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HOW VOLUNTARY ELECTRICITY TRADING CAN HELP EFFICIENCY IN THE SOUTHEAST

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CONTENTS

INTRODUCTION

Encouraged by cost savings, reliability benefits and emissions reductions, electric utilities across much of the United States have banded together to share resources. The Southeast, which is the last frontier for organized wholesale markets, is now contemplating how to improve efficiency through regional energy trade.

Southeastern states have adjusted the cost-of-service monopoly model to modestly accommodate demand for renewable energy, largely for corporate buyers.[1] However, energy bills in the region are high compared to consumer income, and a recent nuclear plant cancellation—which stands to leave residents in South Carolina with a tab in the billions and over 5,000 lost jobs—creates an even more precarious financial situation.[2] Dissatisfaction over such financial mismanagement and demand for more renewable energy have led lawmakers and stakeholders to question whether more fundamental departures from the current utility regulatory model make sense. For example, North Carolina's House Bill 958 could require investor-owned utilities to join or create a regional transmission entity, and both of the Carolinas' legislatures plan to study the potential benefits of such entities.[3] The primary example of a regional transmission entity—a Regional Transmission Organization (RTO)—comes with a governance structure to ensure that the transmission system is transparently operated independently of any particular utility. This helps provide open access to the transmission system, and thus the electricity markets for the organization's member generators. Southeastern utilities, however, emphasize that they want to avoid additional governance and have been discussing more incremental ideas for setting up a voluntary energy exchange.

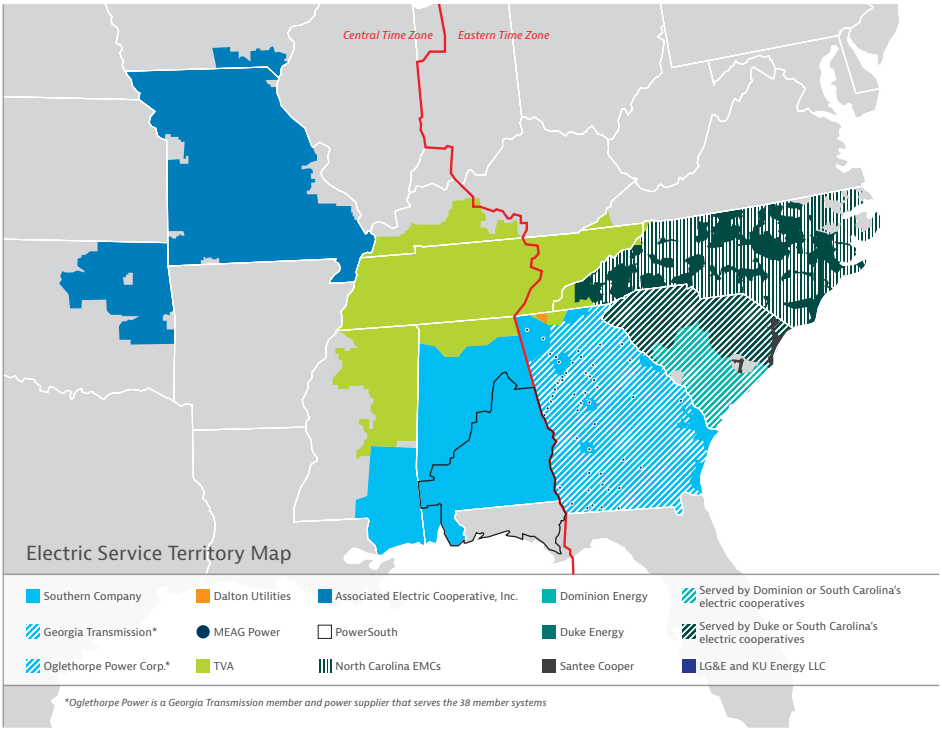
Accordingly, the present study describes various voluntary trading mechanisms, such as energy imbalance markets (EIMs) and several existing mechanisms for voluntary energy exchange in the Southeast. It then suggests that greater net benefits could be derived from a platform transparently operated by an independent entity, which may also preserve a significant degree of autonomy for utilities.

1. Jennifer Chen, "Evaluating Options for Enhancing Wholesale Competition and Implications for the Southeastern United States," Nicholas Institute for Environmental Policy Solutions, March 2020, p. 3. https://nicholasinstitute.duke.edu/publications/evaluating-options-enhancing-wholesale-competition-and-implications-southeastern.

2. Jacob Reynolds, "Former SCANA executive pleaded guilty to conspiracy over failed VC Summer nuclear project" *News19*, July 23, 2020. https://www.wltx.com/article/news/crime/former-scana-executive-pleaded-guilty-to-conspiracy-over-failed-vc-summer-nuclear-project/101-0ab3d333-da8a-4907-bb83-89dd7ced7cce.

3. See, e.g., H.B. 958, Electric Utilities/Allow and Study RTE, April 25, 2019. https://webservices.ncleg.gov/ViewBillDocument/2019/3882/0/DRH40413-RIa-25; H.B. 4940, South Carolina General Assembly 123rd Session, Feb. 12, 2020. https://www.scstatehouse.gov/sess123_2019-2020/prever/4940_20200213.htm; S.B. 998, South Carolina General Assembly 123rd Session, Jan. 14, 2020. https://www.scstatehouse.gov/sess123_2019-2020/prever/998_20200114.htm.

FIGURE I: POTENTIAL SOUTHEAST ENERGY EXCHANGE MARKET FOOTPRINT



SOURCE: Southern Company.

DISCUSSIONS OF A SOUTHEAST ENERGY EXCHANGE MARKET

A group of utilities including Duke, Dominion Energy South Carolina, Southern Company, Associated Cooperative and the Tennessee Valley Authority, have disclosed that they have been discussing a Southeast Energy Exchange Market (SEEM), which would be an automated and voluntary platform that matches buyers and sellers.[4] This exchange could cover all or parts of ten states, as shown in Figure 1 above. Florida, which has utility plans to spend big on solar, is absent from this conversation so far.[5]

The SEEM utilities emphasize that they do not want governing authorities enforcing sales or requiring that transmission capacity be reserved to ensure that sales can be delivered. The group is considering bilateral sales every 15 minutes because to support more frequent sales would require more control by a governing entity. This also makes day-ahead energy trading over SEEM unlikely.[6] In comparison, five-minute dispatch intervals were adopted in organized wholesale electricity markets because they reduce operating costs and regulation requirements. Shorter intervals can also facilitate renewable energy integration, and day-ahead scheduling has been cited as important on that issue.[7] Some stakeholders are concerned that discussions have been conducted without their knowledge and are keen to see a governance structure that is more independent of the utilities.[8]

ORGANIZED WHOLESALE ELECTRICITY MARKETS EXPLAINED

Organized wholesale electricity markets have reduced wholesale energy costs and displaced less efficient, more polluting resources with cheaper, cleaner technologies in the United States. They have also enhanced the flexibility of the power system to balance variable renewable generation and adapt to sudden disturbances.[9]

4. Iulia Gheorghiu, "Duke, Southern plan path for Southeast Energy Imbalance Market," *Utility Dive*, July 14, 2020. https://www.utilitydive.com/news/duke-southern-plan-path-for-southeast-energy-imbalance-market/581556.

