Day-Ahead Market Enhancements

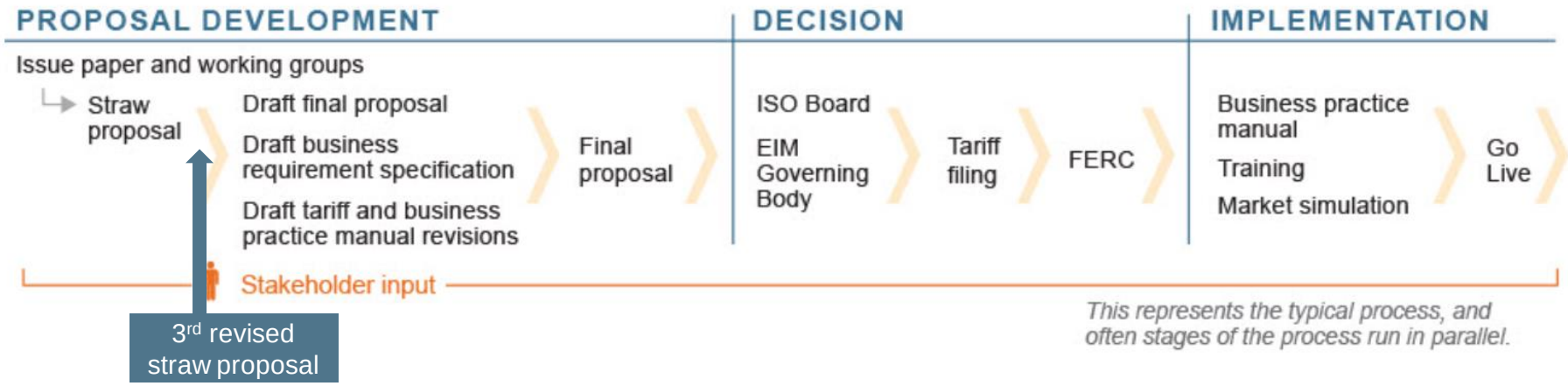
Stakeholder Workshop

March 2, 2022

Agenda

Time:	Topic:	Presenter:
9:00 – 9:05	Introduction/agenda	Kristina Osborne
9:05 – 9:45	Imbalance Reserve Demand Curve	James Friedrich
9:45 – 10:25	Market Power Mitigation	James Friedrich
10:25 – 11:05	Accounting for Energy Offer Price in Upward Capacity Procurement	James Friedrich
11:05 – 11:45	RA Real-Time Must Offer Obligation and Imbalance Reserves	James Friedrich
11:45 – 11:50	Next steps	Kristina Osborne

Stakeholder Process



Day-Ahead Market Enhancements

IMBALANCE RESERVE DEMAND CURVE

Approach for IFM to procure imbalance reserves when supply is scarce

- Originally proposed for IFM to procure imbalance reserves using a demand curve
  - Similar to flexible ramping product approach
  - Uses expected value of forgone procurement based on probability of real-time market power balance violation

- Revised approach to procure imbalance reserves based on penalty prices when supply is scarce
  - Rationale was to procure full imbalance reserve requirement to avoid operator's continued biasing RUC load forecast and to protect imbalance reserves over low-priority exports

Concerns with proposed approach because of large differences between scheduling and pricing run penalty prices

Penalty Price Description	Scheduling Run Value based on $1000 Cap	Pricing Run Value based on $1000 Cap	Scheduling Run Value based on $2000 cap	Pricing Run Value based on $2000 cap
Ancillary Service Region Regulation-up and Regulation-down Minimum Requirements	2500	250	5000	250
Ancillary Service Region Spin Minimum Requirements	2250	249	4500	249
Ancillary Service Region Non-Spin Minimum Requirements	2000	248	4000	248
Self-scheduled CAISO demand, self-scheduled export using identified non-RA supply resources, and export leg of wheel through self-schedules	1800	1000	3600	2000
Imbalance reserve up requirement	1600*	247*	3200*	247*
Self-scheduled exports not using identified non-RA supply resource	1950	1000	2100	2000

- Exports and load potentially will not clear at prices they are willing to pay
  - Creates incentive for demand to self-schedule, undermining market efficiency and market power protection
  - Imports will more often set prices, incenting them to bid high
- Example:
  - Internal load or export bids $900/MWh
  - If there isn't sufficient supply, market schedules IRU instead of clearing this demand
  - Prices based on $247 despite demand's willing to pay $900/MWh

New proposal: imbalance reserve stepped penalty price in both scheduling and pricing runs

Scheduling run IRU relxation (%)*	Scheduling run penalty price ($)	Procurement (%)**	Pricing Run Price ($)
0.000	247	97.5	247
0.026	300	95	300
0.051	400	92.5	400
0.077	500	90	500
0.103	600	87.5	600
0.128	700	85	700
0.154	800	82.5	800
0.179	900	80	900
0.205	1000	77.5***	1000
0.231	1200	75	1000

- This option relaxes IRU procurement as energy prices rise. Allows bid-in demand to clear instead of scheduling incremental IRU.
- Prices IRU requirement relaxation consistent with priority in scheduling run
  - Addresses efficiency and incentive issues
- However, can result in clearing exports while reducing IRU procurement
  - These exports could be curtailed in real-time if a large amount of uncertainty materializes

