

# Resource Planning Advisory Council Meeting

July 27, 2023

# Logistics & Introductions



Presenters will pause occasionally for clarifying questions.



Save in-depth comments and questions for the Q&A sessions.



During periodic pauses for clarifying questions:

- If joining remotely, raise your “hand” to provide comments or ask questions.
- Identify yourself and your organization.
- Please speak clearly.



The chat box will **only** be monitored for reports on **technical difficulties**.

# Agenda

- Introductions
- WMEG Results.
- Update on RMC activities.
- Next Steps

# Definitions Refresher

- **Ancillary services:** services necessary to maintain a reliable electricity system by maintaining proper electricity flow, addressing demand imbalances, and recovering after an energy blackout. Includes
  - Regulation – used to control small mismatches between load and generation and adjusts for small variations on either side of the scale.
  - Reserves – recovers system balance by making up for generation deficiencies if there is loss of a large generator.
  - Spinning reserves – reserves are already online and synchronized, versus non-spinning which are not.
- **Bilateral transactions:** a transaction between two willing parties who enter into a physical or financial agreement to trade energy commodities.
- **CAISO:** California Independent System Operator is a state chartered, California non-profit public benefit corporation that operates the transmission facilities of all Participating Transmission Operators and dispatches certain Generating Units and Loads.
- **CAISO EDAM:** The Extended Day-Ahead Market (EDAM) is a voluntary day-ahead electricity market designed to deliver significant economic, environmental, and reliability benefits to balancing areas and utilities throughout the West.
- **Day ahead market:** this market represents about 95 percent of energy transactions and is based on forecasted load for the next day. It typically occurs the prior morning in order to allow generators to prepare for operation.
- **Real-time market:** this market balances the differences between the day-ahead scheduled amounts of electricity based on day-ahead forecast and the actual real-time load.

# Definitions Refresher cont.d

- **SPP M+:** Market services proposed by the Southwest Power Pool that would centralize day-ahead and real-time unit commitment and dispatch.



Source: SPP

**WECC:** Western Electricity Coordinating Council (WECC) promotes Bulk Electric System (BES) reliability for the entire Western Interconnection system. WECC is the Regional Entity responsible for compliance monitoring and enforcement.

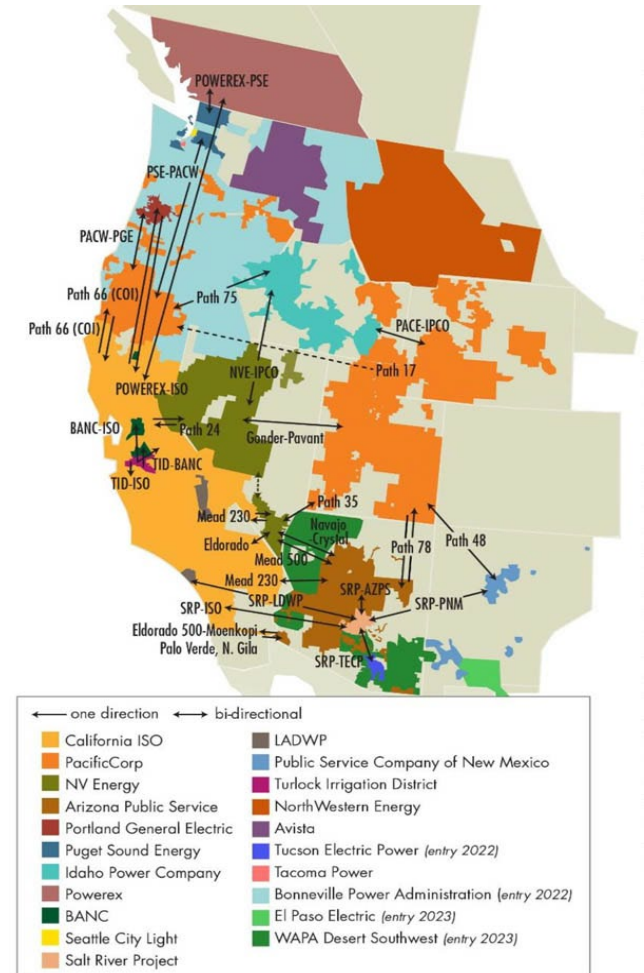


- Encompasses the entire the synchronously operated electric grid in the western part of North America – the Western Interconnection.
- Members represent all segments of the electric industry and provide electricity to 71 million people in 14 western states, two Canadian provinces, and portions of one Mexican state.

# Definitions Refresher cont.d

- **Western Energy Imbalance Market (WEIM):** the WEIM is a voluntary, real-time energy market that centrally dispatches generation and coordinates the movement of wholesale electricity. It is not an RTO, but instead dispatches generation economically every five minutes and balances supply and demand across its large region. It enables exchange of excess generation from one region to address high cost or generation shortage elsewhere.
- **WMEG:** A group of twenty-five electric utilities in the western United States formed to evaluate regional market solutions to strengthen the grid and reduce emissions.