5. See, e.g., Mark Watson, "Florida 100% renewables bill likely to struggle, even as Duke adds solar," *S&P Global*, Jan. 28, 2020. https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/012820-florida-100-renewables-bill-likely-to-struggle-even-as-duke-adds-solar.

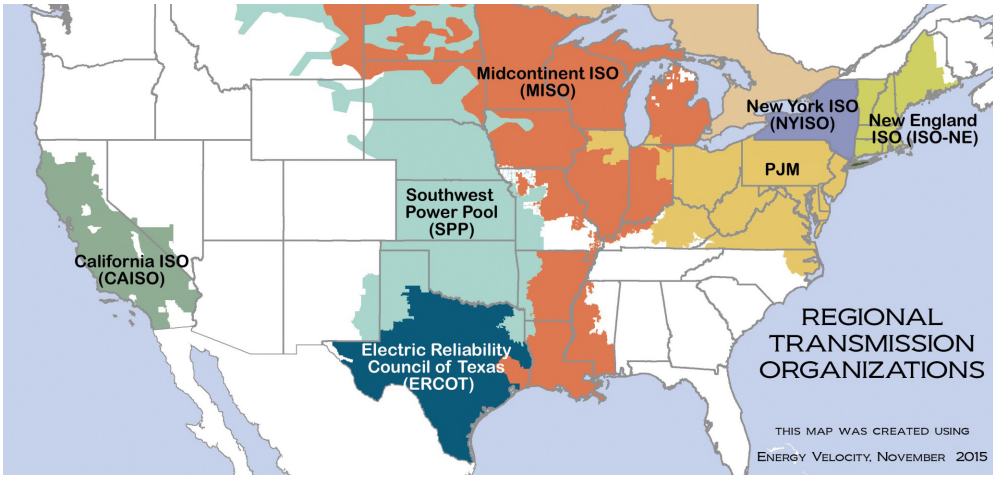
6. John Downey, "How Duke Energy could join other power giants to remake Southeast markets," *Charlotte Business Journal,* July 22, 2020. https://www.bizjournals.com/charlotte/news/2020/07/17/duke-energy-partners-local-control-for-se-market.html.

7. See, e.g., L. Bird et al., "Integrating Variable Renewable Energy: Challenges and Solutions," National Renewable Energy Laboratory, September 2013, pp. 5-6. https://www.nrel.gov/docs/fy13osti/60451.pdf; "Extending the Day-Ahead Market to EIM Entities," California Independent System Operator, Oct. 10, 2019, p. 7. http://www.caiso.com/InitiativeDocuments/IssuePaper-ExtendedDayAheadMarket.pdf.

8. Gheorghiu. https://www.utilitydive.com/news/duke-southern-plan-path-for-southeast-energy-imbalance-market/581556.

9. Chen, pp. 24-32. https://nicholasinstitute.duke.edu/publications/evaluating-options-enhancing-wholesale-competition-and-implications-southeastern.

FIGURE 2: REGIONAL TRANSMISSION ORGANIZATIONS



SOURCE: Federal Energy Regulatory Commission.

These markets are run by Regional Transmission Organizations (RTOs), which are independent, largely nonprofit organizations responsible for transmission grid reliability, planning and operation.[10] RTOs have a number of features to help ensure that generation, demand-side resources and energy storage can fairly compete, and thus promote efficiency and reduce system costs. First, RTOs independently operate the transmission system on behalf of their transmission-owning members. Second, RTO markets are independently monitored for market power abuses and manipulation. Finally, federally regulated RTOs are governed by boards that are independent of any market participants. Roughly two-thirds of the United States are currently served by RTOs, as shown in Figure 2 above.

Because RTOs operate the transmission system within their own footprints, they can optimize the entire system using sophisticated market architecture to meet customer demand with a wider array of energy resources. RTOs schedule the least-cost resources a day in advance and dispatch them over five-minute intervals. Transactions are settled on the same timeframe to ensure that prices reflect the value of energy within those intervals.[11] This incentivizes resource-owners to adjust their output over these times periods.

Overview of Energy Imbalance Markets

As shown in Figures 3 and 5 below, utilities in the non-RTO West are joining energy imbalance markets (EIMs), which leverage neighboring RTOs' existing platforms to allow limited, voluntary, real-time energy trades without becoming RTO members.

An EIM is an energy market operated by an RTO that allows utilities outside of the RTO limited, real-time trade.[12] The RTO running the EIM manages dispatch, transmission congestion, pricing and settlement associated with running a real-time energy imbalance market. All other grid operator functions are retained by the participating utilities.

EIMs do not require the participating utility to join an RTO, which would require conveying operational control of their transmission systems. Utilities that participate in an EIM are typically vertically integrated and retain control over their own systems.[13] These utilities satisfy their own customer energy needs first and then, through the EIM, transact any excess energy or meet demand at lower cost. The utilities can allow a redispatch of generation to meet their commitments, including bilateral trades. They can also ensure that certain generators are limited or not re-dispatched. Participants can offer reserved transmission service for EIM transfers in advance, and closer to real-time, unscheduled transmission capacity is made available for EIM transfers.[14]

An EIM leverages the RTO's existing architecture to optimize system-wide efficiency to reduce costs. It also leverages the RTO's status as an independent entity and its market monitoring. Thus, an EIM can be a cost-effective way for

10. Devin Hartman, "Federal Power Act and Organized Electricity Markets," *R Street Electricity 101 Series* No. 1, August 2016, p. 2. https://www.ourenergypolicy.org/wp-content/uploads/2016/12/Electricity1-5.pdf. Note: Except for the Electric Reliability Council of Tex-as (ERCOT), RTOs are regulated by the Federal Energy Regulatory Commission. This paper refers to RTOs and Independent System Operators (ISOs) as simply RTOs, as the distinction is irrelevant to the present discussion.