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MARKET POWER MITIGATION

Imbalance Reserve Deployment Scenarios

- IRU deployment scenario: IRU awards deployed to balance a demand increase by the IRU requirement
- IRD deployment scenario: IRD awards deployed to balance a demand decrease by the IRD requirement
- IRU/IRD deployment scenarios are co-optimized with the base scenario like contingencies
- Transmission constraints are enforced to assure IRU/URD award deliverability
- Binding transmission constraint shadow prices contribute to the LMP MCC and the IRU/IRD marginal prices

Market Power Mitigation for Imbalance Reserves

- IRU/IRD awards are priced at the shadow price of the IRU/IRD requirement constraint plus MCC contributions from binding transmission constraints in the IRU/IRD deployment scenarios
  - The greater of the availability and opportunity cost
- IRU/IRD availability bids are subject to a bid cap and the IRU/IRD requirements are system-wide
- Energy bids are mitigated if they provide counter flow to uncompetitive binding transmission constraints in the base scenario and the IRU/IRD deployment scenarios
- Mitigating Energy bids also mitigates IRU/IRD opportunity costs

Market Power Mitigation for Reliability Capacity

- The base scenario in RUC is essentially a RCU/RCD deployment scenario solved on top of the IFM solution
- RCU/RCD awards are priced at the shadow price of the RUC power balance constraint plus MCC contributions from binding transmission constraints in RUC
- RCU bids should be mitigated if they provide counter flow to uncompetitive binding transmission constraints
- RCU/RCD availability bids are subject to a bid cap

Bid ceiling and floor for new capacity products

- Imbalance reserve bid range: ($0, $247)
- Tied to existing ancillary service penalty prices and flexible ramping product demand curve
- Reliability capacity bid range: ($0, $250)

Calculating Default Availability Bid

- CAISO mitigates energy offers to the greater of what it calls "default energy bids" or the competitive locational marginal price
  - A similar method will be used for new capacity products but requires calculation of a "default availability bid"
- CAISO will not mitigate imbalance reserve bids; no longer need to develop default availability bids for imbalance reserves
- CAISO proposes to use the 90th percentile historical non-RA RUC bid as a default availability bid for reliability capacity
  - A single price to be used for every resource in every interval
  - Summary: CAISO would mitigate reliability capacity bids to the greater of a competitive reliability capacity price OR this default availability bid

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ACCOUNTING FOR ENERGY OFFER PRICE IN UPWARD CAPACITY PROCUREMENT

Policy objective

- Objective is to prevent opportunities for high-energy-cost resources from routinely being awarded capacity payments and rarely dispatched for energy in the real-time market

- Objective is not to minimize energy costs of resources awarded RCU/IRU

Latest Proposal

- Estimate marginal price of meeting P97.5 net load forecast using available day-ahead energy bids
- Resources would be ineligible for RCU/IRU awards on any capacity segment with an associated energy bid that exceeds the forecasted P97.5 price
- Implementation not feasible

Third proposal alternatives (1 of 2)

- Alternative 1: Limit RT energy bid price to P97.5 price
  - Policy objective is achieved through bid differentiation
  - Resources with energy costs above cap must incorporate financial risk into bid → higher bids for RCU and IRU → less likely to be awarded → meets policy objective
  - Price cap limited to RT energy bid quantity = DA capacity awards
  - Turn off RT energy bid price cap in tight conditions
  - Have to publish P97.5 price in advance of DAM close

- Related options to consider for Alternative 1
  - "No pay" for capacity awards associated with RT energy bids above P97.5 price
  - Could limit bid price to DA bid instead of P97.5 price

Third proposal alternatives (2 of 2)

- Alternative 2: Disqualify resource if accompanied by DA energy bid with any segment above P 97.5 cap
  - Turn off functionality in tight conditions
- Alternative 3: Do not limit energy bids
  - Monitor performance and assess consequences

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RA REAL-TIME MUST OFFER OBLIGATION

RA Real-Time Must Offer Obligation

- CAISO proposal to replace the RA real-time must-offer obligation with imbalance reserves in DAME was discussed at Feb 11 MSC meeting
- CAISO expressed concerns around compensation, efficiency, and asymmetries in EDAM participation
- California entities are firmly opposed
- CAISO proposes to make real-time must-offer obligations optional by Local Regulatory Authority
  - CAISO would no longer enforce bid insertion or real-time must-offer obligations on unscheduled resources
  - LRAs can obligate its load-serving entities to require real-time must-offers in their supply contracts
  - CAISO will provide LRAs with data to help them enforce

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NEXT STEPS

Stakeholder Process Schedule

Date:	Milestone:
March 16	Comments due - workshop
April 6	Post 3rd revised straw proposal
April 13	Stakeholder meeting - 3rd RSP
May 11	Comments due - 3rd RSP
Late May	Stakeholder workshop
Mid-June	Comments due - workshop
Early July	Post DFP
Mid July	Stakeholder meeting - DFP
Late July	Comments due – DFP
Early Aug	Post final proposal
Early to mid-Aug	Stakeholder meeting - final proposal
Mid-Aug	Comments due – final proposal
Sept 2022	ISO BOG decision

Next Steps

- Submit written comments on the workshop materials and discussion by end of day March 16, 2022, through the ISO's commenting tool using the link on the initiative webpage:

  https://stakeholdercenter.caiso.com/StakeholderInitiatives/Day-ahead-market-enhancements

- Publish third revised straw proposal in early April, 2022.