



DEVELOPMENTS IN WESTERN MARKETS: RENEWABLES AND EXPANSION OF ORGANIZED MARKETS IN THE WEST

Power Regulatory Webinar Series

Deanna E. King
Stephen J. Hug

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CURRENT DEVELOPMENTS IN WESTERN MARKETS

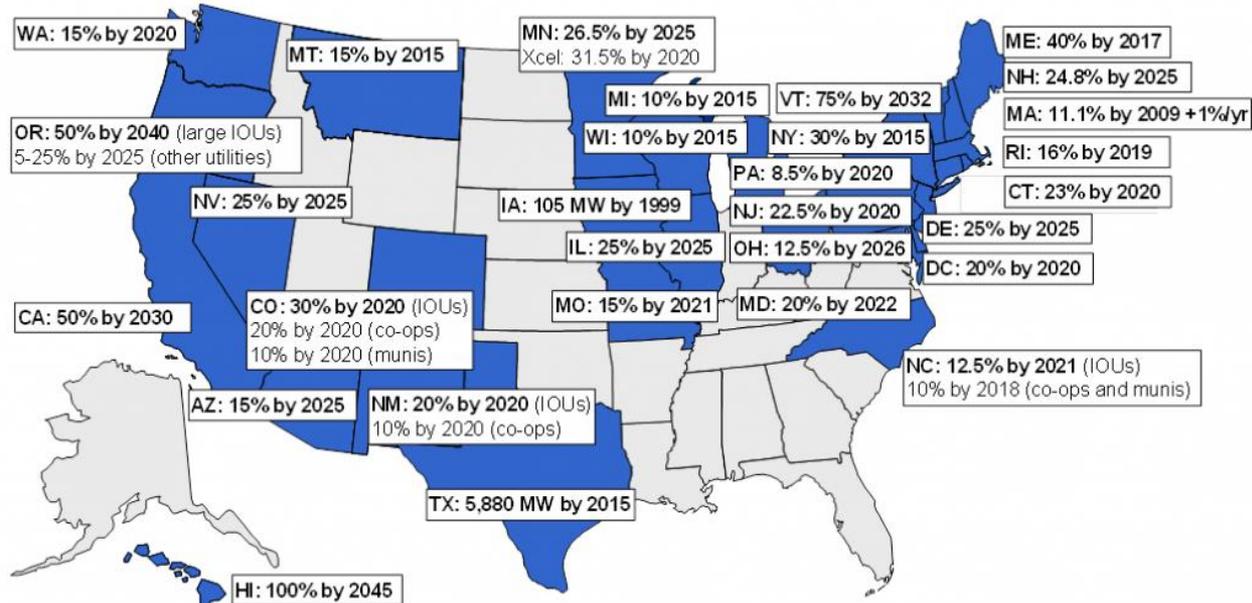
- Growth of Renewable Resources is a Primary Driver
- Impact
 - Flexibility and Reliability Challenges
 - Grid and Planning Challenges
- Multiple Market and Grid Developments
 - West-wide transmission and planning
 - CAISO EIM
 - Regional RTO Integration Initiative



THE GROWTH OF RENEWABLE RESOURCES

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THE GROWTH OF RENEWABLE RESOURCES

