California ISO

Commitment Costs and Default Energy Bid Enhancements (CCDEBE)
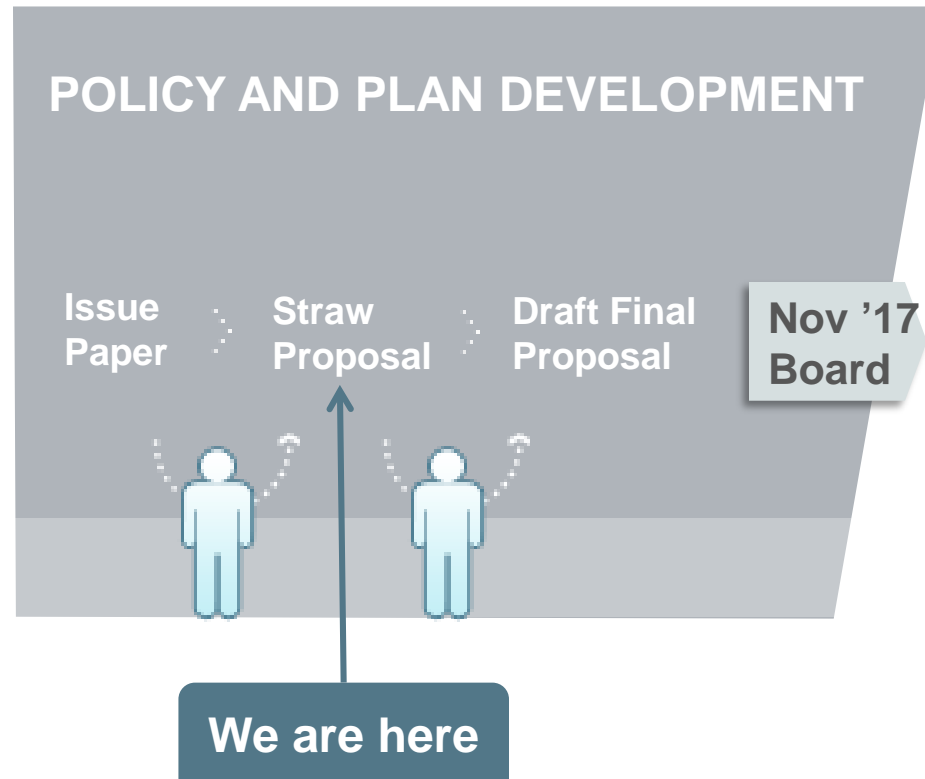
Straw Proposal

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Market & Infrastructure Policy

July 6, 2017

Agenda

Time	Topic	Presenter
10:00 – 10:05	Introduction	Kim Perez
10:05 – 10:50	Proposal Summary	Cathleen Colbert
11:00 – 11:20	Detailed Review of Design Principles	Brittany Dean
11:20 – 12:00	Detailed Review of Issues	Cathleen Colbert
1:00 – 1:30	Workshop – Detailed Background	Brittany Dean
1:30 – 3:50	Workshop – Detailed Proposal	Cathleen Colbert
3:50 – 4:00	Questions & Next Steps	Kim Perez

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ISO Policy Initiative Stakeholder Process

POLICY AND PLAN DEVELOPMENT

Issue Paper ⋯ Straw Proposal ⋯ Draft Final Proposal → Nov '17 Board

We are here

Plan for stakeholder engagement

Milestone	Date
Issue paper posted	November 18, 2016
Stakeholder call	November 22, 2016
Stakeholder written comments due	December 9, 2016
Straw Proposal Posted	June 30, 2017
Stakeholder meeting	July 6, 2017
Stakeholder written comments due	July 20, 2017
Draft final proposal posted	August 25, 2017
Stakeholder meeting	September 1, 2017
Stakeholder written comments due	September 11, 2017
EIM governing body meeting	October 10, 2017
Board of Governors meeting	November 1-2, 2017

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EIM Categorization

- This initiative will affect the real-time market

- The EIM is an extension to the real-time market

- This initiative is EIM related

- EIM Governing Body – E2 classification (Advisory)

  "For a policy initiative proposing changes to generally applicable real-time market rules or rules that apply to all ISO markets, the matter goes to the Board for approval; however, the EIM Governing Body has the option to provide advisory input."

ISO proposes to allow market based offer for "three-part bid" subject to mitigation and allow greater flexibility to negotiate or adjust each component to support market efficiency

	Type	Sub-type	Market Based Offer	Cost Based Offer
Hourly	Energy	Variable Cost	X	Mitigated Price
	MLC	Variable Cost / Fixed Cost	X	Mitigated Proxy Cost
Daily	TC	Fixed Cost	X	Mitigated Proxy Cost
	SUC	Fixed Cost	X	Mitigated Proxy Cost

PROPOSAL SUMMARY

Objective: Comprehensive solution to ongoing commitment cost and DEB issues

- Suppliers need more flexibility to reflect unique costs and volatility

  - Support integration of renewable resources through incentivizing flexible resources participation during tight fuel supply

  - Account for costs of flexible resources (gas and non-gas) to reduce risk of insufficient cost recovery

  - Encourage participation of non-RA and voluntary EIM resources

- ISO needs to comply with FERC Order 831

  - Requires supporting verified costs of energy bids above $1,000/MWh

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Objective: Comprehensive solution to ongoing commitment cost and DEB issues cont.

- ISO has implemented several incremental changes to bidding rules over the past decade

    - Stakeholders maintain incremental changes have been insufficient to resolve concerns

    - Board and officers committed to pursuing comprehensive changes to resolve bidding rule concerns

- CAISO must comply with FERC Order 831 to increase bid cap and implement an ex ante and ex post verification process for *cost-based* energy bids

Background

- Since 2007, CAISO led twelve stakeholder initiatives centered around bidding rules

  - Bidding flexibility

  - Market based offers for commitment costs

  - After-the-fact recovery process

  - A new market power mitigation structure

- *Aliso Canyon Phase 3* Draft Final Proposal

  - Highlighted concerns with bidding flexibility during periods of electric and gas constrained conditions

  - Gas constraint supported in concept by stakeholders

  - Stakeholders' support dependent on CCDEBE enhancements remaining priority of CAISO

Current design restricts supplier's from being able to accurately reflect cost expectations

- CAISO is only ISO that does not support market based commitment costs bids subject to mitigation

- Current bidding rules restrict suppliers from reflecting estimated costs and business needs
  - Expanding EIM
  - Increasingly diverse supply resources

- Overly limiting bid prices can:
  - Undermine market efficiency
  - Discourage participation by non-resource adequacy resources and voluntary EIM resources

Current ISO bidding rule and mitigation design

- ## Energy bids

  - Hourly market-based energy bids limited by cap subject to local market power mitigation test

  - Under uncompetitive conditions, market-based energy bids are replaced with default energy bids

- ## Commitment cost bids

  - Daily cost-based commitment cost bids are subject to cap of 125% of the ISO calculated proxy costs

  - Applied for competitive/uncompetitive conditions

Type	Sub-type	Market Based Offer	Cost Based Offer
Energy	Variable Cost	X	
MLC	Variable Cost		X
	Fixed Cost		
TC	Fixed Cost		X
SUC	Fixed Cost		X

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CAISO not pursuing Market Monitor's recommendation

- Market Monitor proposed:

  - Make permanent Aliso Canyon temporary measure allowing CAISO to manually use approximation of next day index

  - Apply Monday premium based on statistical difference between same-day/ intra-day/ Monday trades relative to next day index

  - Create and publish a real-time gas price index

  - Provide more guidelines for the after-the-fact filing right at FERC

- CAISO not pursuing due to:

  - Regulatory concerns with no oversight of non-indexed trades to mitigate risk of artificial prices if implemented

  - Too excessive of implementation effort and investment needed to become gas index publisher in addition to core business

  - Could not be implemented until Fall 2018 delaying long-term

ISO proposes to allow market based offer for "three-part bid" subject to mitigation and allow greater flexibility to negotiate or adjust each component to support market efficiency

	Type	Sub-type	Market Based Offer	Cost Based Offer
Hourly	Energy	Variable Cost	X	Mitigated Price
	MLC	Variable Cost Fixed Cost	X	Mitigated Proxy Cost
Daily	TC	Fixed Cost	X	Mitigated Proxy Cost
	SUC	Fixed Cost	X	Mitigated Proxy Cost

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Change minimum load bids from daily to hourly subject to current real-time re-bidding rules

- Continue to include one component for cost associated with operating at minimum operating level

- Treat minimum load component as an hourly value

  – Change the bid component to an hourly type

  – Hourly component for the combined costs associated with power production as well as short-term fixed costs for a run hour

