

Western Markets Exploratory Group

Straw Proposal Phase – Deliverables Overview

June 2023

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1 Executive Summary

The Western Markets Exploratory Group (WMEG) is a group of 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. Therefore, studying these impacts as a group will help each member make a well-informed decision for their company. The WMEG contracted with Utilicast to provide project management, workshop facilitation, subject matter experts, writing support, and a collaborative space for evaluating these interests.

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). The WMEG focused their efforts on studying 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. The 2026 overall results of the Core Study ranged from a reduction in production cost of \$60 million to an increase in production cost of \$221 million.¹ 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. This decision could also impact the benefits that they are receiving today from their participation in either the WEIM or the WEIS. The decision by one WMEG entity could potentially impact the access others have to their preferred next-day market offering. 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. The study also found improving the ability to move power between the two next-day markets could provide a decrease in production cost in the range of \$162 and \$206 million and the addition of transmission infrastructure to address congested transmission lines could provide a reduction in production cost of \$387 million.

There are future opportunities for WMEG members to continue their collaboration and help move these Western market and RTO efforts forward. Those WMEG members who elect to participate in either of the day-ahead market offerings, will have opportunities with others selecting a similar market offering to collaborate on market design features and future enhancements. All WMEG members, regardless of their market offering selection, could collaborate on how best to address seams issues between market

¹ Several WMEG members also engaged E3 to develop sensitivity cases. The results of the sensitivity cases are not described in the overview documents.

operators, the development of the optimal transmission portfolio to support enhanced market operations, and cost allocation for the build out of the transmission system.

2 Summary of Approach & Components

2.1 Study Overview

The WMEG contracted with Utilicast for the period of March 2022 through June 2023 to provide project management, workshop facilitation, subject matter experts, writing support, and a collaborative space for evaluating these interests.²

The first phase of the Utilicast engagement started with a Straw Proposal Phase, which evaluated potential options for a Day-Ahead Market and regional collaboration, up to and including an RTO. Through this effort, the WMEG was able to develop a draft Roadmap that helped organize the study of different features and functions of markets and other forms of regional collaboration opportunities.

The WMEG created task forces composed of subject matter experts from the various WMEG entities and Utilicast. These task forces provided technical oversight and input for the production costs study, took deeper dives into various market issues, and evaluated other potential regional collaboration options. The output from these various task forces were memorialized in either the production cost study inputs or through the development of various white papers.

Utilicast engaged E3, on behalf of WMEG, to perform a cost benefit study.³ The various WMEG task forces worked with E3 to develop the final framework for the CBS. These task forces provided direction regarding market design, greenhouse gas regulations, member participation in different market footprints, and native load forecasts. WMEG also used a transmission subgroup to create unique transmission topology for the various study scenarios, including an RTO topology that might be possible through significant transmission infrastructure investment. E3 worked directly with each WMEG member to validate and update generation portfolio information, including existing unit cost parameters, new unit additions, and potential unit retirements. This information became part of the CBS Data Sets that were incorporated into the production costs study.

The WMEG members structured the CBS to evaluate incremental development of market and organized market services over three distinct time periods. These time periods were chosen based on projections for when key changes may occur in the West. The two current market offerings are suggesting a start range of 2025 to 2026, which is consistent with the 2026 study period. The 2030 timeframe was chosen to give these market offerings time to settle in before the next phase of market enhancements would be ready to implement and to provide a data point for those who are facing state mandates to join an RTO type organization. The 2035 timeframe provided sufficient lead time for the Western markets to have evolved into their final state and for transmission investment to be identified and possibly constructed. The results of these incremental evaluations are intended to help each member determine their desired final decision regarding market functions and other regional collaboration opportunities.

² Agreement for Joint Participation for Facilitation and Project Management Services.

³ Agreement for Joint Participation and Data Sharing for Cost-Benefit Analysis.

Several members also engaged E3 to execute sensitivity cases.⁴

The Utilicast engagement also included review of various non-production costs related activities that are part of market functions and regional collaboration efforts. The WMEG again used task forces to study the technical aspects of market products, potential changes to balancing authority areas, and how neighboring markets need to coordinate their activities along their seams with each other to ensure reliable operations of the transmission system. Utilicast developed a non-production cost study that provides estimated costs and potential benefits associated with implementing and maintaining some of these various non-production costs related activities.

2.2 Evolution in Approach

The WMEG and Utilicast team remained flexible during this process and were able to adjust their approach over the course of the project as situations warranted. The approach evolved as a result of both analysis among the members and external events. The team reviewed the approach several organizations used to create their energy market and form an RTO. The approach for how each of these organizations implemented the various aspects of their organized market and RTO functionality was slightly different, but they now have very similar configurations of market features and RTO functionality. The starting point for these other organizations was comparable to the then current situation in the West and provided the WMEG examples of some possible approaches to evaluate as the team worked on how best to achieve their desired market features and possible RTO functions.

