California ISO

California Independent
System Operator

Market Power Mitigation

Market Surveillance Committee Meeting

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The Basic Elements

1. Must offer obligation for Resource Adequacy (RA) units.
2. Strong and effective Local Market Power Mitigation (LMPM) similar to the PJM model.
3. Local Market Power Mitigation for RUC Availability bids.
4. Explicit threshold (80% of run hours over 12-month rolling period) for defining Frequently Mitigated Units.
5. Bid Adder for Frequently Mitigated Units
   - Non-RMR / Non-R.A. units only.
   - Will transition to local capacity contract over time.
   - Open to future development of monthly local capacity imbalance market similar to ISO NE.

The Basic Elements (2)

6. Elimination of System AMP. May be instituted later with increase in bid price cap, scarcity pricing mechanism, and pivotal supplier test.
7. Elimination of System Market Power Mitigation for RUC Availability bids.
8. $250/MWh soft bid cap for energy, increasing annually to $1,000 (hard cap at $500 and up). Increases subject to demonstration that markets are workably competitive.
9. $250/MW hard bid cap for RUC Availability bids to transition to $100/MW when energy bid cap goes to $500/MWh.
10. $250/MW hard bid cap for A/S to transition to $100/MW when energy bid cap goes to $500/MWh (or sooner, depending on competitiveness of more granular A/S procurement).

Summary of Market "Passes"

Pass	Description
Pass 1	Pre-IFM Pass with only competitive transmission constraints enforced. If the CAISO implements System AMP, there will be two passes: Pass 1a – Unmitigated Bid Pass Pass 1b – Mitigated Bid Pass
Pass 2	Pre-IFM Pass with all transmission constraints enforced. Pass 2 determines local market power mitigation and RMR dispatch. If there is a bid conduct and market impact test for local market power mitigation (i.e., Local AMP), this stage will involve two passes; under PJM-style LMPM only Pass 2a is needed: Pass 2a – Unmitigated Bid Pass Pass 2b – Mitigated Bid Pass
Pass 3	Integrated Forward Market (IFM)
Pass 4	Residual Unit Commitment (RUC)

Local Market Power – Energy Bid Mitigation Rules

- Dispatches made in Pass 1a (application of competitive constraints) are considered 'in economic merit order'.
- Subsequent incremental dispatches made in Pass 2a (application of all constraints) beyond the competitive dispatch levels are considered 'out-of-sequence', or 'not in economic order'.
- Units with incremental out-of-sequence dispatches in Pass 2a will have <u>the entire portion of the unit's energy bid curve above the Pass 1a dispatch</u> mitigated to the higher of the highest priced bid dispatched in Pass 1 or the applicable Default Energy Bid.

LECG Concerns with Proposed PJM-Like LMPM

- Potential for inaccurate LMPM due to:
  - Performing Pre-IFM based on forecasted load (as opposed to bid in load).
  - Use of large negative DEC penalty bids in Pass 2 for generation dispatched in Pass 1.
- Two primary concerns
  1. Generation possessing local market power may not be dispatched in Pass 2, will remain unmitigated, and potentially able to exercise market power in Pass 3.
  2. Pass 2 will not necessarily preclude the exercise of market power by non-RMR units that are the least-cost method for managing congestion but have high cost alternatives.

Example of Concern #2

- Assume there is a load pocket with:
  - 300 MW of load
  - 400 MW steam unit with reference price of $50/MW
  - 200 MW of gas turbines with reference price of $150/MW
- If the steam unit submitted an offer price of $200/MW and the gas turbines were bid in at $150/MW:
  - In Pass 2:
    - The gas turbines would be dispatched for 200 MW, and
    - The steam unit would be dispatched for 100 MW and therefore mitigated to $50/MW <u>only</u> for the first 100 MW of output.
  - In Pass 3:
    - The gas turbines would be dispatched to 200 MW and the steam unit would be dispatched to 100 MW.
    - Prices will be set by the gas turbines at $150 even though the entire load could have been met by the steam unit at a price of $50/MW

Modifications to Address the LECG Concerns

1. Generation possessing local market power may not be dispatched in Pass 2 and therefore will not be mitigated and potentially able to exercise market power in Pass 3.

   Modifications that will address this concern:

   - Eliminate DEC penalty bids for Pass 1 dispatch.
   - For units dispatched up in Pass 2, mitigate the entire bid curve that is above the Pass 1 dispatch level.

2. Pass 2 will not necessarily preclude the exercise of market power by non-RMR units that are the least-cost method for managing congestion but have high cost alternatives.