  – Ability to not bid in particular hours

Add negotiated option for commitment proxy costs

- Provides better bidding flexibility

  - May allow supplier to reflect complex costs in bid submission

  - Leverages existing systems that calculate DEBs and proxy commitment costs but allows for similar flexibility in proxy costs as that provided for DEBs today

- Add negotiated option for commitment proxy costs so that:

  - Commitment bids mitigated to either a negotiated or estimated option for proxy costs

  - Energy bids mitigated to higher of the competitive LMP or either a negotiated, variable, or LMP option for default energy bids

- Negotiated option is for purpose of reflecting system differences in cost formulation not volatility

Allow supplier provided ex ante adjustments to either DEBs or commitment proxy costs

- Ex ante adjustments to either DEBs, NDEBs, proxy costs, or negotiated proxy costs

  - DEB or NDEB adjustments will be vehicle for submitting cost-based energy offers above $1,000 subject to verification requirements to comply with Order 831

- Provides better bidding flexibility balanced against need to protect against artificial price impact

  - May allow supplier to reflect gas system limitations or scarcity in bids to improve dispatch

  - Maintains control of calculations

- Balances implementation by limiting on-going ex ante and ex post manual verifications needed

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Straw proposal also includes provisions for compliance with FERC Order 831

- Allow supplier provided ex ante adjustments to either DEBs or proxy commitment costs

  - Develop according to set guidelines

  - Subject to automated ex ante reasonableness validation

- Ex post cost-based bid verification process
  - Used for bids that fail ex ante automated screening
  - Verified costs included in uplift payment
  - Make permanent provisions for suppliers to file with FERC for recovery of energy costs above mitigated price or cap that CAISO cannot verify

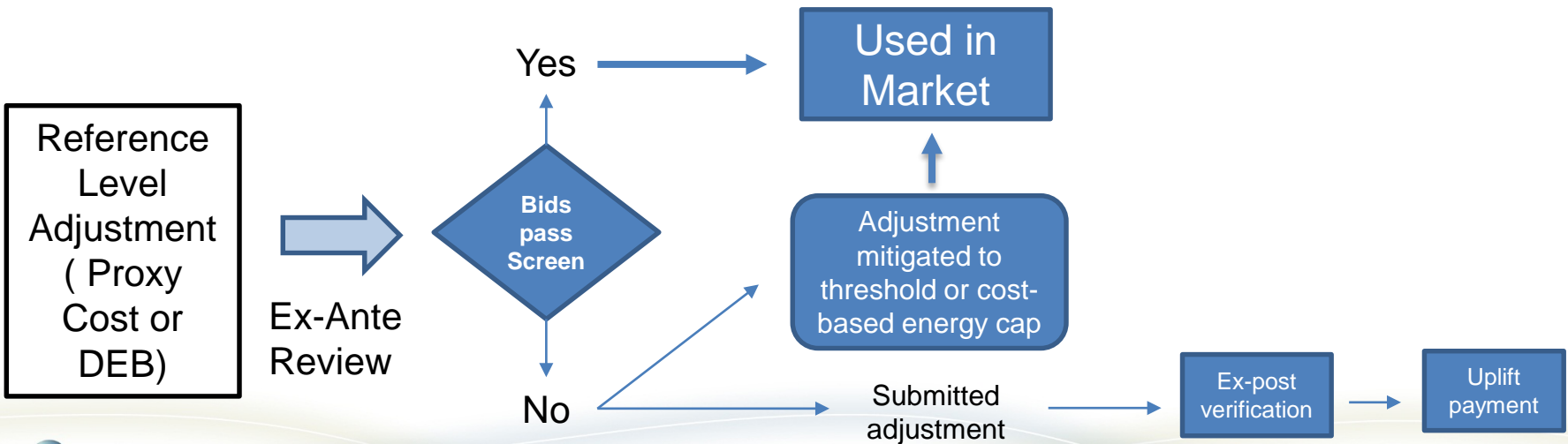- Ex ante verified cost-based bids above $1,000/MWh and up to $2,000/MWh can set prices

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Competitive conditions

Supply Offer ⟶ **Used in Market**

Uncompetitive conditions without reference level adjustment

Reference Levels (Proxy Cost or DEB) ⟶ **Used in Market**

Uncompetitive conditions with reference level adjustment

Reference Level Adjustment (Proxy Cost or DEB) — Ex-Ante Review ⟶ **Bids pass Screen**

- Yes ⟶ **Used in Market**
- No ⟶ Submitted adjustment ⟶ Ex-post verification ⟶ Uplift payment

Adjustment mitigated to threshold or cost-based energy cap ⟶ **Used in Market**

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Support market-based commitment cost offers subject to dynamic market power mitigation

- Propose mitigation of commitment costs

  - Allow suppliers to submit market-based commitment cost bids

  - Apply dynamic market power mitigation test to market-based commitment cost bids

  - Test critical constraints in the dynamic competitive path assessment

- Including commitment cost mitigation contingent upon evaluating feasibility and costs

  - Information to be included in Draft Final Proposal

  - If cost benefit analysis indicates feasibility, implementation could be phased

    - Full implementation with mitigation could be implemented later to ensure resources allocated to reference level enhancement in 2018

DETAILED REVIEW OF DESIGN PRINCIPLES

Principles under competitive conditions

- Competition should discipline markets since it limits market power while incentivizing profit-maximization

- Suppliers incentivized to bid based on asset valuation

  - Market based offer prices at which they are willing to sell

  - Market based offer prices may differ from production cost estimates by including risk, reflecting subsidies, or reflecting other factors such as preferred use

- Resources without must-offer-obligations should have the flexibility to select the hours in a day to participate

- Reduce barriers to entry regardless of technology type

- Even market-based offers should be subject to caps

Proposed principles under uncompetitive conditions – mitigation test

- Market must be protected against market power by testing for insufficient supply without which the market cannot provide competitive incentives

- Three pivotal supplier test is sufficient because it is a robust design and applies a consistent methodology across the three-part offer

- Market should only mitigate when a mitigation test shows potential to exercise market power and balance a reasonable output of false positives/false negatives

- Methodology should consider implementation concerns

Proposed principles under uncompetitive conditions – reference level design

- Market produces efficient dispatch solution and price signals when suppliers offers are reasonable reflections of the suppliers' cost expectations

- Suppliers' offers must only be mitigated to price levels that are reasonable reflection of their cost expectations

- When mitigated, suppliers' reference levels should:

  - Not be able to value assets based on monetized risks, subsidies, contracts, or other factors

  - Suppliers should have ability to reflect fuel availability through a risk margin or scarcity value **as an exception** so the CAISO and supplier can avoid affecting reliability

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Proposed principles under uncompetitive conditions – reference level design cont.

- Gas and non-gas units with unique cost methods should be able to negotiate both commitment cost and energy cost estimate methodologies

- Gas and non-gas units should be able to request reference level adjustments to reflect volatility

- Market should validate reference level adjustment prior to market run for purposes of setting LMPs (ex ante)

- Market should validate reference level adjustment after market run for purposes of uplift resettlement if verifiable through more thorough, documentation review (ex post)

Proposed principles under uncompetitive conditions – reference level design cont.

- Ex ante and ex post validation methods should screen against artificial price impact not suppliers' ability to predict actual costs

  - Uncertainty at time submitted so must be based on expectations

  - Expectations may differ from actual costs once realized

- Ex post cost recovery if adjusted reference levels cannot be validated prior to market run

  - Not avenue for recovery for bids with "wrong" expectations

  - Avenue for recovery when ISO validation thresholds (or cost caps) did not effectively capture adjustments that are reasonable

DETAILED REVIEW OF ISSUES

Objective: Comprehensive solution to ongoing commitment cost and DEB issues

- Suppliers need more flexibility to reflect unique costs and volatility

  - Support integration of renewable resources through incentivizing flexible resources participation during tight fuel supply

  - Account for costs of flexible resources (gas and non-gas) to reduce risk of insufficient cost recovery

  - Encourage participation of non-RA and voluntary EIM resources

- ISO needs to comply with FERC Order 831

  - Requires supporting verified costs of energy bids above $1,000/MWh

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After review of stakeholder feedback CAISO pursuing the following within scope

- Need to support hourly minimum load

- Need to support negotiated commitment cost reference levels and supplier submitted adjustments to energy and commitment cost reference levels

- Need to comply with FERC Order 831 by supporting reference level adjustments to prices above $1,000/MWh subject to verification requirements

- Need to apply dynamic market power mitigation test so that entire supply offer mitigated only when potential to exercise market power is identified

Issues driving need to support hourly minimum load

- Request flexibility for commitment cost values to vary across the hours:

    - MSG resources request flexibility to reflect minimum load costs vary by hour on higher configurations

    - Resources with physical minimum load rerates request flexibility to re-bid costs between $0 and revised minimum load costs with default energy bid integration