11. Federal Energy Regulatory Commission (FERC), *Order No. 825: Settlement Intervals and Shortage Pricing in Markets Operated by Regional Transmission Organizations and Independent System Operators*, June 16, 2016. https://www.ferc.gov/sites/default/files/2020-05/settlement825.pdf.

12. Chen, pp. 8-18. https://nicholasinstitute.duke.edu/publications/evaluating-options-enhancing-wholesale-competition-and-implications-southeastern.

13. "Western EIM FAQ," California Independent System Operator, December 2019. https://www.caiso.com/Documents/EnergyImbalanceMarketFAQs.pdf.

14. See, e.g., "Extending the Day-Ahead Market to EIM Entities," p. 3. http://www.caiso.com/InitiativeDocuments/IssuePaper-ExtendedDayAheadMarket.pdf.

a utility to achieve some of the benefits of an RTO, while retaining its autonomy. However, the downside to only trading real-time energy imbalances is their relatively small volumes. Typically, only about 5 percent of all energy transactions in RTOs are scheduled in the real-time market, and the rest are scheduled a day ahead.[15] Thus, the percentage of energy transactions met by the EIM could be even smaller.

An EIM produces transparent prices every five minutes at each node on the grid. These "locational marginal prices" can inform operational and investment decisions in generation transmission or newer, flexible resources like demand response and energy storage. Locational marginal prices reflect the incremental cost of operating the marginal resource on the transmission system—plus any additional, marginal costs caused by transmission constraints and line losses, which are location-specific and can vary widely across the system.[16] In contrast, the bilateral SEEM market does not produce a single market clearing price and would not be able to provide the same quality of information as locational marginal prices.

The shorter, five-minute dispatch intervals can produce prices that incentivize flexible generation and demand to quickly bring the system into balance. Separately, shorter lead times up to these intervals, during which generators schedule their bids, allow them to account for better information available closer to real-time and reduce the reserves needed due to uncertainty. These shorter dispatch and scheduling intervals reduce renewable integration costs.[17]

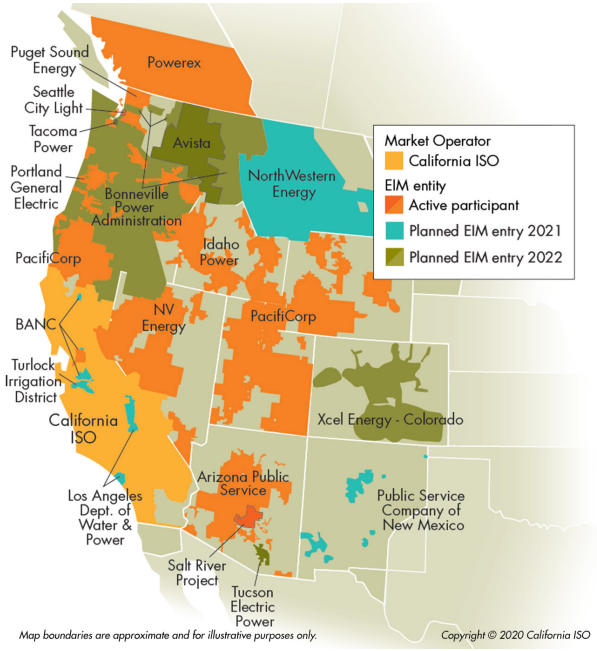
Additionally, granular pricing information by location and generator dispatch enables grid operators to identify and mitigate transmission congestion, thus helping to increase use of transmission assets. Similarly, an EIM can manage real-time changes, such as a sudden outage, by dispatching resources within five-minute cycles. The tools used to run the EIM will enable operators to have better awareness of grid conditions and improved ability to address reliability issues.[18]

The amount costs and emissions can be reduced depends on the diversity of supply and load, and the level of voluntary participation. For example, the Western EIM operated by the California Independent System Operator (CAISO) includes a resource mix of low-cost but variable wind and solar, hydro that can help store excess generation and customer demand for renewable, emissions-free resources driven by state climate policy. This diversity and broader geographic footprint help balance the system at lower cost, including lower curtailments of zero-marginal cost generation and reduced reserve requirements. Further, good governance, transparency and a system that is independently operated and monitored may provide confidence for regulators, investors and participants that the market offers a fair competitive field.

CAISO's Western EIM

The CAISO began operating its Western EIM in 2014 and includes more than 20 current and prospective utilities.[19] Collectively, these entities serve over 75 percent of the load in the Western Electricity Coordinating Council.[20]

FIGURE 3: CURRENT AND PLANNED PARTICIPANTS IN CAISO'S WESTERN EIM



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Utilities must own transmission to join because the EIM relies on its members sharing available transmission without additional transmission fees. Thus, generation-only

15. See, e.g., FERC, *Energy Primer*, U.S. Dept. of Energy, April 2020, p. 62. https://www.ferc.gov/sites/default/files/2020-06/energy-primer-2020_0.pdf; "Letter to Chair Linvill and EIM Governing Body from EIM Participants," Sept. 16, 2019, p. 1. http://www.caiso.com/Documents/PublicCommentLetter-EIMEntites-EDAM-Sep16-2019.pdf.

16. See, e.g., "FAQs: Locational Marginal Pricing," ISO New England, last accessed Aug. 10, 2020. https://www.iso-ne.com/participate/support/faq/lmp.

17. Bird et al., pp. 4-6. https://www.nrel.gov/docs/fy13osti/60451.pdf.

18. "Federal Energy Regulatory Commission staff paper: Qualitative Assessment of Potential Reliability Benefits from a Western Energy Imbalance Market," FERC, Feb. 26, 2013. http://www.caiso.com/Documents/QualitativeAssessment-PotentialReliabilityBenefits-WesternEnergyImbalanceMarket.pdf.

19. Western Energy Imbalance Market (WEIM), "About," California Independent System Operator Corp., last accessed Aug. 8, 2020. https://www.westerneim.com/Pages/About/default.aspx.

