



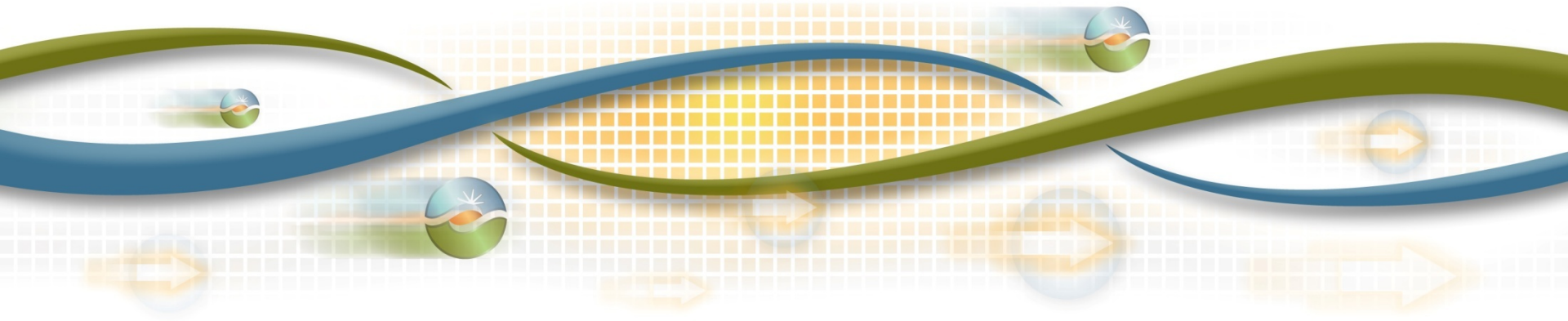
# Commitment Costs and Default Energy Bid Enhancements

March 30, 2017

Cathleen Colbert

Sr. Market Design and Regulatory Policy Developer

Market and Infrastructure Policy



# March 30 working group agenda

Time	Topic	Presenter
10:00 – 10:05	Welcome	Kimberli Perez
10:05 – 10:15	Introduction and Scope	Cathleen Colbert
10:15- 10:55	FERC Offer Cap Rulemaking (Order 831)	Brittany Dean
11:00 – 12:00	Increase Flexibility of Minimum Load Energy Treatment	Cathleen Colbert
12:00 – 1:00	Lunch Break	
1:00 – 2:30	Increase Flexibility of Minimum Load Energy Treatment (continued)	Cathleen Colbert /Li Zhou
2:30 – 3:55	Market Power Mitigation Issues	Cathleen Colbert
3:55	Next Steps	Kimberli Perez
4:00	End	

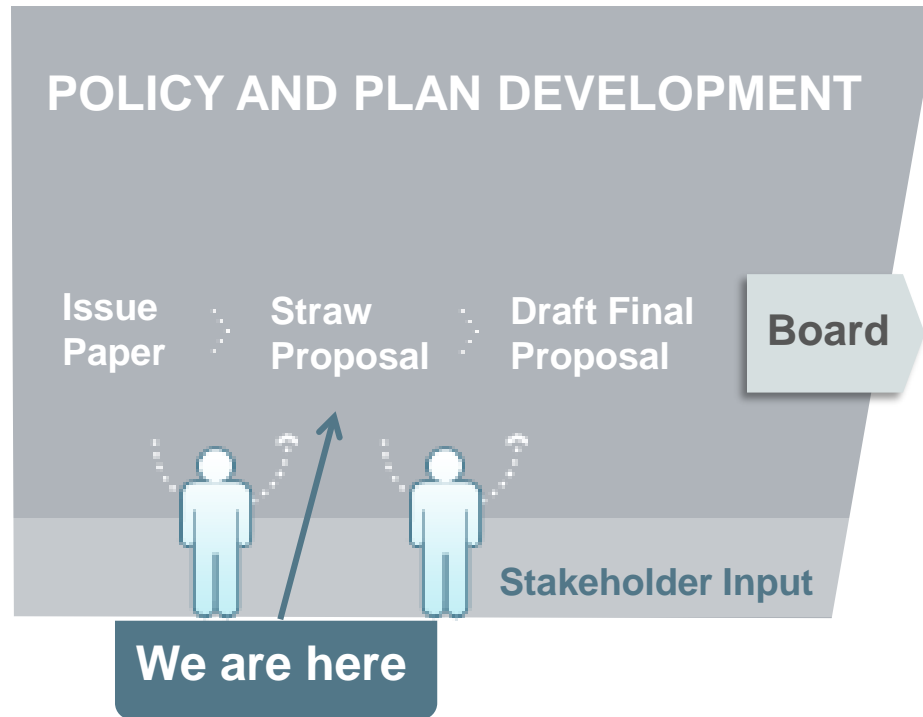
# EIM Categorization

- 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.”

<http://www.caiso.com/Documents/GuidanceforHandlingPolicyInitiatives-EIMGoverningBody.pdf>

# ISO policy initiative stakeholder process



# Commitment Costs and Default Energy Bid Enhancements - Introduction

- Initiative to address stakeholder concerns with ISO's market design features impacting bidding flexibility
- Goal: evaluate ISO's bidding flexibility design and assess whether modifications should be pursued
- Bidding Flexibility includes design features that:
  - Balance both:
    - Suppliers ability to submit economic prices reflecting their willingness to provide energy at a given price
    - Market's ability to protect against vulnerability
  - Ensure mitigated prices are reasonable reflections of suppliers' cost expectations

# Proposed Design Principles under Competitive Conditions

- Competitive forces provide market power protection based on profit-maximizing incentives to submit offers for suppliers' expectation of production costs
- Under competitive conditions, suppliers should be able to offer price at which they are willing to sell the good based on their asset valuation
  - Can include additional valuation of asset outside of its expected production costs such as monetized risks (e.g. “cash out”)
  - Other factors that contribute to willingness to sell

## Proposed principles under uncompetitive conditions

- Market must protect consumers against exercise of market power and only mitigate when test shows potential to exercise market power
- Under uncompetitive conditions, supply offers should be mitigated to price levels that are a reasonable reflection of suppliers' cost expectations
  - When mitigated, suppliers should not be allowed to recover other factors, even if it contributes to their willingness to sell, due to market power concerns
  - When mitigated, reliability externalities might need to be priced in to manage merit order based on needs
  - Could be different than incurred costs

# Theoretical market power mitigation test considerations

- LMPM design is robust for energy mitigation
- Commitment cost caps not as robust and could include some or all of the following:
  - Identifying uncompetitive versus competitive areas
  - Examining impact to energy prices or uplifts if applying conduct thresholds
  - Examining market impacts from non-committed units
  - Examining market impacts of portfolio of units



# Practical market power mitigation test considerations

- Adopts consistent testing method for energy and commitment cost
- Balance costs against benefits
- Minimize false positives
- Minimize dispute risks
- Provide sufficient transparency for suppliers to understand and verify mitigation

# Summary of Issues for March Workshop

Production cost expectations may not be appropriately valued →

In scope of working group meeting

1. Limitations might exist due to commitment cost market power mitigation where commitment cost mitigation may be overly restrictive
2. Limitations might exist where the market power protections are insufficient where exceptional dispatch mitigation may not be restrictive enough

3. Limitations might exist due to reference level design for commitment costs and energy costs where reference levels exclude price impact of externalities
4. Limitations might exist due to reference level design for commitment costs reference levels may not reasonably reflect cost expectations