- Non-RA resources may not want to participate during all hours of the day and should select hours for bidding

    - Flex RA concerns were raised during workshop (out-of-scope)

- Request flexibility to update commitment costs values in real-time to reflect changing fundamentals

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Issues driving need to support negotiated commitment cost and supplier submitted adjustments to energy and commitment cost reference levels

- Stakeholders expressed that there are several limitations that:

  - May result in not reflecting their cost expectations for a unit due to missing cost components or more resource-specific approach

  - May impose larger price risk on the supplier to potentially incur losses than the supplier would have been willing to assume

- Specific concerns raised include:

  - Fuel replacement costs (i.e. storage opportunity costs)

  - Risk margins to better reflect production cost

 - Ability to procure from multiple trading hubs or fuel switch

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Issues driving need to comply with FERC Order 831

- FERC Order 831 introduced new requirements for the CAISO to implement to comply

- FERC Offer Caps Rule identified the following issues with overly restrictive offer caps and cost based offers:

  - Offer caps may result in resources not being compensated for incurred or expected costs

  - Offer caps for market based offers are upper limit (extreme limits) on market based offers and that caps should not limit cost based offers

  - While initially not intending to limit cost based offers as well for the energy cost based offer, FERC determined cap is important backstop mitigation to address potential for imperfect information

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Action	Category A (market based offer <$1,000/MWh)	Category B (verified cost based offer > $1,000/MWh < 2,000/MWh	Category C (unverified cost based offer > $1,000/MWh < 2,000/MWh	Category D (cost based offer > 2,000/MWh)
CCDEBE Scope Items Identified Initial assessment of ISO/SC actions based on category bid				
Allowed to submit market based offers subject to $1,000/MWh cap	Y	N	N	N
Market based offers subject to mitigation (LMPM)	Y	N/A	N/A	N/A
Market based offers capped at higher of $2,000/MWh or mitigated price	Y	N/A	N/A	N/A
Allowed to submit cost based offers	N	Y	Y	Y
Cost based offers capped at higher of $2,000/MWh or verified cost offer	N/A	Y	Y	Y
Used to set merit order above $2,000	N/A	N/A	N/A	Y
Ex ante verification of cost based offers required	N/A	Y	Y	N
Used to calculated LMPs	Y	Y	N	N
Ex post verification of cost based bids required	N/A	N	Y	Y
Eligible for uplift	Y	Y	Y	Y
Re-calc of uplift required if verifiable	N	Y	Y	Y

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Offer cap structure requirement effectively creates four categories of bids for caps and validation requirements
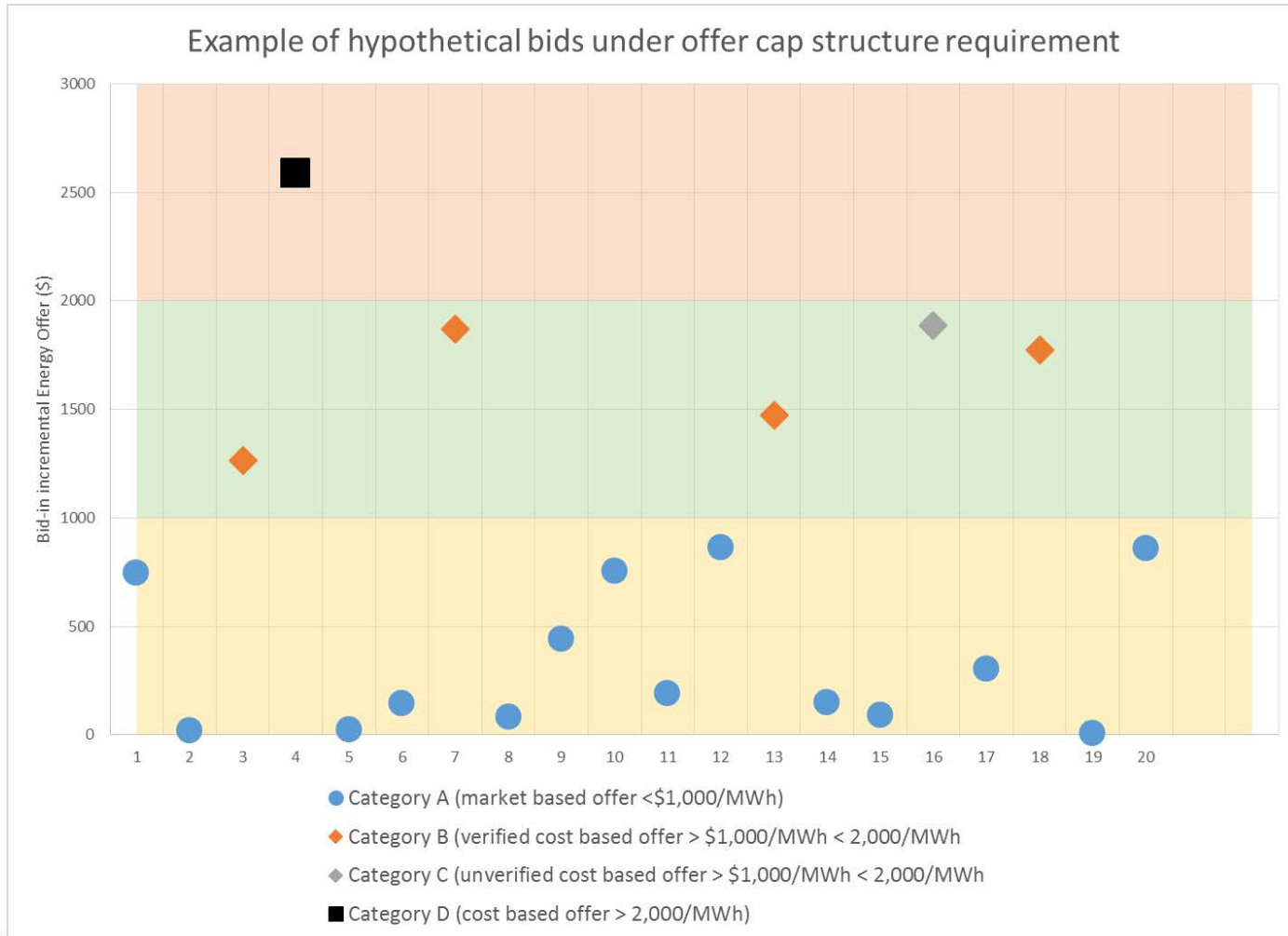
Example of hypothetical bids under offer cap structure requirement

Need to apply dynamic market power mitigation test so that entire supply offer mitigated only when potential to exercise market power is identified

- Some stakeholders expressed bids should include market based commitment offers subject to mitigation

- Without market based offers and only supporting cost based offers (de facto mitigation), some stakeholders expressed that they view this as overly restrictive

  - Applying cap under all conditions in every run assumes uncompetitive conditions in every run – competitive or uncompetitive conditions

  - Bid cap limits cost offer range (125% conduct test) to validate cost based offer falls within reasonable range of expected costs

After review of stakeholder feedback CAISO removing exceptional dispatch enhancements from scope

- ~~Limitations might exist where the market power protections are insufficient where exceptional dispatch mitigation may not be restrictive enough~~

  - CAISO moved and addressed concerns with incremental exceptional dispatch in a separate initiative - *Aliso Canyon Gas-electric Coordination Phase 3*

  - Decremental exceptional dispatches ability to exercise market power is largely influenced by excess supply driving prices below $0 or to the bid floor and is more appropriate in an effort examining impacts of overgeneration on market dynamics

WORKSHOP - DETAILED BACKGROUND

Bidding rules design with market based and cost based offers by component - Today

- **Variable cost** refers to costs that **vary with changes in MWH output** (hourly value)

- **Fixed cost** refers to **short-term fixed costs** for event-based commitment costs of a generating or non-generating resource incl. participating demand response (daily values)

- **Long-term fixed costs**, going forward fixed costs or overhead such as salaries while a cost of business are not short-term costs for power production but instead capacity costs. Cost may be recovered through infra-marginal rents.

