



California ISO

Local market power mitigation enhancements discussion

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Market Design Policy

Market Surveillance Committee Meeting

General Session

January 25, 2019

Summary of changes in draft final proposal

- Limit BAA net exports to the greater of the quantity of base transfers or pre-mitigation transfers, plus the total of the flexible ramping-up awards in excess of the BAAs flexible ramping up requirement
- Updated DEB calculation to include a gas floor price, a locational floor, and a geographical floor. Updated multiplier based on additional analysis also included
- Included provisions for manual reference level consultations and/or basing them on same-day gas trading observed on ICE

Local Market Power Mitigation Enhancements

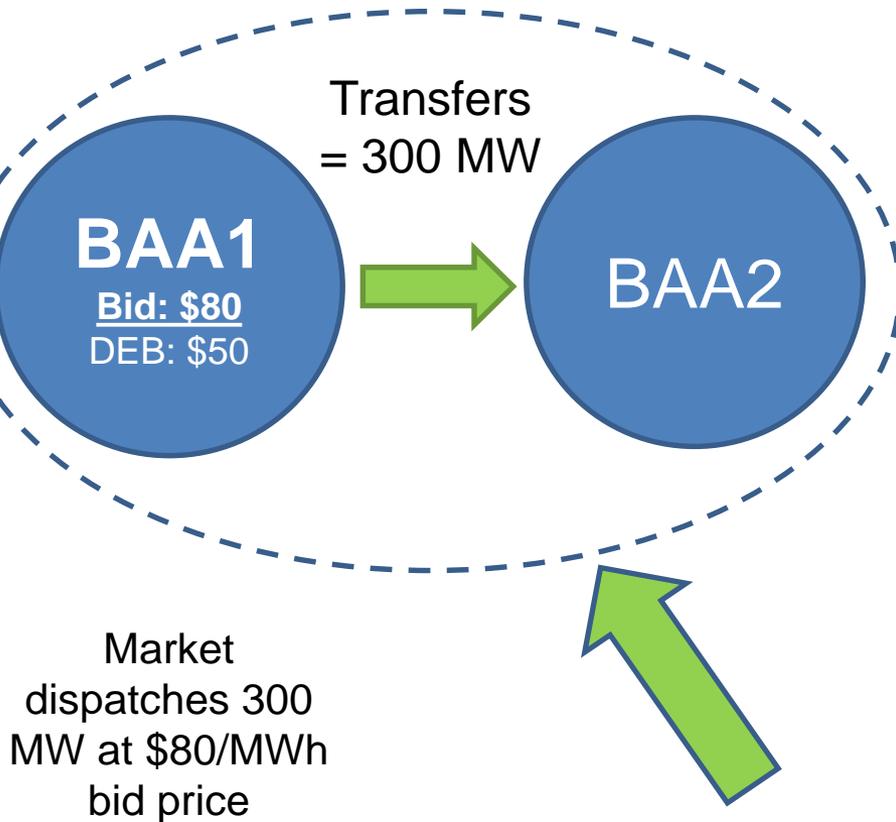
MITIGATION PROCESS: ECONOMIC DISPLACEMENT