   Modifications that will address this concern:

   - For units dispatched up in Pass 2, mitigate the entire bid curve that is above the pass 1 dispatch level.

Example of Concern #2 with Modification

- Assume there is a load pocket with:
  - 300 MW of load
  - 400 MW steam unit with reference price of $50/MW
  - 200 MW of gas turbines with reference price of $150/MW
- If the steam unit submitted an offer price of $200/MW and the gas turbines were bid in at $150/MW:
  - In Pass 2:
    - The gas turbines would be dispatched for 200 MW, and
    - The steam unit would be dispatched for 100 MW and therefore mitigated to $50/MW for the <u>entire</u> 400 MW of output.
  - In Pass 3:
    - The steam unit will be dispatched to 300 MW;
    - The gas turbines will not be dispatched; and
    - Prices will be set by the steam unit at $50.

Modification does not entirely address Concern #2

- Assume there is a load pocket with:
  - 495 MW of load
  - Two 300 MW steam units with reference price of $50/MW
  - 200 MW of gas turbines with reference price of $150/MW
- If the steam units submitted an offer price of $200/MW and the gas turbines were bid in at $150/MW:
  - In Pass 2:
    - The gas turbines would be dispatched for 200 MW, and
    - One steam unit would be dispatched for 300 MW and therefore mitigated to $50/MW for the entire 300 MW of output.
  - In Pass 3:
    - The steam unit will be dispatched to 300 MW;
    - The gas turbines will be dispatched to 195 MW; and
    - Prices will be set by the gas turbines at $150, even though the entire load could have been met by both steam units at a price of $50.

Comments on Residual Concern #2

- To be a profitable strategy,
  1. The supplier would need to have a unit that is relatively low cost compared to the next best competitive alternative;
  2. The local constraint could be solved without the use of that unit (i.e., through the use of other competitive (mitigated) bids); and
  3. The supplier has other units in the same vicinity that are scheduled at a sufficiently high enough level that the profit from raising the price exceeds the lost profit opportunity of the unit that is economically withheld.
- In addition, this would be limited to circumstances where the local market power is not being addressed by RMR contracts or LSE Resource Adequacy contracts.
- Seems unlikely that these sets of circumstances will occur frequently.

ISO Recommendation for Addressing the Residual Issue with Concern #2

- Maintain PJM-like LMPM with the modification of mitigating the entire bid curve above the Pass 1 dispatch level.
- Utilize ISO LMP studies over the next year to undertake an assessment of the extent to which this residual concern is likely to occur.
- If the residual concern is more significant than expected, the ISO will consider options to address it, including adopting the NY-like Market Power Mitigation approach.

MSC Recommendation

LECG Concern – Limiting the Pool of Resources available for Commitment

- Under the proposed MRTU design, the units committed in Pass 2 of the Pre-IFM define the pool of resources that will be considered for commitment in Pass 3 (IFM) and Pass 4 (RUC). This constraint was imposed primarily to ensure more accurate local market power mitigation in Pass 3 and 4.
- LECG expressed concern that imposing this constraint will lead to sub-optimal commitment decisions in the IFM and RUC and recommend that all available resources be considered in Pass 3 and Pass 4.

This Issue Raises Two Fundamental Questions

1. Which approach is more efficient:
   - Limiting the pool of units for Pass 3 & 4 to Pass 2 units, or
   - Considering all units in Pass 3 & 4?
2. Would relaxing the resource pool considered in Pass 3 &4 undermine the local market power mitigation?
3. If considering all units in Pass 3 & 4 is more efficient but would potentially undermine the local market power mitigation, which is likely to be the greater impact?

Efficiency Arguments

- **View 1**: Restricting the pool of units to those committed in Pass 2 is efficient because this pool represents the least cost commitment for meeting forecasted load and therefore the sequential IFM/RUC process should not be allowed to undue this optimal commitment.
- **View 2**: The pool of units from Pass 2 may not be optimal because additional supplies may be available in the Hour Ahead Scheduling Process. Therefore, it is more efficient to relax this constraint in Pass 3 and 4, particularly since the RUC optimization is based on a different set of bids (i.e., RUC Availability Bids).

Does relaxing the Resource Pool Constraint undermine Local Market Power Mitigation?

- Local market power bid mitigation is based on the units committed and dispatched in Pass 2 of the Pre-IFM.
- Different views of this issue:
  - **View 1:** Relaxing the resource pool constraint in Pass 3 and 4 could result in other units being committed and dispatched such that the network flows and congestion patterns change in a manner that undermines the effectiveness of the local market power bid mitigation.
  - **View 2:** Relaxing the resource pool constraint will not undermine the LMPM because substitute resources will only be committed and dispatched if they are cheaper than the mitigated units.

