California ISO

Local Market Power Mitigation Enhancements

Draft Final Proposal

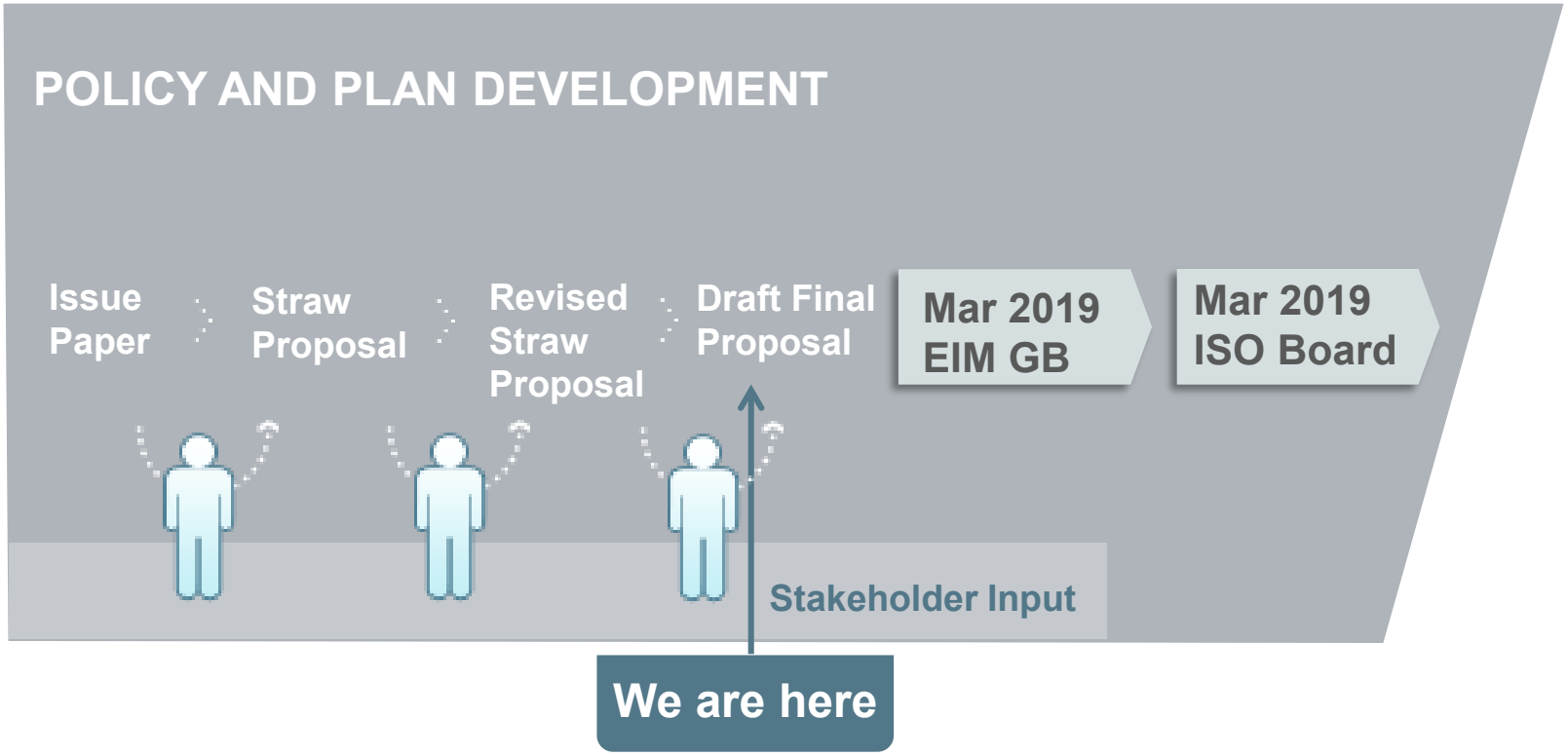
Stakeholder Web Conference
January 23, 2019
9:30 am - 12:30 pm