Economic Displacement – description

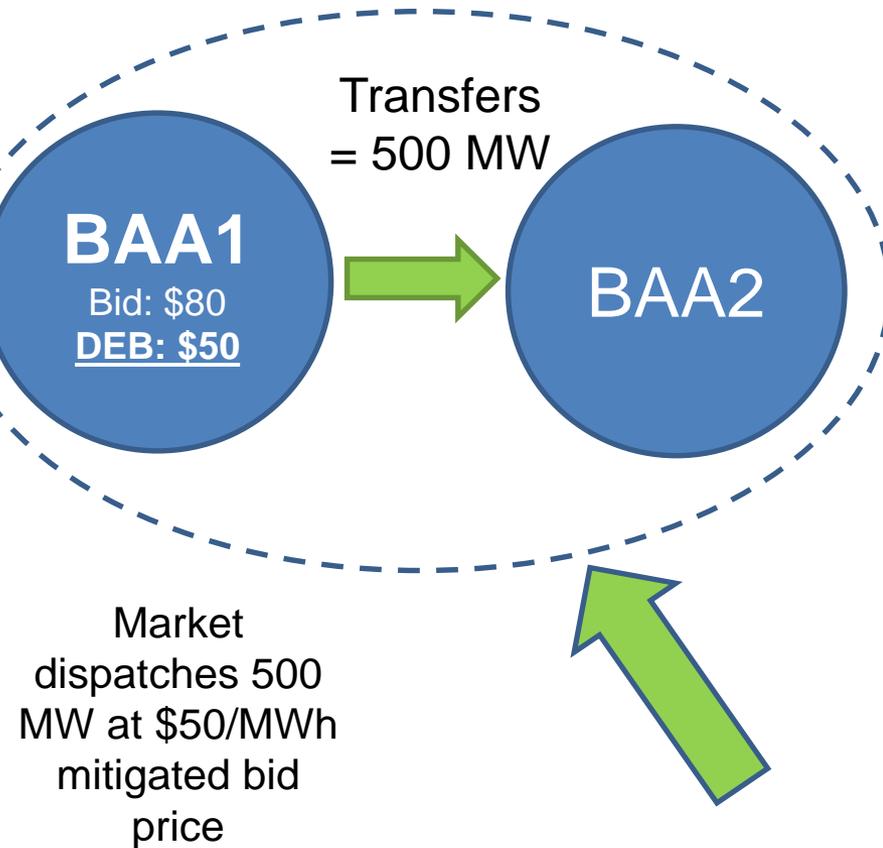
- Economic displacement due to mitigated bids occurs when energy from one resource is replaced with energy from another
 - This can result in transfers beyond what is needed to resolve market power
- Mitigated bids that result in additional transfers in a voluntary market can be problematic in cases when a resource's default energy bid is lower than a resource owner's estimate of costs

Economic Displacement – Current Framework

Mitigation Run



Current Market Run



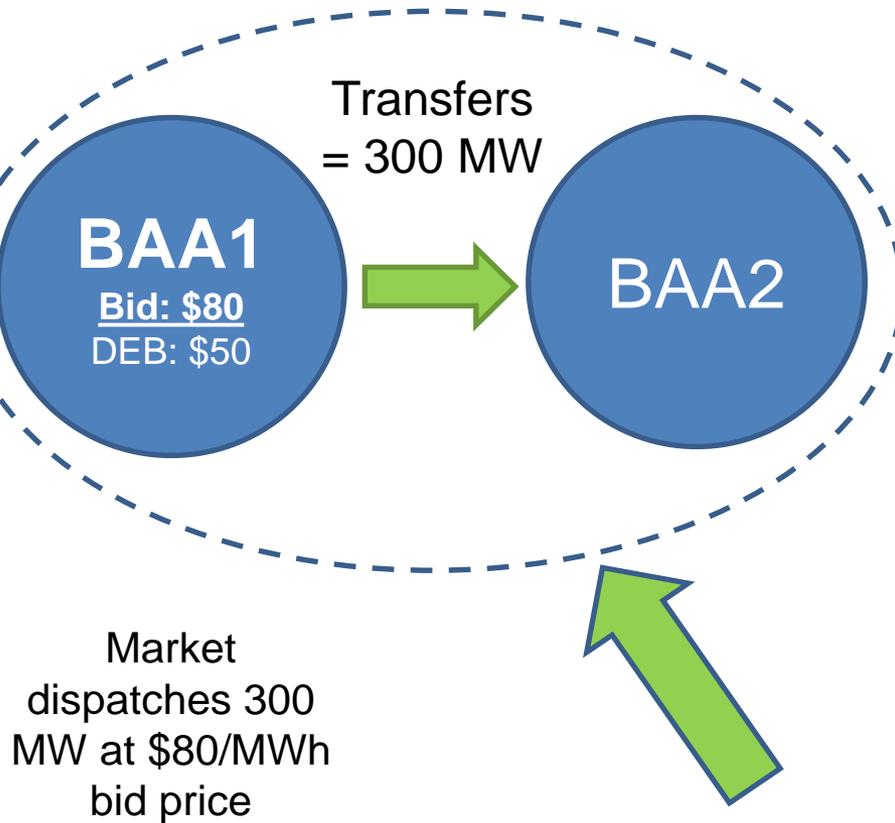
Proposed economic displacement formula:

$$T_{BAA} \leq \max\left(T_{BAA}^{(Base)}, T_{BAA}^{(MPM)}\right) + \max\left(0, \sum_{i \in BAA} FRU_i^{(MPM)} - FRUR'\right)$$