Out of scope

# Summary of Issues for Workshop Cont. – Bidding rules design with market based and cost based offers by component

Type	Sub-type	Market Based Offer	Cost Based Offer
Energy	Variable Cost	<b>X</b>	
MLC	Variable Cost		<b>X</b>
	Fixed Cost		<b>X</b>
TC	Fixed Cost		<b>X</b>
SUC	Fixed Cost		<b>X</b>

Bidding rules since 2010

- Considering allowing suppliers to submit market based offers for commitment cost components subject to mitigation test
- Considering retaining cost based offers for commitment costs subject to verification (e.g. 125% ex ante verification)
- Considering allowing suppliers to submit cost based offers for energy component subject to verification (e.g. individual bid validation)

# **FERC OFFER CAP RULEMAKING (ORDER 831)**

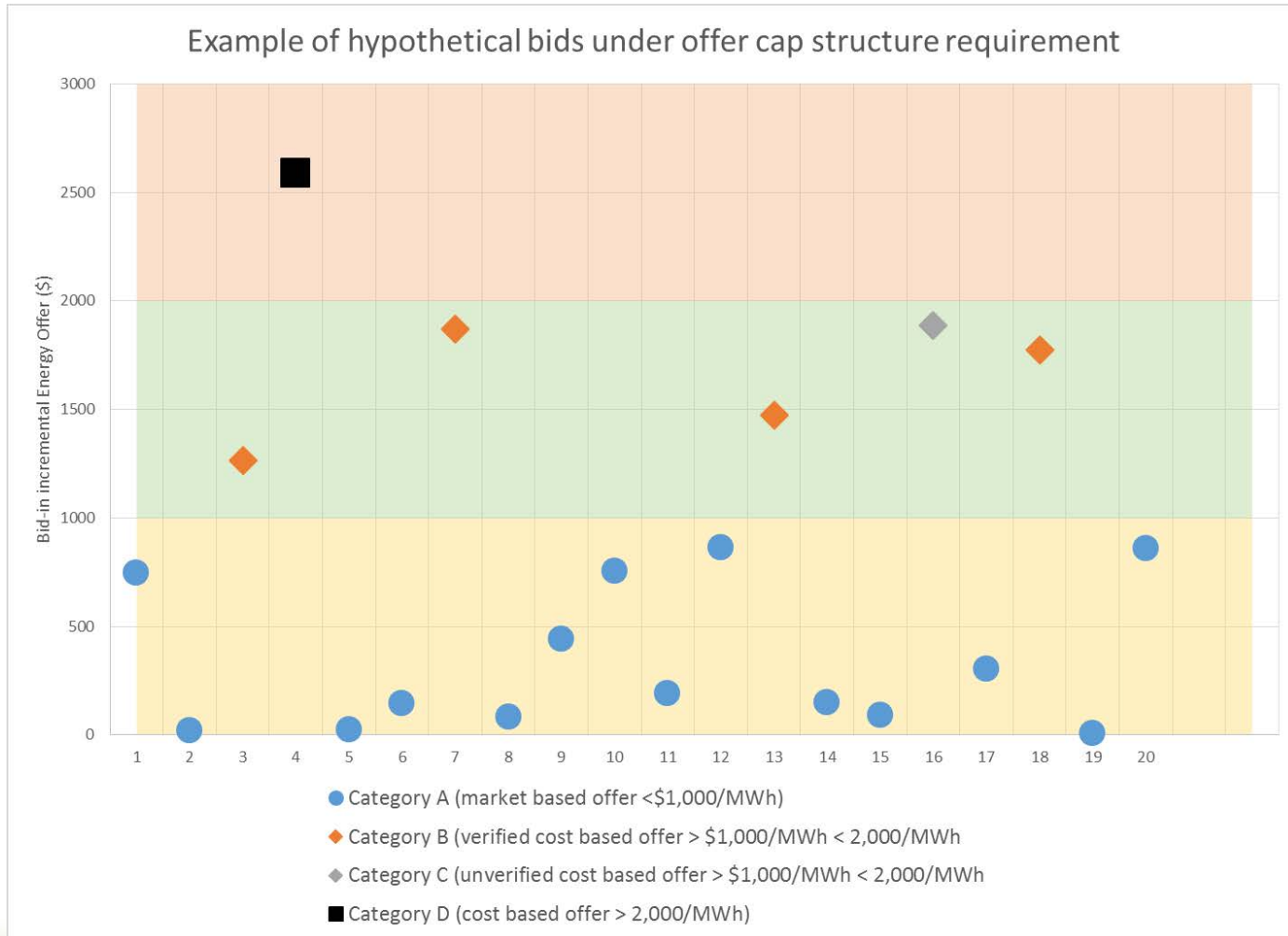
## Order 831 provides principle that cap on market based offers is upper limit

- While Order 831 was specific to incremental energy component of the supply offer, guidance on caps on market based offers and validating bid-in cost based offers would apply to any market based offer including commitment costs (SUC, TC, MLC)
- Market based offer caps:
  - May result in resources not being compensated for incurred or expected costs
  - Are upper limit (extreme limits) on market based offers, should not limit cost based offers
  - Is important backstop mitigation to address potential for imperfect information

# Order 831 and Commitment Cost and Default Energy Bid Enhancements

- 831 introduces three new requirements: Offer Cap Structure, Verification, and Resource Neutrality Requirements.
- Offer Cap Structure and Verification Requirements include:
  - No longer limit cost based incremental energy offers (ie cost based offers) submitted to a specific level
  - Cap market based offers at \$1,000/MWh cap (status quo)
  - Cap cost based offers at higher of the \$2,000/MWh hard cap its ex ante verified cost based offer
  - Use cost based offers above \$2,000/MWh to determine merit order dispatch but not used for purpose of setting LMPs
  - Perform ex post validation on either non-verifiable cost based bids or bids over \$2,000/MWh and if verifiable re-calc uplift

# Offer cap structure requirement effectively creates four categories of bids for caps and validation requirements



**CCDEBE Scope Items Identified**  
**Initial assessment of ISO/SC actions based on category bid**

<b>Action</b>	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)
Allowed to submit market based offers subject to \$1,000/MWh cap	Y	N	N	N
Market based offers subject to mitigation (LMPPM)	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 validation of cost based offers required	N/A	Y	Y	N
Used to calculate LMPs	Y	Y	N	N
Ex post validation of cost based bids required	N/A	N	Y	Y
Eligible for uplift	Y	Y	Y	Y
Re-calc of uplift necessary if validated	N	Y	Y	Y



# CCDEBE Scope Items Related to 831 Compliance

- CCDEBE already contains within its scope the four identified scope items under 831 making it the appropriate process to develop design enhancements necessary to be in compliance with 831
- All other items not highlighted will be handled in other initiatives
- ISO posed consideration of merits of moving to a bid-in cost based offer design subject to monitoring and validation requirements
- ISO posed consideration of enhancements to its mitigated price design to introduce more flexibility to update the cost based estimate (either re-bid cost based offer or adjust fuel price used to calculate reference level)
- With this increased flexibility, the ISO stressed it would need to balance flexibility with validation mechanisms to protect against market power abuse

# CCDEBE scope items for 831 compliance as well as benefit for consistent treatment across tech types

- ISO posed two questions :
  - Should ISO re-examine its policy that gas-fired units' costs can be estimated while other types cannot?
  - Should the ISO consider moving from a reference level to a bid-in cost based offer supporting bid-in cost offers?
- ISO understood from comments that:
  - NRG stated administratively calculating all technology types cost expectations might not lead to more efficient outcomes if administratively calculated costs do not reflect real costs
  - NRG, NV Energy, and EDF appeared to support conceptually the consideration of bid-in cost based offers across all technology types.
  - DMM cautions moving to bid-in cost based offer for all resource types may be more problematic, less effective, and require significant staffing.

