



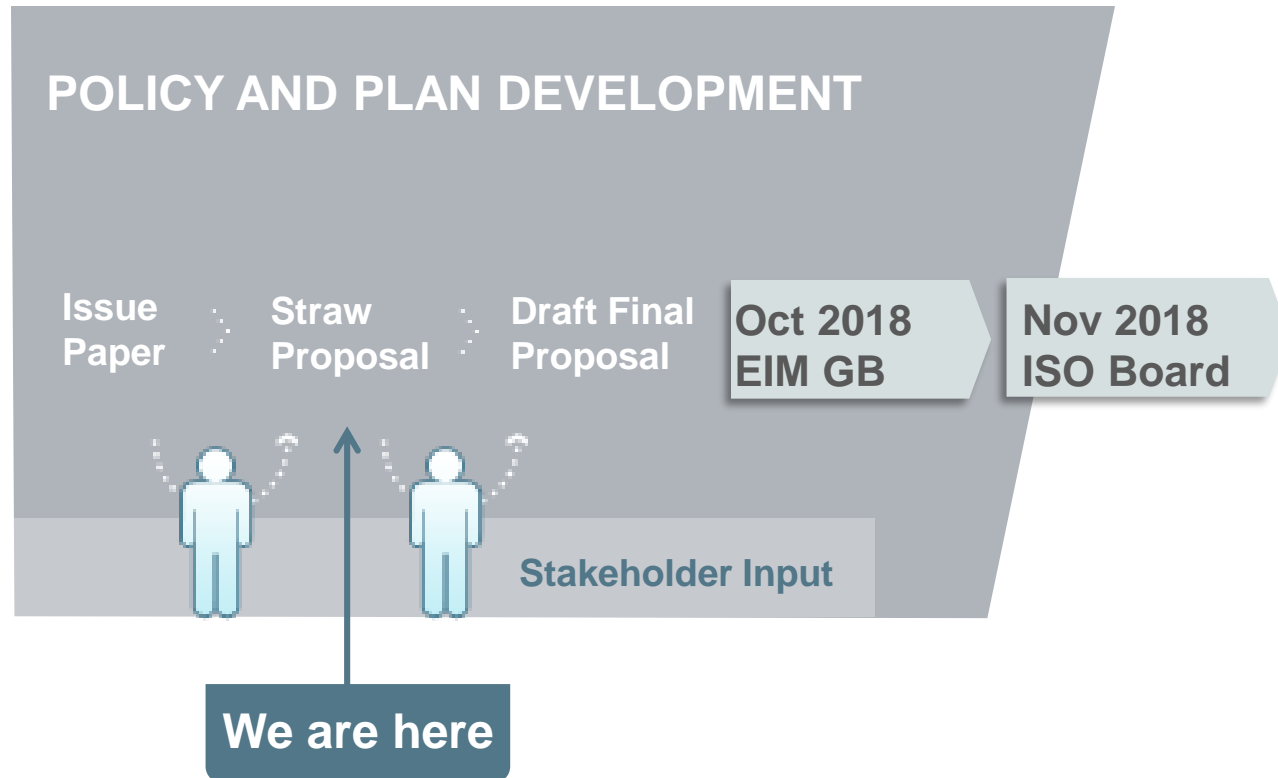
# **15-Minute Day-Ahead Scheduling Granularity Second Revised Straw Proposal**

Stakeholder Conference Call  
September 4, 2018

# Agenda

Time	Topic	Presenter
1:00 – 1:10	Welcome and Introductions	Kristina Osborne
1:10 – 2:00	15-Minute Granularity	Don Tretheway
2:00 – 2:25	15-Minute Ancillary Services	Megan Poage
2:25 – 2:50	EIM Changes	Don Tretheway
2:50 – 3:00	Next Steps	Kristina Osborne

# ISO Policy Initiative Stakeholder Process



# DAME Initiative in Two Phases

- Phase 1: 15-Minute Granularity
  - 15-minute scheduling
  - 15-minute bidding
- Phase 2: Day-Ahead Flexible Ramping Product (FRP)
  - Market formulation of FRP consistent between day-ahead and real-time market
  - Evaluate combining integrated forward market (IFM) and residual unit commitment (RUC) processes
  - Improve deliverability of FRP and ancillary services (AS)
  - Re-optimization of AS in real-time 15-minute market

# Phase 1 schedule

- Draft Final Proposal - October 2018
- EIM Governing Body - October 2018
- ISO Board of Governors - November 2019
- Implementation – Fall 2020

## Phase 2 preliminary schedule

- Scope items from previous slide are in the order we would like to address with stakeholders through technical workshops to be held remainder of the year
- Straw Proposal - January 2019
- Draft Final Proposal - March 2019
- EIM GB and BOG decision - May 2019
- Implementation – Fall 2021