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Example – Allowing All Units Bid into DAM to be Considered in IFM

Day-Ahead Market…

	Start up Cost	Min. Load Cost	Min. Load MW	Engy Bid ($/MWh)	Reference Price
Unit 1 (500 MW)	$5,000	$2,000	50	$150	$50
Unit 2 (500 MW)	$7,500	$2,000	50	$140	$50
Pass 2 (DAM)	**Loc. Area Load (Forecast)**	**Loc. Area Resid. Load** (1,000 MW trans. limit)	**SU/ML Cost**	**Incremental Energy Bid Cost**	**Total Bid Cost**
Load (MW)	1,350	350			
Unit 1			$7,000	$45,000	$52,000
Unit 2			$9,500	$42,000	$51,500
Pass 3 (DAM)	**Loc. Area Load (Bid)**	**Loc. Area Resid. Load** (1,000 MW trans. limit)	**Bid Cost (SU/ML + Incr. Engy)**	**Mitigated Cost (SU/ML + Incr. Engy)**	
Load (MW)	1,070	70			
Unit 1	Available at $150/MWh		$10,000	$10,000	
Unit 2	Available at $50/MWh		$12,300	$10,500	

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Allowing All Units Bid into DAM to be Considered in IFM

Real-Time…

Pass 2 (RT)	Loc. Area Load	Loc. Area Resid. Load (1,000 MW trans. limit & 70 MW from DAM)	SU/ML Cost	Incremental Energy Bid Cost	Total Bid Cost
Load (MW)	1,350	280			
Unit 1				$42,000	$42,000
Unit 2 (unavail)				$39,200	$39,200
Pass 3 (RT)	**Loc. Area Load**	**Loc. Area Resid. Load** (1,000 MW trans. limit & 70 MW from DAM)	**Bid Cost (Incr. Engy.)**	**Mitigated Cost (Incr. Engy)**	
Load (MW)	1,350	280			
Unit 1	Dispatched in RT at $150/MWh		$42,000	$42,000	
Unit 2	Unavail… no DA commit.		$39,200	$14,000	
	Restrict to Pass 2 Commitment (Unit 2 Disp.)	**Allow Units Bid into DAM into IFM (Unit 1 Disp.)**			
Day Ahead	$10,500	$10,000			
Real-Time	$14,000	$42,000			
Total	**$24,500**	**$52,000**			

Example

- Restricting the pool of units in Pass 3 to those committed in Pass 2 may lead to inefficiencies in the Day-Ahead Market.
  - Higher cost of $500 in example.
  - How likely is this situation to occur?
- Real-Time costs may be higher - If don't restrict pool and, as in example, allow Unit 1 to be dispatched in Pass 3 (saving $500 in DAM):
  - Unit 2 not available in Real-Time.
  - Unit 1 mitigated in Real-Time to greater of highest accepted bid or Default Energy Bid.
  - Highest accepted bid is $150 from Pass 3 in Day-Ahead.
  - Result is $27,500 in increased costs when allowing all units bid into DAM to be dispatched in IFM (not just those committed in Pre-IFM).

Options

- Option 1: Current Proposal
  - Restrict pool of resources in IFM (Pass 3) and RUC (Pass 4) to those committed in the Pre-IFM (Pass 2).
- Option 2:
  - Restrict pool of resources in IFM to those committed in the Pre-IFM, and
  - Allow all units that bid into DAM to be considered in RUC.
- Option 3:
  - Allow all units that bid into DAM to be considered in both the IFM and RUC.

MSC Recommendation

Bid Price Cap Transition

- Proposal to transition bid caps as follows:
  - Bid cap of \$250 (soft) for energy with stepped transition to \$1,000 (hard) over three years.
    - Bid cap for energy will be hard at \$500
    - Transition steps contingent on assessment of adequate competition.
  - Bid cap of \$250 (hard) for A/S and RUC with transition to \$100 when energy bid cap goes to \$500
    - May lower A/S bid cap sooner based on competitive assessment within more granular procurement areas.
- Alternative transition schedules that have been discussed:
  1. Should \$100 bid cap for A/S be tied to a \$1,000 bid cap for energy?
  2. Should the A/S bid cap also be transitioned over three years along with energy bid cap: \$250 in 2007, \$175 in 2008, and \$100 in 2009.

MSC Recommendation