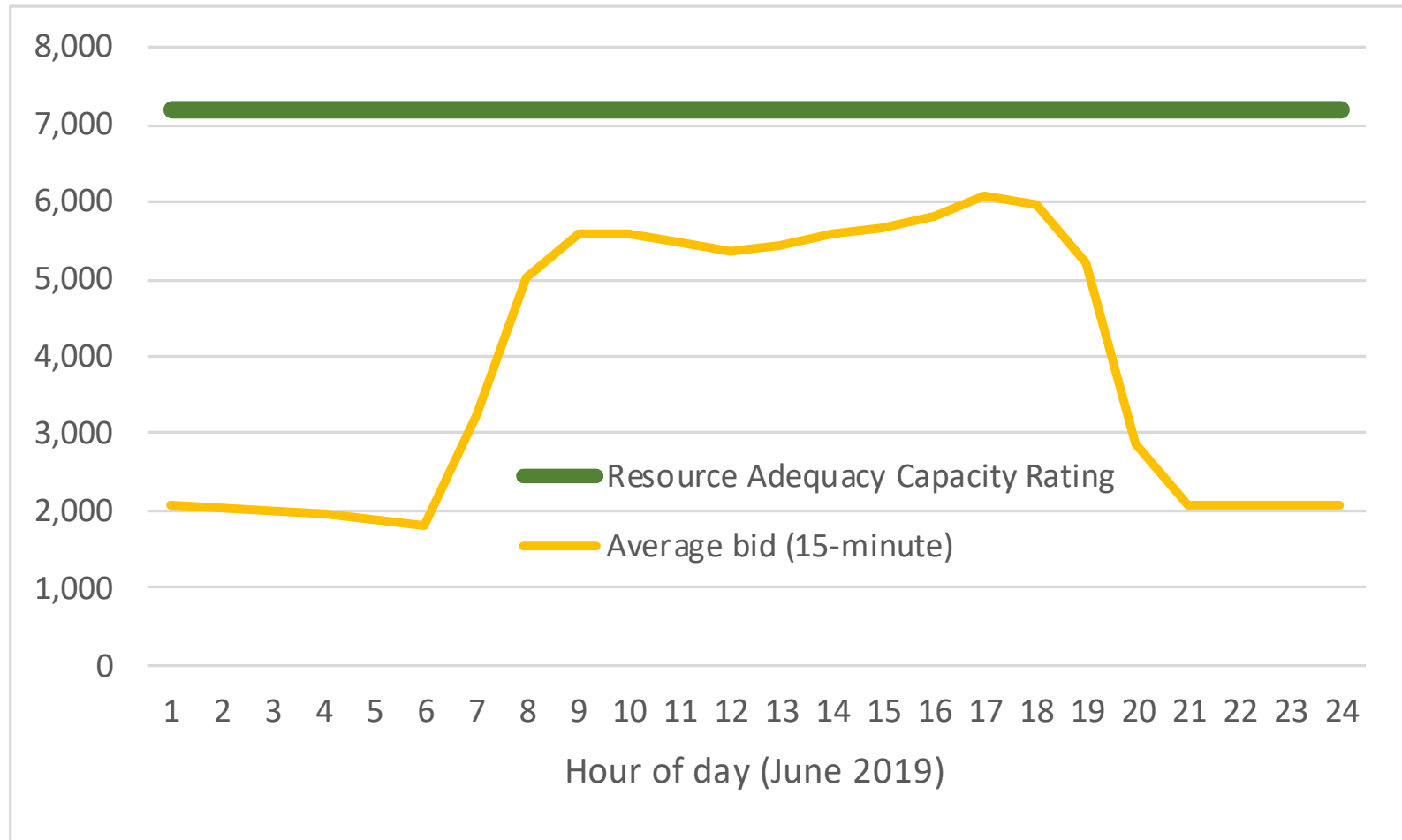
Demand response being relied upon to meet about 1,700 MW of peak summer resource adequacy requirement.