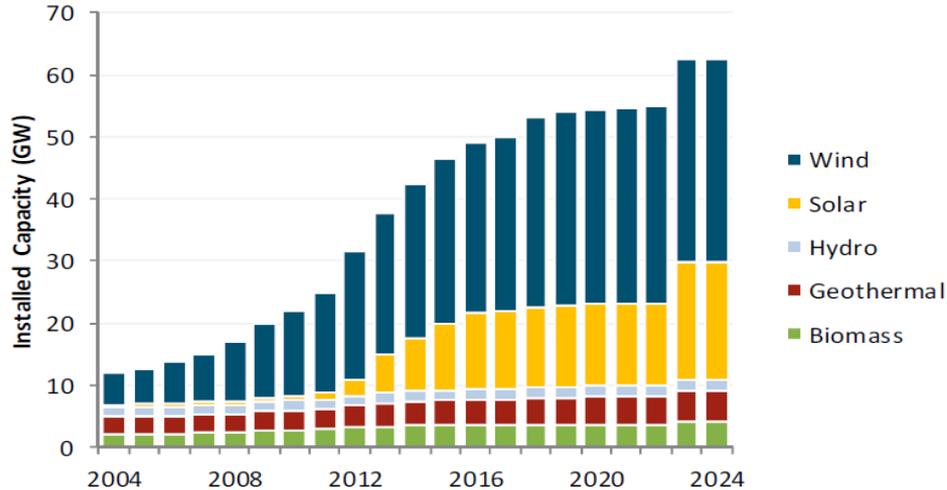


Source: Berkeley Lab

Source: Lawrence Berkeley National Lab, available at: <https://emp.lbl.gov/projects/renewables-portfolio>

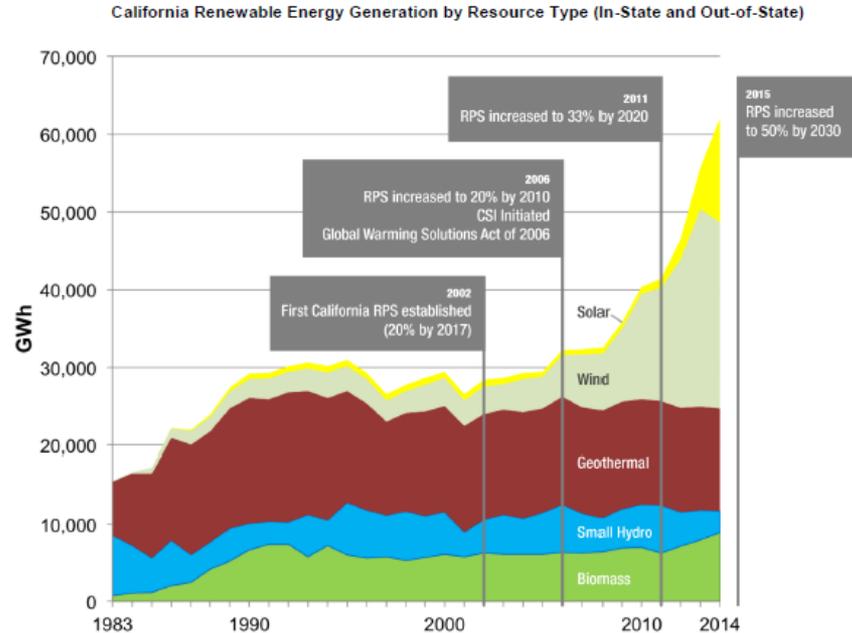
RENEWABLE RESOURCE GROWTH IN THE WEST

- Historical & projected growth of renewables in the Western Interconnection under RPS policies in place through 2014



Source: Western Interconnection Flexibility Assessment, Final Report (January 11, 2016), *available at:* https://www.wecc.biz/Reliability/WECC_Flexibility_Assessment_Report_2016-01-11.pdf

