

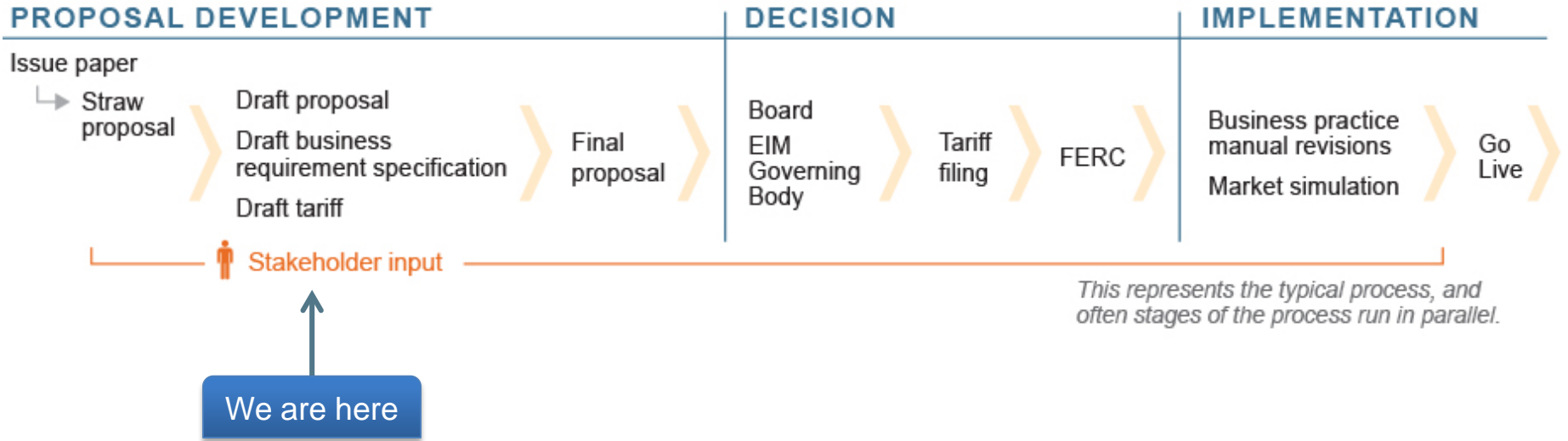


FERC Order 831- Import Bidding and Market Parameters

Brittany Dean and Danielle Tavel
Market Design Policy

Stakeholder Call
April 29, 2020
1:00 – 4:00 p.m.

CAISO Policy Initiative Stakeholder Process



Agenda

Topic	Presenter
Welcome and stakeholder process	Isabella Nicosia
Introduction/Background	Brittany Dean
Stakeholder comments	Brittany Dean
Proposal 1. Market Parameters 2. Import Bidding	Danielle Tavel Brittany Dean
Examples and EIM Classification	Danielle Tavel
Next Steps	Isabella Nicosia

INTRODUCTION/BACKGROUND

Background

- FERC Order 831 required ISO/RTOs make compliance filing to raise energy offer caps to \$2,000/MWh
 - Verify generator costs for bids above \$1,000/MWh before the market run to be eligible to set energy prices
 - Did not require verification rules for import or virtual bids above \$1,000/MWh
- ISO's compliance filing included a deferred implementation date to allow time to develop a verification methodology for import bids and penalty parameters to align with the \$2,000/MWh bid cap
 - The CAISO notified FERC it would extend the implementation to Fall 2021 to allow more time for policy development and implementation

This initiative addresses two topics related to the CAISO's compliance with FERC Order No. 831

1. Adjusting CAISO market constraint relaxation parameter prices “penalty prices” to align with the increased energy bid cap
2. Price screening methodology for import bids greater than \$1,000/MWh

STAKEHOLDER COMMENTS

Power Balance Constraint Relaxation Pricing

- The revised straw proposal described two potential penalty price options:
 1. Retain the CAISO's current policy and scale the penalty prices relative to the hard energy bid cap of \$2,000/MWh
 2. Scale the penalty prices relative to the \$2,000/MWh power balance constraint relaxation penalty price only when there are cost-verified energy bids greater than \$1,000/MWh submitted in the CAISO market.
 - a) Included a variation that sets energy prices at the price of the highest-priced cleared economic bid when verified bids are above \$1,000/MWh

Stakeholders generally supported the CAISOs proposed option to retain current parameters unless there is a verified cleared bid above \$1,000/MWh