## CAISO WEIM PARTICIPANTS



Source: CAISO

# Background

- The Western Markets Exploratory Group (“WMEG”) is a group of twenty-five electric utilities with similar interests in developing an incremental approach for organized market services up to and including an end state as a regional transmission organization (“RTO”).
- The WMEG recognizes the best path forward may be different for each member and their individual company's decision may impact or be impacted by the decision of others.
- Studying these impacts as a group to help each member make a well-informed decision for their company.
- Many of the WMEG members are actively participating in either the California Independent System Operator (CAISO) Western Energy Imbalance Market (WEIM) market or the Southwest Power Pool (SPP) Western Energy Imbalance Service (WEIS).
- Study focused on the impacts related to incremental additions to these two markets and the possible additions of functions commonly part of an RTO to determine which would provide benefits for their customers.
- There are two current day-ahead market offerings in development, namely the CAISO Extended Day-Ahead Market (EDAM) and the SPP Markets Plus (Markets+).
- The proposed functionality for these two market offerings is slightly different from each other and both have less features than other regional markets operating today.
- The WMEG engaged Energy and Environmental Economics, Inc. (E3) to study the production costs impacts related to incremental additions to the WEIM and WEIS markets.



# Study Criteria

- **Timeline:** 2026, 2030, 2035
- **Entities:** Western Interconnect utilities in both WMEG member areas and non-WMEG areas.
- **Data Inputs:** Load growth projections, updated generator additions and retirement information, as well as generator operational parameters, costs, and percentage shares that are owned and or contracted to different WMEG entities. Includes significant generation additions, particularly of solar, wind, and storage resources based on the data developed by WECC and updated by WMEG members.
- **Output:** Entity-specific "**Net Variable Cost Savings**"
- These footprints do not represent the only potential maps for two Western Markets, as there are a wide range of potential combinations that could lead to different market footprints.