In addition to simply trying to build the same structures that others had, the WMEG evaluated other options that might provide similar functionality and do so more efficiently. One such option discussed during the development of the Roadmap was a “thin RTO” concept. This concept proposed creating an organization that was considerably smaller than other fully integrated RTOs, would have an independent board, and an appropriately sized staff to manage the day-to-day activities. The thin RTO would contract with others for the desired services. These discussions helped the WMEG members better understand the different functions and requirements of a fully integrated RTO. After considerable discussion it was decided to table this effort and focus members’ efforts on the CBS and the two newly released next-day market offerings being proposed by the CAISO and SPP.

2.3 Study Components

The WMEG Straw Proposal phase considered many aspects of regional collaboration. These considerations, questions, analysis, options, and results are captured in several documents.

1. Straw Proposal Phase – Deliverables Overview – Provides context for the overall effort and integrates the results of the Production Cost study and the Non-Production Cost Modeling.
2. Updated Roadmap – An update to the Initial Roadmap which provides discussion of potential next steps based on the results of the Straw Proposal phase.
3. Western Day Ahead Market Production Cost Impact Study – Provides context on key modeling assumptions underpinning the Production Cost study and highlights the aggregated results.

⁴ Agreement for Joint Participation and Data Sharing for Alternative Pricing Proposals.

4. Non-Production Cost Benefit Study – Provides context on functions or features which were not included in the Production Cost Model and provides qualitative and quantitative estimates of costs and benefits for these functions and features.
5. Seams Task Force White Paper – Describes likely Seams issues which can exist between Markets and legacy BAAs as well as non-Market functions of interest to WMEG and approaches that could be used to mitigate the Seams.
6. CBA Task Force White Paper – Describes the primary operational and compliance components that would be impacted by consolidating Balancing Authorities.
7. Market Design Straw Proposal for CBS – Briefly describes the CAISO Extended Day-Ahead Market (EDAM) and the SPP Markets+ (Markets+) proposals and why the WMEG chose to consider them for the Straw Proposal Phase.
8. Transmission Rate Sub-Group White Paper – Analyzed issues which may arise in creating a future de-pancaked transmission service tariff, discussed how transmission service revenue distribution can mitigate issues, and reviewed how other regions have addressed these issues.

In addition to the components of the Straw Proposal phase which are cited above, several additional deliverables were created and are available to members, including Task Force charters, meeting presentations, meeting minutes, progress dashboards, initiation deliverables, background information, and other similar items. These materials will be available for members to retrieve from the WMEG SharePoint through July 31, 2023.

2.4 Organizing Documents

As footnoted above, the WMEG Straw Proposal Phase was executed according to three Agreements for Joint Participation. Specifically,

1. Agreement for Joint Participation for Facilitation and Project Management Services
2. Agreement for Joint Participation and Data Sharing for Cost-Benefit Analysis
3. Agreement for Joint Participation and Data Sharing for Alternative Pricing Proposals

An initial Roadmap, which became the basis for the CBS, defined a Core Study. Some members also wanted the ability to add sensitivity cases to the Core Study. During the selection and contracting of E3, optional services, such as sensitivities, and the associated pricing were identified as Alternative Pricing Proposals (APPs). The Agreement for Joint Participation and Data Sharing for Alternative Pricing Proposals enabled the executing members to request E3 conduct sensitivity studies or obtain additional services from E3, on an opt-in basis, while allowing other member to choose to not fund these APPs. Since not all members funded the APPs, they are not described in the summary results documents. In all, six APPs were executed during the Straw Proposal Phase.

1. APP #1 – Footprint Sensitivity – A sensitivity analyzing four additional Market footprint permutations using the 2026 case inputs and assumptions.
2. APP #2 – Footprint Sensitivity – A sensitivity analyzing on four additional Market footprint permutations using the 2030 and 2035 case inputs and assumptions.

3. APP #3 – Transmission Availability Sensitivity – A sensitivity analyzing reduced available transmission in case runs using primarily a contract path approach to transfers, relative to case runs using a primarily flow-based approach to transfers, otherwise using the 2026 base case inputs and assumptions.
4. APP #4 – Supplemental Analysis – Additional analysis and services to support member’s interpretation of their individual results or to provide additional data extracts on request.
5. APP #5 – Cross-Market Hurdle Rate Sensitivity – A sensitivity analyzing three permutations of the Day-Ahead and Real-Time Cross-Market hurdle rates to analyze different levels of potential coordination in reducing Cross-Market Seams, otherwise using the 2030 case inputs and assumptions.
6. APP #6 – Footprint Sensitivity – A sensitivity analyzing one additional Market footprint permutation using the 2026 case inputs and assumptions.

3 Cost/Benefit Discussion

There were two separate efforts to consider costs and benefits during this Straw Proposal Phase. These are generally referred to as the Cost Benefit Study (CBS), which is the E3 prepared Western Day Ahead Market Production Cost Impact Study, and the Non-Production Cost (NPC) Study prepared by Utilicast. Additional details can be found in the individual reports that are listed in Section 2.3 above.

The CBS generally found Adjusted Production Cost savings across the different aspects of regional coordination which were specified in the Study. However, to who the benefits accrued varied across the studied conditions. For example, for the region Adjusted Production Cost is \$60 million lower in the EDAM Bookend Case, \$221 million higher in the Main Split Case for the 2026 study period. The majority of WMEG members experience net cost savings in the Main Split Case though some of the members experience cost increases. For all 25 WMEG members summed together, Total Net Costs decline by \$26 million in the Main Split.