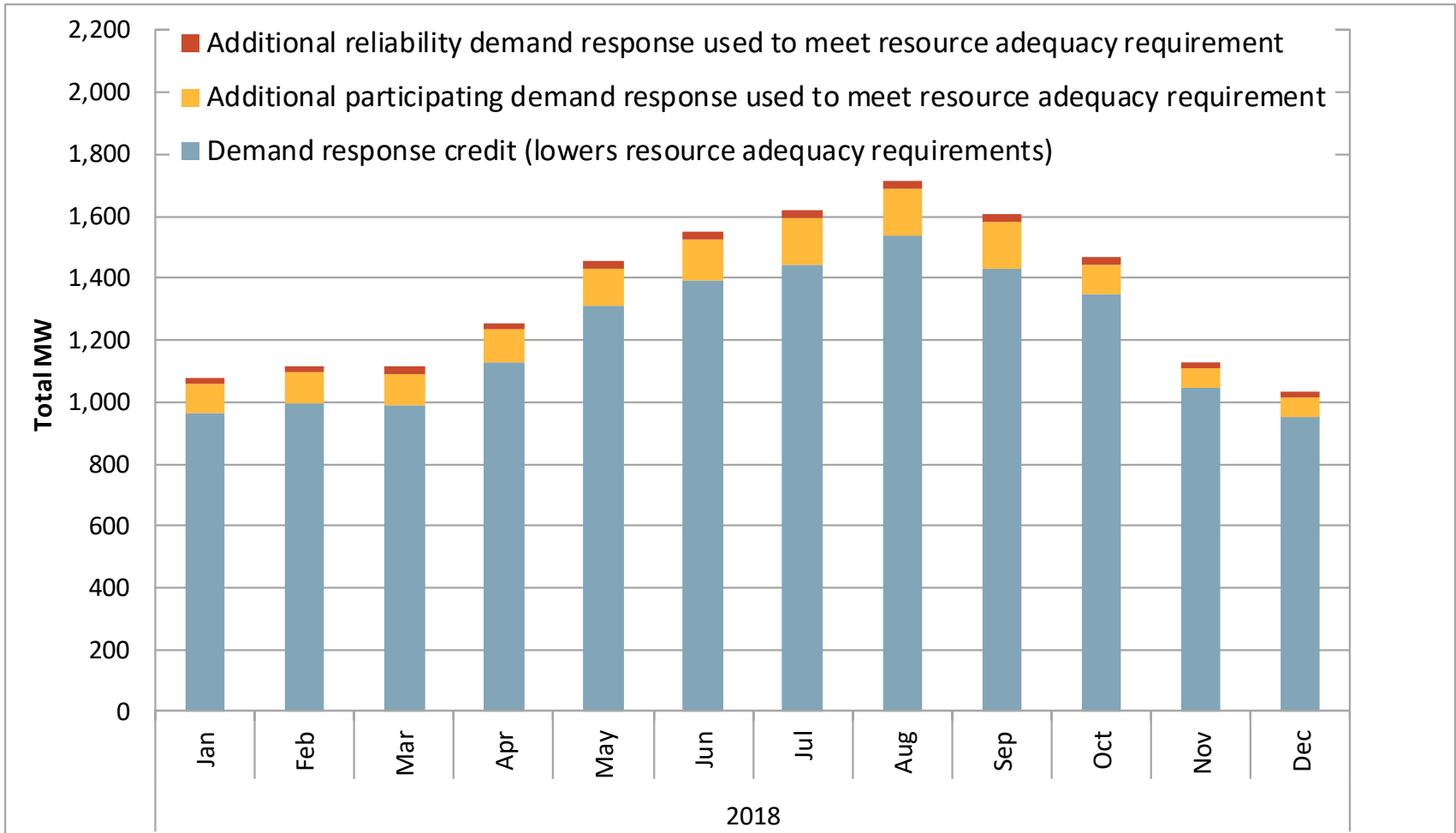
Demand response available for dispatch less than portion of resource adequacy requirement assumed to be met by demand response.