# CCDEBE scope items for 831 compliance as well as benefit for consistent treatment across tech types

- ISO proposes key market design principles should include design flexibility so that diverse technologies, even unanticipated ones, are able to participate within the established model i.e. technology agnostic approach.
- ISO agrees conceptually estimating all technology types would impose an excessive implementation and staffing burden especially in light of anticipated changes to resource fleet.
- ISO believes gas units should be provided similar flexibility in estimating cost expectations as non-gas fired units and that non-gas fired units should be provided similar flexibility to update their cost based offers as gas units.
- ISO respectfully believes implementation and staffing costs referred to by DMM are needed to support verification of bid-in cost-based offers above \$1,000/MWh (Order 831 Final Rule) so there would be de minimis costs to allowing bid-in cost based offers below \$1,000/MWh.

INNOVATE RULES ASSESSMENT MAKE RISKS INCENTIVES  
TOOLS PROVIDE ZING ENVIRONMENT THINK SPACE EVERYONE  
ALLOW WANT INVOLVED GIVE FEEDBACK CUSTOMER  
USING SPARKS TECHNOLOGY BARRIERS STAFF OF  
CELEBRATE STRATEGIC DIFFERENTLY CUSTOMERS  
STAFF OF FEEDBACK CUSTOMER  
PROCESS FOCUS INNOVATION  
NEW MUST LET ORGANIC  
THINKING COMMUNICATION CRE  
PEOPLE OPEN DIFFERENT CREATE FUN ENCOURAGE  
GOOD LISTEN OWNERSHIP LEADERS CHALLENGE ACCEPT  
MAY END NEED EXTERNAL PAGE

# INCREASED FLEXIBILITY FOR MINIMUM LOAD ENERGY TREATMENT

# ISO posed questions on whether it should enhance flexibility for MLE bidding

- ISO posed two questions :
  - Should the ISO consider moving to a “no load” versus a “minimum load” structure?
  - Should the ISO consider enhancing its minimum load structure to allow hourly variation?
- ISO understood from comments that:
  - NRG supported either moving to a no load structure or allowing hourly variation of MLC since both measures provide similar bidding flexibility to incremental energy bids – NRG’s preferred level of flexibility.
  - PG&E and NVE supported consideration of allowing daily profile (different values for an hour across the day) of MLC since MLE on CCGT higher configurations are expected to vary by hour
  - PG&E, WPTF, NRG, EDF, NVE all conceptually supported consideration of hourly changes to the MLC bid

# Background on design differences between “no load” versus “minimum load structure”

# Bidding structure with one daily component for costs associated with Pmin (e.g. min load structure)

Ex - CAISO Bids with Minimum Load Structure					
Bid Component	Quantity (MW)	Bid Price	Variable Cost	Fixed Cost	Total Cost
Start Up/Transition	0	15000	-	17000	15000
Minimum Load	0	2000	-	17000	17000
SEG1	20	30	300	17000	17300
SEG2	30	40	400	17000	17700
SEG3	40	50	500	17000	18200
SEG4	50	60	600	17000	18800
SEG5	60	70	700	17000	19500
SEG6	70	80	800	17000	20300
SEG7	80	90	900	17000	21200
SEG8	90	100	1000	17000	22200
SEG9	100	110	1100	17000	23300
SEG10	110	110		17000	23300

Note: MC value at Pmin is conceptual to show the fuel cost proxy portion not included in pricing run



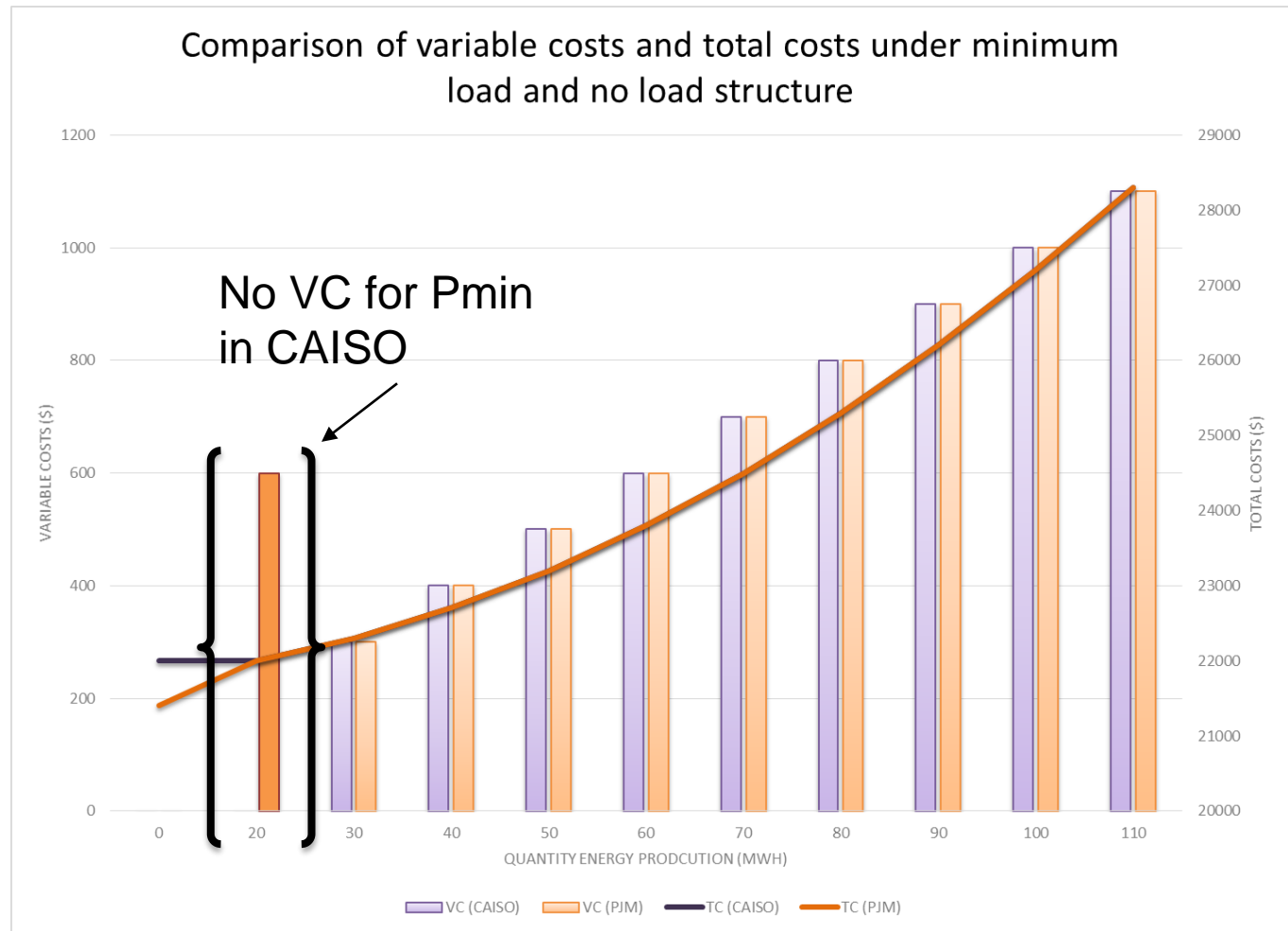
# Bidding structure with two components for costs associated with Pmin (e.g. no load structure)

<b>Ex - PJM Bids with No Load Structure</b>					
<b>Bid Component</b>	<b>Quantity (MW)</b>	<b>Bid Price</b>	<b>Variable Cost</b>	<b>Fixed Cost</b>	<b>Total Cost</b>
Start Up/Transition	0	15000	-	16400	15000
No Load	0	1400	-	16400	16400
SEG0	0	30	600	16400	17000
SEG1	20	30	300	16400	17300
SEG2	30	40	400	16400	17700
SEG3	40	50	500	16400	18200
SEG4	50	60	600	16400	18800
SEG5	60	70	700	16400	19500
SEG6	70	80	800	16400	20300
SEG7	80	90	900	16400	21200
SEG8	90	100	1000	16400	22200
SEG9	100	110	1100	16400	23300
SEG10	110	110		16400	23300

Note: MC value at Pmin is conceptual to show the fuel cost proxy portion only SEG1-10 are modelled as incremental energy the no load and SEG0 are integrated in model.