Type	Sub-type	Market Based Offer	Cost Based Offer
Energy	Variable Cost	X	
MLC	Variable Cost		X
MLC	Fixed Cost		X
TC	Fixed Cost		X
SUC	Fixed Cost		X

Non-exhaustive list of electricity market operators responsibilities

- Support suppliers submitting market based offers if no market power concerns exist limited by "circuit breaker" offer cap

- Test for suppliers ability to adversely impact the market (increase energy prices or uplift payments)

CAISO only supports market based offers for the variable energy cost curve in the supply bids

Type	Sub-type	Market Based Offer	Cost Based Offer
Energy	Variable Cost	X	
MLC	Variable Cost		X
	Fixed Cost		
TC	Fixed Cost		X
SUC	Fixed Cost		X

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Non-exhaustive list of electricity market operators responsibilities

- Replace market based offers with cost based offers if potential to exercise market power is detected

- Validate and refer suspected artificial cost based offers to deter false or artificial offers inflating energy prices or uplift

CAISO uses capped commitment cost based offers every hour and replaces energy market based offer with default energy bids (mitigated price)

Type	Sub-type	Market Based Offer	Cost Based Offer
Energy	Variable Cost	X	**Mitigated Price**
MLC	Variable Cost		X
	Fixed Cost		
TC	Fixed Cost		X
SUC	Fixed Cost		X

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CAISO tests for market power on its energy bids using local market power mitigation (LMPM)

- CAISO applies three pivotal supplier test to its incremental energy market based offers

  - Called local market power mitigation (LMPM)

- A three pivotal supplier test evaluates if constraint is competitive or un-competitive by removing three largest suppliers and testing if supply could relieve constraint.

  - If there is sufficient supply to meet demand after removing the largest suppliers ➔ competitive

  - If insufficient supply to meet demand after removing the largest suppliers ➔ uncompetitive and opportunity for market power.

CAISO tests for market power on its energy bids using local market power mitigation (LMPM) cont.

- Consider only net suppliers as potentially pivotal

- Consider resources with bids in market and can be started to produce energy

- Will only apply mitigation for testing **binding** constraints

- All supply adjusted to account for effectiveness on constraint being tested (constraint analysis)

- Account for ramping limitations in real time market

- Demand Response, Participating Load, Non-Generator Resources and Virtuals are included in MPM as a part of power balance constraint but are **exempt** from mitigation

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Challenges with applying three pivotal supplier test on binding constraints to commitment cost mitigation

- Would need to evaluates if constraint is competitive or un-competitive by removing largest suppliers and testing if supply including minimum load energy – **lumpy amount** - could relieve constraint

- Concern - unit not mitigated because commitment decision would relieve congestion

*Figure 1: Example of difficulties applying dynamic mitigation to commitment costs*

50MW

Res: Pmin (40MWs)

Load 60MWs
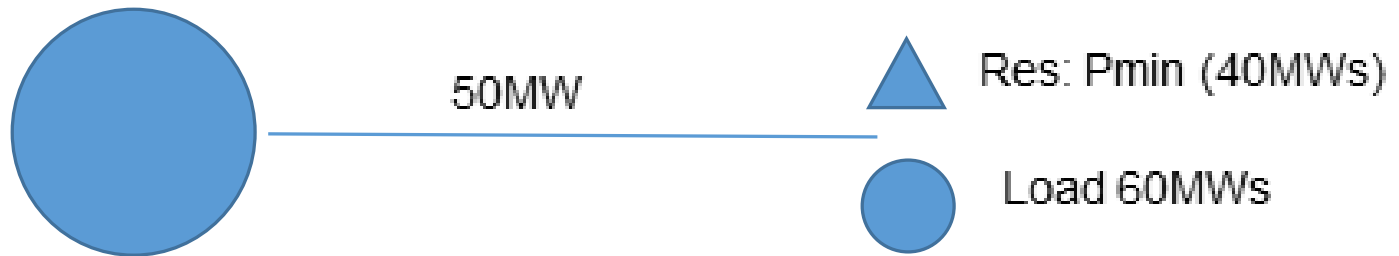
CAISO reference level design used to replace market-based energy component and cap commitment costs

- Market replaces submitted energy market-based offers with administratively calculated cost estimate if mitigated

- Suppliers can submit commitment cost cost-based offers up to maximum allowable commitment costs

- ISO generates a cost based offer for RA resources under bid insertion rules that did not submit a supply offer bid

- ISO calculates cost based offers based on:

  - Gas units: next day gas index and MF heat rates

  - Non-gas units: MF fuel cost equivalent values

Current tariff allows real-time rebidding in the absence of a DAM commitment or an inter-temporal constraint

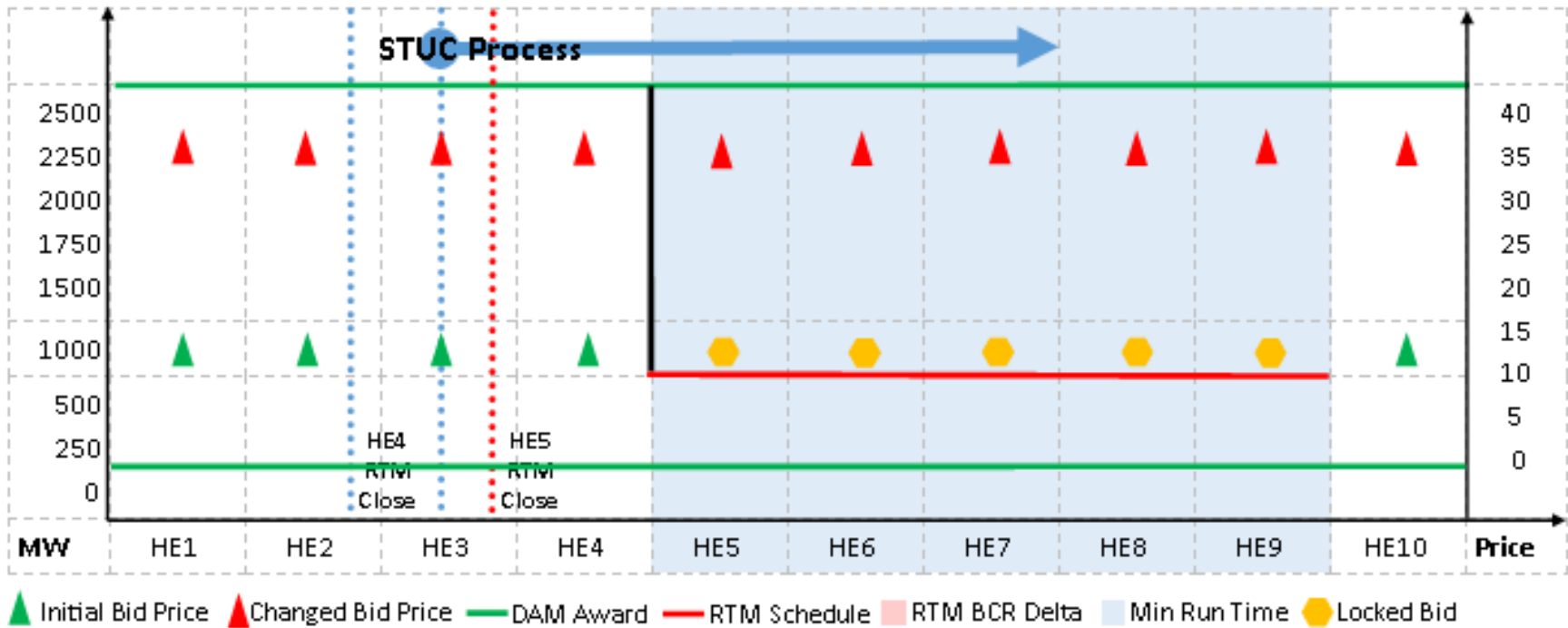Concern: Increase MLC bid after committed to inflate uplift payments
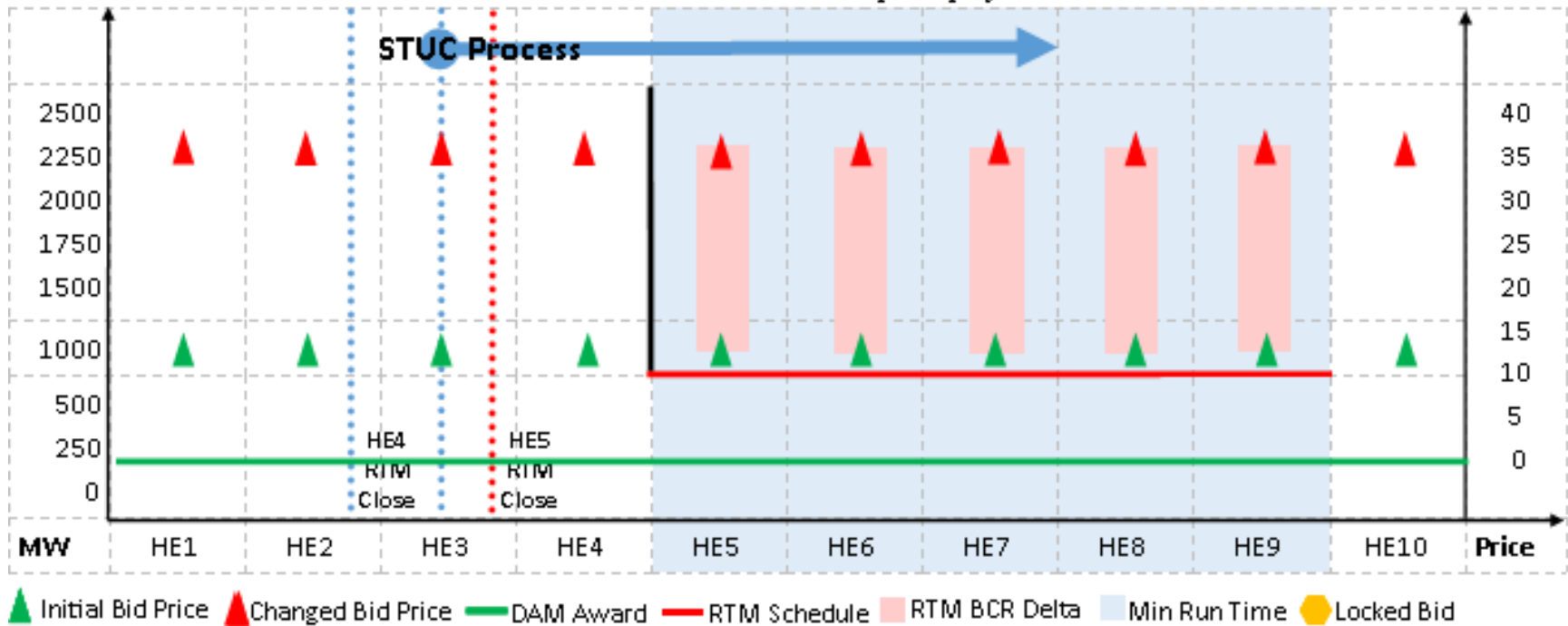
Note:
- Visual based on MLC structure design without hourly variation across day
- Static values for bid price is representing that the bid is for a daily component
- When bid price changes the prior market processes never used the updated value

