

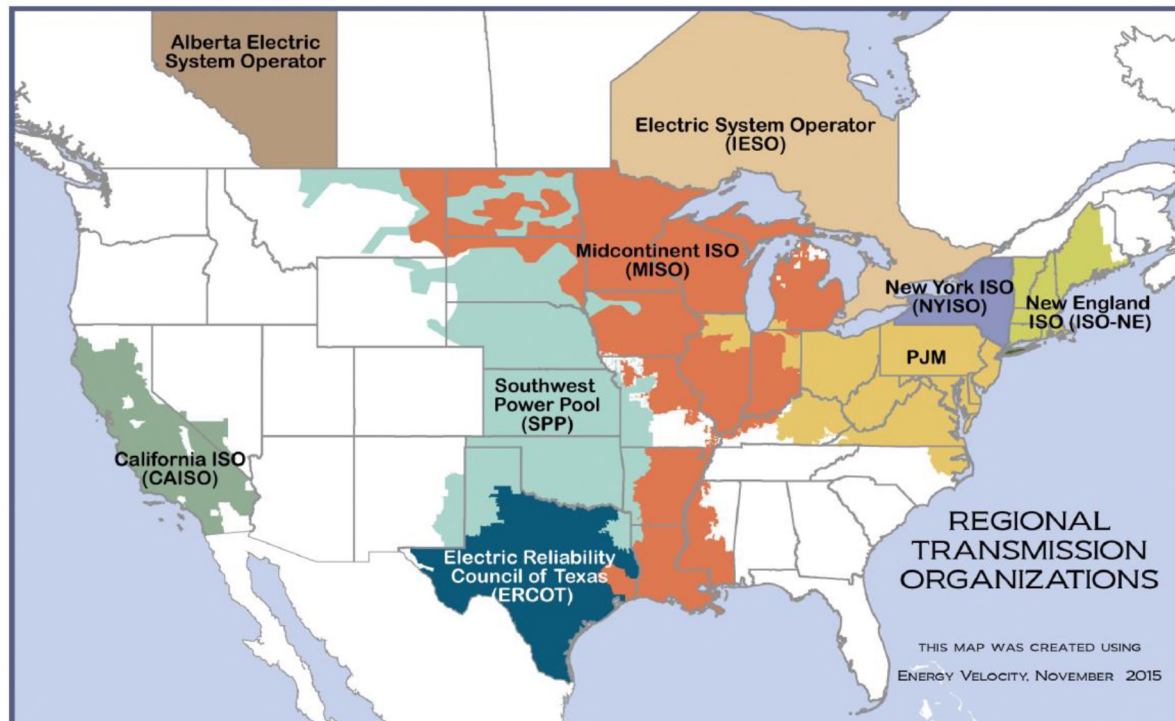


**Legislative Committee on Energy
Western Market Update
NV Energy
January 17, 2020**

Types of Wholesale Energy Markets



- “Bilateral market” - individual utilities are responsible for maintaining the supply and demand balance in their home Balancing Authority Area; power is procured in separate transactions with transmission service arranged under an open-access transmission tariff
- “Organized markets” -- a regional transmission organization (RTO) or independent system operator (ISO) is the regional Balancing Authority Area; operates the transmission systems of participating utilities; and conducts bid-based markets



Organized Markets



- Bid-based markets (day-ahead energy, real-time energy, ancillary services)
- Minimize the cost of generating enough electricity to meet load by using the least-cost set of available generators possible given limitations of the transmission system -- known as “least-cost, security-constrained dispatch”
- All RTOs and ISOs use a form of pricing called locational marginal pricing (LMP)
 - the LMP is the cost of providing one more megawatt of power at a specific location on the grid
 - the LMPs serves as a dispatch signal -- if the LMP is at or above a generator’s offer price, the offer is taken and the generator is paid at the LMP; if the LMP is below the offer, the offer is not accepted and the generator is not used

What the Energy Imbalance Market (EIM) Does



- Expansion of CAISO's real-time market
- Advanced market systems automatically find the lowest-cost energy to serve real-time imbalances across a wide geographic area
- Pre EIM – each Balancing Authority managed real-time imbalances through standalone dispatch of internally controlled resources
- Post EIM – Balancing occurs regionally;
 - more diverse resource portfolio;
 - increased flexibility and responsiveness for integrating renewable energy (solar and wind)

What the EIM Does Not Change



- Reliability service obligations and functions
- Integrated resource planning for energy supply options and resource adequacy
- Transmission control, planning, and cost allocation
- Changes in state regulatory authority
- Market optimization and economic transactions earlier in time than the real-time market horizon