GROWTH OF RENEWABLE RESOURCES IN CALIFORNIA

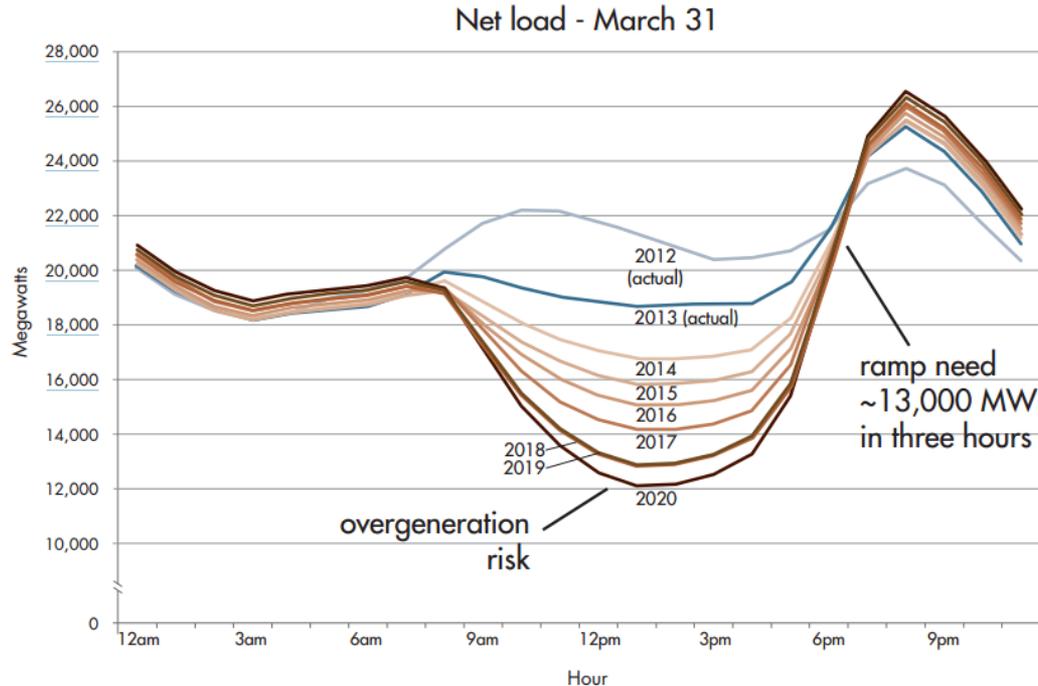


Source: California Energy Commission, Tracking Progress (Dec. 22, 2015), available at: http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf

IMPACT OF RENEWABLE RESOURCE GROWTH

- New Transmission Challenges
 - Growth of renewables has fundamentally altered the task of those responsible for operating and balancing the wholesale electric grid
 - Balancing authorities must ensure that they have sufficient resources to respond to real-time changes in renewable production while meeting demand and preserving reliability
 - Renewables can create new transmission constraints and usage patterns that affect grid management and regional transmission planning
- New Energy Products and Practices
 - Renewable resources in turn increase the importance of flexible resources that can be dispatched up or down to respond to fluctuations in variable production
- New Markets

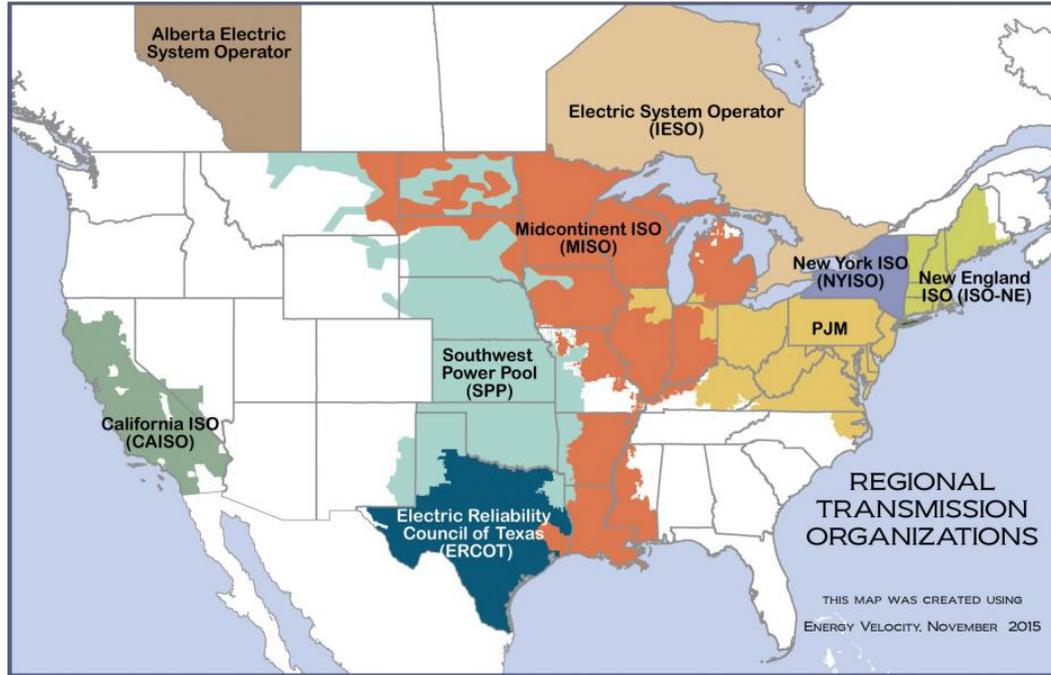
IMPACT OF CALIFORNIA'S RENEWABLE RESOURCE GROWTH



