2019 EBA WESTERN CHAPTER ANNUAL MEETING

February 21-22, 2019
San Francisco, CA

Palace Hotel San Francisco
2 New Montgomery Street
San Francisco, CA 94105
Summary

The energy industry is entering a period of unparalleled and dramatic change. That change comes in many different forms – climate change, the dramatic growth of alternative energy providers, disruptive technology, and the development of single, Western United States energy markets. We are excited that at this year’s Annual Meeting of the Western Chapter of the Energy Bar Association we will have an opportunity to hear from leaders in the energy industry about these changes and their impact. Each of our speakers brings a unique perspective to these events and will share insights regarding how Energy Bar Association members can meet these challenges. This year’s Annual Meeting is an incredible opportunity to learn and hear from individuals who are helping shape the energy industry future in the Western United States.

Agenda

THURSDAY, FEBRUARY 21, 2019

5:30 pm – 7:00 pm  Welcome Reception and Wine Auction
Benefit for the Charitable Foundation of the Energy Bar Association with proceeds going to local charity

FRIDAY, FEBRUARY 22, 2019

8:00 am to 9:00 am  Registration
8:00 am to 8:15 am  Welcome
Jonathan Schneider, President-Elect, Energy Bar Association, Partner, Stinson Leonard Street LLP
Charles Middlekauff, President, Western Chapter of the Energy Bar Association, Chief Counsel, Pacific Gas and Electric Company

8:15 am to 9:00 am  Keynote Speaker: James Danly, General Counsel, Federal Energy Regulatory Commission
9:00 am to 9:15 am  Networking Break
9:15 am to 10:30 am  Finding the Path to Climate and Disaster Resilience: The “New Abnormal”

As we experience hotter, drier, and longer summers in the West, our communities are vulnerable to more frequent wildfires, floods and other disasters. In 2017 and 2018, California experienced the most devastating and widespread wildfires in the state’s history. This panel will discuss the legal and regulatory challenges the energy industry faces to address climate resilience with utility electrical infrastructure. Our panelists will analyze how such challenges impact utility ratepayers, insurance coverage, state economies, land use policies, utility financing and operations, and community safety. The panel will also highlight significant legal and regulatory issues California faces as it addresses the aftermath of the 2017 and 2018 wildfires, and provide an overview of potential legislative and regulatory options state agencies and legislators are considering to achieve climate resilience in the near future.