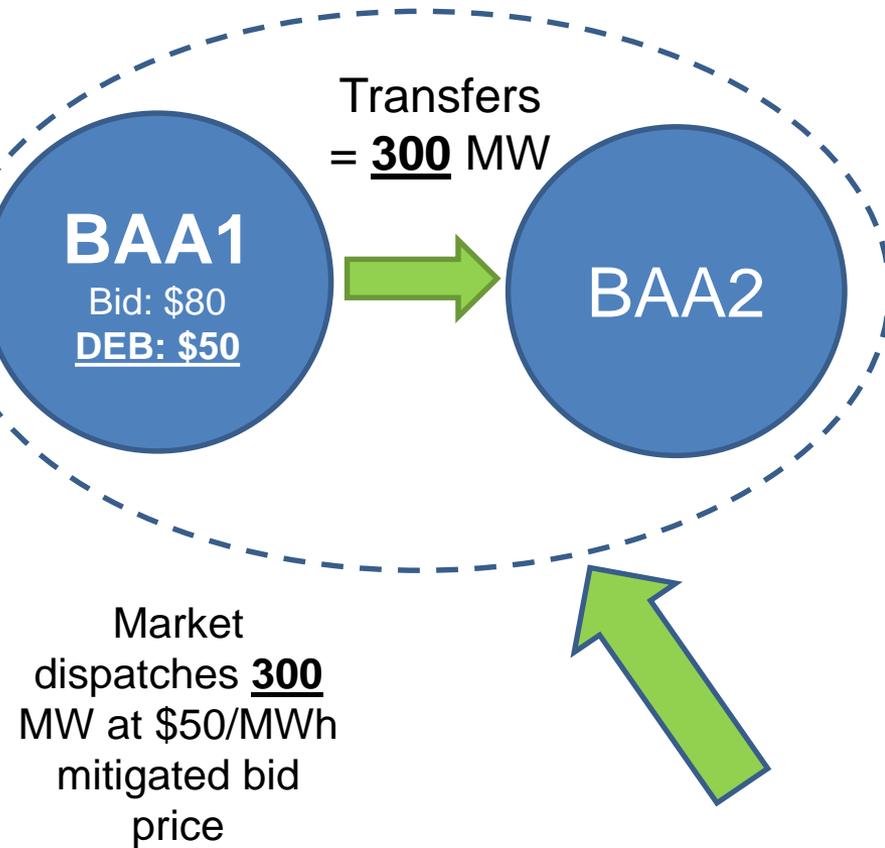
T_{BAA}	Net EIM Transfer of the mitigated BAA
$T_{BAA}^{(Base)}$	Base net EIM Transfer of the mitigated BAA
$T_{BAA}^{(MPM)}$	Pre-mitigation (market power mitigation run) net EIM Transfer of the mitigated BAA (for RTD, the previous RTD run serves as the market power mitigation run)
$FRU_i^{(MPM)}$	Flexible ramping up award for resource i (in the MPM run)
$FRUR'$	Flexible ramping up requirement for the mitigated BAA, adjusted for EIM diversity and demand elasticity