20. Western EIM, "Western EIM Benefits Report Third Quarter 2019," CAISO, Oct. 29, 2019, p. 19. https://www.westerneim.com/Documents/ISO-EIMBenefitsReportQ3-2019.pdf.

companies, such as renewables developers, would need to schedule through an EIM participant to gain access to the market. It is up to the EIM participant whether it will facilitate another company's participation.

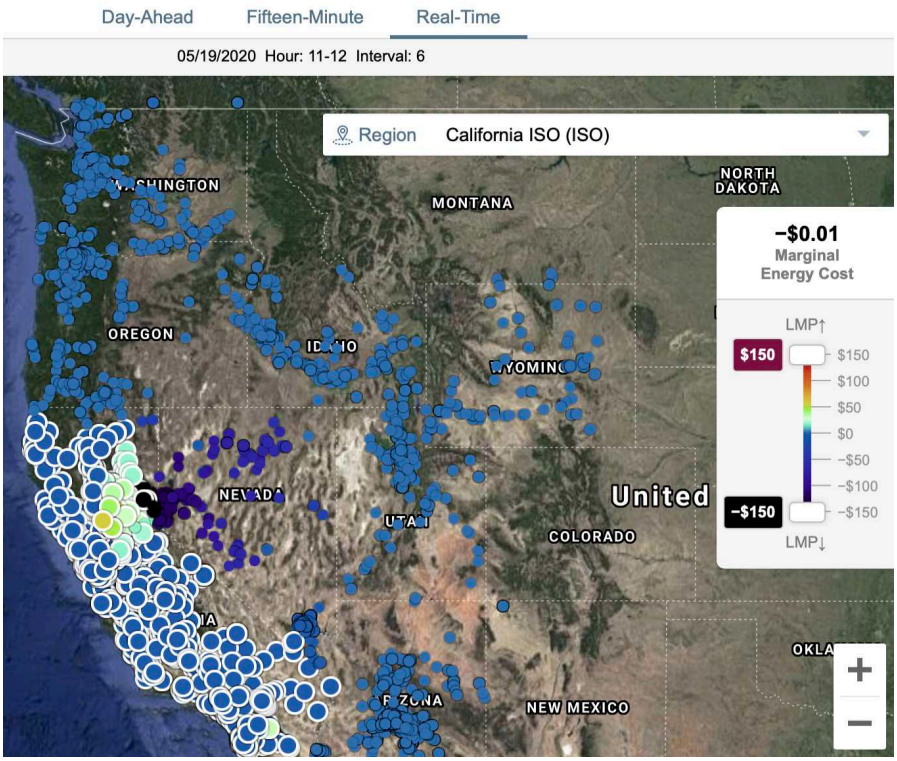
The Western EIM currently balances supply and demand over five- and 15-minute intervals while respecting bilateral contracts.[21] It may also add a day-ahead market.[22] Actual gross benefits have reached $1 billion for the Western EIM from its start in November 2014 through July 3, 2020.[23]

Avoided renewables curtailment can reduce emissions by displacing fossil-fired generation. The total avoided renewable curtailment since 2015 is estimated at 1,246,404 megawatt-hours, equivalent to 533,381 metric tons of CO_2.[24] The Western EIM saved its participants 47-54 percent of the amount of flexible ramping capacity they would have needed individually.[25]

Day-ahead scheduling across a larger footprint can improve efficiency from better coordinated unit commitment and increased diversity and renewables integration benefits. Production cost savings for the day-ahead market have been estimated at $119–$227 million per year, depending on the level of participation.[26]

Figure 4 below shows a snapshot of prices at each node on the map. The prices reflect the short-term marginal cost of energy, given system constraints. These prices are thus reasonable approximations for the short-term marginal value of energy, and utilities are starting to use them for applications like time-of-use rate design.[27]

FIGURE 4: REAL-TIME ENERGY PRICES IN WESTERN EIM



SOURCE: CAISO Market Price Maps. *Licensed with permission from the California ISO. Any statements, conclusions, summaries or other commentaries expressed herein do not reflect the opinions or endorsement of the California ISO.*

21. "About." https://www.westerneim.com/Pages/About/default.aspx.

22. "Extending the Day-Ahead Market to EIM Entities." http://www.caiso.com/InitiativeDocuments/IssuePaper-ExtendedDayAheadMarket.pdf.

23. "Benefits," Western Energy Imbalance Market (EIM), last accessed Aug. 8, 2020. https://www.westerneim; Western EIM, "Western EIM Benefits Report: Second Quarter 2020," CAI-SO, July 29, 2020, p. 18. https://www.westerneim.com/Documents/ISO-EIMBenefitsReportQ2-2020.pdf.

24. Western EIM, "Western EIM Benefits Report: Second Quarter 2020," CAISO, July 29, 2020, p. 18. https://www.westerneim.com/Documents/ISO-EIMBenefitsReportQ2-2020.pdf .

25. Ibid., p. 21.

26. "Extended Day-Ahead Market Feasibility Assessment—Update from EIM Entities," EIM Entities, Oct. 3, 2019, p. 18. https://www.caiso.com/Documents/Presentation-ExtendedDay-AheadMarketFeasibilityAssessmentUpdate-EIMEntities-Oct3-2019.pdf.

27. See, e.g., "Direct Testimony of Robert M. Meredith," The Public Service Commission of the State of Utah, Docket No. 20-035-04, May 2020, pp. 16, 34 and 50. https://www.rockymountainpower.net/content/dam/pcorp/documents/en/rockymountainpower/rates-regulation/utah/filings/docket-20-035-04/05-08-20-application/15_Meredith_Testimony_and_Exhibit.pdf.