Moderator: Tara Kaushik, Partner, Holland & Knight
Panelists: Arocles Aguilar, General Counsel, California Public Utilities Commission
Laura Genao, Managing Director, State Regulatory Affairs, Southern California Edison Company
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>10:30 am to 10:45 am</td>
<td>Networking Break</td>
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<tr>
<td>10:45 am to 12:00 pm</td>
<td>Community Choice Aggregation and Non-IOU Energy Providers – An Update on the Landscape</td>
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<td>More and more retail customers are obtaining power through non-utility providers. In California, there has been a marked increase in the number of Community Choice Aggregators (CCAs) in operation and throughout the West states are exploring ways to expand opportunities for direct access providers. This panel focuses on the present landscape for CCA and direct access, particularly in California and Nevada.</td>
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<td>Moderator:</td>
<td>Beth Fox, Partner, Manatt, Phelps &amp; Phillips, LLP</td>
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<td>Panelists:</td>
<td>Beth Vaughan, Executive Director, California Community Choice Association, Scott Olson, Director, Western Government and Regulatory Affairs, Direct Energy, Michael Greene, Senior Attorney, NV Energy</td>
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<tr>
<td>12:00 pm to 1:15 pm</td>
<td>Networking Lunch &amp; Luncheon Address</td>
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<td>Kip Lipper, Chief Advisor, Energy and Environment, Office of California Senate Pro Tempore</td>
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<td>1:15 pm to 2:30 pm</td>
<td>Blockchain and the Energy Industry</td>
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<td>Technology is changing the world, and the energy industry is not immune to these changes. This panel will provide an introduction to the emerging technology BlockChain - - what it means, how it is used, various applications for BlockChain in the energy industry and legal issues presented by using BlockChain in energy transactions. BlockChain is already having significant impacts on the energy industry, and that trend will only accelerate in the near future.</td>
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<td>Moderator:</td>
<td>Pam Anderson, Partner, Perkins Coie, LLP</td>
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<td>Panelists:</td>
<td>Jennifer Solomon, Assistant General Counsel, Exelon Corporation, Wendy Moore, Partner, Perkins Coie, Karen Hsu, Chief Revenue Officer, BlockCypher</td>
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<tr>
<td>2:30 pm to 2:45 pm</td>
<td>Networking Break</td>
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<td>2:45 pm to 4:00 pm</td>
<td>Western Markets Evolution and Development</td>
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<td>This panel of experts will discuss how energy markets in the West have evolved over the last 20 years and what might be achieved through market expansion. This includes a state regulator’s viewpoint; an overview of recent market expansion from the perspective of a market operator; the regulatory considerations related to the use of transmission in the Western Energy Imbalance Market; and the evolving political and regulatory factors in the development of Western Markets.</td>
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<td>Moderator:</td>
<td>Deborah R. Scott, Senior Director, Regulatory Policy &amp; Public Involvement, Salt River Project</td>
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<td>Panelists:</td>
<td>The Honorable Jordan White, Commissioner, Utah Public Utilities Commission</td>
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John Anders, Assistant General Counsel, California Independent System Operator Corporation
Sarah Edmonds, Director of Transmission Services and Reliability, Portland General Electric
Tony Braun, Attorney/President, Braun Blaising Smith Wynne, P.C.

4:00 pm

Western Chapter Annual Meeting to Elect Board and Directors

About the Energy Bar Association:

The Energy Bar Association is an international, non-profit association of attorneys, non-attorney professionals, and students active in all areas of energy law. The EBA promotes the professional excellence and ethical integrity of its members in the practice, administration, and development of energy laws, regulations and policies. The EBA provides superior educational programming, networking opportunities, and information resources. Find more information at www.eba-net.org.

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Washington, DC

For conference information, visit: https://www.eba-net.org/education-events/2019-annual-meeting-conference/
SB901 and the “New Abnormal”

2019 EBA Western Chapter Annual Meeting
Finding the Path to Climate and Disaster Resilience:
The “New Abnormal” February 22, 2019
Arocles Aguilar, General Counsel, CPUC
The California Legislature passed SB901 in August of 2018, and it was signed into law by Governor Brown on September 21, 2018. SB 901, among other things, attempts to tackle the State’s challenges of catastrophic wildfires, including emergency response, forest health and management, utility wildfire mitigation plans, cost recovery and securitization of costs and also creates a blue ribbon Commission on Catastrophic Wildfire Cost and Recovery, who in consultation with the CPUC and the Insurance Commissioner is tasked with preparing a report assessing the issues surrounding catastrophic wildfire costs and the reduction of damage, and making recommendations for changes to law that would ensure equitable distribution of costs.
I.15-08-019 Order Instituting Investigation on the Commission’s Own Motion to Determine Whether Pacific Gas and Electric Company and PG&E Corporation’s Organizational Culture and Governance Prioritize Safety

http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M154/K363/154363217.PDF

1) Phase I Decision 18-11-050 issued November 29, 2018 Ordering PG&E to Implement the Recommendations of the NorthStar Report.
http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M245/K812/245812124.PDF

2) Phase II Scoping Memo issued December 21, 2018.
http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M252/K547/252547055.PDF
In Phase II of PG&E’s Safety Culture OII, the Commission will look at alternatives to the existing PG&E operational and management structure of providing gas and electric service in Northern California. Factors include:

- the safety and reliability of utility service,
- the operational integrity and technical unity of components within PG&E’s gas and electric transmission and distribution systems,
- the stability and adequacy of the utility workforce,
- the utility’s relationships with and role in local communities,
- the ability of the state to implement its energy policies, including the need to reduce GHG emissions and local criteria pollutants in both the utility sector and the economy as a whole,
- the ability of the utility to meet financial challenges posed by large catastrophic events such as earthquakes and wildfires,
- the utility’s ability to raise capital and purchase gas and electricity, and
- the cost of utility service.
On October 25, 2018, the Commission issued Rulemaking 18-10-007, Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to Senate Bill 901
http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M235/K696/235696605.PDF

1) SB 901 requires all California electric utilities to prepare and submit wildfire mitigation plans that describe the utilities’ plans to prevent, combat and respond to wildfires affecting their service territories.

2) On February 6, 2018, the following utilities filed their required Wildfire Mitigation Plans: PG&E, Edison, SDG&E, Liberty Utilities, PacifiCorp, Bear Valley Electric Service, NextEra Transmission West, LLC and TransBay Cable, LLC. SB901 requires the Commission to issue its Decision on the initial Wildfire Mitigation Plans three months from the filing/service of the Plans. Thereafter, the WMPs will be filed annually on March 1.
On January 18, 2019, the Commission issued Rulemaking 19-01-006, Order Instituting Rulemaking to Implement Public Utilities Code Section 451.2 Regarding Criteria and Methodology for Wildfire Cost Recovery Pursuant to Senate Bill 901.

http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M260/K065/260065710.PDF

1) This OIR will adopt criteria and a methodology, commonly referred to as the “stress test” for use by the Commission in future applications for cost recovery related to 2017 wildfire costs. However, this OIR will not adopt a specific financial outcome for purposes of cost recovery in a future wildfire cost recovery application by a utility. Bond Securitization of 2017 costs authorized by SB901 could happen only after the Commission issues a decision on cost recovery after the utility files its application for cost recovery.
451.2. (a) In an application by an electrical corporation to recover costs and expenses arising from, or incurred as a result of, a catastrophic wildfire with an ignition date in the 2017 calendar year, the commission shall determine whether those costs and expenses are just and reasonable in accordance with Section 451.

(b) Notwithstanding Section 451, when allocating costs, the commission shall consider the electrical corporation’s financial status and determine the maximum amount the corporation can pay without harming ratepayers or materially impacting its ability to provide adequate and safe service. The commission shall ensure that the costs or expenses described in subdivision (a) that are disallowed for recovery in rates assessed for the wildfires, in the aggregate, do not exceed that amount.

(c) An electrical corporation may apply for a financing order pursuant to Article 5.8 (commencing of Section 850) of Chapter 4 for the amount of costs and expenses allocated to the ratepayer as just and reasonable or as disallowed for recovery but exceeding the amount determined pursuant to subdivision (b).
451.1. (a) In an application by an electrical corporation to recover costs and expenses arising from a catastrophic wildfire occurring on or after January 1, 2019, the commission may allow cost recovery if the costs and expenses are just and reasonable, after consideration of the conduct of the utility. In evaluating the reasonableness of the costs and expenses, the commission shall consider the conduct of the electrical corporation and relevant information submitted into the commission record, which may include, but is not limited to, all of the following:

(1) The nature and severity of the conduct of the electrical corporation and its officers, employees, contractors, and other entities with which the electrical corporation forms a contractual relationship, including systemic corporate defects.

(2) Whether the electrical corporation disregarded indicators of wildfire risk.
Public Utilities Code Section 451.1
2019 and thereafter

(3) Whether the electrical corporation failed to design its assets in a reasonable manner.

(4) Whether the electrical corporation failed to operate its assets in a reasonable manner.

(5) Whether the electrical corporation failed to maintain its assets in a reasonable manner.