Source: California ISO, Flexible Resources: Fast Facts, *available at:*

https://www.caiso.com/Documents/FlexibleResourcesHelpRenewables_FastFacts.pdf

RENEWABLE RESOURCES AND ORGANIZED MARKETS



Source: Federal Energy Regulatory Commission, RTO Map, *available at:*
<http://www.ferc.gov/industries/electric/indus-act/rto/elec-ovr-rto-map.pdf>

RENEWABLE RESOURCES: WESTERN MARKET RESPONSE

- Renewed interest in regional coordination and “diversity” benefits has led to several ongoing multi-state initiatives:
 - CAISO Energy Imbalance Market
 - Western RTO
 - Mountain West Transmission Group



CAISO ENERGY IMBALANCE MARKET

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CAISO EIM - OVERVIEW

- First significant expansion of organized markets in the Western Interconnection outside of California
- CAISO real-time market for participating BAAs (“EIM Entities”) to meet obligation to provide energy and generation imbalance service
 - Diversity: CAISO dispatches resources from combined area to meet variations in load and generation on 5-minute and 15-minute basis
 - Imbalances settled based on CAISO-calculated LMP
- EIM Entities maintain OATT and retain reliability obligations and control over their respective transmission systems

CAISO EIM OPENS WITH PACIFICORP PARTICIPATION

- PacifiCorp – operates two BAAs spanning five states in the Western Interconnection
- June 19, 2014 – FERC issues orders approving revisions to CAISO and PacifiCorp tariffs to implement EIM



CAISO EIM – PACIFICORP

- Initial Difficulties
 - Deployment delayed from October 1, 2014 until November 1, 2014 to allow for extended period of non-binding market simulation
 - Price spikes immediately occur following market deployment
 - CAISO triggers application of \$1,000/MWh penalty price
 - Initial Response to Price Spikes
 - CAISO requests waiver of penalty pricing provisions
 - FERC investigation under Section 206 of the FPA to identify underlying issues and solutions

CAISO EIM – PACIFICORP

- FERC proceedings focus on nature of EIM shortages
 - Resource insufficiency v. false scarcity
- Significant modifications made to the EIM in result:
 - Available Balancing Capacity mechanism
 - Enhanced readiness measures
 - 6-month transition period for BAAs integrating into the EIM

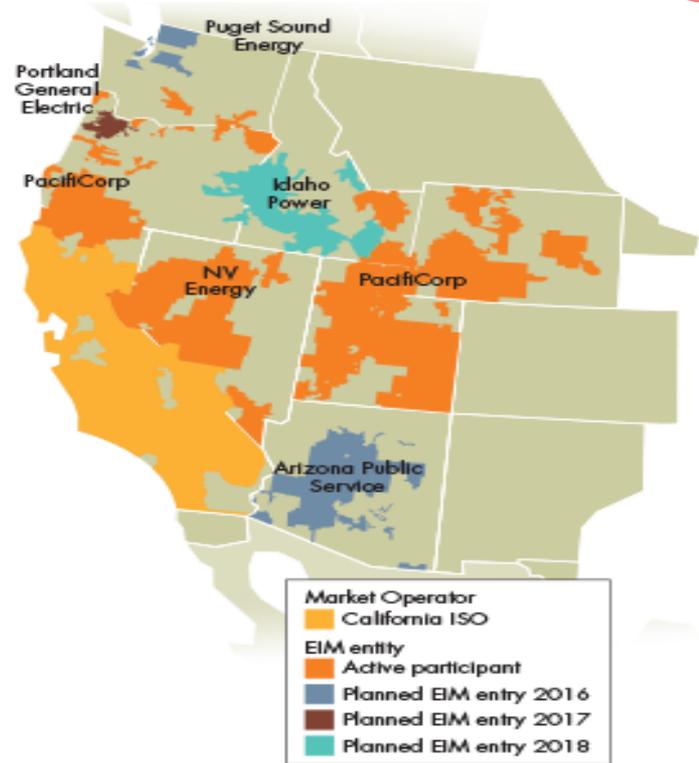
CAISO EIM – GROWTH AND DEVELOPMENT

- On May 14, 2015, FERC issues orders approving proposed extension of EIM to BAA operated by NV Energy
- After period of parallel operations and testing, NV Energy integrates into the EIM on December 1, 2015