NV Energy's Entrance into the EIM



- March 2012: CAISO first presents the Western Energy Imbalance Market (EIM) as a conceptual proposal to the Western Governors' Association Public Utility Commissions Task Force
- February 2013: PacifiCorp and CAISO execute a memorandum of understanding and commence the stakeholder process to design the EIM
- November 2013: NV Energy expressed its intent to join the EIM in comments at the CAISO Board of Governors meeting
- March 2014: NV Energy and CAISO release an EIM Market Economic Assessment for NV Energy; projected annual gross benefits at a range from \$6.0 million to \$9.5 million in 2017 and from \$7.7 million to \$12.2 million in 2022
- April 2014: NV Energy files with the PUCN for approval for amendments to Energy Supply Plans to reflect participation in the EIM and CAISO files Implementation Agreement between CAISO and NV Energy at FERC (ER14-1729)
- August 2014: PUCN Order in Docket No. 14-04024 approves NV Energy's participation in the EIM
- November 2014: PacifiCorp starts participation in the EIM
- March 2015: NV Energy files EIM Tariff amendments at FERC in Docket No. ER15-1196
- May 2015: FERC Order Conditionally accepting NV Energy EIM tariff filing
- December 2015: FERC order on rehearing and clarification on NV Energy EIM tariff
- December 2015: NV Energy commences EIM participation

EIM Benefits



- Anticipated benefits include: reduced costs to serve customers, improved situational awareness for increased reliability, and more effective integration of renewables
- CAISO estimates total savings for NV Energy's footprint through Q3 2019 at \$82.41 million
- Cost savings accrue entirely to customers:
 - Compensation when NV Energy's lower cost resources are used to meet real-time imbalance requirements is credited back to customers
 - Costs savings realized when NV Energy's higher cost resources are displaced with more efficient EIM resource alternatives

What is the Extended Day-Ahead Market (EDAM)



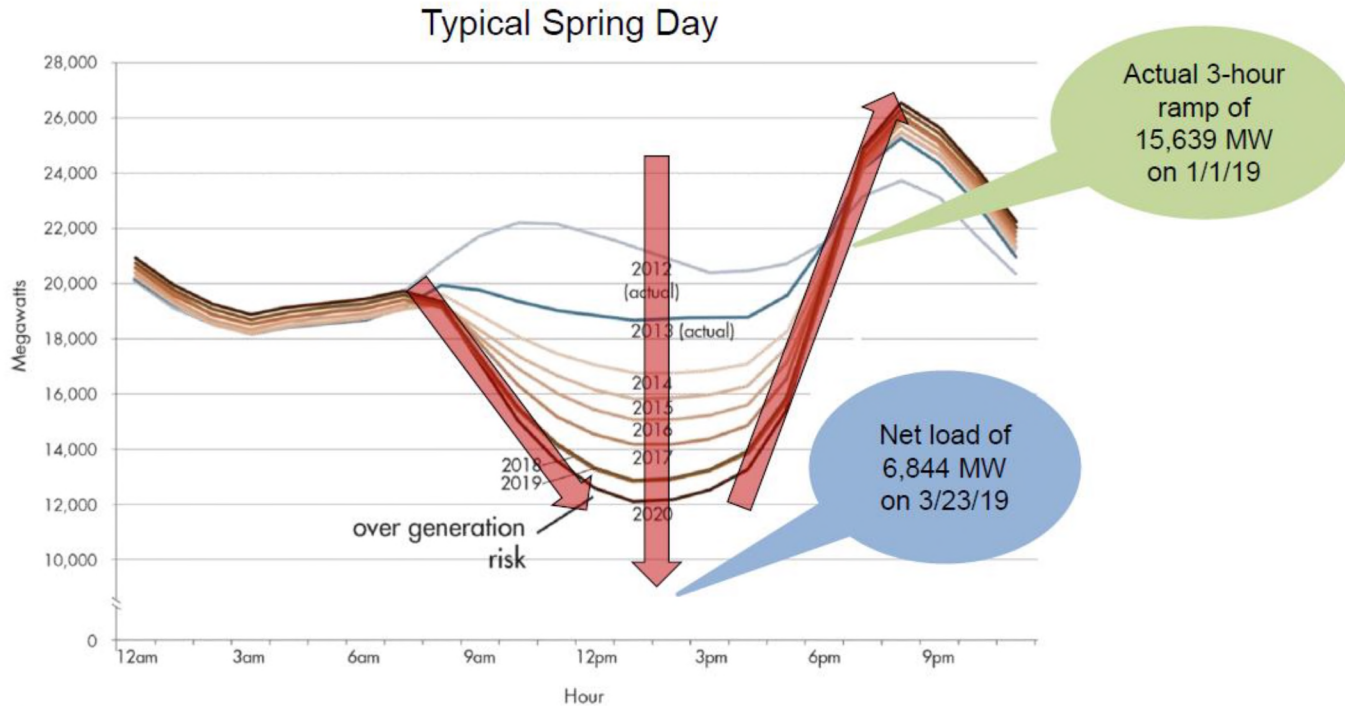
- Currently a market concept – would extend the CAISO’s day-ahead market to EIM Entities who voluntarily choose to participate
- Similar to EIM, EDAM is not equivalent to becoming a full member of CAISO:
 - Additional, voluntary market layered on top of EIM
 - No change in transmission planning and cost allocation
 - Resource adequacy and resource planning will continue to remain with member utilities and their respective regulating authorities
- Intended to be similar and additive to EIM:
 - Seeks added benefits from day-ahead resource optimization
 - Intended to further integrate renewables
 - Cannot be EDAM participant only
- Like the EIM, each entity would retain control over transmission assets and reliability responsibilities
- Does not replace EIM; can remain EIM only participant