(6) Whether the electrical corporation’s practices to monitor, predict, and anticipate wildfires, and to operate its facilities in a reasonable manner based on information gained from its monitoring and predicting of wildfires, were reasonable.

(7) The extent to which the costs and expenses were in part caused by circumstances beyond the electrical corporation’s control.
whether extreme climate conditions at the location of the wildfire’s ignition, including humidity, temperature, or winds occurring during the wildfire, contributed to the fire’s ignition or exacerbated the extent of the damages. The electrical corporation shall provide the commission with specific evidence and data demonstrating the impact of climate conditions on the severity of the wildfire.

9) The electrical corporation’s compliance with regulations, laws, commission orders, and its wildfire mitigation plans prepared pursuant to Section 8386, including its history of compliance.

10) Official findings of state, local, or federal government offices summarizing statutory, regulatory, or ordinance violations by any actor that contributed to the extent of the damages.

11) Whether the costs and expenses were caused by a single violation or multiple violations of relevant rules.
Public Utilities Code Section 451.1
2019 and thereafter

(12) Other factors the commission finds necessary to evaluate the reasonableness of the costs and expenses, including factors traditionally relied upon by the commission in its decisions.

(b) Notwithstanding Section 451, this section shall direct the commission’s evaluation of applications for recovery of costs and expenses arising from a catastrophic wildfire. This section shall not apply to any other applications for cost recovery.

(c) This section shall not affect any civil action, appeal, or other action or proceeding.
Other Issues/Factors

• Inverse Condemnation
• New Legislation?
• PG&E Bankruptcy
• Statewide solution needed
The Path Toward a Balanced, Durable, and Stable Wildfire Regulatory Framework for California

2019 EBA Western Chapter Annual Meeting

February 22, 2019
Overview

• Wildfire Risk in SCE’s Service Territory

• Wildfire-Related CPUC Regulatory Proceedings

• SCE’s Proposal for a Wildfire Cost Recovery Framework
High Fire Risk Areas (HFRA) in SCE’s Service Area

- ~35 percent of SCE’s 50,000 square mile service area is located in HFRA
  - CPUC Tier 3 = ~18%
  - CPUC Tier 2 = ~9%
  - Other HFRA\(^1\) = ~8%

- Programs and activities to reduce wildfire risk are focused in SCE’s HFRA

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1. Areas within SCE’s service area that continue to be designated as HFRA and are in the process of being evaluated to determine whether they remain as HFRA.
SCE’s Wildfire Mitigation Strategy

SCE has taken substantial steps to reduce the risk of wildfires and will continue to proactively enhance our operational practices and infrastructure through our comprehensive wildfire mitigation strategy.
Wildfire Covered Conductor Program (WCCP) is a key activity to mitigate future ignitions from events historically associated with ~70% of utility distribution ignitions in HFRA.
SCE’s Key Wildfire-Related Regulatory Proceedings

Multiple key SCE regulatory proceedings are under way, but timely decisions are critical to maintaining financially stable utilities.

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<tr>
<th>Proceeding</th>
<th>Description</th>
<th>Next Steps</th>
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<tr>
<td><strong>Key CPUC Proceedings</strong></td>
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<tr>
<td>2021 General Rate Case &amp; RAMP Filing (I. 18-11-006)</td>
<td>Sets CPUC base revenue requirement, capital expenditures and rate base for 2021-2023. RAMP risk framework to be incorporated into GRC review.</td>
<td>RAMP filed November 2018. 2021 GRC to be filed in September 2019.</td>
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**Other**

- Senate Bill 901 & Other Wildfire-related Activities
  - Commission on Catastrophic Wildfire Cost and Recovery
  - Wildfire Cost Recovery
  - Liability Cap/ Stress Test
  - Securitization
  - Inverse Condemnation
Other Current and Expected WF-Related CPUC Proceedings

Given the volume of proceedings, coordination and consistency of approach will be critical to operational success and restoration of confidence in California’s regulatory framework.