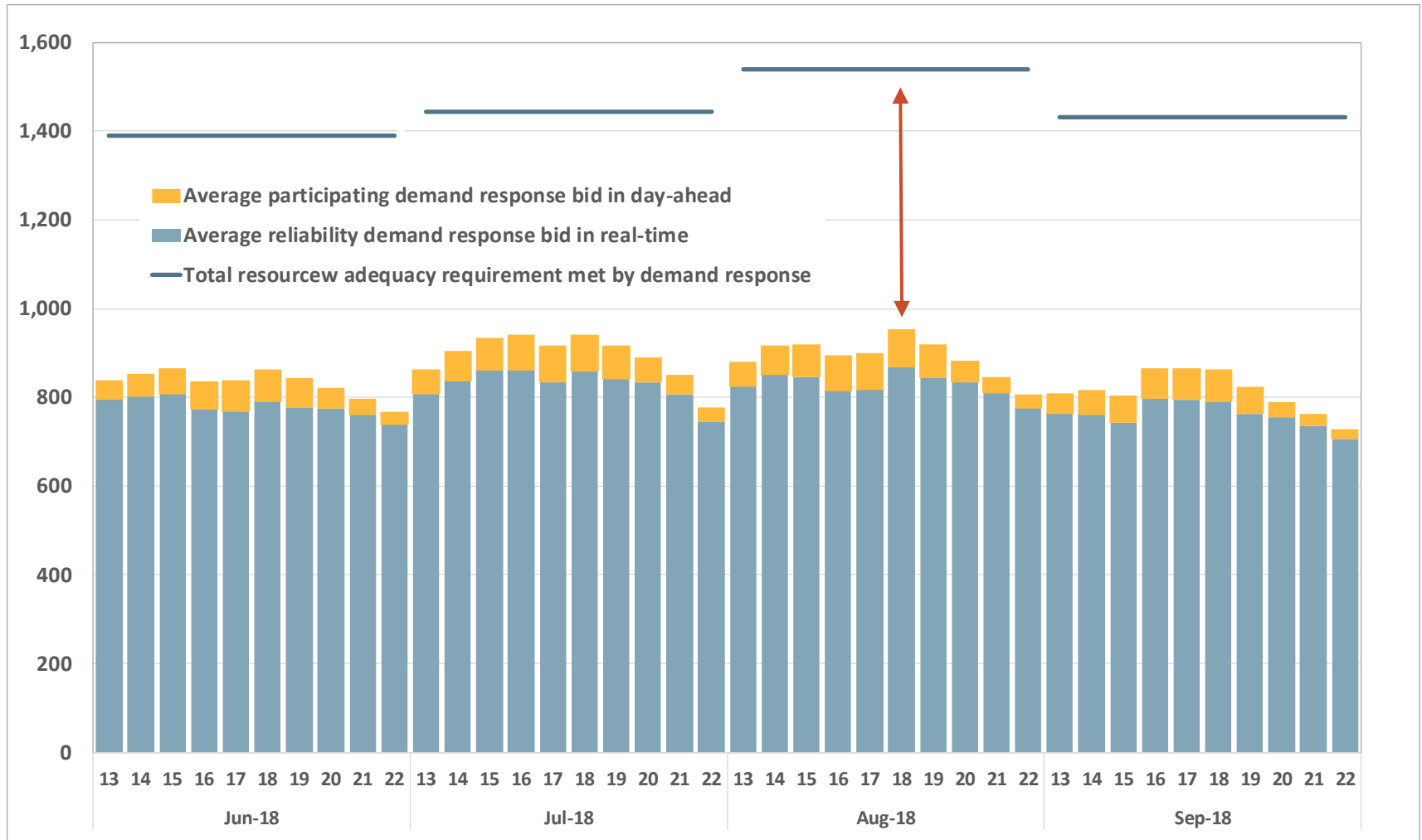
Potential actions by ISO to reduce the potential for system market power:

- Begin consideration of options for system market power mitigation.

- Don't raise hard bid cap to $2,000/MWh
  - Require *ex ante* verification for import bids over $1,000/MWh that are allowed to set price (Order 831)

- Set local and system resource adequacy requirements sufficiently high to ensure reliability (which may also reduced likelihood of non-competitive market outcomes).

- Re-examine resource adequacy provisions relating to imports (e.g. must offer obligation in day-ahead only, resource or system backing RA imports, etc.)