



California ISO

EIM Resource Sufficiency Evaluation Enhancements

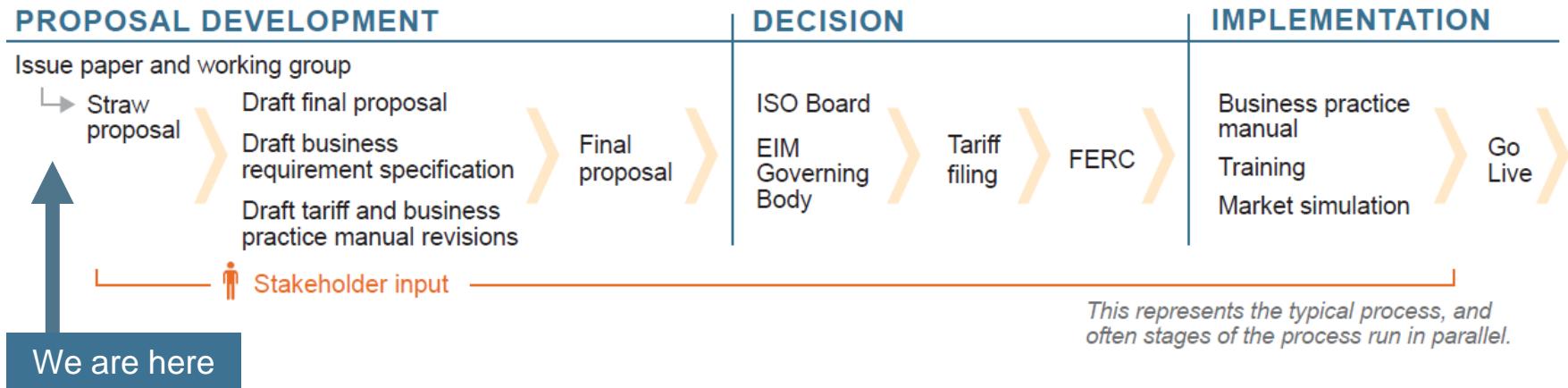
Stakeholder Workshop – Day 1

Market Design Policy
June 25, 2021

Agenda

Topic	Presenter
Welcome and stakeholder process	Kristina Osborne
Resource sufficiency evaluation design principles	Danny Johnson
Joint EIM entity presentation on proposed RSE design principles	Gary Nolan
Potential RSE design changes	Danny Johnson
Joint EIM Entity presentation specific enhancements to improve accuracy of RSE	Jeff Spires

Stakeholder Process



Purpose and scope of initiative

- Explore additional improvements to the EIM resource sufficiency evaluation (RSE) including consideration of:
 - Applying the balancing test to the CAISO balancing authority area (BAA)
 - Modifications to the capacity test
 - Modifications to the flexible ramping sufficiency test
 - Accounting for emergency operator actions within the RSE
 - Financial consequences for failure of either the capacity or ramp sufficiency test

The RSE has been generally accepted as intended to meet the following principles:

- Leaning is participation in the EIM without sufficient capacity and ramping capability to meet expected load
- The resource sufficiency evaluation should measure the capacity and ramping capability of a balancing authority area
- The consequences of resource sufficiency evaluation failures should not cause operational or reliability issues
- The resource sufficiency evaluation does not dictate resource adequacy or integrated resource plans in individual balancing authority areas

JOINT EIM ENTITY PRESENTATION ON PRINCIPLES

BACKGROUND ON THE DESIGN OF EXISTING RSE

With stakeholder input, the RSE has evolved since its inception with the following design changes:

- Evaluating each 15-minute interval independently
 - As part of this change, transfers are limited to the most recently passed 15-minute interval
- Including an adder on the capacity test that reflects historic intertie schedule changes between the T-40 RSE and the T-20 tagging deadline
- Locking load and variable energy forecasts prior to the advisory T-55 evaluation
- A tolerance band for the flexible ramping test – the greater of 1MW or 1%

Existing resource sufficiency design is comprised of four tests: feasibility, balancing, capacity, and flexibility

- RSE is run at T-75, T-55, and T-40 prior to the upcoming hour
 - First two tests (T-75 and T-55) produce advisory results
 - Allows BAAs to update base schedules so they may pass the final, financially binding test at T-40
- Failure of the capacity and flexible ramping sufficiency test results in limiting additional incremental EIM transfers
- Currently, the feasibility and balancing tests are not applied to the CAISO BAA

The purpose of the RSE is to:

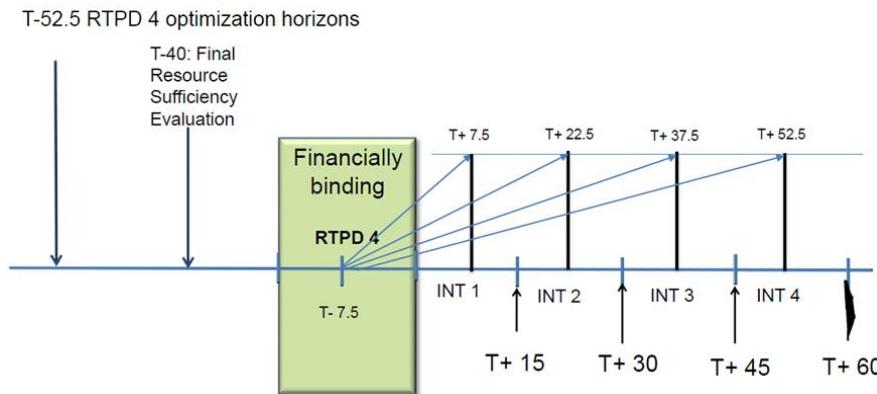
- Ensure each EIM entity is able meet their demand with their own net-supply prior to engaging in transfers with other BAAs through the EIM's real-time market
 - Capacity that is required to meet forecasted demand and uncertainty
 - Flexibility necessary to ramp to fifteen minute demand variations within the hour
- Provides incentive for an EIM entity to submit balanced supply and demand schedules, and provides EIM entities information about potential congestion within their BAA

The capacity test determines whether a balancing authority area is participating in the EIM with sufficient supply to meet its demand forecast

- The CAISO calculates the capacity test by determining if total bid range is greater than the total requirement. If the bid range is greater than the requirement, the balancing authority area passes the test
 - EIM transfers (imports or exports) and temporal constraints are not included in either of the CAISO or EIM BAA's tests
- If a balancing authority area fails the capacity up or down test for any interval in an hour, they automatically fail the respective up or down flexibility test for the corresponding hour's fifteen-minute interval

The flexibility test (flexible ramp sufficiency test) ensures balancing authority areas have sufficient ramping capabilities to meet load forecast change and uncertainty inherent to both load and renewable resource performance

- Asses that a BAA has upward and downward flexible capacity available to be dispatched in the real-time market
 - Test evaluates four ramp intervals from the last 15-minute schedule from the proceeding hour to each 15-minute interval of the current hour



The flex ramp test has six inputs:

- Net-demand uncertainty
 - Fixed number for all tests and can increase the requirement
- Forecasted change in demand
 - Can either increase or decrease the requirement
- Diversity benefit factor
- Net import capability
- Net export capability
- Flexible ramp credit

Can reduce requirement

The balancing test provides a financial incentive for EIM balancing authority areas to provide/update base schedules near forecasted demand

- There is an opportunity for EIM entities to over/under-schedule load within their submitted base schedules as a means to control energy prices
 - Avoid de-committing generation to avoid start-up costs by providing base schedules in excess of forecasted load
 - Gaming opportunities via imbalance charges when systemic differences in LMP are present
- Test compares EIM BAA's base schedules to a demand forecast to determine hourly imbalances
 - CAISO's DAM, HASP, and RTPD processes are designed to commit supply equal to forecasted demand

For the balancing test, EIM BAAs may choose to use the CAISO's demand forecast or use their own forecasts

- If EIM BAA elects to use CAISO demand forecast:
 - Imbalances < 1%, BAA passes test
 - Imbalances > 1%, BAA fails test
 - Subject to tiered over- or under-scheduling penalties if actual load is >5% or >10% more or less than its base schedule for an hour
- If EIM BAA elects to use their own demand forecast:
 - Always subject to over- or under-scheduling penalties if actual load is >5% or >10% more or less than its base schedule for an hour

The feasibility test provides an opportunity for EIM entities to minimize re-dispatch and resulting imbalance charges that are necessary to resolve infeasible base schedules