TABLE I: ESTIMATED AND ACTUAL UTILITY SAVINGS IN JOINING CAISO WESTERN EIM

Region	Study	Projected Benefits in Millions $	Actual Cumulative Gross Benefits in Millions $
PacifiCorp	Energy and Environmental Economics, "PacifiCorp-ISO Energy Imbalance Market Benefits," March 13, 2013. https://www.westerneim.com/Documents/PacifiCorp-ISOEnergyImbalanceMarketBenefits.pdf.	2017 gross dispatch savings: $16.4-$40.8 Including flexibility reserves and renewable curtailment savings, total 2017 gross savings: $21-$129.	$251.55 (since November 2014)
NV Energy joins EIM (w/ CAISO & PacifiCorp)	Energy and Environmental Economics, "NV Energy-ISO EIM Economic Assessment," March 25, 2014. https://www.westerneim.com/Documents/NV_Energy-ISO-EnergyImbalanceMarketEconomicAssessment.pdf.	2017 savings: $7.8. Incremental 2017 benefits to other 2 utilities: $6.0.	$99.12 (since December 2015)
Arizona Public Service joins EIM (w/CAISO, PacifiCorp and NV Energy)	Energy and Environmental Economics, "APS Energy Imbalance Market Participation: Economic Benefits Assessment," April 2015. https://www.westerneim.com/Documents/ArizonaPublicService-ISO-EnergyImbalanceMarketEconomicAssessment.pdf	Dispatch efficiency savings for APS $8.9/year (2020). APS also saved $1.0-$3.2 in flexibility reserves. Dispatch savings for other 3 utilities: $1.4/year.	$157.98 (since October 2016)
Puget Sound joins EIM (w/ CAISO, PacifiCorp and NV Energy)	Energy and Environmental Economics, "Benefits Analysis of Puget Sound Energy's Participation in the ISO Energy Imbalance Market," September 2014. https://www.westerneim.com/Documents/PugetSound-ISO_EnergyImbalanceMarket-BenefitsAnalysis.pdf	2020 gross dispatch savings: $17.6. $9.1/year in balancing costs for external wind resources. $0.8/year in renewable curtailments. Incremental savings to other 3 utilities: $3.5-$4.2/year.	$46.07 (since October 2016)
Portland General joins EIM (w/CAISO, PacifiCorp, NV Energy and Puget)	Energy and Environmental Economics, "PGE EIM Comparative Study: Economic Analysis Report," Nov. 6, 2015. https://edocs.puc.state.or.us/efdocs/HAD/lc56had152028.pdf	2020 gross benefits: $2.7 from sub-hourly dispatch. $0.8 on flexibility reserves. Incremental savings to other 4 utilities: $2.7-$3.7.	$89.35 (since October 2017)

NOTE: All data in the Actual Cumulative Gross column is from "Benefits," Western Energy Imbalance Market, June 2020. https://www.westerneim.com/Pages/About/QuarterlyBenefits.aspx.

Utilities' EIM experiences have produced benefits that exceed their estimated costs of joining. For example, the Arizona Public Service (APS) cost-benefit analysis for joining the Western EIM estimated that sub-hourly dispatch savings (compared to relying on bilateral trades on an hourly basis) and savings in flexibility reserves would range from $7 to $18 million annually. In fact, APS' actual gross savings have been much higher at about $34 million in 2017, $45 million in 2018 and $54 million in 2019.[28] The APS estimated implementation to cost $13-$19 million, including metering upgrades, software for communications with the EIM and settlements, business process changes and tariff changes. The ongoing costs, estimated at $4 million annually, included software license renewal, staffing for EIM-related roles, and fees to the CAISO for running and managing the EIM.[29] Additional examples on the estimated and actual utility savings generated by joining the CAISO Western EIM are detailed in Table 1 above.

SPP's Western Energy Imbalance Service Market

The Southwest Power Pool (SPP), which became an RTO in 2004, operated an energy imbalance service in its Eastern Interconnection footprint from 2007 until 2014, when that EIM was incorporated into a full energy market.[30] The minimum qualifications for an RTO include a market mechanism for congestion management, which can be provided by running an imbalance service.[31] The EIM participants estimated their energy usage and submitted a schedule of when they were going to operate each generator. Prices were calculated every five minutes, averaged to hourly settlement prices and reflected the incremental cost of delivering energy to specific locations.[32] This EIM produced about $173 million in net benefits annually from 2007 to 2013.[33] The SPP expanded its market in 2014 to include day-ahead energy and operating reserves, and saw a total savings of $2.7 billion over the first five years.[34]

28. "Benefits." https://www.westerneim.com/Pages/About/QuarterlyBenefits.aspx.

29. Brad Albert, "Letter RE: Energy Imbalance Market: Integrated Resource Planning," Arizona Corpo-ration Commission, Docket No. E-00000V-13-0070, April 17, 2015, p. 4. https://images.edocket.azcc.gov/docketpdf/0000161758.pdf.

30. See, e.g., Nathania Sawyer and Les Dillahunty, *The Power Relationships: 75 Years of SPP South-west Power Pool* (Southwest Power Pool, 2016), p. 124. https://www.spp.org/documents/46282/spp-75th-anniversary-online.pdf; "Integrated Marketplace," SPP, last accessed Aug. 8, 2020. https://www.spp.org/markets-operations/integrated-marketplace; "Western Energy Imbalance Service Market (WEIS)," SPP, last accessed Aug. 8, 2020. https://www.spp.org/weis.

31. FERC, *Order No. 2000: Regional Transmission Organizations*, Dec. 20, 1999. https://ferc.gov/sites/default/files/2020-06/RM99-2-00K_1.pdf.

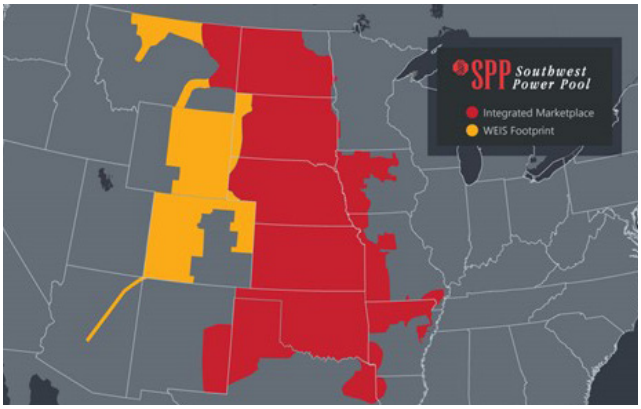
32. Sawyer and Dillahunty, p. 123. https://www.spp.org/documents/46282/spp-75th-anniversary-online.pdf.

33. "SPP Western Energy Imbalance Service Market (WEIS) Overview," SPP, Nov. 11, 2019, p. 7. https://www.wapa.gov/regions/DSW/Rates/Documents/SPP%20WAPA%20DSW%20Presentation%2011-12-19.pdf.

34. Derek Wingfield, "As it turns five, Southwest Power Pool's Integrated Marketplace is saving billions and enabling big changes in energy dispatch," Press Release, Feb. 28, 2019. https://www.spp.org/newsroom/press-releases/as-it-turns-five-southwest-power-pool-s-integrated-marketplace-is-saving-billions-and-enabling-big-changes-in-energy-dispatch.