- Bid cap should remain at \$1,000/MWh and only increase above that in the rare instance that costs would be greater than \$1,000/MWh
 - Energy prices should be set by the price of the highest-priced cleared economic bid if there is a bid greater than \$1,000/MWh and the market must relax the power balance constraint

Stakeholder concerns regarding scarcity pricing addressed through Flexible Ramping Product Refinements (FRP) initiative

- FRP design includes a procurement demand curve that was intended to provide scarcity pricing signals in the real-time market
 - But, FRP requirement is not always relaxed prior to the power balance constraint due to congestion
- Nodal procurement will ensure the FRP requirement is fully relaxed prior to the power balance constraint being relaxed
 - Market will no longer make FRP awards to transmission infeasible capacity
 - Produces stepped scarcity pricing up to \$1,000/MWh

FRP demand curve results in energy prices gradually rising prior to relaxing power balance constraint

- Example demand curve

Relax Qty	Relax Price	Marginal Energy	Marginal Energy Price
50 MW	\$40	\$45	\$85
100 MW	\$110	\$120	\$230
150 MW	\$200	\$230	\$430
9999 MW	\$247	\$250	\$497

- For EIM entities, FRP is relaxed prior to calling on Available Balancing Capacity
 - PBC violation only after both FRP and ABC exhausted

Import Bid Cost Verification Requirements

- The revised straw proposal proposed to price-screen all imports greater than \$1,000/MWh based on a maximum import bid screen
 - Calculated based on published electrical price indices
 - Proposed two options for applying the maximum import bid screen:
 1. Reject import bids above maximum import bid screen price
 2. Reduce import bids to greater of \$1,000/MWh or maximum import bid screen price. Provide after-the-fact cost recovery for bids that were reduced

Stakeholders differed on which imports should be subject to the maximum import bid price screen

- Some stakeholders maintained it is not practical for the CAISO to develop a methodology to accurately determine an import's actual costs
 - CAISO does not have specific generator information to estimate costs
 - Costs include opportunity costs, which are very subjective
 - Stakeholders did not provide a viable methodology for the CAISO to determine supplier's costs needed for an after-the-fact make-whole payment
- Reducing non-resource adequacy import bids could discourage imports from bidding into the CAISO market
 - Do not have the same must offer obligation requirement as resource adequacy resources

Stakeholders suggested modifications to the maximum import bid price calculation

- Rather than shaping based on load in each hour, the CAISO should shape the daily prices to hourly prices based on the system marginal energy price
- The gas floor component was not needed because gas costs were accounted for in the bilateral electrical prices in the rare events when costs are greater than \$1,000/MWh
- The long-term opportunity cost component was not need because there is no long-term opportunity cost when prices are high
- A higher multiplier to account California greenhouse gas regulation compliance costs and transmission costs

PROPOSALS

MARKET PARAMETERS

The CAISO market may relax constraints when it needs to reach a feasible solution

- When supply does not equal demand the power balance constraint is relaxed
- When the market cannot bring flows below limits, transmission constraints are relaxed
- Market constraint relaxation parameter prices are the price at which the market relaxes a constraint
 - The market reflects this cost in energy prices
 - These relaxation parameter prices are referred to as “penalty prices”
- Currently, the power balance constraint is set at the hard energy bid cap of \$1,000/MWh and all other penalty prices are scaled relative to the power balance constraint

Power balance relaxation proposal retains current parameters unless there is a verified cleared bid above \$1,000/MWh

- Without changes, prices would be set at \$2,000/MWh bid cap once FERC Order 831 is implemented
- Proposal to scale penalty prices relative to a \$2,000/MWh power balance constraint relaxation penalty price when either of the following conditions exist:
 - There is a submitted and cost-verified bid from a resource-specific resource greater than \$1,000/MWh
 - The CAISO-calculated maximum import bid price is greater than \$1,000/MWh
- Propose to set prices in the pricing run at highest verified cleared bid when the power balance constraint is relaxed and cost-verified bids are greater than \$1,000/MWh

Proposal to set all power balance constraints at \$2,000/MWh and scale other market constraints accordingly when conditions are met

- CAISO real-time market includes individual power balance constraints for each EIM BAA and one for the overall market
- If power balance constraint set to \$2,000/MWh for any hour in day-ahead market:
 - \$2,000/MWh penalty price will be used for all hours in day
- If power balance constraint set to \$2,000/MWh for one market interval in real-time market:
 - \$2,000/MWh penalty price will be used for remainder of the day