Day-Ahead Market Enhancements

# 15-MINUTE GRANULARITY

Don Tretheway

Sr. Advisor, Market Design Policy

# NEW - Propose to allow 15-minute bidding granularity (1 of 2)

- Applies to all market participants: load, imports, exports, generation, virtual supply/demand
- Eliminates need to use forecasts to shape hourly bids
  - VERs reflect forecast changes by changing the upper economic limit for each 15-minute bid
  - Load can shape their demand by submitting different 15-minute interval bids
  - Proxy Demand Response (PDR) resources can reflect changes in underlying load by 15-minute interval



# NEW - Propose to allow 15-minute bidding granularity (2 of 2)

- **Day-Ahead Market**
  - Submission deadline moved from 10:00 AM to 9:00 AM to allow for additional processing time
  - SC can submit a unique bid curve for all 96 15-minute intervals for the operating day
- **Real-Time Market**
  - Submission deadline remains unchanged at 75 minutes prior to the operating hour
  - SC can submit a unique bid curve for all four 15-minute intervals of the operating hour

# 15-minute residual unit commitment (RUC) process

- RUC will be performed after IFM to clear physical supply compared to the ISO's 15-minute load forecast
- Intermittent adjustment process will evaluate under-scheduled VER supply in 15-minute granularity
- RUC will only commit additional supply
- DAME Phase 2 will evaluate changes in RUC beyond moving to 15-minute granularity

# Interties can be scheduled with 15-minute granularity and hourly blocks

- Applies to both imports and exports
- Elect as either an hourly block or 15-minute
  - Cannot change designation between DA and RT
  - If a 15-minute intertie resource cannot be scheduled in the real-time market, it can self-schedule its day-ahead award in RT
  - If an SC wants an hourly day-ahead schedule and also be 15-minute dispatchable in RT, the intertie resource can be self-scheduled into the DA market to ensure the same MW award in each 15-minute interval

# Inter-SC trades will be performed on a 15-minute interval basis

- Currently submit a single hourly inter-SC trade 45 min before the hour
- Proposal
  - Day-ahead
    - No change to timeline, but introduce 15-minute trades
  - Real-time
    - Allow RT inter-SC trades to be submitted 45 minutes prior to each FMM interval
    - Will enable VERs to use a 15-minute forecast closer to actual flow to create inter-SC trade
    - Inter-SC GMC = \$1.00 charge, divided by 4 for a new rate of \$0.25 per trade

# Load submission can be in 15-minute or hourly granularity based on underlying meters

- No requirement for 15-minute meters
- 15-minute meters only, 15-minute submission and settlement
- If mix or only hourly, hourly submission can be shaped for settlement purposes
  - Use linear ramp between hourly mid-points to create 15-minute value at the 15-minute interval mid-point

	HE 10				HE 11				HE 12			
Hourly Meter (MWh)	1000				1200				1400			
	HE 10				HE 11				HE 12			
	Int 1	Int 2	Int 3	Int 4	Int 1	Int 2	Int 3	Int 4	Int 1	Int 2	Int 3	Int 4
15-Minute Shaped (MW)	-	-	1025	1075	1125	1175	1225	1275	1325	1375	-	-
15-Minute Shaped (MWh)	-	-	256	269	281	294	306	319	331	344	-	-

- $200\text{MW ramp} / 60 \text{ minutes} = 3.33 \text{ MW/Min}$
- $\text{HE10 interval 3} = 1000\text{MW} + 3.33 \text{ MW/Min} * 7.5 \text{ Min} = 1025\text{MW}$

# Modification to expected energy calculation to support 15-minute granularity

- Currently, standard ramping energy (SRE) and ramping energy deviation (RED) calculated for all resources to address hourly schedule changes
  - SRE is settled at a \$0.00 price
  - RED is settled at RTD LMP
- Propose to only calculate SRE and RED for resources that self-schedule into the real-time market
  - Hourly block self-schedule will assume a 20 minute ramp
  - 15-minute self-schedule will assume a 10 minute ramp
- Real-time dispatched resources benefit from energy being settled only at the FMM or RTD LMP

# Additional changes to align with 15-minute granularity (1 of 3)

- Administrative pricing rules
  - Use relevant 15-minute day ahead price if FMM and RTD prices are unavailable
- Make-whole payments
  - Only applies to load and hourly block exports
  - 15-minute exports eligible for bid cost recovery
- 15-minute real-time load aggregation point price
  - Weighted average of FMM + 3 RTD intervals

## Additional changes to align with 15-minute granularity (2 of 3)

- CRR clawback evaluated each 15-minute interval
  - CRRs are settled for each 15-minute day-ahead interval
  - Cleared convergence bids are awarded by 15-minute interval and settled at 15-minute LMP
  - Convergence bids are automatically reversed at the FMM price for the corresponding real-time 15-minute interval
- HASP reversal rule evaluated each 15-minute interval
  - 15-minute resource that doesn't tag could have different schedule for each 15-minute interval
- Market power mitigation performed for each 15-minute interval