# Hourly component treats MWH output up to Pmin as variable for bidding but not for setting LMPs

- Views MWH production costs as variable
- Allows separate bidding for variable costs from fixed costs at Pmin
- SCUC integrates variable and fixed costs
- SCED sets LMP using incremental energy offers above Pmin



# ISO understands marginal cost estimates would be the same between the two designs

Unit R Characteristics	Value
MLE	20
Gas Price \$/MMBtu	4
HR Conversion Rate from btu/kwh to mmbtu/mw	0.001

- Views MWH production costs as variable
- Allows separate bidding for variable costs from fixed costs at Pmin
- SCUC integrates variable and fixed costs
- SCED sets LMP using incremental energy offers above Pmin

Ex - CAISO Marginal Cost Estimates (Energy Reference Level) by Design			
Bid Component	Quantity (MW)	Monotonic Incremental HR	Calc Marginal Cost*
Start Up/Transition	0		-
Minimum Load	0	13000	52
SEG1	20	9863	39
SEG2	30	10051	40
SEG3	40	10295	41
SEG4	50	10581	42
SEG5	60	10932	44
SEG6	70	11324	45
SEG7	80	11773	47
SEG8	90	12265	49
SEG9	100	12265	49
SEG10	110	12265	49

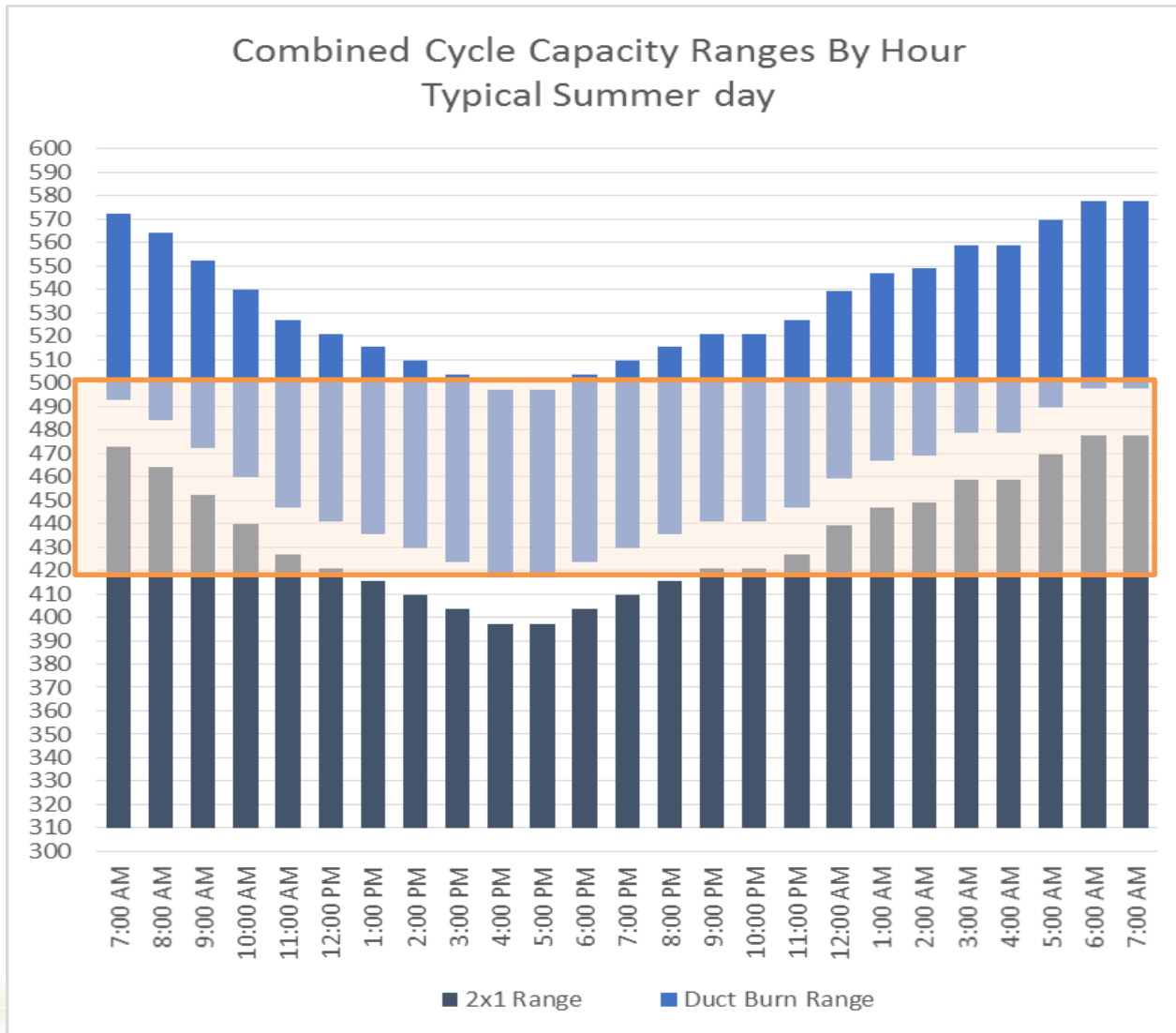
Ex - PJM Marginal Cost Estimates (Energy Reference Level) by Design			
Bid Component	Quantity (MW)	Incremental Monotonic	Calc Marginal Cost*
Start Up/Transition	0		-
No Load	0		-
SEG0	0	13000	52
SEG1	20	9863	39
SEG2	30	10051	40
SEG3	40	10295	41
SEG4	50	10581	42
SEG5	60	10932	44
SEG6	70	11324	45
SEG7	80	11773	47
SEG8	90	12265	49
SEG9	100	12265	49
SEG10	110	12265	49

Background on policy development to ensure sufficient bidding flexibility to reflect changes to minimum operating levels within an hour