Market Design Policy

Agenda

Time	Topic	Presenter
9:30 – 9:45	**Welcome and Introductions**	Kristina Osborne
9:45 – 12:25	**Revised Straw Proposal Comments**	Elliott Nethercutt
	Proposal: Mitigation Process - Flow Reversal	Danielle Tavel
	Mitigation Process - Economic Displacement	Elliott Nethercutt
	Hydro Resource Default Energy Bid	Brittany Dean/ Danielle Tavel
	Reference Level Adjustments	Brittany Dean
	EIM Governing Body Classification	Brittany Dean
12:25 – 12:30	**Next Steps**	Kristina Osborne

CAISO Policy Initiative Stakeholder Process



Local Market Power Mitigation Enhancements

REVISED STRAW PROPOSAL STAKEHOLDER COMMENTS

Mitigation Process: Flow Reversal

- Stakeholders support the application of the competitive LMP for mitigation in every interval, including the elimination of the rule that extends a mitigated interval for the balance of the hour
  - The proposed flow reversal rule has remained unchanged
- Some stakeholders are concerned about the impacts of a nominal bid adder to ensure price separation; suggest the adder cap should be specified in the CAISO tariff
  - The nominal bid adder will be limited to a price adder of $0.10 in the tariff, with the actual adder necessary to meet the objectives of the rule in the business practice manual. The CAISO currently plans to use $0.001 for the price adder

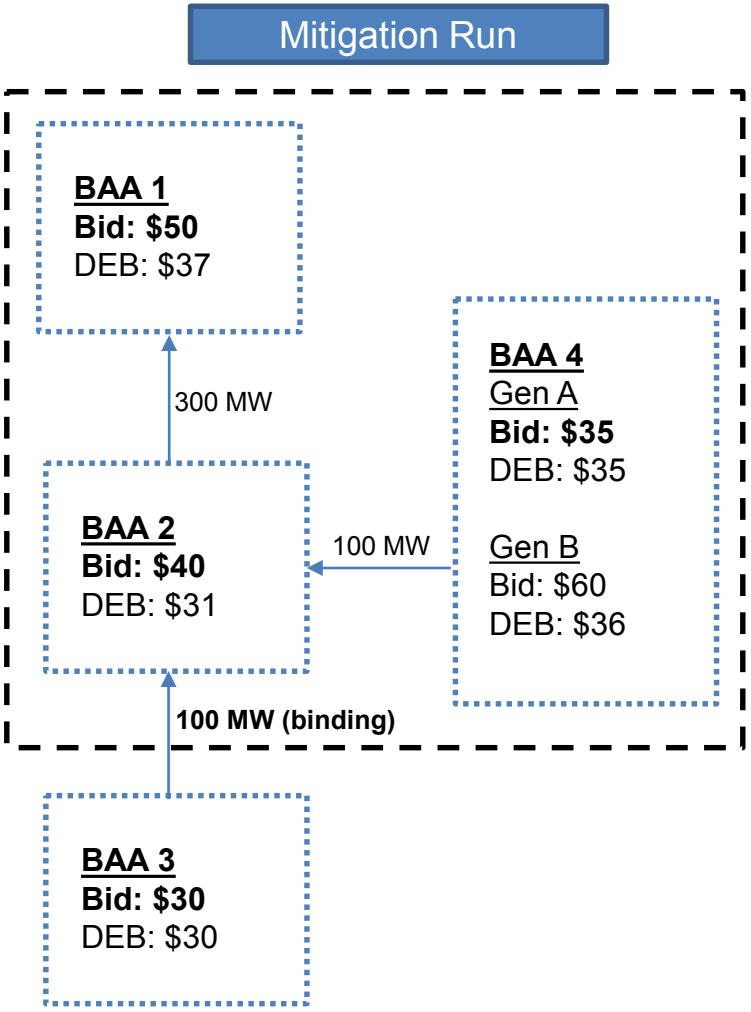
Mitigation Process: Economic Displacement