# Additional changes to align with 15-minute granularity (3 of 3)

- RA MOO bid insertion
  - Insert the same bid for each 15-minute interval in an operating hour
- Existing transmission contract calculator
  - All different transmission limits for 15-minute interval based upon 15-minute ETC use
- In general, all hourly rules will move to 15-minute granularity
  - Please include in stakeholder comments if a rule isn't addressed and the general rule may not apply

Day-Ahead Market Enhancements

# 15-MINUTE ANCILLARY SERVICES

Megan Poage

Sr Market Design Policy Developer

## Clarification to AS given 15-minute granularity in day-ahead market

- Appendix K requires spin/non-spin to sustain output for 30 minutes.
  - Applies even if no AS schedule in subsequent 15-minute interval
- NGR awards must be supported by 30 minute state of charge
- AS on interties can only be procured from 15-minute dispatchable resources.
  - Hourly block require contingency dispatch to be held for remainder of the hour even if not needed
  - 15-minute dispatchable allow ISO to recover reserves after contingency event has been resolved

## AS clarifications to ensure accurate ramp rate to account for reserves

- Award AS using single dynamic ramp rate, limited by certified AS capacity
- Regulation ramp rate used in AGC can be lower than dynamic ramp rate
- If contingency event, spin/non-spin will be dispatched using dynamic ramp
- When in contingency, regulation resources use dynamic ramp rate

## Eliminate the ancillary services self-provision qualification process

- Continue to support self-provision
- Currently, multi-step pre-process before the DA market optimization
- Maintain scheduling priority through penalty prices, but allow co-optimization with other products

Day-Ahead Market Enhancements

# EIM CHANGES

Don Tretheway

Sr. Advisor, Market Design Policy

# EIM changes needed to align with ISO day-ahead market

- EIM base schedules are currently hourly consistent with ISO's current day-ahead scheduling granularity
- With DAM enhancements implementation, base schedules will now be submitted with 15-minute granularity
- 15-minute base schedules change from tests from hourly to 15-minute evaluation
  - Resources sufficiency evaluation capacity and balance test
  - Over/under scheduling penalties

# Resource sufficiency evaluation ensures EIM entities don't lean on others capacity, flexibility or transmission

- Currently, performed hourly if any test is failed, EIM transfers cannot exceed prior hour's level
- Changes that will be implemented with move to 15-minute base schedules
  - Capacity test by 15-minute interval
  - Balance test by 15-minute interval
- Changes that will be implemented ASAP through BPM change process
  - Flexible ramping test failure freeze by 15-minute interval
  - Flexible ramping test passes if within 1% of requirement



## Over / under scheduling penalty will align with 15-minute base schedules

- Determine if penalty should apply each 15-minute interval
- Penalty only applies for 15-minute interval not entire hour
- Under extended DAM, this penalty is no longer applicable because EIM participants can't determine how much imbalance is settled in EIM

## During SMUD implementation identified need to add regulation up and regulation down energy settlement (1 of 2)

- Currently, an EIM entity uses a manual dispatch after the operating hour to identify energy that resulted from following AGC
- Manual dispatch changes the classification of the regulation energy from uninstructed imbalance energy to instructed imbalance
- This is important because uninstructed imbalance energy determines the amount of uplift costs that can be shifted between BAAs.

## During SMUD implementation identified need to add regulation up and regulation down energy settlement (2 of 2)

- Add regulation up and regulation down to hourly resource plan
- ISO will then settle regulation energy for the resource
- This eliminates the need for a manual dispatch to have the energy deviations classified as instructed

Day-Ahead Market Enhancements

# **EIM CATEGORIZATION & NEXT STEPS**

Kristina Osborne

Sr. Stakeholder Engagement Specialist

Stakeholder Affairs

# Proposed EIM Governing Body Classification

- Hybrid non-EIM specific: Briefing will be provided to the EIM Governing Body requesting support of its hybrid role
- Proposed enhancement for the settlement of regulation energy is EIM-specific and falls within the primary authority of the EIM Governing Body
  - Severable and does not have to be decided within this initiative
- Stakeholders encouraged to submit responses to the EIM classification within written comments

# Updated schedule

Item	Date
Post Second Revised Straw Proposal for DAME Fifteen-Minute Granularity	August 27, 2018
Stakeholder Conference Call	September 4, 2018
Stakeholder Comments Due	September 18, 2018
Post Draft Final Proposal	September 27, 2018
Stakeholder Conference Call	October 4, 2018
Stakeholder Comments Due	October 11, 2018
EIM Governing Body Meeting (hybrid non-EIM specific)	October 31, 2018
CAISO Board of Governors Meeting	November 14-15, 2018