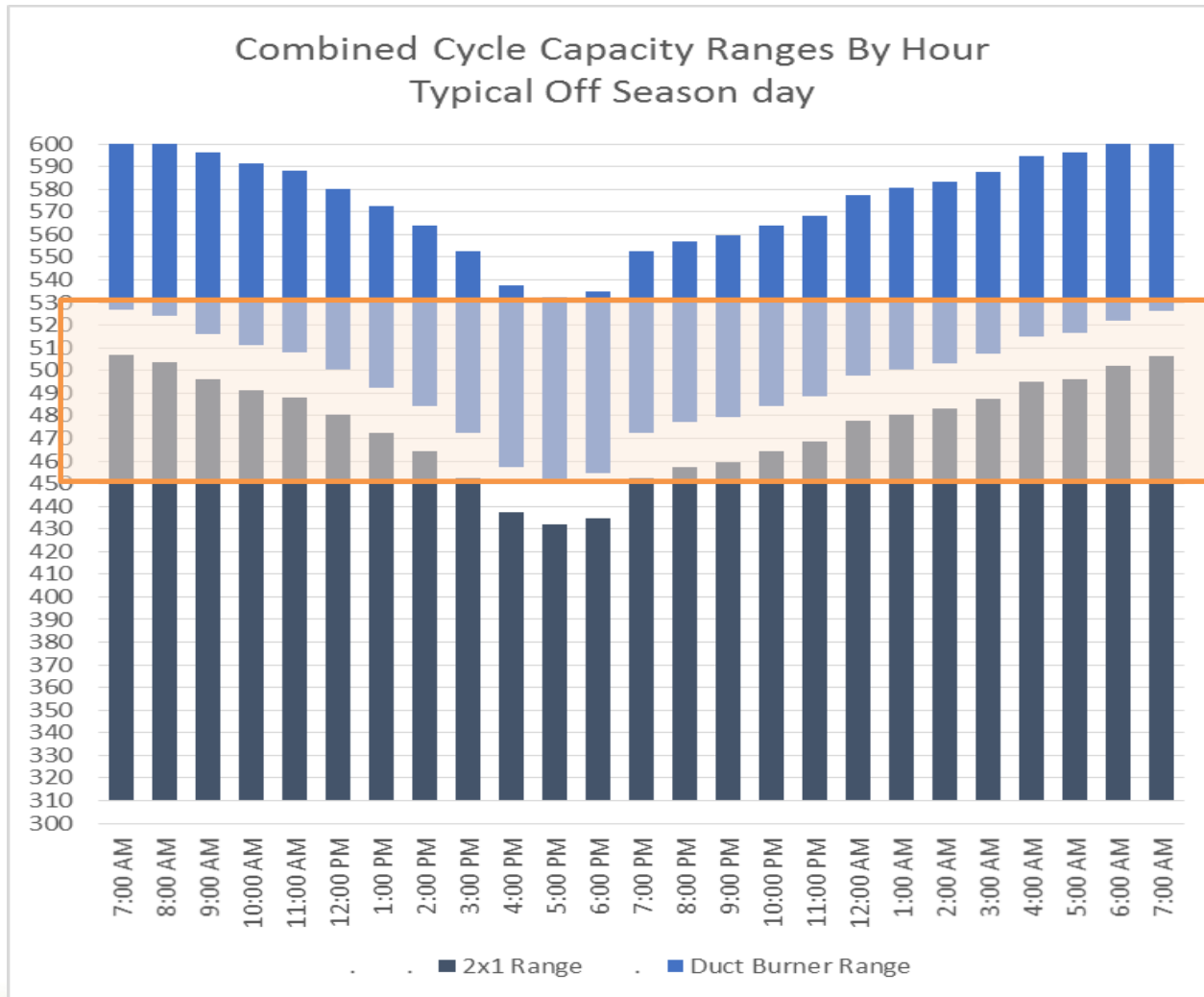
# Existing policy to provide flexibility to adjust Pmin levels using re-rates and integrate DEB costs might need to be revisited

- In Bidding Rules Enhancements initiative, ISO made changes to adjust bid-in minimum load costs when minimum operating levels are temporarily increased.
- Current practice is for resources to register most extreme values for MLE in MF and to use re-rates to reflect hourly variation in its MLE across the day
- Recently implemented policy allows market to replace bid-in minimum load costs (MLC) with a revised value that reflects change to commitment costs associated with additional costs due to the rerated Pmin level
  - ISO is aware of concerns that under this option we might restrict a supplier from bidding MLC that would fall below the revised value
  - Some believe it might be inconsistent with existing policy goal established in Bidding and Mitigation of Commitment Cost Phase 2 (2010) to allow resource to bid-in 0% to 125% of the proxy cost for energy under Pmin

# Continued business case for varying levels of minimum load costs across day might support enhancements



# Continued business case for varying levels of minimum load costs across day might support enhancements



Background on existing policies to provide sufficient flexibility for bids to reflect accurate price information through re-bidding



## Existing policies to provide sufficient flexibility for bids to reflect accurate price information cont.

- In Bidding Rules Enhancements and Aliso Canyon, ISO recognized existing issue that units without a day-ahead schedule may have additional costs associated with procuring sufficient fuel supply during strained conditions
- FERC approved policy allows rebidding of commitment costs for units without IFM schedules or binding RUC start-up instructions until committed and then the value is locked until it completes its minimum run-time
- ISO established re-bidding policy based on key assumption that once committed, a prudent practice is to procure sufficient gas to supply unit's production at least up to its MLE
- ISO can only consider further flexibility if support is provided that this assumption is false to warrant hourly changes even during minimum run time limitations

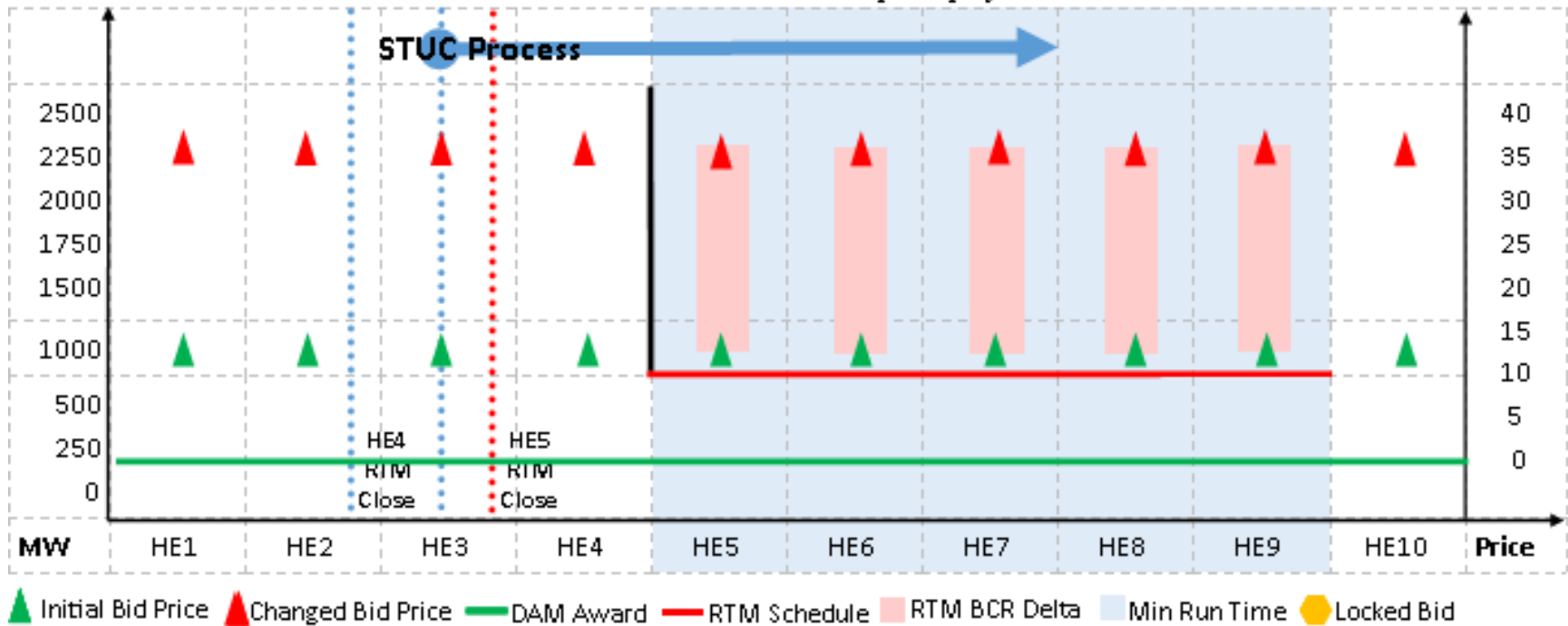
# Options to address bidding flexibility concerns through bidding structure or rules