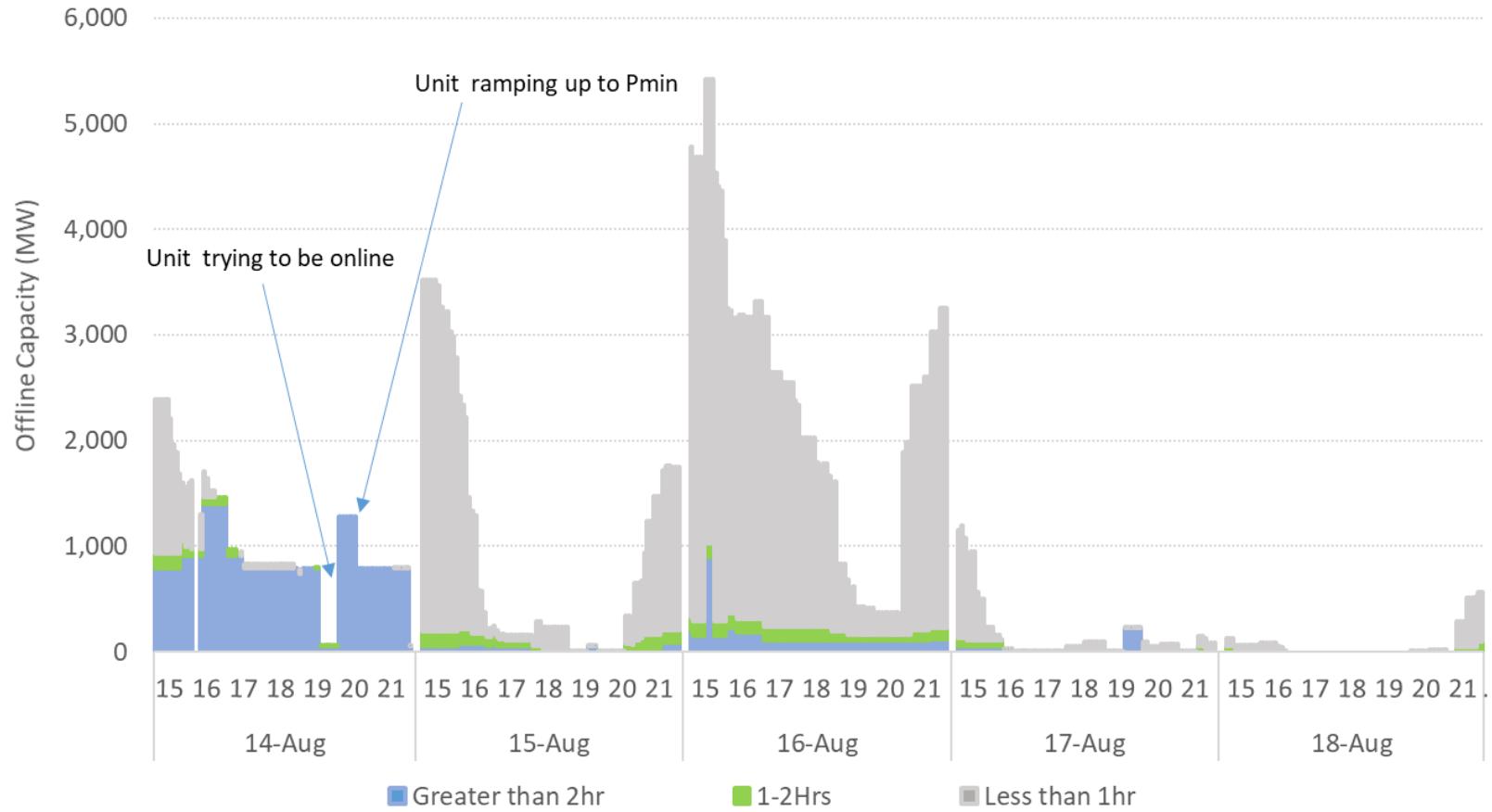
- Performs a power flow evaluation on an EIM BAA submitted base schedules at T-75 and T-55 to determine if base schedules would result in violations of transmission limits
 - Following the results, an EIM entity has an opportunity to adjust its base schedules to resolve advisory violations
- Test not explicitly applied to CAISO BAA because existing market processes to automatically resolve transmission violations

POTENTIAL RSE DESIGN CHANGES

The design of the capacity test currently looks at all bids made available for use by the EIM

- Intertemporal constraints are not considered
 - Actual resource availability is largely captured through the ramping sufficiency test
 - August 2020 events show that the current design can lead to entities incorrectly passing the capacity test
 - Is there a way to consider a subset of intertemporal constraints, i.e. not allow a resource coming back from outages to be available until start-up time has elapsed
- The capacity test does not ensure energy deliverability

Stranded Capacity in the CAISO during the August 2020 Heat Waves



The ramping sufficiency test determines if the EIM base schedule contains sufficient flex ramping capacity to meet forecasted requirements in the following hour

- The test uses the fifteen minute market schedule for the interval immediately prior to the hour as the initial reference point
 - The mid point of this schedule is used (T-7.5)
 - The initial market solution can include operator load forecast adjustment
- Under stressed system conditions the power balance constraint may be relaxed. Should this demand be added to the flexibility requirement?
- What is the correct initial reference point for this test?