Current tariff allows real-time rebidding in the absence of a DAM commitment or an inter-temporal constraint cont.

Current Policy: Final bid used in STUC process (bid resulting in STUC commitment) locked until through minimum run time at which time the market will begin to use the changed bid price

Note:
- Visual based on MLC structure design without hourly variation across day
- Static values for bid price is representing that the bid is for a daily component
- When bid price changes the prior market processes never used the updated value

WORKSHOP - DETAILED PROPOSAL

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Hourly minimum load offers

Propose to support hourly minimum load

- Continue to include one component for cost associated with operating at minimum operating level

- Treat minimum load component as an hourly value

  - Change the bid component to an hourly type

  - Hourly component for the combined costs associated with power production as well as short-term fixed costs for a run hour

- ISO will enhance its bidding rules to ensure that non-RA resources will be able to select hours to participate

Propose to support hourly minimum load cont.

Illustration of proposed change to treat minimum load component as an hourly value

Revising bid-in market based offer for MLC to an hourly component would allow for the values to vary across hours as shown by hourly bids and allowing SC to select hours to participate
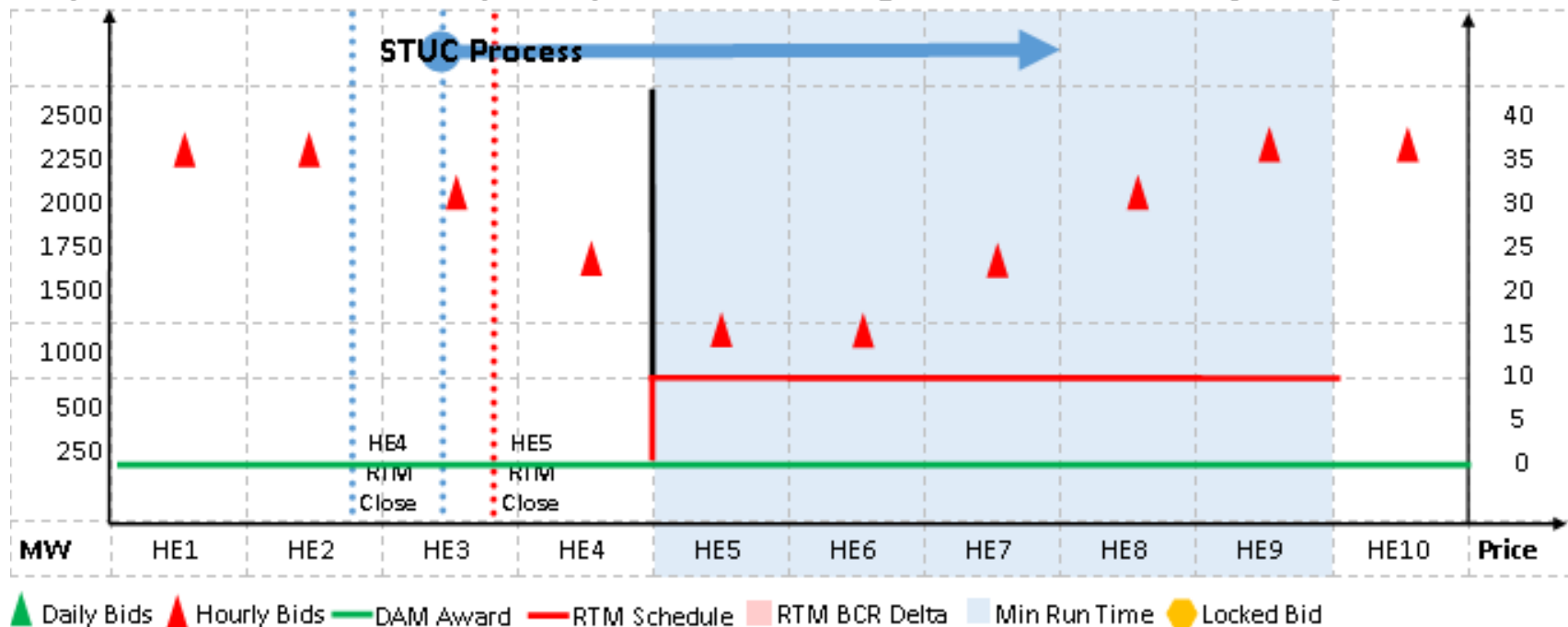
Propose to support hourly minimum load cont.

Illustration of proposed change to treat minimum load component as an hourly value when committed and under inter-temporal constraint (enforcing re-bidding rules)