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<tr>
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<th>Next Steps</th>
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<tr>
<td>De-energization OIR (R.18-12-005)</td>
<td>Rulemaking to examine electric utility de-energization of power lines in dangerous conditions.</td>
<td>Comments on OIR received February 8; Prehearing conference held February 19.</td>
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<td>PG&amp;E CEMA (A.18-03-015)/Future CEMAs</td>
<td>Current (and future) applications for cost recovery related to catastrophic emergencies.</td>
<td>PG&amp;E has pending CEMA for 2015-2016 costs. Other CEMAs will be filed at a future date.</td>
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<tr>
<td>Emergency Disaster Relief OIR (R.18-03-011)</td>
<td>Rulemaking regarding emergency disaster relief program.</td>
<td>Comments on additional questions due February 22, reply comments due March 1.</td>
</tr>
<tr>
<td>Rule 20 Undergrounding OIR (R.17-05-010)</td>
<td>Rulemaking considering implementation and operation of current Rule 20A programs and needed modifications.</td>
<td>ALJ Guidance expected early 2019. Activities related to program operation and near term improvement during Spring/Summer 2019</td>
</tr>
<tr>
<td>Building Decarbonization OIR (R.19-01-011)</td>
<td>Rulemaking on framework for building decarbonization includes potential for pilots in wildfire-affected areas.</td>
<td>Comments on OIR due March 11.</td>
</tr>
<tr>
<td>Climate Change OIR (R.18-04-019)</td>
<td>Rulemaking to provide guidance on how to incorporate climate adaptation into planning and operations.</td>
<td>Working groups under way; Proposed decision slated for September 2019.</td>
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<td>(R.15-06-009)</td>
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<td>Future Wildfire Expense Memorandum Account</td>
<td>Utility applications seeking cost recovery for appropriate wildfire-related costs not otherwise recovered elsewhere.</td>
<td>WEMAs for 2017/2018 fires to be filed at a future date.</td>
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<tr>
<td>Applications</td>
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<tr>
<td>PG&amp;E (A.18-12-009) and SDGE (A.17-10-007) GRCs</td>
<td>Sets CPUC base revenue requirement, capital expenditures and rate base.</td>
<td>Both IOUs have pending applications.</td>
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Swift CPUC Action to Establish a Framework for Stabilizing Utilities’ Financial Health is Necessary

• CPUC issues draft OIR December 21 noting intention to adopt a methodology pursuant to Section 451.2, but that “it will not adopt a specific financial outcome for purposes of cost recovery.”
  • OIR notes primary focus is on methodology for cost recovery in applications relating to ignitions in 2017.
  • In its press release, the CPUC made clear it is “mindful of both the finite resources of ratepayers in California, and the importance of maintaining financially viable utilities to provide safe and reliable service.”

• Recent events have overtaken the ability of the CPUC’s original Section 451.2 approach to maintain the financial viability of the utilities.
  • Investor confidence in California’s regulatory environment is deteriorating.
  • PG&E has declared bankruptcy.
  • SCE and SDG&E have been downgraded and placed on negative watch.

• The Governor has noted a need for longer-term strategies “to ensure that the cost of climate change doesn’t fall on those least able to afford it.”
SCE Has Proposed the Section 451.2 Proceeding Be Broadened and Refocused

• A clear, durable, and repeatable framework similar to the one put in place following the energy crisis is necessary for wildfire.
  • After the energy crisis, AB 57 put in place upfront, achievable metrics, and regular reviews to determine compliance with approved procurement plans.
    • A key feature of AB 57 was prompt review of utility procurement and associated cost recovery.

• In the wildfire context, such a framework would deem an IOU prudent, for cost recovery purposes, if the IOU is found to have substantially complied with a CPUC-approved wildfire plan.
  • Cost recovery would be denied only to the extent an IOU’s non-compliance with its plan was found to be a substantial cause of the wildfire and its damages.
  • The CPUC also retains the authority to investigate and penalize the IOU for misconduct associated with specific fires.