Now, the SPP is launching the Western Energy Imbalance Service Market (WEIS) to centrally dispatch energy every five minutes for participating utilities in the Western Interconnection starting in early 2021.[35] The WEIS will leverage available transmission capacity in the market footprint at no additional charge to participants.[36] Utilities do not have to become members of the SPP RTO to participate. Each utility will be responsible for the generation needed to meet its obligation to balance their customer demand with resources in their footprints.[37] Basin Electric Power Cooperative, Tri-State Generation and Transmission Association, Wyoming Municipal Power Agency, Municipal Energy Agency of Nebraska, Western Area Power Administration (including WAPA Colorado River Storage Project, WAPA Rocky Mountain Region and WAPA Upper Great Plains Region) and Deseret Power Electric Cooperative have announced they are joining the SPP's new contract service.[38] Figure 5 below shows this combined footprint.

FIGURE 5: COMBINED FOOTPRINTS OF UTILITIES JOINING SPP'S PROPOSED EIM



SOURCE: Western Energy Imbalance Service Market (with permission to use from SPP). https://spp.org/weis.

The SPP filed its proposal with the FERC earlier this year. However, it recently rejected the proposal "without prejudice," and offered guidance on how the SPP can address its concerns about transmission usage, resource adequacy and other issues in a modified proposal.[39] The SPP plans to refile.

Regulatory Approvals and Governance

Rules that govern wholesale electricity rates are within the FERC's jurisdiction, and utilities that wish to join the EIM must seek FERC approval. Utilities that seek to recover costs from ratepayers—including costs borne to join and participate in an EIM—require state public utility commission approval.[40]

Good governance can help ensure transparency and a fair playing field, which are important to build confidence in a market platform and attract participation. Additionally, good governance can facilitate input from stakeholders and help align public utility actions with the public interest and policy goals. For example, RTO processes are evaluated based on their inclusiveness, fairness in balancing diverse interests, representation of minority positions and ongoing responsiveness.[41]

The Western EIM is governed by a five-member Governing Body with delegated authority from the CAISO Board of Governors on rules specific to EIM participation.[42] The EIM Governing Body can advise the Board of Governors on other rules involving CAISO's real-time market.[43] Members are nominated by a committee of stakeholders including transmission owners, publicly owned utilities, suppliers and marketers of generation and energy service providers, state regulators, the EIM Governing Body, the CAISO Board of Governors and public interest and consumer advocacy groups.[44] The latter three participate in committee discussions but do not vote. The committee attempts to nominate candidates with a diverse range of expertise and geographic backgrounds.

The Western EIM's Body of State Regulators is a forum on developments relevant to state responsibilities.[45] It consists of one commissioner from each state public utility commis-

35. See, e.g., "Western Energy Imbalance Service Market." https://spp.org/weis; Derek Wingfield, "SPP proposes Western Energy Imbalance Service Market to bring cost savings and grid modernization to the west," Press Release, June 17, 2019. https://spp.org/newsroom/press-releases/spp-proposes-western-energy-imbalance-service-market-to-bring-cost-savings-and-grid-modernization-to-the-west.

36. Christopher M. Nolen, "Letter RE: Southwest Power Pool, Inc., Docket Nos. ER20-1059-000 and ER20-1060-000, Submission of Western Energy Imbalance Service Market Tariff, Western Joint Dis-patch Agreements, and the Western Markets Executive Committee Charter," SPP, Feb. 21, 2020, pp. 18-19. https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=15468364.

37. "A Proposal for the Southwest Power Pool Western Energy Imbalance Service Market," SPP, last accessed Aug. 3, 2020, pp. 5-8. https://www.spp.org/documents/60104/a%20proposal%20for%20spp's%20western%20energy%20imbalance%20service%20market.pdf.

38. "Western Energy Imbalance Service Market." https://spp.org/weis.

39. FERC, *Order on Proposed Tariff*, Docket Nos. ER20-1059, ER20-1060, July 31, 2020.

40. See, e.g., The Public Service Commission of Utah, *Report and Order: PacifiCorp dba Rocky Mountain Power 2014 General Rate Case*, Docket No. 13-035-184, Aug. 29, 2014. https://pscdocs.utah.gov/electric/13docs/13035184/260065135184rao.pdf.

41. FERC, *Order No. 719: Wholesale Competition in Regions with Organized Electric Markets*, Oct. 17, 2008. https://ferc.gov/sites/default/files/2020-06/OrderNo.719.pdf.

42. Jennifer Rotz, "Selection Policy for the EIM Governing Body (as adopted)," CAISO, Nov. 28, 2016, p. 2. https://www.westerneim.com/Documents/SelectionPolicy_EIMGoverningBody.pdf.

43. "Charter for Energy Imbalance Market Governance," CAISO, March 27, 2019, p. 3. https://www.westerneim.com/Documents/CharterforEnergyImbalanceMarketGovernance.pdf.

44. Rotz, pp. 2-3. https://www.westerneim.com/Documents/SelectionPolicy_EIMGoverningBody.pdf.

45. Western EIM, "Body of State Regulators," CAISO, last accessed Aug. 3, 2020. https://www.westerneim.com/Pages/Governance/EIMBodyofStateRegulators.aspx.

sion in which a load-serving utility participates in the market. The Body may express a common position in the CAISO stakeholder process or to the EIM Governing Body on EIM issues. Its members are not restricted from taking any position before the FERC or any other forum concerning EIM or CAISO matters.

The Western EIM Governance Review Committee (GRC) is a temporary advisory group that will identify refinements to the EIM governance structure reflecting the evolution of the EIM, including potential governance changes if a day-ahead market is added.[46] The GRC's proposed revisions will be considered by the EIM Governing Body and the CAISO Board of Governors.

The SPP will establish a Western Markets Executive Committee (WMEC) comprised of representatives from each non-affiliated participant.[47] The WMEC will have authority to approve or reject proposed EIM tariff amendments, provide consultation to the SPP on the administrative rate charged to participants and recommend proposed amendments to the participant agreement. The SPP's independent board of directors will provide oversight of the SPP's administration of the EIM, however, they will give significant recognition to the WMEC's decision-making role. Any WMEC action or inaction may be appealed to the SPP Board of Directors for final resolution.