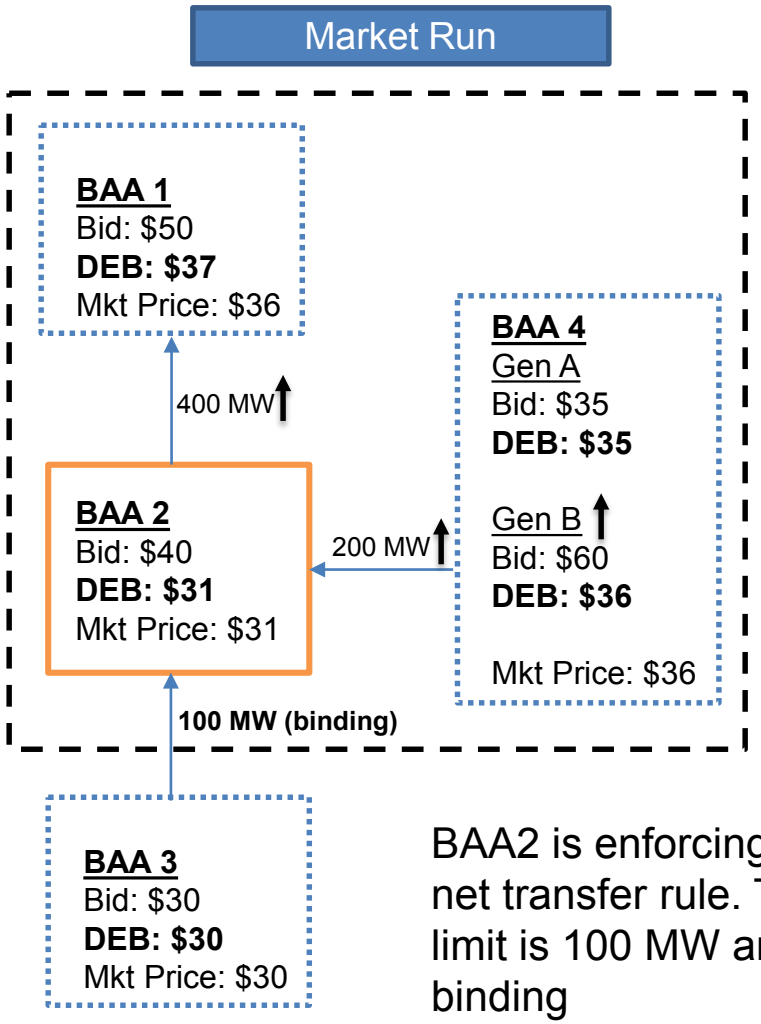
- Concerns that other elements of this initiative render this proposed rule unnecessary
  - This proposed rule is still needed to limit economic displacement, particularly in cases a resource is mitigated to a default energy bid that does reflect marginal costs
- Concerns that the rule allows participants to withdraw capacity, potentially resulting in noncompetitive outcomes
  - The amount of transmission that is made available to support EIM transfers out of an EIM BAA is voluntary. Without this proposed rule, EIM entities could still reduce transfer capability, which would further harm the EIM

Mitigation Process: Economic Displacement

- SCL requests that the CAISO explore providing mitigation results in real-time so that entities can respond accordingly
  - The CAISO believes this is not feasible, since the election to enforce the transfer limitation rule must be implemented in the Master File, outside of the real-time market
- DMM is concerned about the establishment of schedules in two different runs with different sets of inputs and prices, which could lead to prices that are inconsistent with the CAISO's dispatch instructions and incentives for resources to deviate from dispatch or to not bid their true marginal costs
  - The following example further illustrates these concerns:

Mitigation Process: Economic Displacement





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

Mitigation Process: Economic Displacement

- The rule will result in energy flowing from an area with higher prices to an area with lower prices
  - In actuality, lower-priced energy is supporting a higher priced BAA because the energy wheels through
- The rule will still result in a resource selling below their unmitigated bid
  - This is not the point of the rule.
- The rule could impact bidding behavior:
  - All bids are submitted at T-75 with no opportunity to strategically bid, since it is unknowable whether the rule will be triggered in one market (FMM) vs. another (RTD)