# Options to enhance bidding rules with flexibility to reflect varying levels of MLC across day

- Option 1: Maintain current policy allowing changes outside of physical constraints and addresses market power abuse concern
- Option 2: Hourly Minimum Load Cost Component
  - Convert bid-in market based MLC to an hourly component instead of a daily component to the supply offer bid
  - Maintain current re-bidding rules allowing re-bidding for resources with IFM or binding RUC start-up instruction until committed through MRT
- Option 3: Hourly and Daily Minimum Load Energy Bid Components
  - Hourly component for costs due to MWH output associated with energy production up to minimum operating level i.e. MLE
  - Daily component for costs that do not fluctuate based on energy output based instead are function of run hours
  - Maintain current re-bidding rules allowing re-bidding for resources with IFM or binding RUC start-up instruction until committed through MRT

# Current policy allows changes outside of physical constraints and addresses market power abuse concern to use changed bids to inflate uplift

Concern: Increase MLC bid after committed to inflate uplift payments

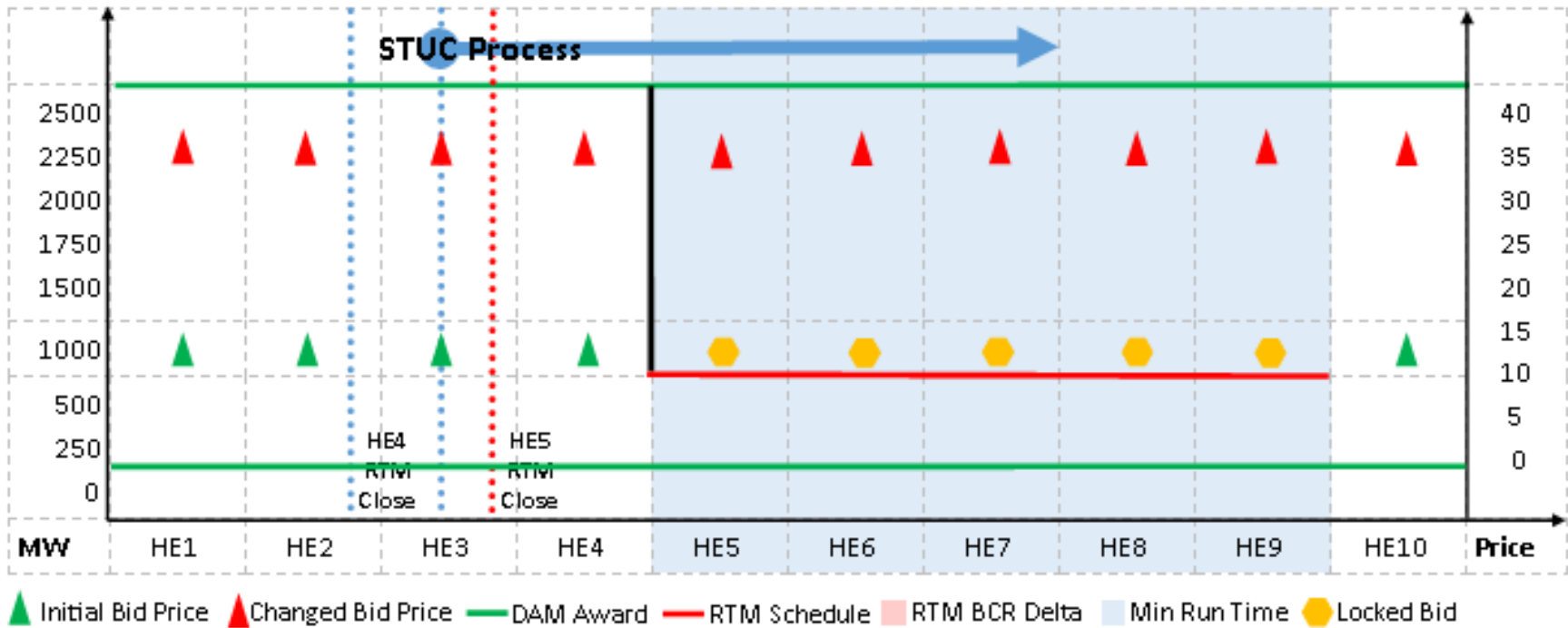


Note:

- 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

# Option 1 – Maintain current policy allowing changes outside of physical constraints and addresses market power abuse concern

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:

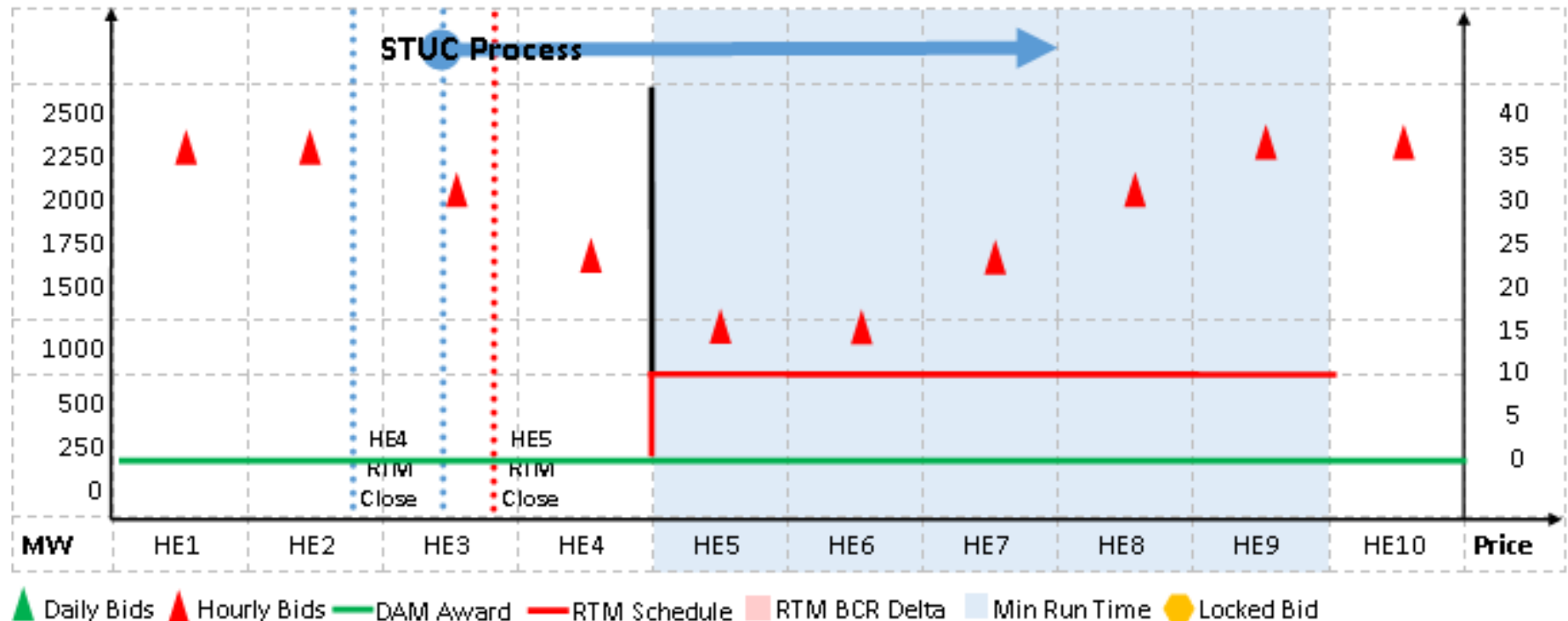
- Visual based on MLC structure design without hourly variation across day
- Static values for bid price is representing that the bid is for a daily component
- When bid price changes the prior market processes never used the updated value