Revising bid-in market based offer for MLC to an hourly component would allow for the values to vary across hours as shown by hourly bids and allowing SC to select hours to participate
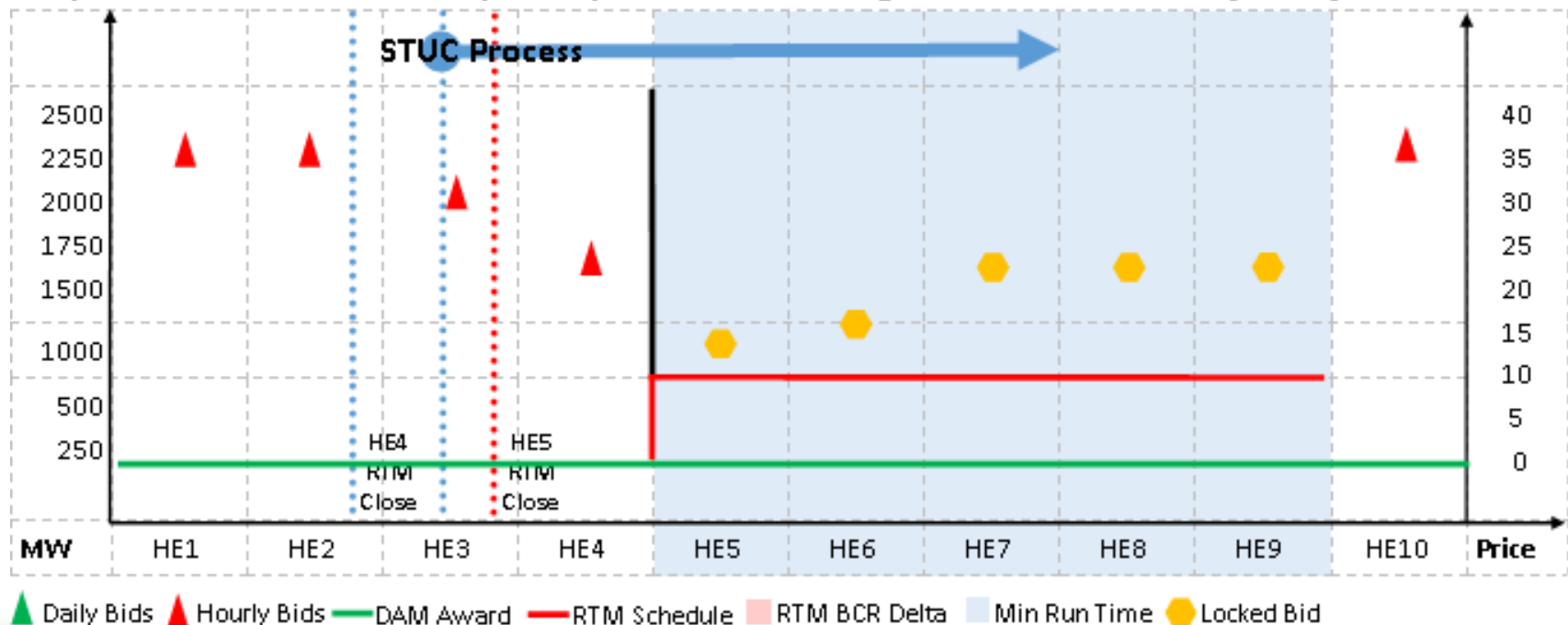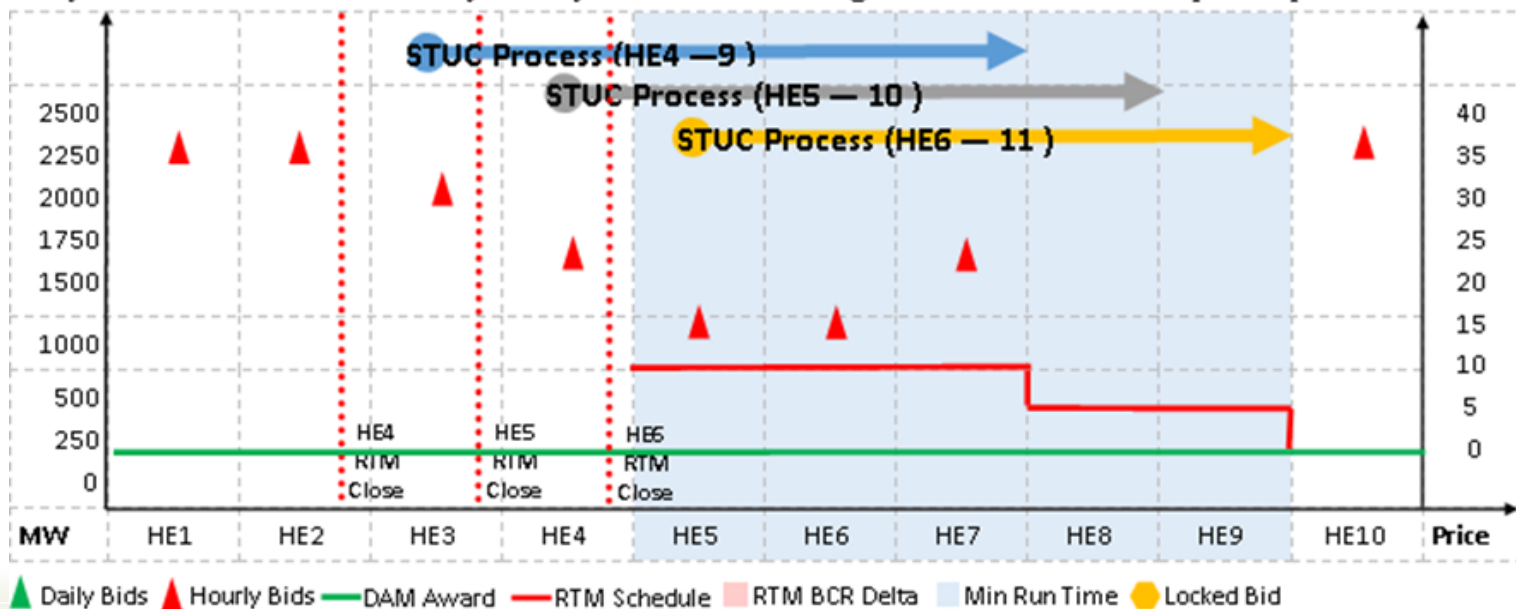
Propose to apply settlement rules when no minimum load cost offer present

- Need to establish "no bid" process for settling resources for minimum load cost when no minimum load component is present

- No bid process for commitment costs needed if:

  - Instructed imbalance energy for dispatches to minimum load if under inter-temporal constraint

  - Consider interval analogous to a self-commitment period

    - Only assess imbalance energy for minimum load at LMP

    - Not eligible for bid cost recovery

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Propose to apply settlement rules when no minimum load cost offer present cont.

- Initial commitment was feasible based on optimization window

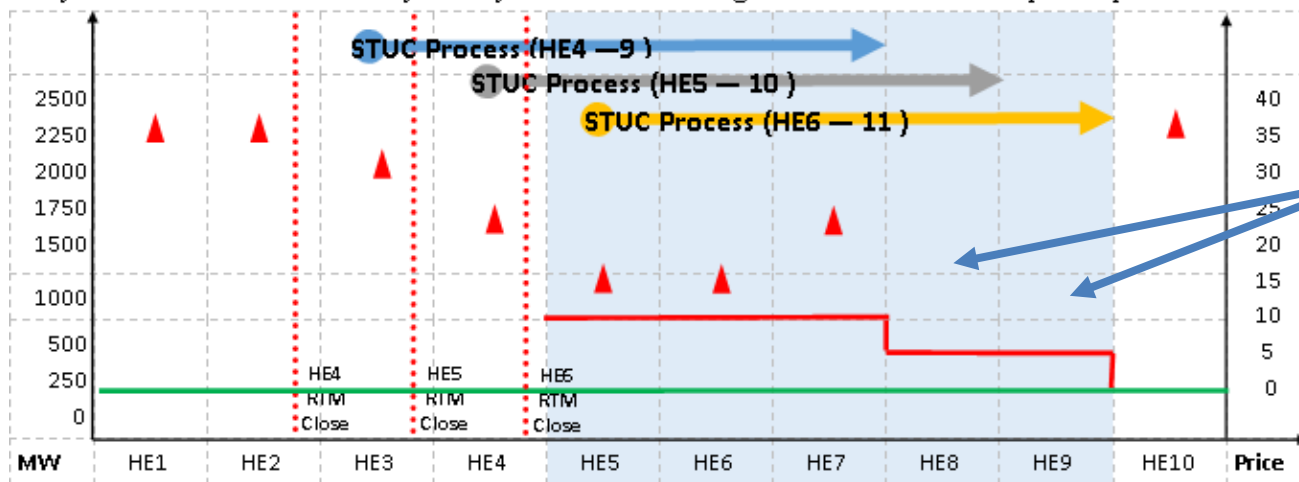- Market will need to send unit to its minimum load during hour endings 7 – 9 to respect its minimum run time

Revising bid-in market based offer for MLC to an hourly component would allow for the values to vary across hours as shown by hourly bids and allowing SC to select hours to participate

Propose to apply settlement rules when no minimum load cost offer present cont.

- SC has ability to submit supply offers for HE8 and HE9 after the binding start up and commitment instruction are received

- Propose to settle as self-commitment period for hour ending 8 and 9 unless bids revised (at levels up to "locked" bid level)

Revising bid-in market based offer for MLC to an hourly component would allow for the values to vary across hours as shown by hourly bids and allowing SC to select hours to participate

Self-commitment periods will be treated on cost side as minimum load energy at LMP unless bid is submitted prior to binding energy dispatch

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Propose to apply settlement rules when no minimum load cost offer present cont.

- SC has ability to submit supply offers for HE8 and HE9 after the binding start up and commitment instruction are received

- Propose to settle as self-commitment period for hour ending 8 and 9 unless bids revised (at levels up to "locked" bid level)

Revising bid-in market based offer for MLC to an hourly component would allow for the values to vary across hours as shown by hourly bids and allowing SC to select hours to participate
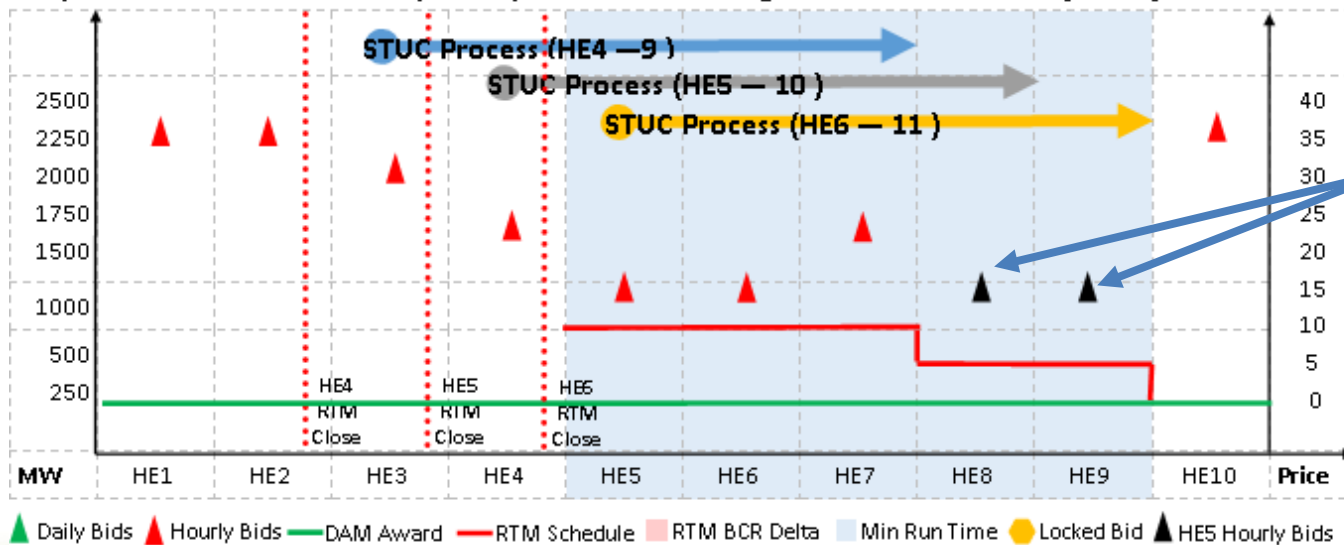
SC submitted bid to provide values for HE8 and HE9 in its real-time market bids submitted in HE5 ➔ no longer self-commitment and eligible for BCR