Proposal to set energy prices in the pricing run at highest-priced cleared economic bid when the power balance constraint penalty price is \$2,000/MWh

- Similar approach to “price discovery mechanism” used in EIM to set prices at the highest-priced cleared economic bid
 - During start-up of new EIM participating BAAs
 - Available balancing capacity

IMPORT BID SCREENING

Propose to price-screen resource adequacy import bids greater than \$1,000/MWh

- Only reduce resource adequacy import bids priced higher than \$1,000/MWh and higher than the CAISO-calculated maximum import bid price to the CAISO-calculated maximum import price
 - When reduced, the CAISO will not reduce a bid to a price below \$1,000/MWh
- Market will not reduce non-resource adequacy and virtual bids greater than \$1,000/MWh
 - However, the CAISO will only clear these bids when the \$2,000/MWh power balance constraint price is place

Proposal reflects the CAISO's agreement with stakeholders that provisions to reduce non-resource adequacy bids to a max import bid price would discourage imports from bidding into the CAISO market

- Reducing resource adequacy imports to the maximum import bid price would not reduce import supply
 - Required to submit bids under the must-offer requirements, as applicable to imports to CAISO market
 - May impose the risk that resource adequacy bids will be reduced to a price below their costs
 - Suppliers can factor this risk into their resource adequacy contracting

CAISO's proposal to screen import bids prices differs somewhat from the CAISO's cost-verifying energy bids of resource-specific resources

- Resource-specific resources bids above \$1,000/MWh must be based on actual or expected costs supported by the supplier's contemporaneously available information
- The CAISO-calculated maximum import bid price represents prevailing energy prices based on published energy price indices
 - Does not represent the source of an import's actual operating costs, but may represent opportunity costs
 - Does not require suppliers to submit import bids based on actual or expected costs

CAISO does not believe a practical methodology exists to objectively determine import costs, which would be needed to provide a make-whole payment

- Stakeholders did not provide an objective methodology for the CAISO to calculate opportunity costs after-the-fact recovery
 - Resource adequacy resources can account for the risk of bids being reduced to below their costs through their resource adequacy contracts

Proposal will clear non-resource adequacy import bids (and virtual bids) in the market above the CAISO-calculated maximum import bid price and up to \$2,000/MWh during certain periods

- Two factors that will mitigate the risk that this will result in excessive market prices:
 - Market will not clear any energy bids greater than \$1,000/MWh
 - Unless max import bid price or cost-verified bid greater than \$1,000/MWh
 - CAISO market should be able to meet demand using only resource adequacy bids
 - The day-ahead market has the additional protection that energy supply clears against economic demand bids

Maximum import bid price =

$$\text{Electric Hub Price} \times 1.1$$

- Used to screen import and virtual supply bids and intended to represent prevailing hourly energy prices
- Calculated each day based on published electrical price indices at representative bilateral trading hubs
 - Reflects variation of CAISO prices hour by hour
 - Prices calculated by on- and off peak periods
- Calculated separately for:
 - Day-ahead and real-time markets
 - North and south interties
- 110 multiplier accounts for differences in prices between published indices and individual transactions

Electric hub price component estimates the current prevailing hourly bilateral electricity price for interties at the north and south of the CAISO, respectively

- Calculation must convert daily prices into hourly prices because electrical price indices are daily prices multi-hour block prices while CAISO prices are hourly prices in the day-ahead market
 - Adjusts prices based on historical CAISO day-ahead SMEC in each hour

Electric Hub Price:

[1+ (CAISO Monthly Average SMEC per hour – CAISO Monthly Average SMEC) /CAISO Monthly Average SMEC] x Index Price

- Index price is determined by region
 - North Region = Mid-Columbia Trading Hub Price
 - South Region = Palo Verde Trading Hub Price
- Use historical SMEC in each hour to shape prices
 - Calculated in advance so market participants could use in forecasting maximum import bid prices
 - Direct indicator of expected hourly price variation than load forecast from revised straw proposal
 - Proposal reflects simple implementation for CAISO internal processes

Average SMEC of an hour is determined by averaging all of the same hours in the same month from the previous year

- For example, Hour-Ending 10 on March 9, 2020:

March Date	SMEC Price
1	\$41.68
2	\$52.79
3 ... 8	\$\$
9	\$15.41
10...22	\$\$
23	\$8.00
24..31	\$\$
Average Monthly Price*	\$26.76