CAISO EIM – GROWTH AND DEVELOPMENT

- APS and Puget Sound Energy expected to integrate into EIM on October 1, 2016
- Additional BAAs have expressed interest in participating:
 - Portland General -2017
 - Idaho Power - 2018
 - Seattle City Light – TBD
 - LADWP - TBD



CAISO EIM – GROWTH AND EVOLUTION

- **EIM Governance**

- Distinct governance model for EIM:

- EIM Governing Body
 - Body of State Regulators
 - Regional Issues Forum

CAISO EIM – GROWTH AND EVOLUTION

- **EIM Intertie Bidding / External Resource Participation**

- CAISO initially gave EIM Entities discretion over whether to implement economic intertie bidding
 - Commits to revisit the issue after initial year of operations
 - In 2016, CAISO submits tariff revisions to prohibit EIM Entities from unilaterally enabling intertie bidding
- FERC rejects CAISO's proposal and directs staff to hold technical conference to further explore feasibility of intertie bidding
 - CAISO outlines a potential external resource participation framework at August 4, 2016 Regional Issues Forum
 - FERC technical conference set for October 28, 2016

CAISO EIM – GROWTH AND EVOLUTION

- **EIM Carbon Leakage**

- Imports of energy into California are subject to GHG emission regulation by the California Air Resources Board
- EIM Participating Resources may submit a bid adder expressing willingness to be delivered to serve load in California
- Current concern that CAISO dispatch system results in GHG “leakage”
 - CAISO EIM model currently selects lower-emitting power plants and “deems” them delivered to California
 - However, in reality, higher-emitting power plants may be plants dispatched to serve California load

CAISO EIM – PRACTICAL IMPLICATIONS

- Extension of organized market framework to external BAAs represents a paradigm shift for integrating utilities and customers
 - EIM framework fundamentally changes manner in which transactions are scheduled
 - EIM creates new compliance challenges and financial risks for customers taking service over an EIM Entity's transmission system
 - EIM-participating resources are required to submit new EIM-specific market power analysis

CAISO EIM – PRACTICAL IMPLICATIONS

- **New Transmission Model**

- No incremental transmission charges or reservation necessary for participating resources dispatched in the EIM
- EIM dispatch relies upon transmission rights reserved by third parties:
 - Donation framework
 - ATC framework
- At same time, implementation of EIM has potential to impose new charges on existing transmission customers for use of transmission
 - Schedule adjustments made after T-57 treated as imbalance and settled based on LMP, even where customer has transmission reservation to support transaction

CAISO EIM – PRACTICAL IMPLICATIONS

- **New Compliance Risks**

- Customers taking service under terms of EIM Entity's OATT are subject to rules of conduct that obligate them to:
 - Comply with CAISO dispatch instructions and EIM Entity operating orders
 - Submit bids for resources that are reasonably expected to be available and capable of performing at levels specified in bid
 - Utilize commercially-reasonable efforts to ensure that forecasts are accurate and based on all information that is known or should have been known at the time of submission to EIM Entity
- EIM Entity may refer violations of rules of conduct to FERC

CAISO EIM – PRACTICAL IMPLICATIONS

- **New MBR Authority Required**

- Any public utility that seeks to make market-based rate sales in the EIM must seek prior authorization from FERC
- Requirement has proven particularly problematic for EIM Entities
 - Lack of third party participation in the EIM and constraints between EIM Entity BAAs creates structural market power issues
 - FERC has found that extension of CAISO market mitigation and monitoring to EIM Entity BAAs insufficient to mitigate market power concerns
- As a result, no existing or prospective EIM Entity has been granted authority to make sales at market-based rates without restriction



REGIONAL INTEGRATION

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REGIONAL INTEGRATION – INTRODUCTION

- On April 14, 2015, PacifiCorp and CAISO announced that they had entered into agreement to explore feasibility and benefits of PacifiCorp joining CAISO as a Participating Transmission Owner
- PTO vs EIM Participation – Key Differences:
 - Extends CAISO’s full day-ahead and real-time markets for energy and ancillary services into the five states in which PacifiCorp operates
 - CAISO assumes operational control over PacifiCorp transmission system and dispatch of all associated resources
 - Elimination of PacifiCorp’s OATT-based transmission framework