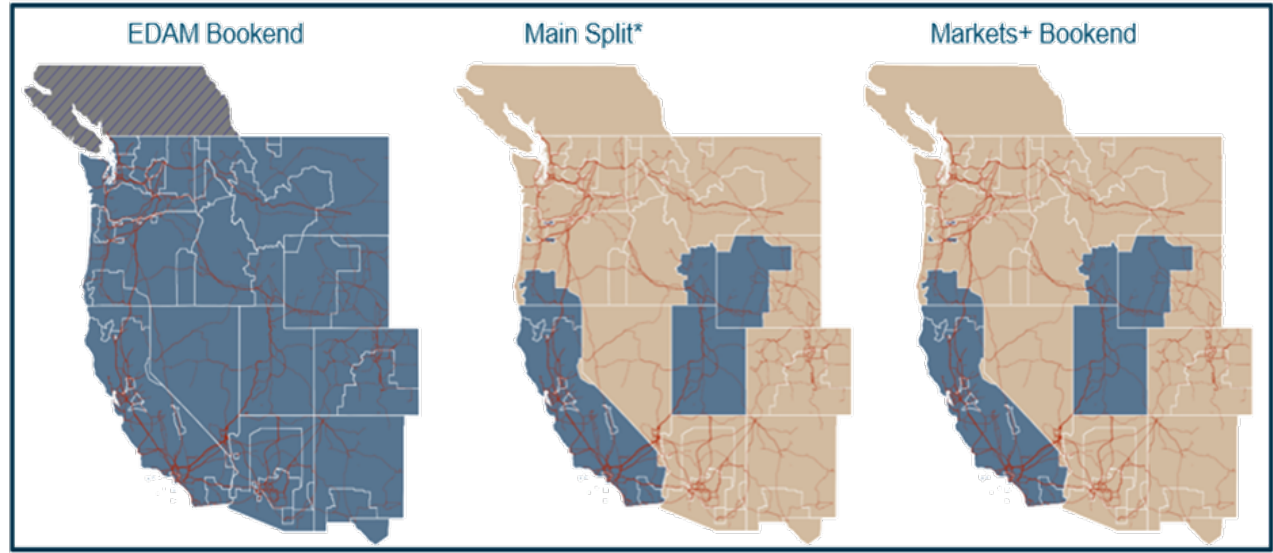
# Market Study Cases

2026 Market Case	Scenario
<p>Models a day-ahead (DA) stage with bilateral trading but no organized market. In the real-time (RT) stage, the BAU case represents wheeling and friction-free trading within the existing WEIM and WEIS footprints.</p>	<p>Business As Usual (BAU Case)</p>
<p>Models a single DA and RT market that covers the entire U.S. portion of the Western Interconnection, excluding Alberta, British Columbia (BC), and CFE in Baja Mexico. Trades inside the Market reflect the currently proposed EDAM design and are simulated with no wheeling costs or transactional friction.</p>	<p>EDAM Bookend</p>
<p>Models two separate DA and RT footprints:            (a) an EDAM comprised of PacifiCorp, and the state of California, and            (b) a Markets+ region consisting of the rest of the US WECC, plus BC which is modeled as a pumped hydro generator with net purchases and sales at the US-Canadian border.            (c) Alberta and CFE are modeled as external zones not participating in either the EDAM or Markets+.</p>	<p>Main Split</p>
<p>Similar to the Main Split, except that WAPA Sierra Nevada Region (SNR), a sub-BA of the Balancing Authority of Northern California (BANC) is modeled in Markets+ rather than EDAM.</p>	<p>Markets+ Bookend</p>

# Results Summary – Market Footprint Cases

CBS looked at various footprints as part of the **Core CBS Study**.

The Main Split footprint is used as the base footprint in all Core Study modeling.



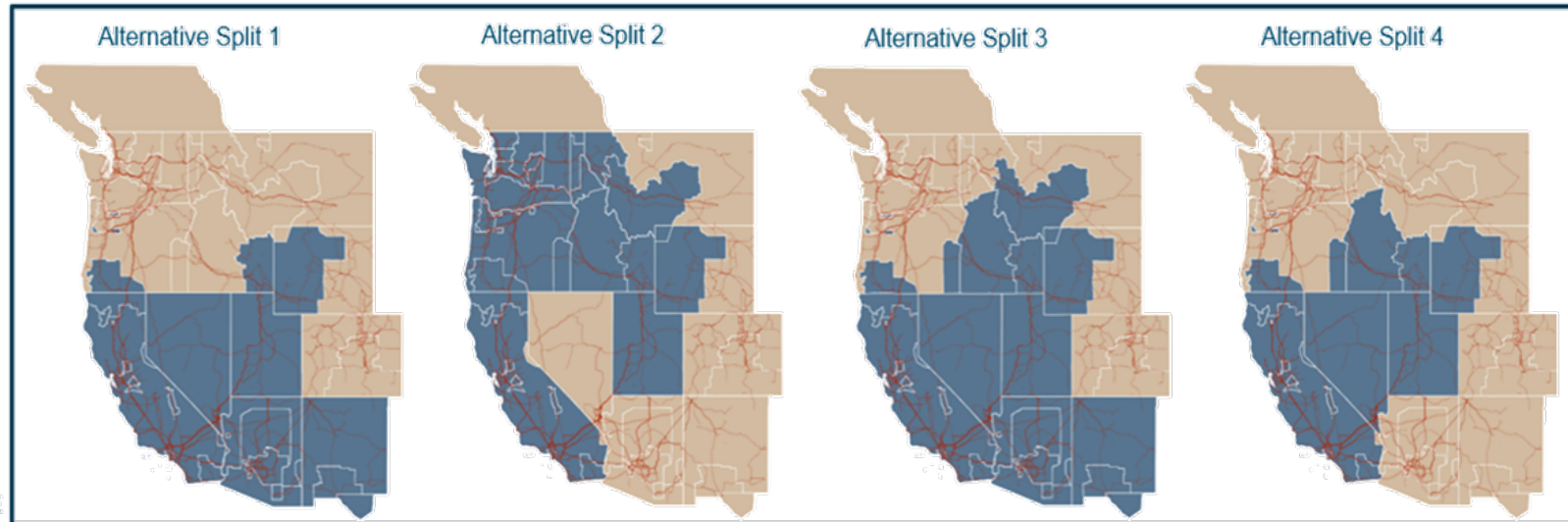
*\*Not explicitly shown: The difference between Markets+ Bookend and Main Split is WAPA SNR sub-BA is part of EDAM in the Main Split*

## Short Market Footprint Description:

BAU	Bilateral trading (no centralized market) in DA; EIM & EIS cover most of WECC in Real-T stage
EDAM Bookend	All US WECC in EDAM; BC Hydro only in M+
Main Split	PAC + all of California (including WAPA SNR) in EDAM; rest of WECC in M+
Markets+ Bookend	PAC, CAISO, LADWP, TIDC, BANC (not WAPA SNR) in EDAM; rest of WECC in M+ (including WAPA SNR)

# Results Summary – Market Footprint Cases Cont.d

A subset of members opted for modeling extra market cases of **additional footprints**



Figures provided by Greg MacDonald from PSE

## Short Market Footprint Description:

- Alt Split 1      PAC + California (excluding Wapa SNR) + SW (AZ + NM + NV) in EDAM; rest of WECC in M+
- Alt Split 2      PAC + California (including WAPA SNR) + NW (WA, OR, ID, NWMT) in EDAM; rest of WECC in M+
- Alt Split 3      PAC + California (excluding WAPA SNR) + SW + ID + NWMT in EDAM; rest of WECC in M+
- Alt Split 4      PAC + California (excluding WAPA SNR) + ID + NV in EDAM; rest of WECC in M+ [Same as M+ Bookend, but NV & ID move to EDAM]

# Result Highlights



The findings from the E3 study noted that each WMEG members are impacted differently based on the future configuration studied.