Economic Displacement – Proposed Rule

Mitigation Run



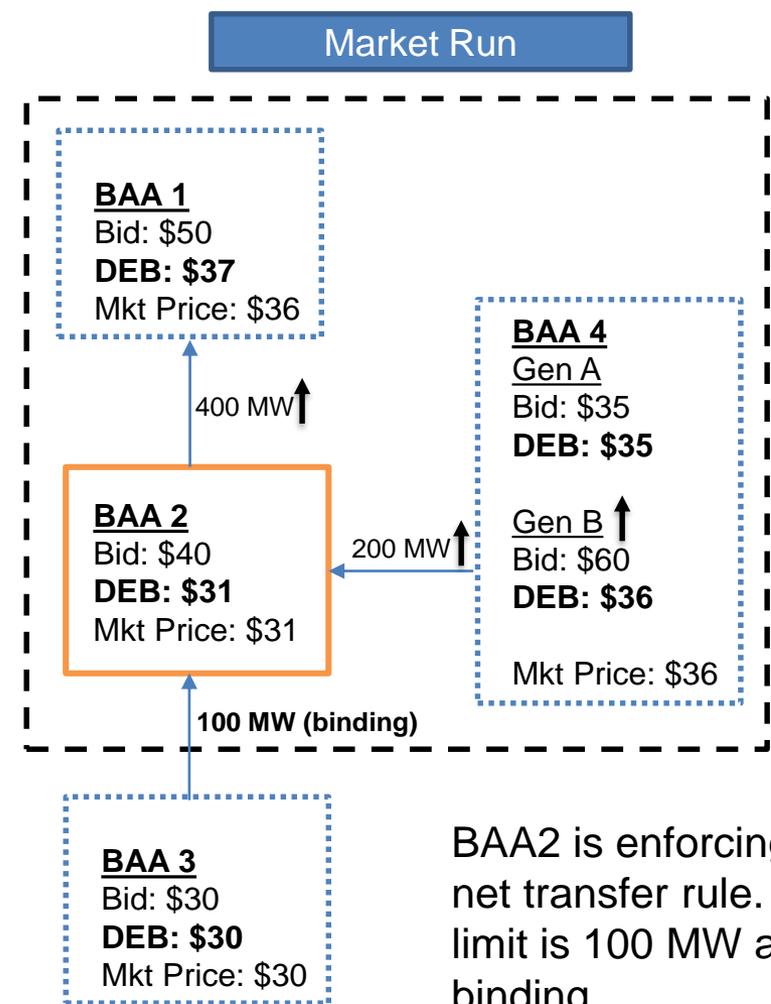
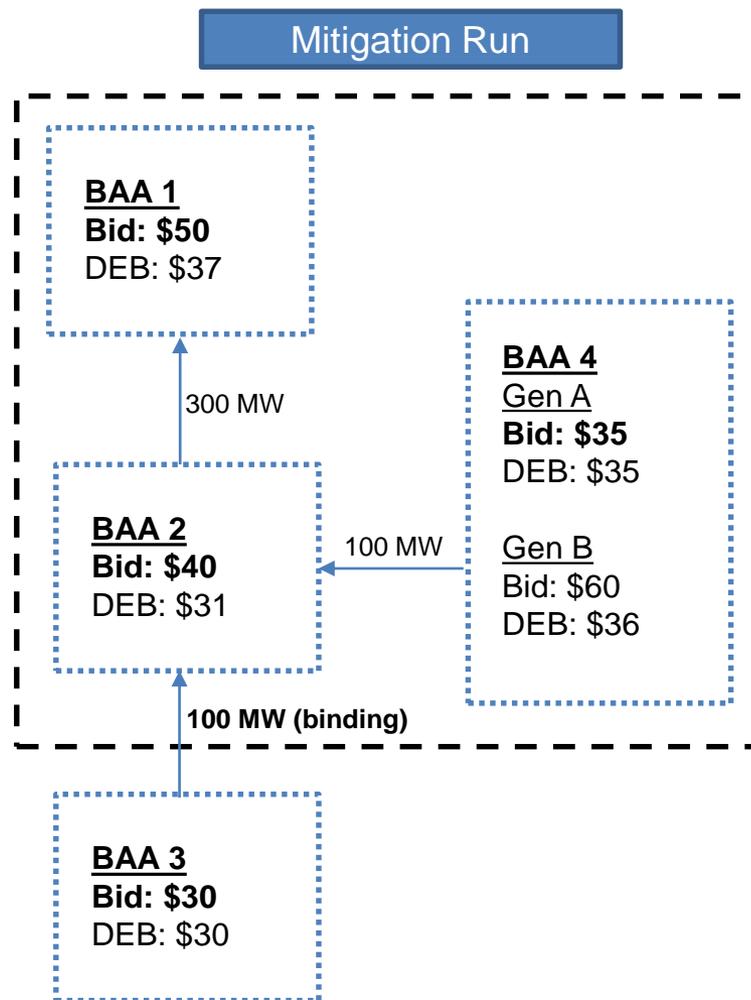
Proposed Market Run