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Negotiated commitment cost reference levels and supplier submitted adjustments to energy and commitment cost reference levels

Propose to add negotiated option for commitment proxy costs

- **Provides better bidding flexibility**

    - May allow supplier to reflect complex costs in bid submission

    - Leverages existing systems that calculate DEBs and proxy commitment costs but allows for similar flexibility in proxy costs as that provided for DEBs today

- **Add negotiated option for commitment proxy costs so:**

    - Commitment bids mitigated to either a negotiated or estimated option for proxy costs

    - Energy bids mitigated to higher of the competitive LMP or either a negotiated, variable, or LMP option for default energy bids

Propose to add negotiated option for commitment proxy costs cont.

- Supplier requests tailored cost estimate which could factor in more complex cases than a more generic method could e.g.:

    – Complex formulations of delivered fuel price:

        • Blend of fuel costs for fuel switching

        • Blend of procurement locations/shipping rates

    – Need fuel replacement costs/storage opportunity costs

- Supplier not able to request risk margin for negotiated proxy cost or default energy bids because

    – ISO proposes that inclusion of risk margin(s) continue not to be appropriate to include in reference levels on routine basis since would be used under both constrained and relaxed conditions

Propose to allow supplier provided ex ante adjustments subject to verification requirements

- To more fully accommodate stakeholder needs –

  – ISO proposes to allow suppliers to provide ex ante adjustments to either DEBs, NDEBs, proxy costs, or negotiated proxy costs

  – DEB or NDEB adjustments will be vehicle for submitting cost-based energy offers above $1,000 subject to verification requirements to comply with Order 831

- Provides better bidding flexibility balanced against need to protect against artificial price impact

  – May allow supplier to reflect gas system limitations or scarcity in bids to improve dispatch

  – Maintains control of calculations

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Propose to allow supplier provided ex ante adjustments subject to verification requirements cont.

- Reference level adjustments address need to reflect changes to fundamental drivers to expected costs

- Supplier requests adjustment to deviate from reference level designed to serve under largely stable conditions

- CAISO expects adjustments would be based on fundamental drivers for which supporting documentation could be provided

- Conditions warranting request could include when gas costs deviate significantly from published index

  - Real-time incremental dispatches

  - Reflect risk margin or scarcity value to avoid violating gas flow order (only after 4PM TD)

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Propose to allow supplier provided ex ante adjustments subject to verification requirements cont.

- Propose to establish guidelines for creating adjustment request which includes supporting documentation to verify request

- Fuel market price information supporting information includes:

  – Index publisher information (consummated low-mid-high)

  – Electronic platforms (bid-ask spreads)

  – Off-ICE quotes if meets a liquidity/counterparty requirement of 5-10 price quotes from at least 2 different counterparties

- Fuel market or transport availability conditions required documentation for non-price based requests:

  – Current line pack levels or other pipeline capacity reports

  – Notice of fuel transport flow orders (e.g. OFO/EFO)

  – Fuel scarcity conditions (e.g. "can't find counterparty")

Propose to allow supplier provided ex ante adjustments subject to verification requirements cont.

- Allow supplier provided ex ante adjustments to either DEBs or proxy commitment costs

  - Develop according to the established guidelines

  - Subject to automated ex ante reasonableness validation

    - Non-public reasonableness thresholds used to validate reference level adjustments

    - CAISO anticipates enhancing over time as conditions warrant – incorporating feedback loop – to ensure robust ex ante verification

  - Enforce hard cap on ex ante adjustments requested to the energy component at $2,000/MW

- Ex ante verified adjustments above $1,000/MWh and up to $2,000/MWh can set prices

California ISO

Propose to allow supplier provided ex ante adjustments subject to verification requirements cont.

- If unverifiable or above $2,000/MWh cap for energy adjustments then the CAISO will perform ex post verification process

  – Used for bids that fail ex ante automated screening

  – Verified costs included in uplift payment

- If unable to verify supplier provided adjustment request met guidelines based on supplier provided sufficient documentation then the CAISO proposes to make permanent tariff provisions for suppliers to file with FERC for recovery of energy costs above mitigated price or cap that CAISO cannot verify
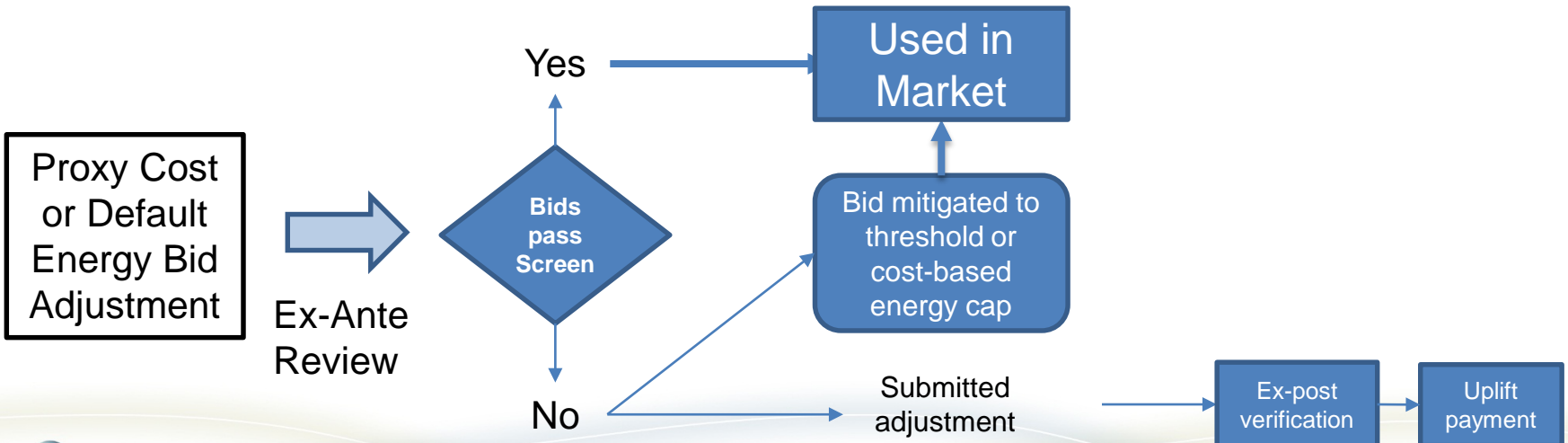
California ISO

Competitive Conditions

| Three-part Bid | → | Used in Market |

Uncompetitive Conditions without DEB or proxy cost adjustment

| Proxy Cost or DEB | → | Used in Market |

Uncompetitive Conditions with DEB or proxy cost adjustment

Proxy Cost or Default Energy Bid Adjustment

Ex-Ante Review

Bids pass Screen

Yes → Used in Market

No → Submitted adjustment

Bid mitigated to threshold or cost-based energy cap → Used in Market

Submitted adjustment → Ex-post verification → Uplift payment

California ISO

Propose to perform ex ante verification on requested adjustments to be eligible

Introduce ex ante verification of requested adjustments that they reflect suppliers' cost expectations to be eligible

- ISO will allow adjustments that pass ex ante verification to be used by the market (regardless of price)

- ISO will calculate resource-specific reasonableness thresholds for adjustments using methodology and inputs in cost development guidelines

- If adjustments are below the reasonableness thresholds and the reasonableness threshold does not exceed $2,000 ➔ ISO automatic validation will flag as verified

- If adjustments are above the reasonableness thresholds or for energy greater than $2,000 ➔ ISO automatic validation will flag as unverifiable

Propose to perform ex ante verification on requested adjustments to be eligible cont.