Hydro Resource Default Energy Bid

- Stakeholders conceptually support proposal and requested the following modifications to DEB calculation:
  - Account for multiple trading locations
  - Include peaking gas heat rate
  - Higher multiplier for short-term resources
- Stakeholders also requested additional analysis using Powerdex prices and 99% frequency of efficient dispatch
  - Updated proposal to include a number of changes that were proposed in comments. Additional analysis included in paper

Reference Level Adjustments

- Stakeholders generally support proposal
  - CAISO included a revised proposal to address Puget Sound Energy and BPA requests to include an intra-day gas price adjustment in the gas price floor component for hydro default energy bids
- CAISO included a revised proposal to address DMM's concern that many EIM areas have less liquid trading hubs and published prices may not reflect their actual trading conditions

EIM Classification

- PacifiCorp, Powerex, and Seattle City Light support the proposed classification of the various elements
  - SLC notes it is unlikely this initiative would have been undertaken without EIM entities that identified the concerns being addressed
- PGP opposed classification and believes the entire initiative should fall under the primary decision making authority of the EIM Governing Body
  - The EIM Governing Body's authority guidance document for handling policy initiatives does not hinge on who identifies issues. Rather, their authority hinges on whether an EIM specific design feature is core to the issue being addressed

Local Market Power Mitigation Enhancements

PROPOSAL

Summary of changes in response to stakeholder feedback

- 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

Flow Reversal – description

- Mitigation results cause EIM BAAs to change from importing to exporting at mitigated bid prices during subsequent market runs
  - MPM is triggered when import transfer constraints are binding
  - To protect native imbalances from market power offer prices are replaced with mitigated bids
  - Import constraints may not be binding, and market power mitigation may not be detected in subsequent market runs, but current rules mitigate for the balance of the hour at the originally mitigated bid price
  - Mitigated bid prices compared to the LMP in a competitive area can result in exports that were not previously scheduled

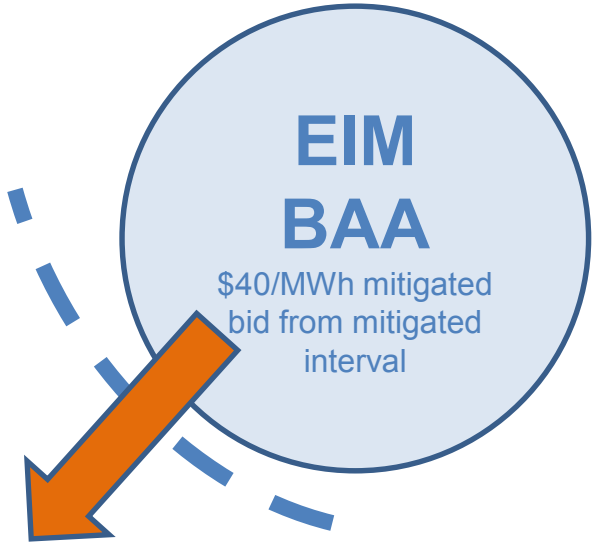
Example A: Extension of mitigated bids for remainder of hour can result in EIM BAAs exporting because of mitigated price (1 of 2)

Current

Mitigated Interval

LMP in competitive area = $40/MWh

Remaining Intervals in Hour



LMP in competitive area = $50/MWh

CAISO proposals to prevent flow reversal

- Modify mitigation extension rules:
  - Eliminate rule that if mitigated in FMM, mitigated in corresponding RTD intervals
  - Eliminate rule to mitigate for:
    - Balance of hour for FMM
    - Balance of 15 minute interval for RTD
- The competitive locational marginal price used to determine mitigated bid price is based on current market run conditions
- Implement a nominal parameter to the mitigated bid calculation to ensure price separation