Economic Displacement – Proposed Rule

- Proposed rule modified to limit BAA net exports to the greater of base transfer quantity or pre-mitigation transfer quantity, plus the total of the flexible ramping-up awards in excess of the BAAs flexible ramping up requirement
- This proposed rule will be optional, based on the preference of the EIM BAA
 - The exporting BAA that elects to use this rule will receive the congestion rents of the binding EIM net transfer limit during periods of mitigation

Economic Displacement – Proposed Rule with 4 BAAs



BAA2 is enforcing the net transfer rule. The limit is 100 MW and binding

Local Market Power Mitigation Enhancements

HYDRO DEFAULT ENERGY BID

To ensure resource participation it is important for hydro resources to have a sufficient default energy bid

- If a hydro resource is depleted too early, it may miss opportunities to earn greater profits during peak periods
- Hydro resources reputedly dispatched inefficiently may choose to not offer into the real-time market
- Hydro resources are a preferred resource to some buyers due to their non-emitting attributes
- Variable cost, LMP and negotiated options for default energy bids are currently available to hydro resources, including opportunity cost adders

Opportunity costs for hydro resources are challenging to calculate

- Models with hundreds of inputs may be used to determine opportunity costs for hydro resources
 - Will imply strike price for a resource to deplete water
 - Inputs may include environmental restrictions, minimum flow requirements, downstream flow requirements, spill probabilities
 - Not practical for the ISO to replicate these calculations
- Outputs for opportunity costs can vary within a day
- Certain resources may be price-takers during some intervals
- Hydro resources may be operated primarily to meet water needs, and secondarily to generate energy

The formula for the hydro default energy bid, has been updated in response to stakeholder feedback

$$\text{DEB} = \text{MAX}(\text{Gas Floor}, \text{Local Floor}, \text{Geo Floor})$$

Where,

$$\text{Gas Floor} = (\text{Peaker Heat Rate} * \text{GPI}) * 1.1$$

$$\text{Local Floor} = \text{MAX}(\text{DA Index}, \text{BOM Index}, \text{MA Index}) * \text{Mult}$$

$$\text{Geo Floor} = \text{MAX}(\text{DA Index}, \text{BOM Index}, \text{MA Index}+1, \text{MA}+2\dots)*1.1$$

- **DA Index** – Day-ahead (DA) peak price at the local trading hub
- **BOM Index** – Balance-of-month (BOM) futures price
- **M Index_{+N}** – Monthly futures index price *N* months in the future
- **Mult** – A multiplier, specified as 1.4, applied to the local floor
- **GPI** – Gas price index for the specific resource

There are two terms that are customizable inputs for this default energy bid

1. Maximum storage horizon

- The specific calculation may be the average length of time between each period when the water is at peak levels
- These inform the number of monthly futures terms used in the geographic floor component of the default energy bid
- Storage is bound below by one month and capped at 12 months for calculating the default energy bid

2. Bilateral hubs

- Inputs to be established through consultation with the CAISO
- Resources electing to use this DEB will be required to submit documentation to the CAISO demonstrating firm transmission availability during the year

A resource will be assigned a default bilateral hub for use in the default energy bid

- This default energy bid will use four bilateral hubs that are highly liquid and widely available:

Resource Area	Default Bilateral Hub
PacifiCorp West, Portland, Powerex, Puget Sound	Mid-Columbia
Arizona, Idaho, PacifiCorp East, NV Energy	Palo Verde
Northern California	North-of-path 15
Southern California	South-of-path 15

- Resource owners that can show firm transmission rights are eligible for additional hubs, including Alberta
- For resources with multiple bilateral hubs the maximum price will be considered in the default energy bid

CAISO completed analysis to determine the multiplier of the local component of the DEB