- If flagged as verified ➔ ISO will allow adjustment to set price

- If flagged as unverifiable commitment costs ➔

  - ISO will adjust ex ante adjustments to ISO calculated resource-specific reasonableness threshold

  - ISO will send the original ex ante adjustment requested directly to an after-the-fact (ex post) verification process

- If flagged as unverifiable energy costs ➔

  - ISO will adjust to lower of ISO calculated resource-specific reasonableness threshold or $2,000/MWh (cap)

  - ISO will use ex ante adjustments for energy mitigated price requested to determine merit-order if above $2,000/MWh cost based energy cap

  - ISO will send the requested ex ante adjustments directly to an after-the-fact (ex post) verification process

Propose to perform ex post verification on requested adjustments to be eligible

- Introduce ISO supported ex post verification of ex ante adjustments on unverifiable adjustments

- Ex post verification process will:

  - Receive unverifiable adjustments (including ex ante adjustments for energy costs above $2,000/MWh cap) automatically

  - Verification will be performed on the ex ante adjustment submitted and require supporting documentation

- Potential results of ex post verification:

  - If successful ➔ eligible for uplift resettlement BCR recalculation)

  - If unsuccessful ➔ ISO will make permanent extending the 205 filing right at FERC if actual energy costs exceeded the cost based cap or the mitigated price at its cost based energy component if mitigated unrecovered through market revenues

California ISO

Propose to perform ex post verification on requested adjustments to be eligible cont.

- Supporting documentation for after-the-fact will follow same guidelines for conditions warranting a request

- CAISO would validate requests based on fuel market price information against the following documentation:

  – Index publisher information (consummated low-mid-high)

  – Electronic platforms (bid-ask spreads)

  – Off-ICE quotes if meets a liquidity/counterparty requirement of 5-10 price quotes from at least 2 different counterparties

- CAISO would validate requests based on fuel availability conditions against the following documentation:

  – Current line pack levels or other pipeline capacity reports

  – Notice of fuel transport flow orders (e.g. OFO/EFO)

  – Fuel scarcity conditions (e.g. "can't find counterparty")

Propose to create cost development guidelines

Cost type	Description	Select details
Variable energy cost	$/MWh for each MW segment above minimum load (Pmin)	• Hourly bid • Can update bids until T-75. • Mitigated when fails LMPM to DEB (cost bid)
Minimum load cost	$/MWh for operating and producing energy at its minimum load (Pmin) $/run hour (event)	• Hourly bid • Subject to re-bidding rules • Proxy costs for setting cap and generating bids
Start-up cost	$/start (event) of the resource or configuration	• Start-up cost based bid • Daily bid in day-ahead and real-time markets • Proxy costs for setting cap and generating bids
Transition cost	$/transition (event) of the configuration	• Transition cost based bid • Daily bid in day-ahead and real-time markets • Proxy costs for setting cap and generating bids

Energy costs

Commitment costs

California ISO

Propose to create cost development guidelines cont.

Start Up

Starts/Transitions ($/start)

- Start-Up Fuel Costs
  - Delivered Fuel Price (commodity, transport, miscellaneous fees including taxes, shrinkage rate, and cap-and-trade credits)
  - Fuel Replacement Costs
  - Risk Margin for non-compliance with OFOs
- Start-up Auxiliary Costs
- GMC
- GHG
- Major Maintenance Adder
- OC (starts limitations)
- Other costs for moving into mode to provide energy output?

Minimum Load

Run Hours ($/hour)

- Major Maintenance
- Service Agreements
- OC (run hour limitations)
- Other hourly costs for a run hour not result of energy production?

Minimum Load Energy ($/MWh)

- Minimum Load Energy Fuel Cost
  - Delivered Fuel Price (commodity, transport, miscellaneous fees including taxes, shrinkage rate, and cap-and-trade credits)
  - Fuel Replacement Costs
  - Risk Margin for non-compliance with OFOs
- VOM
- GMC
- GHG
- DEBA
- OC (output limitations)
- Other costs for providing power output?

Energy Output

Incremental Energy ($/MWh)

- Segment's Fuel Cost
  - Delivered Fuel Price (commodity, transport, miscellaneous fees including taxes, shrinkage rate, and cap-and-trade credits)
  - Fuel Replacement Costs
  - Risk Margin for non-compliance with OFOs
- VOM
- GMC
- GHG
- DEBA
- OC (output limitations)
- Other costs for providing power output?

California ISO

Market-based commitment costs subject to mitigation

Propose market-based commitment costs subject to mitigation

- CAISO is the only ISO that does not support market based commitment costs bids subject to mitigation

- Propose mitigation of commitment costs

  - Allow suppliers to submit market-based commitment cost bids

  - Apply dynamic market power mitigation test to market-based commitment cost bids

  - Test critical constraints in the dynamic competitive path assessment

- Including commitment cost mitigation contingent upon evaluating feasibility and costs

  - If cost benefit analysis shows feasibility, implementation could be phased

Propose caps for each component of the market based supply offer

- Enforce four "circuit breaker" hard caps on each component of the market based supply offer

  - Hard caps used as backstop mitigation accounting for imperfect information in mitigation methods

  - Establish a conservative cap initially and then as needed increase over time e.g. energy offer cap

- Cap description by component for market based offer:

  - Energy cap: no change to $1,000/MWh

  - Minimum load cap: 300 percent above proxy costs * 110%

  - Transition cap: 300 percent above proxy costs * 110%

  - Start up cap: 300 percent above proxy costs * 110%

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Propose market power mitigation applied dynamically in the market to market based commitment costs

- Introduce a commitment cost market power mitigation in all unit commitment processes that tests all critical constraints not just binding constraints

- Perform dynamic competitive path assessment to determine non-competitive congestion components based on (1) binding constraints and (2) critical constraints

  - If any binding constraint fails in the dynamic competitive path assessment, entire three-part bid would be mitigated

  - If any critical constraint fails in the dynamic competitive path assessment, all commitment cost market based offers mitigated to reference level for each component (proxy cost * 100%)

- Exempt DR, participating load, NGRs and virtuals

Propose market power mitigation applied dynamically in the market to market based commitment costs cont.

- Only additional post-processing enhancements needed
  - Add separate determination of dynamic competitive path assessment (DCPA) for mitigating commitment costs
  - DCPA for mitigating commitment cost market based offers will be separate from DCPA used to mitigate energy offers
- DCPA enhanced to test for mitigating commitment costs offers
  - Test all critical constraints (constraints with 85% flow)
  - Calculate second residual supply index (RSI) where:
    - Estimates effective available capacity based on bid max not ramp capable within unloaded capacity
    - Allows commitment/de-commitments
    - Removes ramp limitations

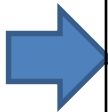| Mitigation Design Feature	IFM	STUC	HASP	RTM Pre-Dispatch/FMM
Requires new process	N	Y	N	N
Type of constraint tested	Critical (85% Flow)	Critical (85% Flow)	Critical (85% Flow)	Critical (85% Flow)
RSI calculation – allows commitment/de-commitments	Y	Y	Y	Y
RSI calculation – basis for maximum capacity that could be withheld from pivotal suppliers	Max effective available capacity	Max effective available capacity	Max effective available capacity	Max effective available capacity
Apply mitigation	If hour failed test	If failed test in any of the 15-minute intervals associated with an hour	If failed test in any of four 15-minute HASP intervals for that hour for HASP up to RTPD/RTD	If failed test in applicable 15-minute interval of RTPD run through balance of hour

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Propose mitigation for exceptional dispatches to maintain consistency with dynamic assessment

- Enhance default competitive path assessment to assess based on both binding and critical constraints to ensure consistency between dynamic and default assessments

- Constraint that passes following two thresholds will be deemed competitive for purposes of applying mitigation to incremental exceptional dispatches:

  - Congestion Threshold: Congested in 10 hours or more in the RTUC run with DCPA at either binding or critical levels

  - Competitive Threshold: Deemed competitive 75 percent or more of the instances where constraint was tested on either the binding or critical constraints RSI

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QUESTIONS & NEXT STEPS

Plan for stakeholder engagement

Milestone	Date
Issue paper posted	November 18, 2016
Stakeholder call	November 22, 2016
Stakeholder written comments due	December 9, 2016
Straw Proposal Posted	June 30, 2017
Stakeholder meeting	July 6, 2017
Stakeholder written comments due	July 20, 2017
Draft final proposal posted	August 25, 2017
Stakeholder meeting	September 1, 2017
Stakeholder written comments due	September 11, 2017
EIM governing body meeting	October 10, 2017
Board of Governors meeting	November 1-2, 2017

Requesting comments responsive to comment template and other comments.

California ISO