Stakeholders have previously asked the CAISO to consider the application of the balancing test to the CAISO BAA

- Balancing test has not previously been applied as the CAISO market processes are designed to produce balanced schedules
 - The CAISO's market process (clearing to demand forecast) does not provide the same mechanism to misrepresent energy schedules to take advantage of systemic price differentials
- The relaxation of the power balance constraint when insufficient supply is available to balance demand can lead to the CAISO market producing schedules less than forecast demand
 - This occurred during the august 2020 heat waves

CAISO and EIM BAA operators are able to take actions outside of real-time market process to secure additional supply or reduce forecast load

- Utilize load as non-spinning reserves and access emergency demand response programs
 - The RSE is conducted 40 minutes prior to the upcoming hour, these actions are only accounted for to the extent that they are taken 40 minutes prior to the hour
- Is it appropriate to allow operator actions designed to increase net supply or reduce demand that are planned via emergency procedure to counted towards RSE requirements?

JOINT EIM ENTITY PRESENTATION SPECIFIC ENHANCEMENTS TO IMPROVE ACCURACY OF RSE



California ISO

EIM Resource Sufficiency Evaluation Enhancements

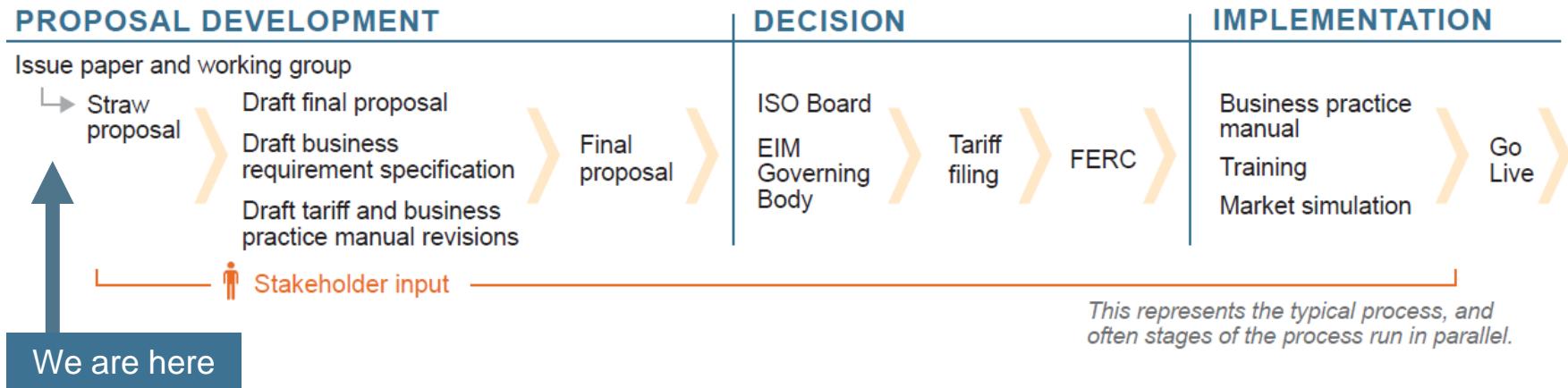
Stakeholder Workshop – Day 2

Market Design Policy
June 28, 2021

Agenda

Topic	Presenter
Welcome and stakeholder process	Kristina Osborne
Joint EIM entity presentation on enhanced transparency, reporting and oversight	Mark Symonds
Potential enhancements to RSE financial consequences	Danny Johnson
Joint EIM entity presentation on failure consequences and opportunity for EIM energy assistance	Mark Symonds
Joint EIM entity presentation on uncertainty in the capacity test	Dustin Herrick
Next steps	Kristina Osborne

Stakeholder Process



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JOINT EIM ENTITY PRESENTATION ON ENHANCED TRANSPARENCY, REPORTING AND OVERSIGHT

FINANCIAL CONSEQUENCES FOR RSE FAILURE

Should additional consequences apply during all intervals or only during more targeted, stressed, system conditions

- RSE is currently applied during all hours and observed data has shown that many EIM entities periodically fail
- To the extent that additional consequences we only be applied during stressed system conditions, what is a good proxy for those conditions?