• The CPUC has the authority under P.U. Code Sections 451 and 701 to implement such a framework.
Inverse – One of Many Challenges for Wildfires in CA

Toby Shea, VP-Sr Credit Officer
February 2019
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Inverse Raises Credit Risk

» Inverse attracts exposure to claims because plaintiffs do not need to prove negligence

» Threats of large losses shakes market confidence, raising the cost of capital

» Testing ratepayer tolerance to absorb higher costs
  – Limited tolerance for rate increases
  – Crowds out other beneficial utility expenditures
  – Shifting costs between ratepayers and share-owners
Difficult to Eliminate Inverse

» Inverse is courts’ interpretation of California’s eminent domain clause
» No clear hope for overturning precedent
» Constitutional amendment long and difficult
  – 2/3 of each chamber plus popular vote
  – Insurance and trial lawyers lobby are against inverse reform
Mitigating Effects of Inverse

» Insurance fund characteristics
  – Visible funding source with no rate increases
  – But contributions may be hard to come by

» Safe harbor – no second guessing if utility followed the policy and procedure.

» Stress test – limits the burden on shareholders

» Higher certainty with clarifications and precedents
Problem w or w/o Inverse

» Physical characteristics of grid infrastructure

» Utilities still subject to negligence

» Forest management policies

» Wind and drought

» Expanding housing developments
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Finding the Path to Climate and Disaster Resilience: The “New Abnormal”

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2019 EBA Western Chapter Meeting
Legal Challenges for Utilities

- Expanding Liability---Inverse Condemnation (CA)
- Expanding Categories of Claimants (CA)
- Expanding Damages (CA)
- Inconsistent Standards
- Inconsistent and Ineffective Public Policies
- Utility Infrastructure and Services at Risk
- Compliance While Providing Reliable Electric Service that People Can Afford
Wildfire Consequences

- Property Damage
- Lives Lost
- Fire Suppression Costs
- Insurance Claims
- Litigation Costs
- Insurance Costs
- Utility Operation Costs
- Insurance Coverage
Wildfire Challenges: Insurance

• Increased Cost of Insurance
  – Professional Liability for IVM Contractors

• Declining Insurance Coverage/Capacity
  – Aggregate Insurance Limits for Fire Events
  – Limiting Coverage re: Additional Insureds

• Emergence of Insurance Towers of Off-Shore Insurer Syndicates in Lieu of Traditional Coverage for Utilities

• 2017 Western Wildfires Set Insured Loss Record ($18B)

• 2018 California Wildfire Insured Loss: $9B-$19B*

Households at High or Extreme Risk from Wildfires

1. California 2,044,800
2. Texas 715,300
3. Colorado 366,200
4. Arizona 234,600
5. Idaho 171,200
6. Washington 154,900
7. Oklahoma 152,900
8. Oregon 148,800
9. Utah 133,100
10. Montana 133,000
California Law of Eminent Domain

“No property may be taken or damaged for public use without just compensation”

Article 1 § 19
California Constitution

An electrical corporation may condemn any property **necessary** for the construction and maintenance of its electric plant.

Inverse Condemnation

- The taking or damage
- of private property
- for public use
- without just compensation
- by a governmental entity that has not instituted formal proceedings
California’s Law of Inverse Condemnation Has Not Been Applied Elsewhere

When property damage is an unintended result of the government's act or policy, it cannot be said that the property was “taken or damaged for public use.”