In the 2030 case, the CBS provides a data point on benefits that might results from the Consolidation of Balancing Authorities (CBA) and the introduction of an Ancillary Services Market (ASM). The \$10 million annual reduction in regionwide Adjusted Production Cost compared to the Main Split case with enhanced Market Operator coordination is based only on co-optimized reserves procurement on a regional basis and a reduction in flexibility requirements.

In the 2035 case, the additional transmission capability produced a \$387 million reduction in incremental regionwide Adjusted Production Cost. However, this does not reflect the capital cost of constructing new transmission, nor any generation investment savings due to programmatic sharing of load and resource diversity for participating entities, or from more optimized regional resource procurement.

While the Western Day Ahead Market Production Cost Impact Study does a good job in providing overall context for the study cases which were specified, and the savings observed, it is important for members to both interpret their individual results as well as the overall results and for members to consider the context of the study assumptions and which elements are included or not included in the results.

The NPC Study reviewed the costs and benefits associated with Roadmap Elements which did not fit well within the CBS framework. The approach included reviewing the initial and on-going costs associated with comparable efforts – such as the creation of Day-Ahead and Real-Time Markets, Consolidation of Balancing Areas, Consolidation of Transmission Planning and Tariff functions – in other regions. This analysis yields a range of costs and benefits from different sources to provide a basis for analysis.

There is overlap between the functions addressed in the CBS and those covered in the NPC report such as in the case of Consolidation of Balancing Authority Areas. As noted above, the CBS provide estimates for production costs savings associated with a fairly narrow change. Other functions, such as netting of ACE, additional diversity of load and variable energy resources, and centralization of compliance obligations, were not scoped for inclusion in the CBS framework but are still relevant for consideration. The NPC reviewed the benefits SPP and MISO attribute to CBA/ASM and their reported range of \$61 million to \$164 million.

Neither the CBS or the NPC produced an estimate for the potential cost savings due to a reduction in generation investment costs which can be achieved with a larger footprint. In other studies, some of which are cited, the reduction in installed generation capacity costs have provided significant benefits.

Overall, the different components of the WMEG Straw Proposal Phase effort provide a substantial amount of information on different regional collaboration frameworks, the functionality and features of those frameworks, and of costs and benefits of them. This information is one source members can consider as they continue to develop their own paths forward. In doing so it is important to consider the underlying scope and assumptions.

4 Next Steps

The various task forces and subgroups provided recommendations as part of their final work products. The various white papers discuss possible approaches WMEG members could pursue during future regional organizational development efforts and possible continued collaboration topics. These white papers do not attempt to provide the exact approach nor language for such efforts.

The Seams White Paper does provide suggestions for criteria to use when developing efficient energy transactions between market regions, addressing reliability challenges, the need for coordination of market flows on the overall transmission systems, potential changes for regional and interregional transmission planning efforts, and the need to develop cost allocation for transmission projects. This White Paper also discussed many of the technical criteria that are part of a Joint Operating Agreement between market operators, neighboring markets, and Balancing Authorities (BAs). The intermarket transactions and reliability coordination suggestions, along with the JOA discussions, may need to be brought forward into the two regional market development efforts underway with EDAM and Markets+. The transmission planning and cost allocation discussions will likely involve a broader group of stakeholders and may be best handled in a different forum.

The Consolidated Balancing Authority White Paper provides different potential configurations that could be initiated before or integrated with either of the two regional market development efforts underway. There are significant logistical issues with infrastructure to support any resulting change in balancing

authority requirements. There may also be additional market products, such as those to address generation ramping capabilities and ancillary services, that would need developed to support consolidating those legacy balancing areas that join a specific market footprint.

The Transmission Rate Sub-Group White Paper discusses possible approaches for transitioning from multiple utility transmission service rates to a single regional transmission rate system. Future analysis of scenarios with the collected data and transmission service processes could be used to help inform the WMEG, for the benefit of all WMEG participants. WMEG participants could continue exploring the impact that the group would see under de-pancaking scenarios and how revenue distribution might mitigate some of the impacts to member transmission service revenue, and start discussions on the other elements of a regional tariff, to both understand how those elements affect the members and transmission customers, but also to see if whether consensus could be reached on how to promote an acceptable method for use in a regional tariff.

5 Abbreviations

APP	Alternative Pricing Proposal
ASM	Ancillary Service Market
BA	Balancing Authority
CAISO	California Independent System Operator
CBA	Consolidated Balancing Authority
CBS	Cost Benefit Study
E3	Energy and Environmental Economics
EDAM	CAISO Extended Day-Ahead Market
Markets+	SPP Markets Plus
MISO	Midwest Independent System Operator
NPC	Non-Production Costs
RTO	Regional Transmission Organization
SPP	Southwest Power Pool
WEIM	CAISO Western Energy Imbalance Market
WEIS	SPP Western Energy Imbalance Service
WMEG	Western Markets Exploratory Group