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
California ISO	0	0	0	0	0	0	0	20	3	0	0	0
Arizona PS	0	0	0	0	2	1	0	0	0	5	1	0
BANC	0	1	0	0	0	4	5	8	5	6	3	0
Idaho Power	0	0	0	0	0	0	2	0	0	0	0	0
NV Energy	0	2	1	4	63	53	172	283	95	69	33	8
PacifiCorp East	0	0	0	0	0	1	0	13	1	0	0	0
PacifiCorp West	0	1	2	0	0	3	2	0	0	7	1	2
Portland GE	0	0	0	0	0	0	18	2	11	9	1	0
Powerex	0	0	0	0	0	0	0	0	0	0	0	0
Puget Sound En	0	5	2	0	2	77	164	79	28	20	1	0
Salt River Project				8	2	1	11	51	55	61	52	0
Seattle City Light				0	1	0	0	7	6	5	2	0

Potential forms of a financial consequence

- Hurdle rate
- After-the-fact payment
- Forward use capacity type payment
- Accurate cost causation will be difficult given the varying but limited duration of incremental capacity support, combined with the various costs of installing and maintaining capacity

A hurdle rate incorporated into the market clearing process

- A \$/MW cost that would need to be surpassed in a energy deficient BAA prior to incremental power transfers being permitted
- Ensures that deficient entity utilizes all internal supply
- Ensures revenue from incremental EIM transfers that support a supply deficient BAA compensates entity supporting the transfer
- Would this rate be standardized?
- Is there any basis for this rate?
- Will require more extensive market changes than other options

A fixed after-the-fact \$/MWh fee

- What is the appropriate amount (\$/MWh) size of an after-the-fact financial fee?
- Revenues would be distributed to EIM entities who passed the test
 - Distributed to all entities who passed that hour's test?
 - Distributed to all entities who pass all tests over the day?

A fixed capacity payment that would give an entity access to another entity's capacity for a preset duration of time

- What is the existing value of capacity in each BAA? Do all EIM entity's have this defined by their Local Regulatory Authorizes (LRAs)? If not, does this need to be defined at the LRA level?
- What would be the mechanism for forward capacity procurement?
- How will deliverability be guaranteed over the extended time period this type of payment contemplates?
- If deliverability cannot be guaranteed does a bid-range trading model serve a similar function?

Allocation of potential revenue can be designed to promote resource sufficiency or to compensate entities who supported the transfer

- Allocation can be made to all entities who have passed the RSE, either hourly or daily
 - This serves to encourage all entities to pass as they are eligible for compensation
- Allocation can be made based on net negative uninstructed deviation
 - Only benefits entities who are exporting
- Allocation can be made to entities that can be shown to have supported EIM exports through excess bid capacity as well as transmission availability
 - This allocation best corresponds to cost causation

The funding of a financial consequences will be dependent on an EIM entities OATT

- For the CAISO the funding of penalties will fall to CAISO Load Serving Entities
 - Option to assign the financial consequence pro-rata to metered demand within the CAISO
 - Option to assign the financial consequence to load serving entities based upon their failure to meet their prescribed capacity procurement targets as specified within the resource adequacy program
- These options have varying levels of impact on current RA program

JOINT EIM ENTITY PRESENTATION ON COMPENSATION FOR EMERGENCY SUPPLY

JOINT EIM ENTITY PRESENTATION ON UNCERTAINTY IN THE CAPACITY TEST

Schedule

Date	Milestone
July 9, 2021	Comments due – issue paper and workshop discussions
Aug 3, 2021	Straw proposal posted
Aug 10, 2021	Stakeholder call – straw proposal
Aug 27, 2021	Comments due – straw proposal
Sept 22, 2021	Draft final proposal posted
Sept 29, 2021	Stakeholder call - draft final proposal
Oct 15, 2021	Comments due - draft final proposal
Nov 2, 2021	Final proposal/draft tariff language/draft business spec req posted
Nov 9, 2021	Stakeholder call – final proposal
Nov 23, 2021	Comments due – final proposal
December 6, 2021	EIM GB Meeting
December 15, 2021	BOG Meeting

Next Steps:

Submit comments on the issue paper and workshop presentations/discussion by EOD July 9 using the comment template link on the initiative webpage:

<https://stakeholdercenter.caiso.com/StakeholderInitiatives/EIM-resource-sufficiency-evaluation-enhancements>.