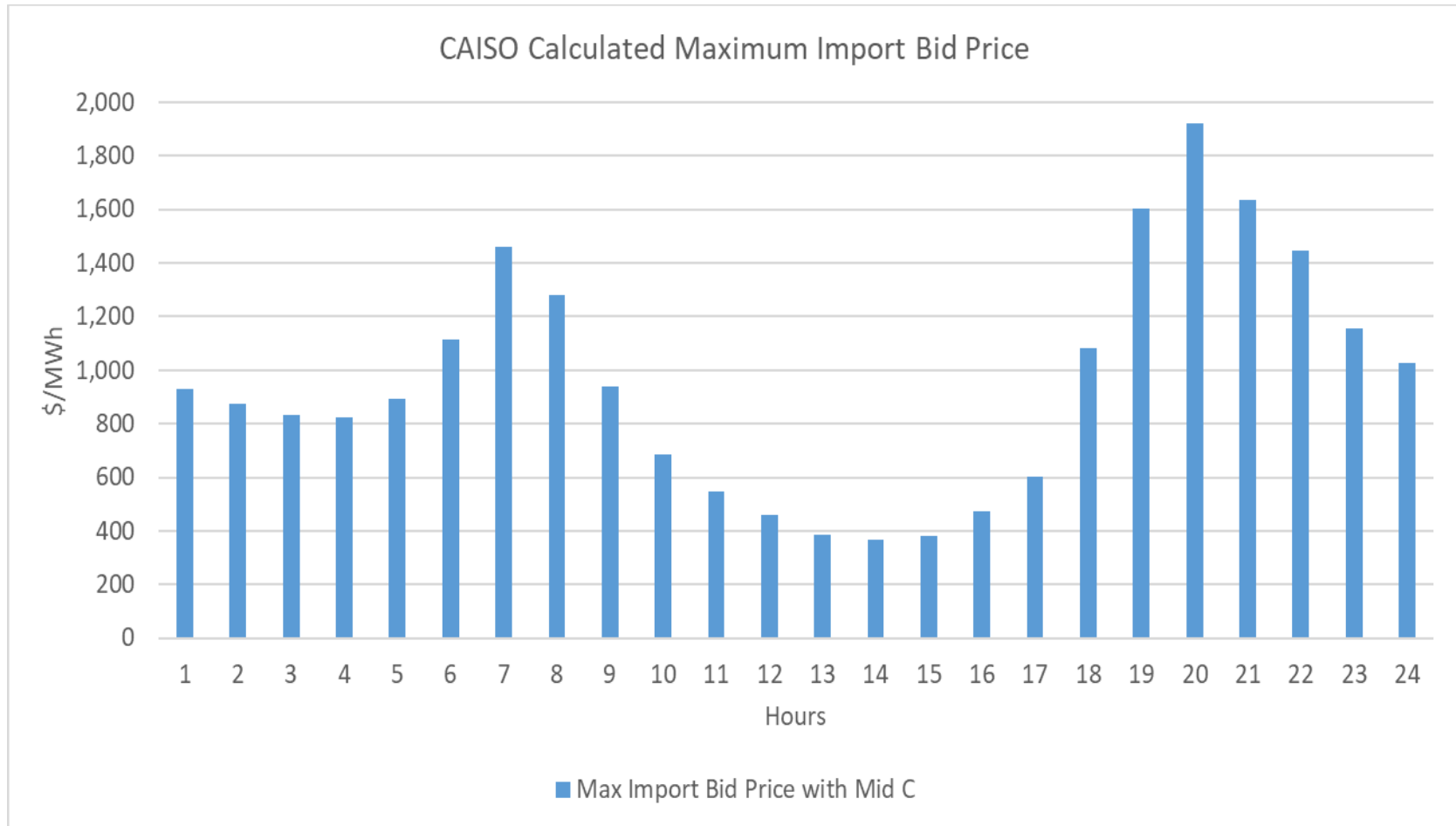
Monthly SMEC average is calculated by determining on- and off-peak average for the exact month from the previous year

- For example, Hour-Ending 10 on March 9, 2020

Hourly Shaping Factor =

$$1 + \left[\frac{(\text{Avg SMEC of HR 10 in March 2019}) - (\text{Avg SMEC of ON peak hrs in March 2019})}{\text{Avg SMEC of ON peak hrs in March 2019}} \right]$$