Potential Additional EDAM Benefits



- Additional fuel and purchase power cost savings:
 - more efficient day-ahead hourly trading and use of available transmission through an organized market
 - More efficient day-ahead unit commitment
 - Co-optimized footprint wide resources for a more efficient and cost effective day-ahead solution
- Additional renewables integration

CAISO Duck Curve



EDAM Feasibility Assessment



- A high-level estimate of regional cost savings intended to inform EIM Entities and CAISO about proceeding to a market design process; not sufficient to inform a commitment to move forward with market implementation
- Included simplified assumptions on a market design still to be determined during stakeholder process
- Assumed every EIM participant would participate in the EDAM
- Results – range of production cost benefits of between \$119M/yr and \$227M/yr
 - Benefits may not be uniform among market participants
 - Significant drivers include assumptions on gas prices, CAISO export limits, GHG, and resource sufficiency assumptions

Where Are We on EDAM



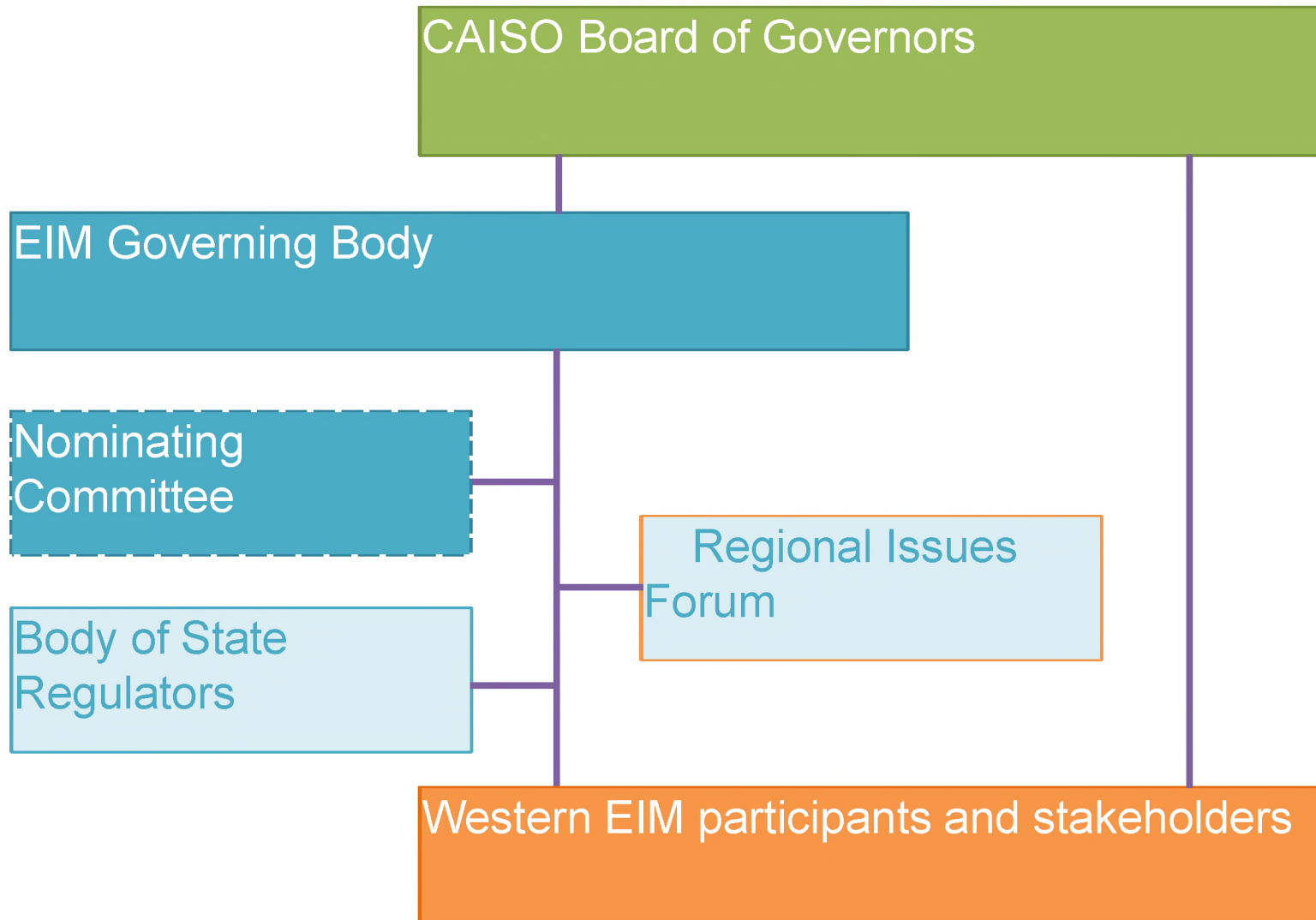
- Determination to proceed with stakeholder processes, CAISO Issue Paper
- CAISO stakeholder process
 - Continued improvement of the EIM
 - Governance Review Committee
 - EDAM Design
 - Workshops on key issues (transmission, resource sufficiency)
 - Series of straw proposals with meetings and comments
- Approval by the EIM Governing Body and the CAISO Board of Governors
- Drafting of CAISO Tariff
- CAISO Tariff filing and FERC review
- NV Energy – specific cost/benefit study
- PUCN review and authorization
- NV Energy OATT filing and FERC review
- Market simulation
- Parallel operations
- Readiness certification
- Go live