A Standalone EIM

Southeastern utilities could join an EIM offered by a neighboring RTO without having to join that RTO. Doing so would leverage the existing market expertise, and the hardware and software of an RTO, and thus would reduce the startup and implementation costs of a market. The RTO's market monitor can also monitor the EIM. Alternatively, Southeastern utilities could potentially form and operate an EIM, but they would have to recruit expert staff and build hardware and software, which are likely to incur more costs than leveraging the architecture and staff expertise of an existing RTO. Further, EIM participation requires utilities to share potential commercially sensitive data with the EIM operator. This has not been a concern for RTO-operated EIMs as they are independent from market participants, but could be an issue if a participating utility also operates the market. Without an independent operator, certain utilities may be in a better position to exercise market power. The FERC has emphasized independence as a bedrock principle for RTOs, ISOs and transcos.[48] While a standalone EIM is not any of these entities, it is apparent that independence—both real and perceived—is important to the FERC.

LESS-STRUCTURED WHOLESALE TRADING AGREEMENTS

The non-RTO Southeast has a number of trading arrangements between utilities, but volumes are low and virtually all physical sales are done bilaterally. Price data is therefore scarce, and the Intercontinental Exchange—a leading power brokerage platform—does not provide a financial product in the Southeast.[49] Price data can help regulators determine whether customers are indeed paying for lowest-cost generation, and whether investments other than what cost-of-service utilities are proposing are the most cost-effective.

Southern Company holds auctions for day-ahead and hour-ahead energy within the Southern Balancing Authority Area. Its website states that: "The purpose of the energy auction is to resolve perceptions that Southern Company could exercise horizontal market power through the physical or economic withholding of generation."[50] To mitigate potential market power abuse, Southern Company must offer all of its available uncommitted, thermal generation capacity into the auction after reserve requirements are met.[51] The auction is not an automated trading platform. Rather, it matches parties to facilitate bilateral transactions by sorting offers in ascending order and bids in descending order.[52] While the auction has an independent administrator, its role is largely bookkeeping, and Southern Company is the official operator.[53] In 2015, the FERC launched a section 206 investigation because auction activity had been sparse since its inception in 2009.[54] The website posts average hour-ahead purchases

46. Western EIM, "Governance Review Committee," CAISO, last accessed Aug. 3, 2020. https://www.westerneim.com/Pages/Governance/GovernanceReviewCommittee.aspx.

47. "Western Markets Executive Committee Charter," SPP, May 15, 2020, p. 4. https://spp.org/documents/61046/wmec%20charter%2020200515.pdf.

48. *Order No. 2000: Regional Transmission Organizations*, p. 193. https://ferc.gov/sites/default/files/2020-06/RM99-2-00K_1.pdf.

49. See, e.g., *Energy Primer*, p. 71. https://www.ferc.gov/sites/default/files/2020-06/energy-primer-2020_0.pdf; Chen, p. 20. https://nicholasinstitute.duke.edu/publications/evaluating-options-enhancing-wholesale-competition-and-implications-southeastern.

50. "General Auction Information," Southern Company, last accessed Aug. 3, 2020. https://www.southerncompany.com/about-us/energy-auction/general-auction-information.html.

51. *Energy Primer,* p. 71. https://www.ferc.gov/sites/default/files/2020-06/energy-primer-2020_0.pdf.

52. Alabama Power Company, "Rules of the Energy Auction," Southern Company, Feb. 2, 2017, §§ 5.4-6.5. https://www.southerncompany.com/content/dam/southern-company/pdf/energyauction/Rules-of-the-Energy-Auction-MBR-Tariff.pdf.

53. Alabama Power Company, "Rules on Southern Companies' Energy Auction Participation," Southern Company, Feb. 2, 2017, §§ 2.1A and 2.1B. https://www.southerncompany.com/content/dam/southern-compa-ny/pdf/energyauction/Participation%20Rules%20of%20the%20Energy%20Auction%20with%20Appendices%20MBR%20Tariff.pdf.

54. See, e.g., FERC, *Order on Updated Market Power Analysis, Instituting Section 206 Proceeding and Establishing Refund Effective Date*, April 27, 2015, pp. 7-8. https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=13854842; FERC, *Order Accepting Market-Based Rate Tariff Revisions Subject to Condition*, Feb. 2, 2017, p. 18. https://elibrary.ferc.gov/IDMWS/common/opennat.asp?fileID=14482652.

and sales a day after the transactions. However, for most days of the year, the auction does not report any transactions.[55] Its market monitor performs limited functions compared to independent market monitors for RTOs who are tasked to identify ineffective market rules and recommend proposed fixes.[56] Nearly all of the data is redacted in the public version of the energy auction monitoring report.[57]

Southern Company also operates a power pool among its affiliates Georgia Power, Alabama Power and Mississippi Power.[58] The main function is to centrally dispatch excess resources—except for conventional hydro and nuclear power—beyond that needed for each utility to serve its own customers. These resources are obtained through bilateral transactions and thus energy prices and volumes are determined through contracts in advance. The centralized dispatch schedules resources according to variable costs rather than generator bids, subject to constraints and obligations across the region. Transactions are hourly—compared to every five minutes for RTOs and EIMs.[59]

Joint dispatch agreements exist between a number of utilities in non-RTO regions. Duke Energy Carolinas and Carolina Power & Light (now Duke Energy Progress) agreed to jointly dispatch some generation as a condition to the merger of Duke Energy and Progress Energy.[60] Duke Energy Carolinas dispatches the companies' generation resources to meet customer demand subject to reliability, contractual requirements and transmission constraints.[61] Payments are settled hourly.[62] The estimated cost-savings from joint dispatch of generation were $364.2 million from 2012 through 2016, and improved practices for fuel procurement and use were estimated to save $330.7 million over the same five-year period.[63]

As proposed, the SEEM is a step up from how energy is currently traded in the Southeast, but the projected net savings appear to be small compared to the net benefits utilities have reaped through EIMs. As modeled, SEEM is anticipated to save 0.35-0.40 percent of total production costs regionally in the base case. That amounts to projected savings between $37-46 million in 2022, $43-$54 million in 2027, $41-$50 million in 2032 and $44-$55 million in 2037. In a carbon-constrained scenario, the savings increase over time, beginning with $56-$70 million in 2027 and reaching $117-$146 million in 2037. These projections exceed estimated costs, which are about $5 million in startup costs and $0.750-$3 million in annual costs region-wide.[64] In comparison, a 2005 study performed by the same consultancy to weigh the costs and benefits of SPP establishing an EIM found a 2.5 percent savings in annual production costs. The SPP in 2005 was about 40 gigawatts, and the net benefits were estimated to be $373 million to the transmission owners over the ten-year study period.[65] There was no carbon-constrained scenario in the SPP study, and 2005 was before the buildout of wind took off in the SPP. With a fleet of potentially 170 gigawatts, the SEEM could be more than four times larger than the SPP in 2005.[66] The savings from the SEEM are thus diluted over a larger system. To the extent that these two systems—both consisting of vertically integrated utilities with significant fleets of baseload generation—may be compared, the projected net benefits from the 2005 study of SPP's EIM were higher on a per- gigawatt basis by a factor of three. Note that joining an existing EIM would be less costly than building a new one, as modeled in the SPP study, and thus the net benefits would be even greater.