REGIONAL INTEGRATION – INTRODUCTION

- October 7, 2015, California Governor signs SB 350, “Clean Energy and Pollution Reduction Act of 2015”
 - The bill expresses intent of legislature to “provide for the evolution of the [CAISO] into a regional organization to promote the development of regional electricity transmission markets in the western states and to improve the access of consumers served by the [CAISO] to those markets.”
 - SB 350 directs CAISO to:
 - Conduct public study of potential impacts of a regional market, including impact on emissions of greenhouse gases and other air pollutants
 - Develop governance modifications to facilitate transition of CAISO to regional market

REGIONAL INTEGRATION – BENEFITS STUDY

- Between February and July 2016, CAISO’s consulting firms study potential benefits of a west-wide RTO, including:
 - Overall benefits to California ratepayers
 - Emissions of greenhouse gases and other air pollutants
 - Creation or retention of jobs and other benefits to the California economy
 - Environmental impacts in California and in adjacent areas
 - Reliability and integration of renewable energy resources
- Study methodology and conclusions criticized by a variety of groups in the region

REGIONAL INTEGRATION – BENEFITS STUDY

- SB 350 Study Process
 - Final study transmitted to California governor on September 15, 2016
 - Study's key findings in support of a west-wide RTO:
 - Cost savings associated with reduction in curtailment of renewable resources, thereby reducing need for development of in-state resources
 - Reduction in GHG emissions and other air pollutants
 - Additional 9,900 to 19,300 jobs in California by 2030
 - Estimates at least \$700 million/year in benefits to California ratepayers by 2030
 - Key assumption: Full participation by virtually all utilities and transmission providers in the Western Interconnect by 2030

REGIONAL INTEGRATION - GOVERNANCE

- In April 2016, California Energy Commission commenced proceeding to consider potential governance changes to facilitate development of west-wide RTO
 - Envisions a single ISO under a multi-state governance structure
 - Convenes series of workshops to permit public discussion of potential governance structures with CAISO, CPUC, California Governor, and stakeholders
 - Goal to submit governance structure to legislature by end of 2016

REGIONAL INTEGRATION – GOVERNANCE

- **CAISO Governance Proposal:**

- Governance Principles
- Governance Transitional Committee
- Independent Board
- Western States Committee
- Market Advisory Committee

REGIONAL INTEGRATION - GOVERNANCE

- **CAISO Governance Proposal**

- July 26, 2016 Joint state agency workshop and CAISO presentation
 - Many stakeholders express concern regarding pace of initiative
 - Other key issues
 - Role and authority of Western States Committee
 - Prohibition on capacity markets
 - GHG accounting and policies
 - Market Advisory Committee
- August 8, 2016: California Governor sends letter notifying California legislature that significant unresolved issues have emerged
 - Aim to submit governance proposal by end of January 2017

REGIONAL INTEGRATION – CRITICAL INITIATIVES

- In addition to benefits study and governance, CAISO and PacifiCorp have identified several other key initiatives that must be addressed before regional integration:
 - Integration of PacifiCorp OATT rights
 - GHG Accounting
 - Regional Resource Adequacy
 - Transmission Access Charge Options

REGIONAL INTEGRATION – OUTSTANDING ISSUES

- **Integration of existing PacifiCorp OATT Rights**

- Following PacifiCorp integration into CAISO footprint, PacifiCorp would no longer provide transmission service under an OATT
 - Raises issue of how to address existing transmission rights over the PacifiCorp system
- January 27, 2016 – PacifiCorp holds meeting to discuss issues associated with proposed integration into CAISO footprint
 - “Existing Contracts will continue to be honored for the duration of those contracts.”
 - Indicates that PacifiCorp will attempt to negotiate changes to the extent necessary to align the contract’s scheduling and operating provisions with CAISO’s scheduling and operational procedures