- Analysis reviews prices at PacifiCorp East, PacifiCorp West, and Puget Sound Energy
- Analysis included:
 - Calculating default energy bid for a resource with 3 months of storage
 - Comparing to historic EIM prices (10/2017 – 9/2018)
 - Determining the number of intervals a resource would run based on prices and bids at the default energy bid
- Determined 1.4 multiplier by assuming using 4 hours of available energy per day and 95-99% dispatch efficiency

Percent a resource is dispatched less than potential daily availability, using PacifiCorp East prices

Multiplier	Resource Storage Duration (Hours/Day)			
	2 Hrs.	4 Hrs.	6 Hrs.	8 Hrs.
120%	68%	89%	95%	98%
130%	73%	92%	97%	99%
140%	77%	95%	98%	99%
150%	82%	97%	99%	99%
160%	88%	98%	99%	100%

Percent a resource is dispatched less than potential daily availability, using PacifiCorp West prices

Multiplier	Resource Storage Duration (Hours/Day)			
	2 Hrs.	4 Hrs.	6 Hrs.	8 Hrs.
120%	80%	94%	100%	100%
130%	84%	97%	100%	100%
140%	88%	99%	100%	100%
150%	91%	99%	100%	100%
160%	94%	99%	100%	100%

Percent a resource is dispatched less than potential daily availability, using Puget Sound Energy prices

Multiplier	Resource Storage Duration (Hours/Day)			
	2 Hrs.	4 Hrs.	6 Hrs.	8 Hrs.
120%	80%	95%	99%	100%
130%	85%	97%	100%	100%
140%	88%	99%	100%	100%
150%	91%	99%	100%	100%
160%	93%	99%	100%	100%

Local Market Power Mitigation Enhancements

REFERENCE LEVEL ADJUSTMENTS

Commitment Costs and Default Energy Bid Enhancements policy established reference level adjustment process

- CAISO reference levels based on published price information may not always be accurate
 - Suppliers request a before-the-market adjustment to reference level
- Supplier's actual costs must be more than CAISO calculated reference level
 - Retain sufficient justification supporting the need for a reference level adjustment request
- Bidding up to a supplier's reasonableness threshold is not a safe harbor and reference level adjustment requests must be based on actual costs

Reference level adjustments – gas resources proposal

- CAISO proposes to proactively update each morning the reasonableness thresholds used for the CAISO's real-time market on same-day gas trading the CAISO observes on ICE
 - Update the reasonableness thresholds for all resources located in a given fuel region if gas prices are greater than 10% compared to the gas price index used in the prior day
 - If review of same-day gas prices does not account for some resources, resource owners may request a manual consultation when same-day gas prices are more than 10% or \$0.50, whichever is highest, compared to the gas price index used in the prior day

Reference level adjustments – gas resources proposal

- If the CAISO has sufficient information (same-day gas trades ICE and/or manual consultations) the CAISO proposes to adjust reasonableness thresholds for other resources in the same fuel region
 - Using a weighted average of the gas prices for updating reasonableness thresholds for a fuel region
- No longer need CCDEBE policy to increase gas prices used to calculate reasonableness thresholds for real-time market by 25% for Mondays

Reference level adjustments – hydro resource default energy bid proposal

- The CAISO proposes to adjust hydro default energy bids for all hydro resources in same fuel region based on updated gas prices when the CAISO updates the gas resource reasonableness threshold for a fuel region
 - Through manual consultations with gas resources and/or through same-day gas trading observed on ICE in the same fuel region
- Resource owners who may control a hydro resource and a gas resource:
 - Request a manual reference level adjustment based on the gas resources increased real-time natural gas costs

Day-ahead market gas prices

- CAISO proposes to adjust its use of gas index costs in its day-ahead market for Mondays by including ICE's Monday-only index
- No longer need CCDEBE policy to increase gas prices used to calculate reasonableness thresholds for day-ahead market by 25% for Mondays. CAISO will retain 25% for days after holidays

Initiative Schedule



Milestone	Date
Market Surveillance Committee Meeting	January 25, 2019
Stakeholder Written Comments Due	January 30, 2019
MSC opinion posted	Late February
EIM Governing Body Meeting	March 12, 2019
Board of Governors Meeting	March 27- 28, 2019