Illustration of hourly shaping factor



EXAMPLES

Examples:

#1 : Assume the following inputs in the day-ahead market:

- Highest-priced submitted bid from a resource-specific resource = \$900/MWh
- Highest-priced submitted RA import bid = \$900/MWh
- Highest-price submitted Non-RA import bid = \$950/MWh
- Highest-priced submitted virtual bid = \$800/MWh
- CAISO-calculated maximum import bid price = \$200/MWh

The power balance constraint penalty price would be set to \$1,000/MWh

- If there is a power balance constraint infeasibility:
 - Energy prices would be set based on \$1,000/MWh

#2: Assume the following inputs in the day-ahead market:

- Highest-priced submitted bid from a resource-specific resource = \$1,200/MWh
- Highest-priced submitted RA import bid = \$900/MWh
- Highest-priced submitted Non-RA import bid = \$950/MWh
- Highest-priced submitted virtual bid = \$800/MWh
- CAISO-calculated maximum import bid price = \$700/MWh

The power balance constraint penalty price would be set to \$2,000/MWh

- If there is a power balance constraint infeasibility:
 - Energy prices in the pricing run would be set based on \$1,200/MWh

#3: Assume the following inputs in the day-ahead market:

- Highest-priced submitted bid from a resource-specific resource = \$900/MWh
- Highest-priced submitted RA import bid = \$1,000/MWh
- Highest-priced submitted Non-RA import bid = \$1,200/MWh
- Highest-priced submitted virtual bid = \$1,800/MWh
- CAISO-calculated maximum import bid price = \$1,100/MWh

The power balance constraint penalty price would be set to \$2,000/MWh

- If there is a power balance constraint infeasibility:
 - Highest-priced cleared economic bid = \$1,800/MWh virtual bid
 - Energy prices in the pricing run would be set based on \$1,800/MWh

#4 : Assume the following inputs in the real-time market:

- Highest-priced submitted bid from a resource-specific resource = \$900/MWh
- Highest-priced submitted RA import bid = \$1,200/MWh
- Highest-priced submitted Non-RA import bid = \$1,050/MWh
- CAISO-calculated maximum import bid price = \$1,100/MWh

The power balance constraint penalty price would be set to \$2,000/MWh

- Market reduces the submitted \$1,200/MWh RA import bid to the \$1,100/MWh maximum import bid price
 - If there is a power balance constraint infeasibility:
 - Highest-priced cleared economic bid = \$1,100/MWh import bid
 - Energy prices in the pricing run would be set based on \$1,100/MWh

5: Assume the following inputs in the real-time market:

- Highest-priced submitted bid from a resource-specific resource w/n EIM BAA= \$1,200/MWh
 - EIM BAA is import constrained
- Highest-priced submitted RA import bid = \$800/MWh
- Highest-price submitted Non-RA import bid = \$700/MWh
- CAISO-calculated maximum import bid price = \$900/MWh

The power balance constraint penalty price would be set to \$2,000/MWh for all individual EIM BAAs and overall market

- If there is a power balance constraint infeasibility within the import constrained EIM BAA:
 - Highest-priced cleared economic bid = \$1,200/MWh
 - Energy prices in the pricing run would be set based on \$1,200/MWh

EIM GOVERNING BODY CLASSIFICATION AND NEXT STEPS

Some EIM entities objected to the CAISO's proposed classification for penalty prices in the revised straw proposal

- They explained objected strongly to one of the options offered in the revised straw proposal in which the penalty price would be scaled to \$2,000/MWh
 - The CAISO should instead develop a different methodology for establishing market prices that gradually increase based on the amount of infeasibility to \$1,000/MWh
- The CAISO believes that this proposal in conjunction with the *Flexible Ramping Product Refinements* initiative addresses these concerns

EIM Governing Body Classification

- The proposal falls within the EIM Governing Body's advisory role
 - Proposed changes would not change any market rules that are EIM-specific
- Stakeholders are encouraged to submit a written response if they have concerns or questions

Proposed Initiative Schedule



Date	Milestone
4/23/20	Publish Draft Final Proposal
4/29/20	Stakeholder call
5/8/20	Market Surveillance Committee Meeting
5/20/20	Stakeholder written comments due
May - June 2020	Development of Draft Business Rules Specifications and Draft Tariff Language
June 2020	EIM Governing Body
July 2020	Board of Governor's meetings
Implementation	Fall 2021, concurrent with FERC 831 implementation