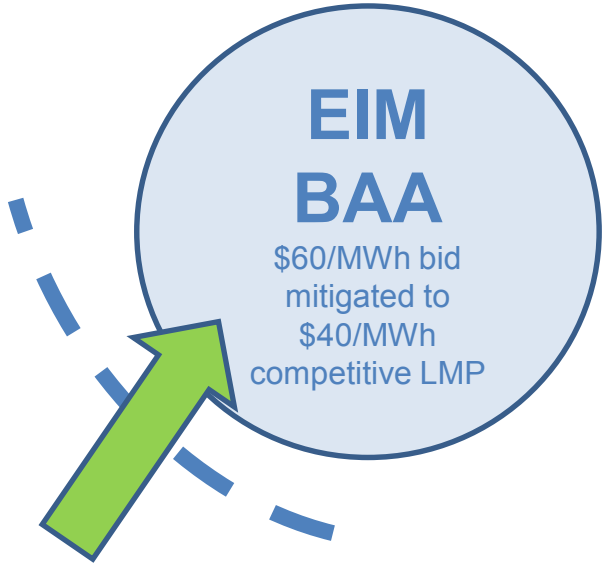
Proposed mitigation framework enhancements

- Current:
  - Competitive LMP can only decrease if previously mitigated
  - Mitigated bid = MAX (DEB, Competitive LMP)
- Proposed:
  - Competitive LMP will be recalculated in each market interval
  - Mitigated bid = MAX (DEB, Competitive LMP + $0.001)

Assumes mitigated bid is less than offer price

Example A: Extension of mitigated bids for remainder of hour can result in EIM BAAs exporting because of mitigated price (2 of 2)

