

NorthWestern[®] Energy

Delivering a Bright Future

Organized Markets in WECC

4/18/18



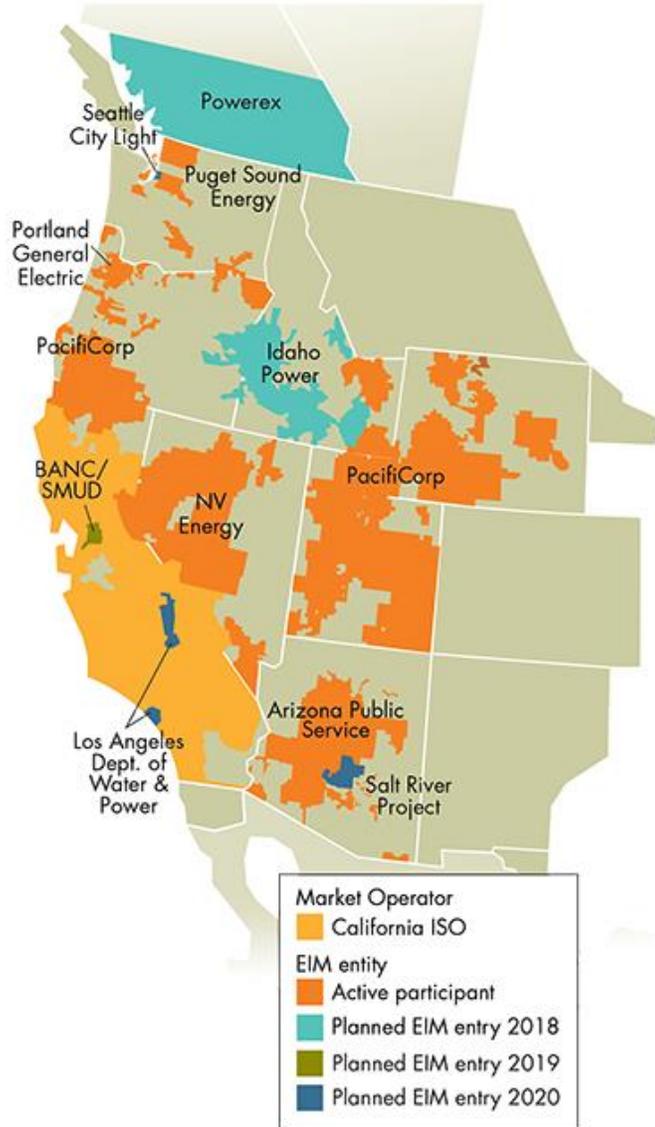
- Regional Markets Update
 - Regional Market Activity
 - EIM
 - CAISO
 - Mountain West
 - Peak Reliability / PJM
 - Implications for Resource Planning
 - Resource adequacy
 - Resource selection



- Realtime markets such as the EIM:
 - Make more efficient use of the transmission system
 - Take advantage of load diversity as well as weather diversity (VERs)
 - Optimize available resources
 - Enhance reliability through market signals
- In addition to the above, RTOs and ISOs:
 - Greatly enhance efficient use and planning of transmission system
 - Commit resources much more efficiently than can be done on an hour-ahead basis
 - Eliminate transmission rate pancaking
 - Save costs by operating under a single OATT



- Operating since 2014 and continuing to add new members
- Organized market that aims for economically efficient dispatch of resources on a sub-hourly basis
 - Each EIM Entity must be Resource Sufficient coming into each hour (must have ability to meet its own balancing needs)
 - Participants offer resources into the market
 - Resources are dispatched based on economics regardless of whether an imbalance exists
 - Automated balancing of load and generation
- Unlike RTOs and ISOs, the EIM does not:
 - Provide ancillary services
 - Administer an OASIS site
 - Take on reliability responsibility



Active Participants

- PacifiCorp, 2014
- NV Energy, 2015
- Puget Sound Energy, 2016
- Arizona Public Service, 2016
- Portland General, 2017
- Idaho Power, 2018
- Powerex, 2018

Pending

- BANC/SMUD, 2019
- LA Dep't of Power & Water, 2020
- Salt River Project, 2020
- Seattle City Light, 2020

Bonneville is considering joining the Western EIM, though a final decision is still several months away, he said. "I think it's important we make a decision one way or the other and not sit on the sidelines."

BPA has put together its business case for joining the market, and is soliciting feedback from various entities. Next it will complete its due diligence, before making a final decision, he said. "We don't see any fundamental red lights . . . that would prohibit us from participating."

The day-ahead market could be especially beneficial for BPA hydropower sales, he said.