ISSUES



- EIM improvements
- Governance
- Resource sufficiency (reserve requirements)
- Transmission
- Price formation / market power mitigation
- GHG policy and implementation
- Grid management charge (allocation of CAISO administrative costs)
- OATT changes and 3rd party customers

EIM Governance



Other Western Market Activities



- **Change in Reliability Coordinator Services**
 - A Reliability Coordinator has the highest level of authority and responsibility for the reliable operation of power grids, and has wide visibility of bulk electric systems
 - Monitors the interconnected power grids for compliance with federal and regional grid standards; authorize measures to prevent or mitigate system emergencies in day-ahead or real-time operations; and leads system restoration
 - 41 entities across 14 western states and northern Mexico selected CAISO as their Reliability Coordinator
 - 11 Entities selected the Southwest Power Pool as their Reliability Coordinator
- **Southwest Power Pool Western Energy Imbalance Service Market**
 - Scheduled launch February 2021
 - Limited participation: Wyoming Municipal Power Agency, Municipal Energy Agency of Nebraska, Basin Electric Power Cooperative, Tri-State Generation and Transmission Association, and WAPA (Colorado River Storage Project and Rocky Mountain and Upper Great Plains regions)

Questions?



Additional Resources



- EIM Entities Statement of Principles - <http://www.caiso.com/Documents/PublicCommentLetter-EIMEntites-EDAM-Sep16-2019.pdf#search=eim%20entity%20principles>
- CAISO EDAM Issue Paper - <http://www.caiso.com/InitiativeDocuments/IssuePaper-ExtendedDayAheadMarket.pdf>
- EIM Entity Comments on the Issue Paper - <http://www.caiso.com/InitiativeDocuments/EIMEntityJointComments-ExtendedDay-AheadMarket-IssuePaper.pdf>
- NV Energy Comments on Issue Paper - <http://www.caiso.com/InitiativeDocuments/NVEComments-ExtendedDay-AheadMarket-IssuePaper.pdf>
- Governance Review Committee - <https://www.westerneim.com/Pages/Governance/GovernanceReviewCommittee.aspx>
- Feasibility Assessment – <http://www.caiso.com/InitiativeDocuments/Presentation-ExtendedDay-AheadMarketFeasibilityAssessmentUpdate-EIMEntities-Oct3-2019.pdf>
- NV Energy governance comments January 2019 – <https://www.westerneim.com/Documents/NVEnergyComments-EIMGovernanceReviewIssuePaperandStrawProposal.pdf>