## Option 2 – hourly minimum load cost component cont.

- Bids continue to include one component for cost associated with operating at minimum operating level
- Change the bid component to an hourly type that would allow SCs to submit MLC at various levels across day
- Hourly component – combined costs associated with MWH production with fixed costs At a run hour, eg:
  - Maintenance adders
  - Auxiliary costs
  - Fuel cost proxy for MWH under the Pmin curve

# Option 2– hourly minimum load cost component cont..

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

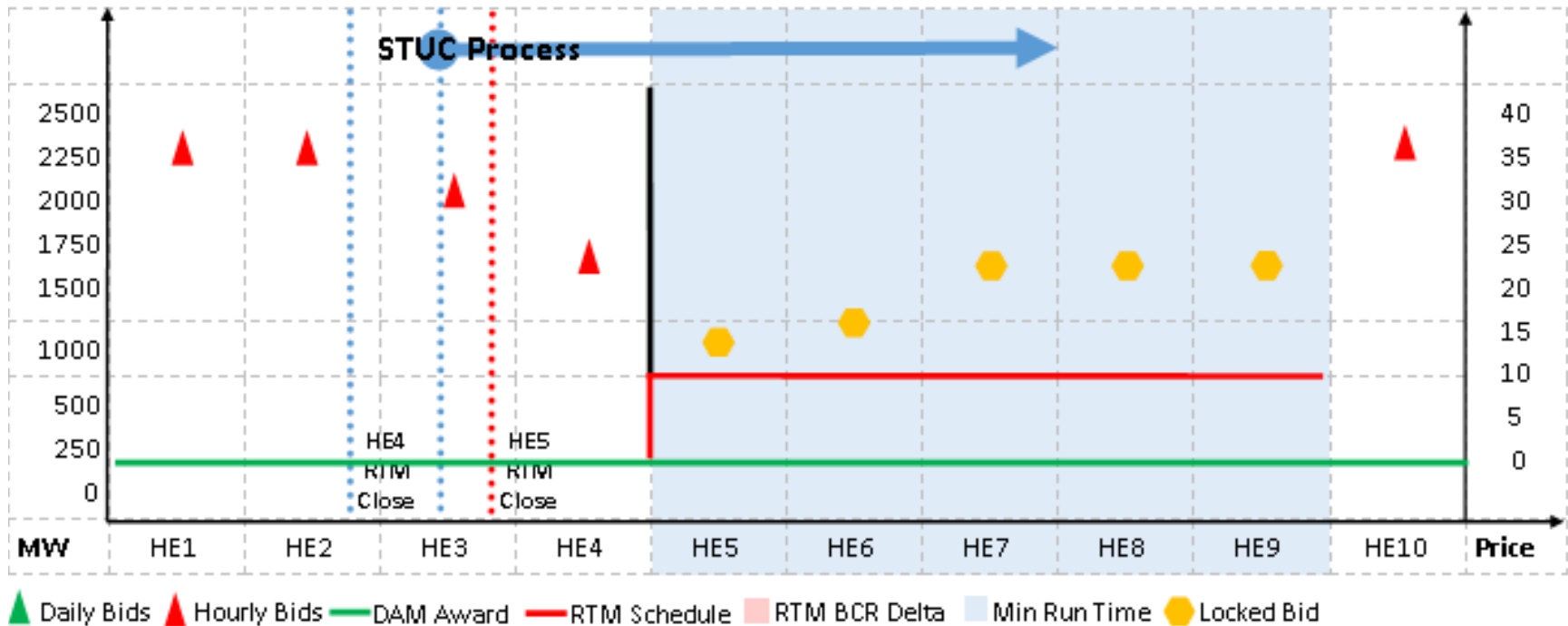


Note:

- 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

# Option 2 – hourly minimum load cost component cont.

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



Maintain recently implemented policy that allows rebidding of commitment costs for units without IFM schedules or binding RUC start-up instructions until committed and then the value is locked until it completes its minimum run-time.



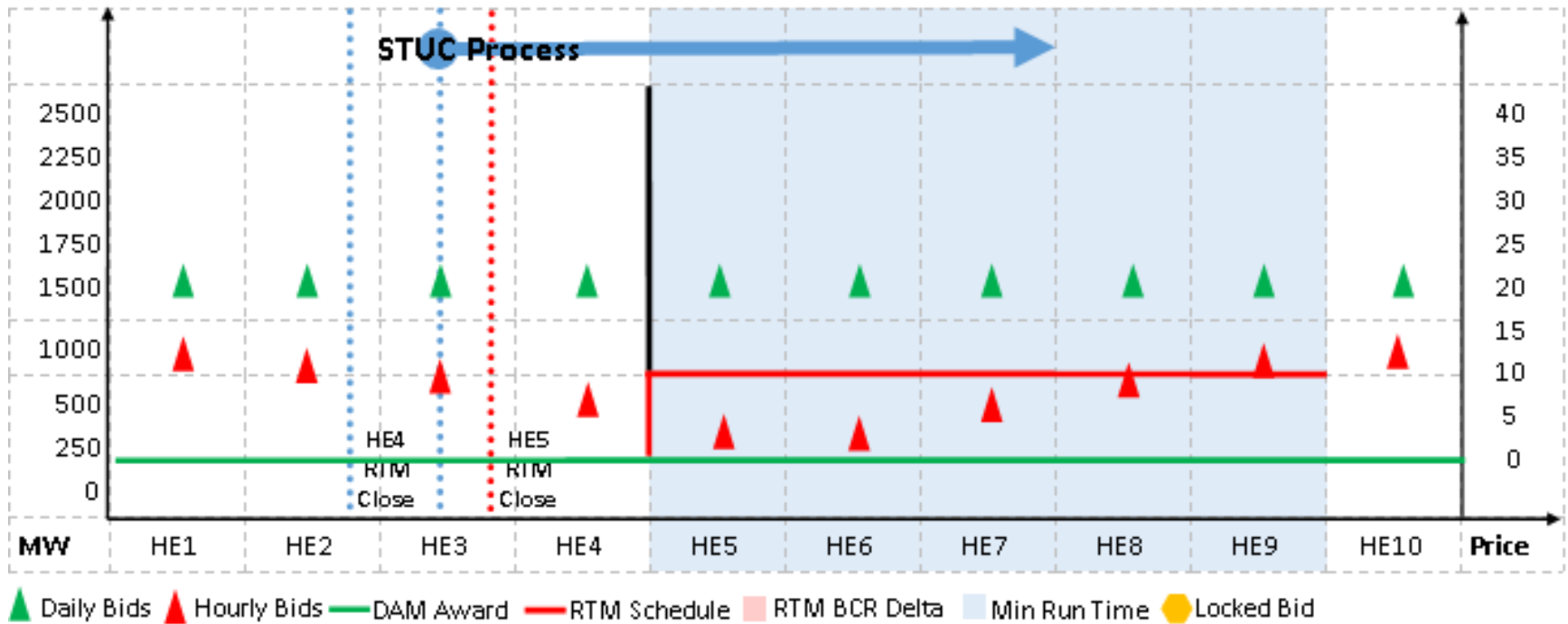
## Option 3 – hourly and daily minimum load energy bid components cont.