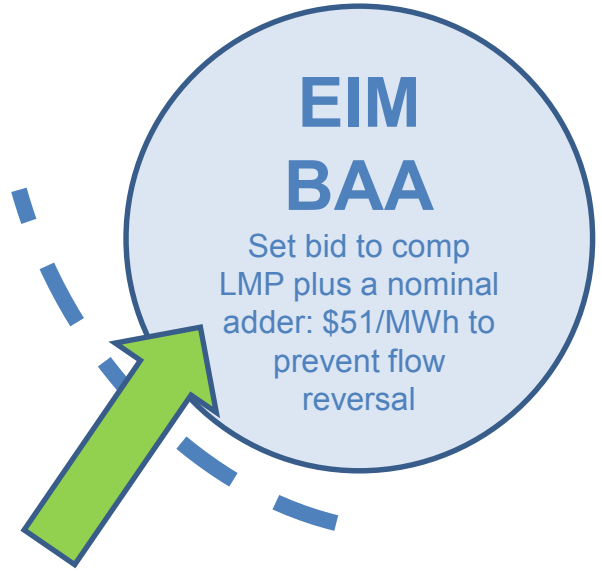
Mitigated Interval



LMP in competitive area = $40/MWh

Proposed

Remaining Intervals in Hour

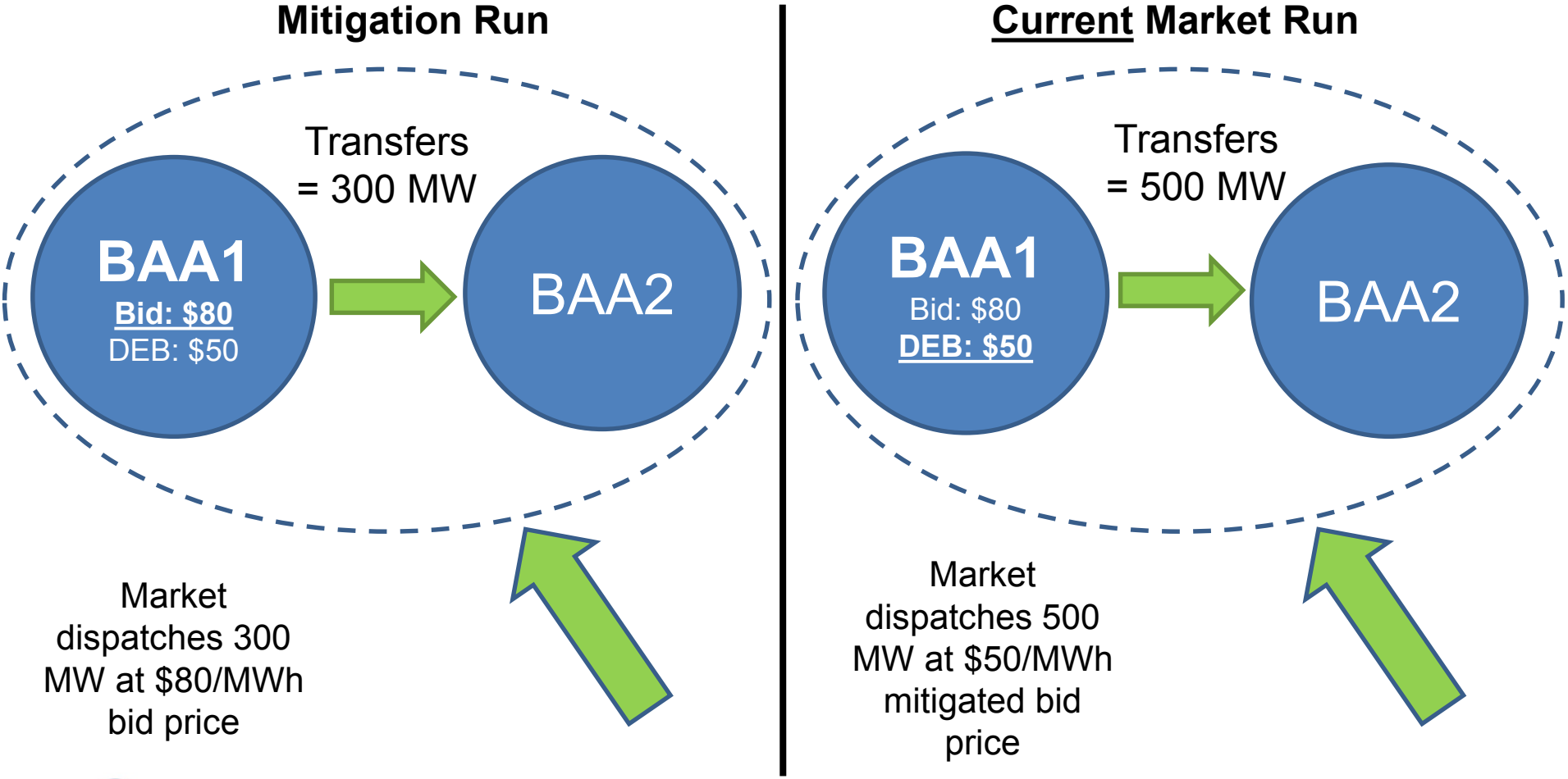


LMP in competitive area = $50/MWh

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 necessary 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