REGIONAL INTEGRATION – OUTSTANDING ISSUES

- **Integration of existing PacifiCorp OATT Rights**

- June 24, 2016 – CAISO and PacifiCorp hold second integration meeting
 - Discussion focuses on integration proposal outlined in joint CAISO and PacifiCorp discussion paper
 - Proposes to terminate rights of customers taking service under any transmission service agreements entered into after effective date of PacifiCorp OATT
 - Stakeholders express significant concerns regarding PacifiCorp proposal's impact on long-term firm rights under PacifiCorp OATT

REGIONAL INTEGRATION – OUTSTANDING ISSUES

- **GHG Accounting**

- Imports of energy into California and California generators subject to California Cap-and-Trade program
- CAISO market optimization currently treats supply serving any load within CAISO BAA as subject to California Cap-and-Trade program
- Key question is how to take into account flows within western RTO between states with different GHG policies
 - Some stakeholders have expressed concern that regional integration may undermine ability of California to achieve climate and environmental goals

REGIONAL INTEGRATION – OUTSTANDING ISSUES

- GHG Accounting
 - CAISO currently seeking stakeholder comments on potential design changes that can accommodate GHG policies within western RTO footprint
 - Potential solutions:
 - Separate zones based on state boundaries or GHG policies
 - Ability for generation to opt-out of serving California load similar to EIM structure

REGIONAL INTEGRATION – OUTSTANDING ISSUES

- **Transmission Access Charge Options**

- Focuses on how to allocate costs of transmission grid following integration of external PTO
 - Embedded costs of CAISO grid recovered through access charge assessed to load and exports
 - Costs of PacifiCorp facilities recovered from OATT customers reserving transmission

REGIONAL INTEGRATION – OUTSTANDING ISSUES

- **Transmission Access Charge Options**

- Distinguishes between “existing” and “new” high-voltage facilities:
 - Sub-regional allocation for existing transmission facilities and new reliability-driven projects to meet distinct need within sub-region
 - Regional allocation of high-voltage policy and economic projects
 - Construction and cost allocation decisions left to Western States Committee

REGIONAL INTEGRATION – OUTSTANDING ISSUES

- **Regional Resource Adequacy**

- Initiative focused on modifying existing resource adequacy provisions to accommodate expansion to western RTO
- Key issues:
 - Load forecasting
 - Treatment of inertie resources for RA purposes
 - Internal transfer constraints
 - Counting methodologies

DEVELOPMENT OF WESTERN MARKETS – WHAT’S NEXT?

- Further market design changes and proposed market solutions should be expected as the Western Interconnect grapples with dramatically increasing renewable resource penetration
- Numerous significant and contentious issues that will need to be addressed before creation of a western RTO
 - The manner in which these issues are handled will have an impact on all entities that participate in western markets
 - Efforts to integrate PacifiCorp likely to continue to occur over the next two to three years
- EIM appears to be here to stay and can be expected to expand and to further develop over the coming years

BRACEWELL CONTACTS



Deanna E. King
Partner

T: +1.512.494.3612

E: deanna.king@bracewell.com

bracewell.com/king

Deanna King represents domestic and foreign energy-industry clients in a broad range of matters related to market access, competition, market behavior and market design, enforcement and compliance, and restructuring and cross-border issues related to participation in United States energy markets. Deanna counsels energy sector clients on regulatory and compliance matters and represents them in enforcement, administrative and litigation proceedings, with a particular focus on organized and bilateral energy markets in the west, contract negotiation and dispute resolution, and compliance with market rules. She has represented clients participating in agency rulemaking and policy proceedings involving competition, pricing and access to wholesale electricity and transmission markets.



Stephen J. Hug
Associate

T: +1.202.828.5866

E: stephen.hug@bracewell.com

bracewell.com/hug

Stephen Hug represents clients in matters related to federal and state regulatory policies, regulations and rules applicable to the electric industry. He has experience with the Federal Energy Regulatory Commission (FERC) and the Federal Power Act (FPA), including: FERC enforcement and compliance; wholesale power trading; centralized energy and capacity markets; transmission and interconnection matters; and representation of utilities in contested proceedings before FERC. Stephen also has experience with state regulatory matters, including: ERCOT and PUCT regulations; state net metering programs, interconnection issues, and retail choice programs. Prior to joining Bracewell, Stephen was an Attorney Advisor in the Office of the General Counsel, Energy Markets at FERC, where he reviewed and analyzed filings submitted under Section 205 and 206 of the FPA.



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