- Bids include two components for cost associated with operating at minimum operating level ( $P_{min}, MLE$ )
- Daily component – fixed costs associated with a run hour, eg:
  - Maintenance adders
  - Auxiliary costs

Costs are at 0 MW output
- Hourly component – costs associated with MWH production costs, eg:
  - Fuel cost proxy for MWH under the  $P_{min}$  curve

# Option 3— hourly and daily minimum load energy bid components cont.

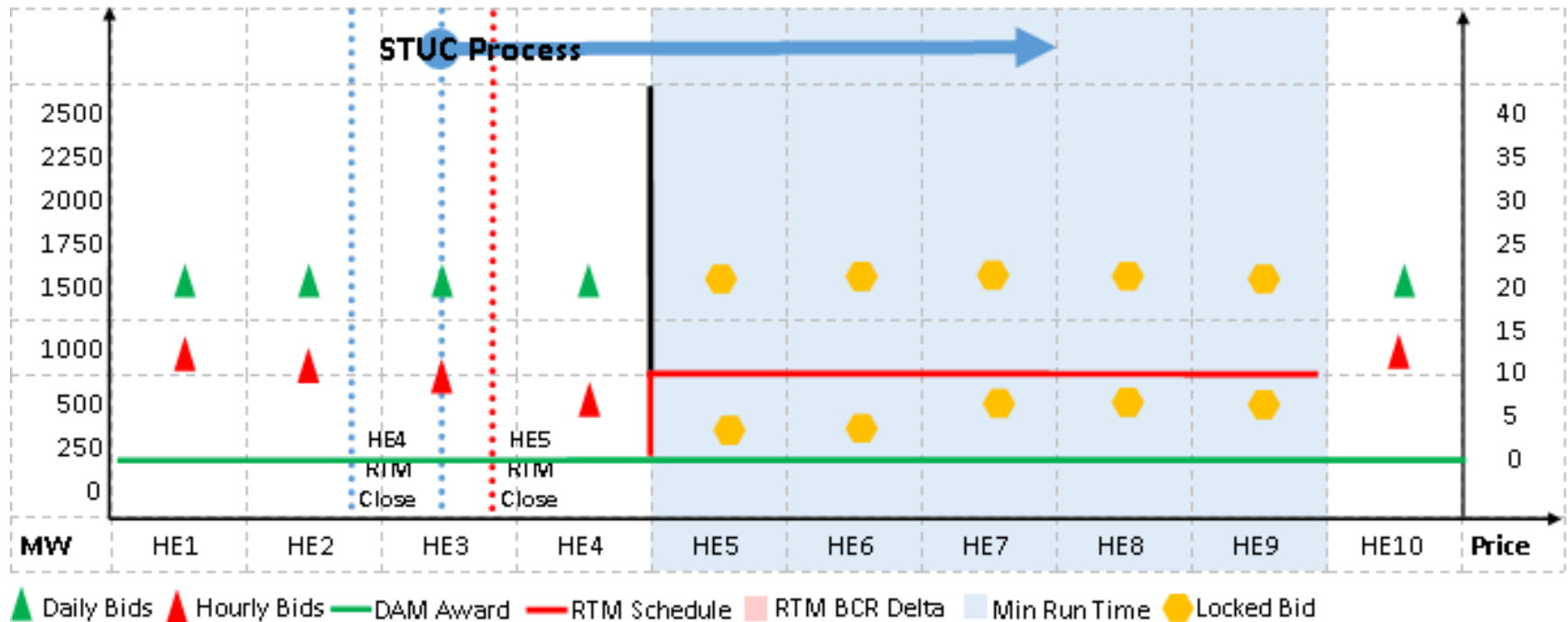
Revising bid-in market based offer for MLC to an hourly component for the minimum load energy MWH production costs and a daily component for the event-based costs (e.g. aux costs and MMA)



Note: Visual based on no load equivalent design with a daily component for event-based minimum load costs and hourly component for MWH production costs up to MLE

# Option 3 – hourly and daily minimum load energy bid components cont.

Revising bid-in market based offer for MLC to an hourly component for the minimum load energy MWh production costs and a daily component for the event-based costs (e.g. aux costs and MMA)



Maintain recently implemented policy that allows rebidding of commitment costs for units without IFM schedules or binding RUC start-up instructions until committed and then the value is locked until it completes its minimum run-time.



# MARKET POWER MITIGATION ISSUES

## Issue identified that commitment cost mitigation may be overly restrictive

- Stakeholders expressed concerns that the commitment cost mitigation methodology may result in over-mitigation
  - Assumes uncompetitive conditions for every run
    - Bid Cap limits offer range (125% conduct test)
    - Applying cap under all conditions in every run – competitive or uncompetitive conditions
  - Conduct threshold lower than other designs for reference level for unconstrained areas
- This is theoretically inappropriate under competitive conditions since competitive market forces exist to provide incentives that limit adverse market impacts

# ISO initially against conduct and impact test because ISO wants to maintain robust Energy LMPM design

- Conduct and Impact Test:
  - Evaluates if economic withholding could be occurring to warrant mitigation if capable of adverse market impacts.
  - Apply conduct threshold where offers exceeding level are flagged and apply impact threshold where changes in energy prices or uplift exceeding level are flagged
- Concerns with moving in this direction –
  - Allows markup for potential market power within headroom provided by conduct threshold
  - Effectiveness of running conduct and impact test only on the commitment cost component and not entire supply offer
  - Inconsistency between tests on commitment costs and incremental energy component

# Pivotal supplier test background

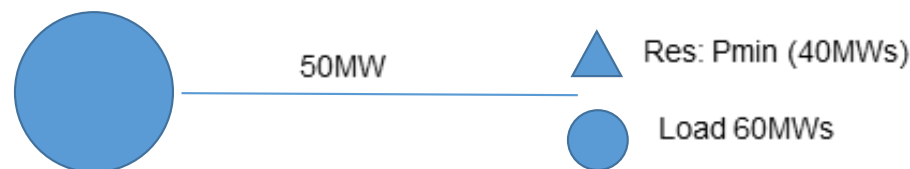
- ISO applies pivotal supplier test to its incremental energy market based offers
- Test for uncompetitive conditions using a structural test (Pivotal Supplier Test) could be applied to the commitment cost bid components
- Evaluates if constraint is competitive or un-competitive by removing largest suppliers 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.



# ISO believes that prior concern with pivotal supplier test can be mitigated with expanded MPM design

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

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



- Concern comes from the practice of restricting transmission constraints tested for competitive or uncompetitive conditions to binding constraints
- To capture effect of minimum operating level on ability to relieve congestion a pivotal supplier test needs to be performed on all constraints – not just binding

# ISO initially considering introducing a dynamic market power mitigation run for commitment costs

- Introduce market based offers for commitment costs
- Relax commitment cost bid cap to a higher level for market based commitment cost offers
- Retain existing verification on cost based commitment cost offers subject to verification 125% cap
- Introduce a commitment cost market power mitigation in DAM and RTM
  - Would capture effect of Pmin in pivotal supplier test by testing **all constraints** – not just binding
  - Balance performance concerns with frequency



# NEXT STEPS

# Next Steps

Next workshop will be April 20, 2017

Stakeholders are asked to submit written comments after the second workshop in April to [InitiativeComments@caiso.com](mailto:InitiativeComments@caiso.com).