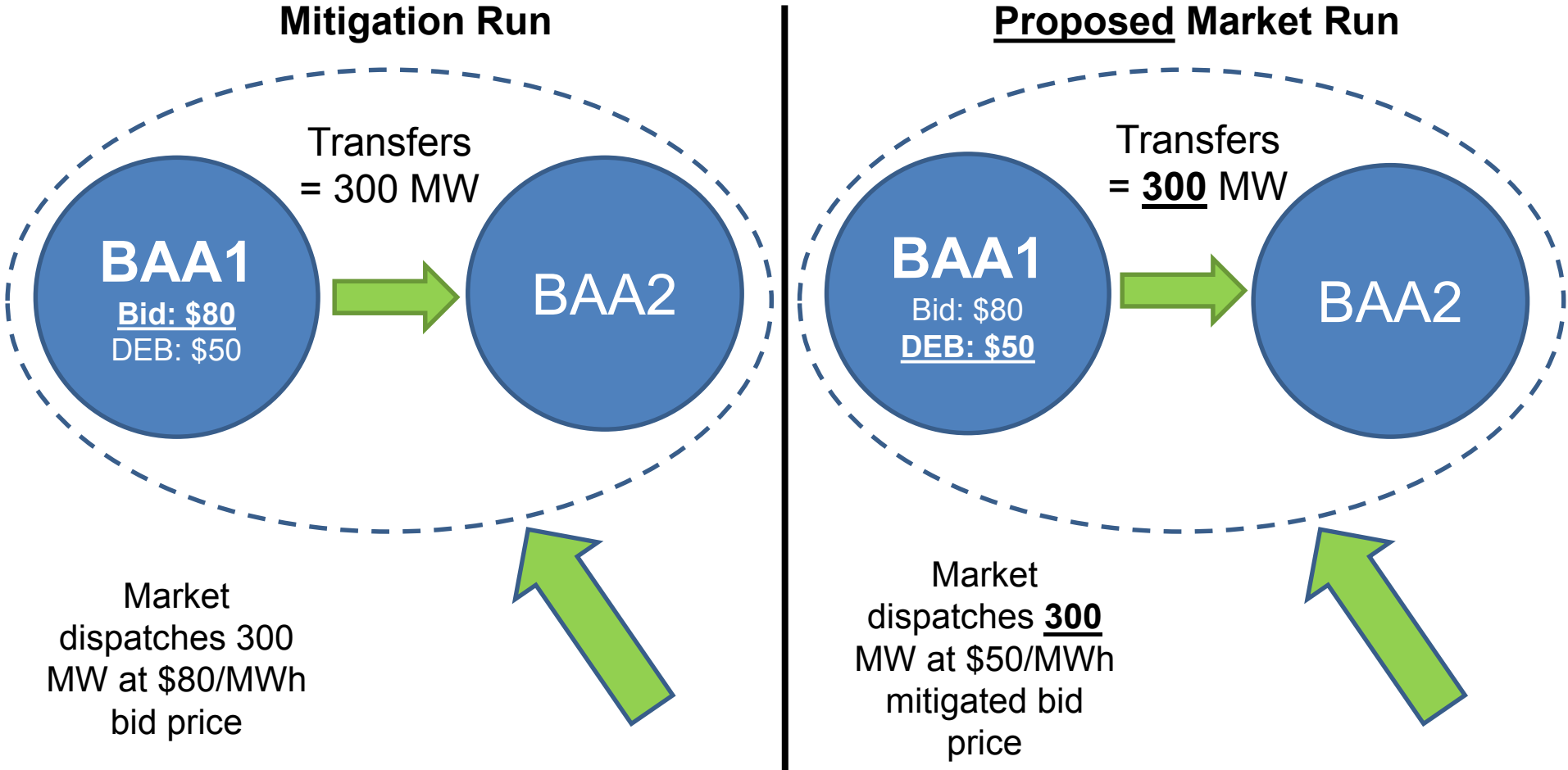


Proposed economic displacement formula:

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

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 Process: Economic Displacement

- 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

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
- The default energy bid proposed offers transparency into the calculation offered by CAISO to hydro resources
- 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

DEB = MAX(Gas Floor, Local Floor, Geo Floor)

Where,

Gas Floor = (Peaker Heat Rate * GPI) * 1.1

Local Floor = MAX (DA Index, BOM Index, MA Index) * Mult

Geo Floor = MAX(DA Index, BOM Index, MA Index+1, MA+2…)*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 consultations 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

Local Market Power Mitigation Enhancements

GAS PRICE INDICES

Gas Price Indices – Real-time market

- S&P Global Platts contains information about Intercontinental Exchange (ICE) trades through their daily and monthly North America natural gas indices
  - CAISO proposes to remove references to ICE in real-time market tariff
- Modify requirement of two gas indices to determine a blended gas price used in markets
  - CAISO proposed to allow as few as one index

Local Market Power Mitigation Enhancements

EIM GOVERNING BODY CLASSIFICATION

EIM Governing Body Classification

- The following proposals fall within the EIM Governing Body's Hybrid non-EIM specific approval authority:
  - Proposals to prevent flow reversal
  - Option to limit transfers between EIM BAAs areas
- The following proposals fall within the EIM Governing Body's advisory role:
  - Hydro resource default energy bid option
  - Reference level adjustment process
  - Gas price indices

Local Market Power Mitigation Enhancements

NEXT STEPS

Initiative Schedule

Milestone	Date
Post Draft Final Proposal	January 16, 2018
Stakeholder Call	January 23, 2019
Market Surveillance Committee Meeting	January 25, 2018
Stakeholder Written Comments Due	January 30, 2019
EIM Governing Body Meeting	March 12, 2019
Board of Governors Meeting	March 27- 28, 2019

Please submit written comments by January 30, 2019 to initaitivecomments@caiso.com