The result for each member is also impacted by the decisions that others may make, such as which next-day market offering they select for the future.



It is cheaper for the West to go into one market, however, TEP and the other DSW entities benefit more from being separate from CAISO.



In the single market study case, CA entities experience significant cost reduction, non-CA entities would see a cost increase or less savings in comparison to other market options.



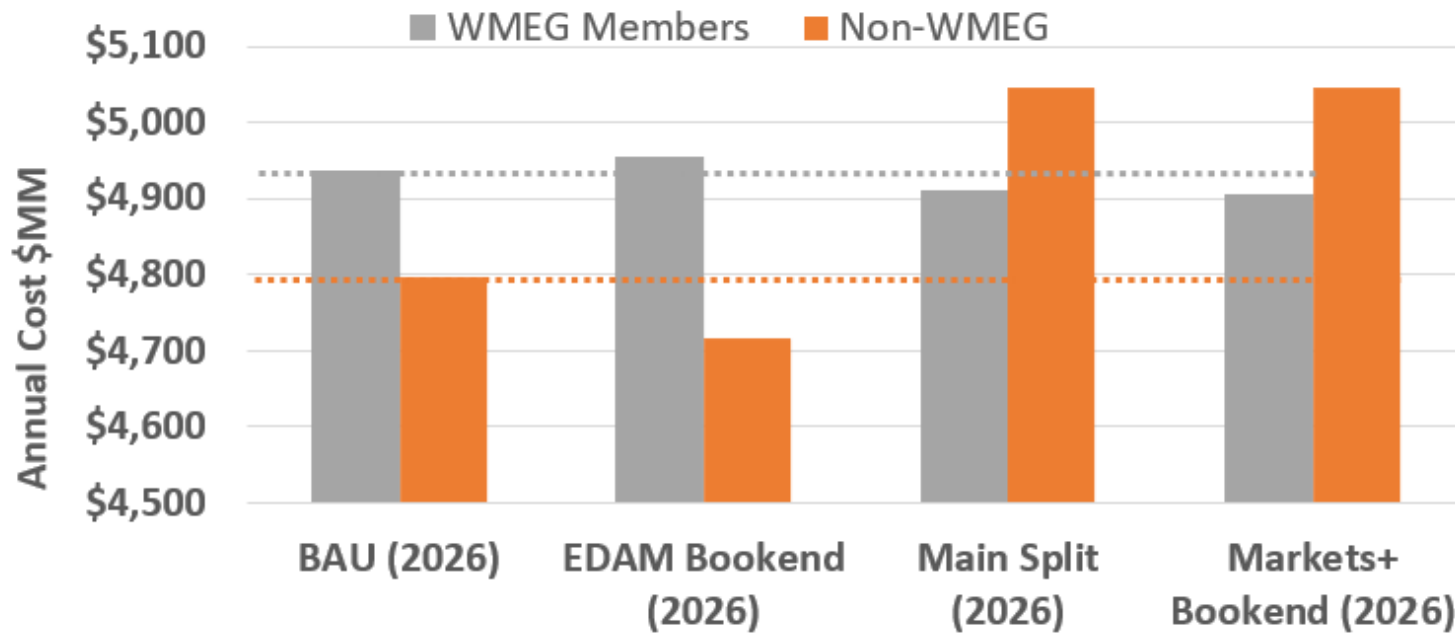
The E3 Study also showed that adding an ancillary services market (ASM), coupled with consolidating balancing authorities, does provide ongoing production costs reduction of roughly \$10 million.



All WMEG members, regardless of their market offering selection, could collaborate on how best to address seams issues between market operators.

# Results Summary – WMEG Net Variable Cost

*Total Net Variable Cost for WMEG Members and Non-WMEG Entities*



**EDAM has highest net variable cost for WMEG members.**

**Net Variable Cost = Load Cost + Generation Cost + Reserve Cost – Reserve Revenue – Generation Revenue – Wheeling Revenue – Congestion Revenue – Wheeling Revenue**

# WMEG Next Steps

- Pathways that would allow participants to develop an initial market design proposal.
- Provide a roadmap that could lead to a Regional Transmission Organization (RTO), depending upon what each state and/or utility determines is in the best interest of their customers.