CONCLUSION

The benefits to enhanced trading between utilities and resource sharing across broader regions can be substantial.[67] Current regulatory constructs and voluntary trading mech-

55. See, e.g., Southern Company, "Announcement," Press Release, Feb. 21, 2017. https://www.southerncompany.com/about-us/energy-auction/announcement.html; "Auction Clearing Prices," Southern Company, last accessed Aug. 3, 2020. https://www.southerncompany.com/about-us/energy-auction/auction-clearing-prices.html.

56. See, e.g., "Rules on Southern Companies' Energy Auction Participation," § 3.3. https://www.southerncompany.com/content/dam/southern-compa-ny/pdf/energy-auction/Participation%20Rules%20of%20the%20Energy%20Auction%20with%20Appendices%20MBR%20Tariff.pdf; *Order No. 719: Wholesale Competition in Regions with Organized Electric Markets*, pp. 3-4. https://ferc.gov/sites/default/files/2020-06/OrderNo.719.pdf.

57. See, e.g., The Brattle Group, "Tenth Annual Informational Report of the Independent Auction Mon-itor," Southern Company, June 28, 2019, pp. 4-5, 8, 9, Appendices B, C. https://www.southerncompany.com/content/dam/southern-company/pdf/energyauction/Informational-Report-2019-PUBLIC.pdf.

58. Charles D. Long, "Southern Company System Intercompany Interchange Contract" Southern Com-pany, May 18, 2007, p. 1. https://www.southerncompany.com/content/dam/southern-company/pdf/energyauction/Intercompany-Interchange-Contract-5-18-07.pdf.

59. Ibid., pp. 12, 23.

60. See, e.g., Duke Energy Corp. and Progress Energy, Inc., 139 FERC ¶ 61, 193 (2012); *Order denying reh'g*, 151 FERC ¶ 61, 242 (2015); *Order on remand, Orangeburg, S. Carolina v. FERC*, 862 F.3d 1071 (D.C. Cir. 2017); *Order on remand*, 166 FERC ¶ 61, 112 (2019); Duke Energy Corp. and Progress Energy, Inc., "Joint Dispatch Agreement Between Duke Energy Carolinas, LLC Carolina Power & Light Company," 2011. https://dms.psc.sc.gov/Attachments/Matter/f01eecfc-f7e6-482e-b733-d02df9f63335.

61. Duke Energy, 151 FERC ¶ 61, 242, p. 12.

62. "Joint Dispatch Agreement Between Duke Energy Carolinas, LLC Carolina Power & Light Company," pp. 7–10.

63. State of North Carolina Utilities Commission, "Order Approving Merger Subject to Regulatory Con-ditions and Code of Conduct," *In the Matter of Application of Duke Energy Corporation And Pro-gress Energy, Inc., to Engage in a Business Combination Transaction and to Address Regulatory Conditions and Codes of Conduct*, Docket Nos. E-2, SUB 998, E-7, SUB 986, pp. 17, 30. https://dms.psc.sc.gov/Attachments/Matter/0db7d38b-155d-141f-2376ec5bc8152322.

64. "Southeast EEM Benefits and Non-Centralized Costs," Guidehouse/Charles River Associates, July 6, 2020.

65. Ellen Wolfe et al., "Cost-Benefit Analysis Performed for the SPP Regional State Committee," Charles River Associates, April 23, 2005 (revised July 27, 2005), p. IX. https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=935666601.

66. Downey. https://www.bizjournals.com/charlotte/news/2020/07/17/duke-energy-partners-local-control-for-se-market.html.

67. Chen, pp. 24-32. https://nicholasinstitute.duke.edu/publications/evaluating-options-enhancing-wholesale-competition-and-implications-southeastern.

anisms in the Southeast have not significantly encouraged developments to enhance efficiency through trade or overcome barriers to it. Thus, trading volumes remain low, risk of generation overbuild is high and, as the resource-mix evolves to include more variable generation, utilities that attempt to balance their systems will miss the savings that a larger, more flexible grid offers.

The discussion among Southeastern utilities to implement a voluntary energy exchange is encouraging, and the regional scope of these utilities is impressive. Based on what is known about the limited centralized control and governance of the Southeast Energy Exchange Market, it could be an improvement on the status quo, but will not reap most of the benefits of an EIM or RTO. Looming questions remain about the magnitude of net benefits that can be expected. Details on costs savings, avoided renewables curtailment, emissions reductions and price transparency would help. Another big question is whether market power concerns can be sufficiently mitigated if there is no truly independent entity operating the system.

If utilities wish to trade on a voluntary basis, the EIM is a model with quantified success, and leveraging the market platform of an existing RTO could be less costly than setting up a new market or exchange. The Western EIM allows participants to set aside transmission in advance—but does not require it—and can rely on transmission that is unreserved and available in real time.

Factors for EIM success in cost and emissions reduction include a footprint with a diversity of resources and customer demand, as well as energy storage that helps avoid curtailing zero-marginal-cost energy. Leveraging existing market architecture and expertise can help contain costs. Centralized market operation can help optimize the system at the granularity of five-minute dispatch and settlement intervals, increase the flexibility of the system and enhance reliability by improving visibility, optimizing resources for dynamic conditions and coordinating dispatch. The level of market participation and transmission availability are also key.

Good governance and the ability to operate the system independently of market participants may also help inspire confidence in the platform and attract participants. The governance framework for the Western EIM has not slowed the steady stream of utilities volunteering to join. Participating utilities have done the analyses and determined that the benefits are worth accepting a governance framework to ensure that the system works for everyone.

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