-Clearing Up Issue 1842, March 16, 2018, quoting Elliot Mainzer



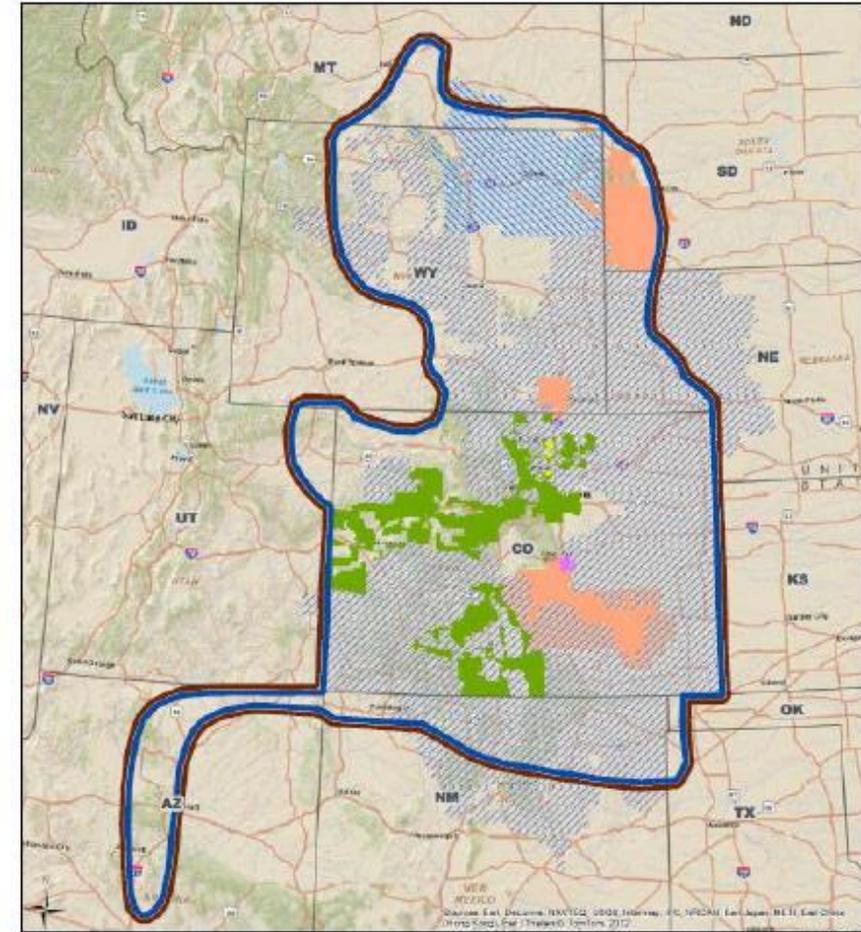
- CAISO is in the process of implementing enhancements to its day-ahead market
 - Part of this process is the extension of the EIM to the day-ahead market
 - There are significant challenges to this idea, particularly with transmission
 - CAISO has published a straw proposal and will have a public stakeholder process
 - Implementation is targeted for Q4 2019
- The extension of the EIM to include a day-ahead component could increase the value of the market



Mountain West Transmission Group and SPP

- 11 Entities, primarily in CO and WY
- Announced plans to join SPP
- Targeting go-live in early 2020

- Basin Electric Power Cooperative
- Black Hills Energy
- Black Hills Power
- Black Hills Colorado Electric
- Cheyenne Light, Fuel and Power
- Colorado Springs Utilities
- Platte River Power Authority
- Public Service Company of Colorado
- Tri-State Generation and Transmission Association
- Western Area Power Admin.
- Loveland Area Projects-RMR
- Colorado River Storage Project



Mountain West Transmission Group

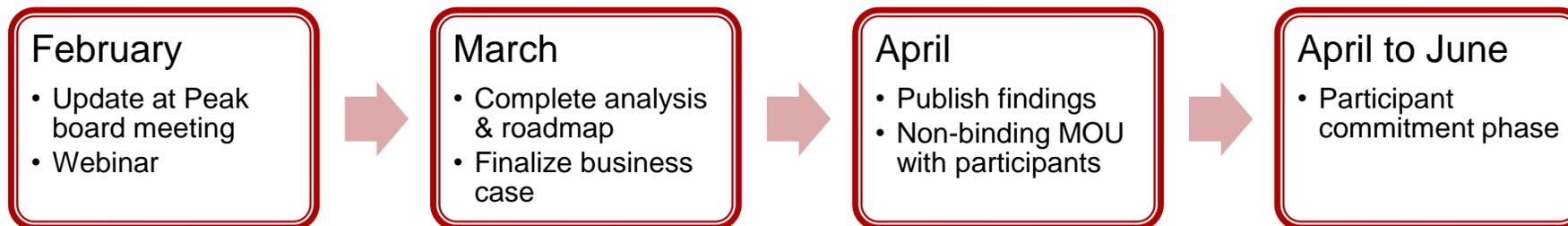


- SPP Board of Directors approved addition of MWTG on March 13
 - The parties are now estimating that integration will take two years
 - The intention is for SPP to operate a single market, optimizing across the DC ties
 - SPP will operate separate East and West Balancing Authorities and will be the Reliability Coordinator (RC) for the entire footprint
 - Initially, SPP will have separate East and West transmission planning regions, but will coordinate modeling assumptions
- NorthWestern does not have sufficient connectivity to the current MWTG members to participate in this market



Peak Reliability / PJM Connex developing Market Design Options

- Proposing a market “for the West by the West”
- Combines knowledge and relationships of Peak with the operational experience and expertise of PJM





- It is likely that both the EIM and SPP will continue to add members in the WECC
 - It's also possible that Peak/PJM may gain traction
- NorthWestern will continue to assess market alternatives over the next several months
 - We are engaged with neighboring utilities and others
- It will become increasingly more challenging to operate outside of the organized markets as more and more parties join them



- Membership in an organized market would have resource planning implications
 - Resource adequacy
 - Specific reserve margin requirements
 - Capacity contribution of VERs
 - Capacity contribution of hydro
 - Resource selection
 - Specifics of the market would influence the composition of the portfolio



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