City of Austin v. Liberty Mut. Ins., 431 S.W.3d 817 (Tex. App. 2014) [fire]


See Cary v. US, 552 F3d 1373 (Fed.Cir.2009) [5th Amendment] [fire]

Cf Knutson v. City of Fargo, 714 NW2d 44 (2006) [water]

Cf Ridge Line Inc. v. United States, 346 F.3d 1346 (Fed. Cir 2003) [5th Amendment] [water]
The “Ridge Line Test” as to Whether Inverse Condemnation or Tort Law Applies

“A taking only results when the government intends to invade a protected property interest or the asserted invasion is the “direct, natural, or probable result of an authorized activity and not the incidental or consequential injury inflicted by the action.”

“Even where the effects of the government action are predictable, to constitute a taking, an invasion must appropriate a benefit to the government at the expense of the property owner, or at least preempt the owners right to enjoy his property for an extended period of time, rather than merely inflict an injury that reduces its value.”

*Ridge Line Inc. v. United States*, 346 F.3d 1346 (Fed. Cir 2003) [5th Amendment] [water]
Tree Failure -- Beaufort Scale
Vegetation Management for Utilities

- 2017 NESC § 218
- FAC-003-4  FERC/NERC Transmission VM
- Integrated Vegetation Management (IVM) – ANSI A300
  - ANSI A300, Pt 7—Utility ROW
  - ANSI A300, Pt 9—Tree Risk Assessment
- IVM Best Management Practices (BMP)—Companion Publication to ANSI A300 Part 7: Tree, Shrub and Other Woody Plant Management
- State Legislation/Regulation (e.g., GO 95 Rule 35 – California)
- Federal Land Policy and Management Act of 1976 —Section 512 (NEW)

Evolving ISA IVM “Best Management Practices”

Changes to A300 IVM Standards

Prospects for Regulatory/Legislative Change at State Level --- Need for Regional/Federal Approach?
“An example of one approach commonly used by industry is ANSI Standard A300, Part 7 Annex A—“Wire Zone Border Zone Concept” FAC-003-4---VM Work Plan (p. 22)
Federal Land Policy and Management Act of 1976 Section 512 (NEW)

- Requires Expedited Approval of Integrated Vegetation Management Plan for Transmission and Distribution on Federal Lands to include use of Secretary’s Categorical Exception from National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.)
- Limitation on Liability available where Secretary fails to act and/or utility not allowed to comply with Federal, State, or local electric system reliability and fire safety standards, including standards established by the North American Electric Reliability Corporation [latter of which apply only to transmission.]
- Limitation on Liability with failure to allow removal of identified “hazard tree”
- Allows Utility to Act to Remove Hazard Trees and Maintain Clearances
"(a) HAZARD TREE.—The term ‘hazard tree’ means any tree or part therof (whether inside the right-of-way or located outside a right-of-way) that has been designated, prior to tree failure, by a certified or licensed arborist or forester under supervision of the Secretary concerned or the owner or operator of a transmission or distribution facility to be---

(A) dead, likely to die within the routine vegetation management cycle, or likely to fail within the routine vegetation management cycle; and

(B) if the tree or part of the tree failed, likely to---

   (i) cause substantial damage or disruption to a transmission or distribution facility; or

   (ii) come within 10 feet on an electric power line
Finding the Path to Climate and Disaster Resilience: The “New Abnormal”

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2019 EBA Western Chapter Meeting
What is CCA?

CCA is “a fascinating and I think a very constructive force to drive the fulfillment of the big three goals that we have here of affordability, decarbonization and reliability.”

- Pat Wood, Member of CPUC “Green Book” Ad Hoc Advisory Committee, former chair of the Federal Energy Regulatory Commission
CCAs Enabled by the Legislature

2000  Energy crisis prompted demand for more stability through public management of energy.

2002  AB 117 (Migden) allowed energy choice and changed default provider to local government entities.

2011  SB 790 (Leno) established a CCA ‘bill of rights’ and allowed CCAs to administer efficiency programs.
Why CCA?

- Customer choice
- Local, transparent decision-making
- Rate competition / rate stability
- Green energy choices
- Energy efficiency and community-based programs
CCA Service Launch Dates

New Service

1. Clean Power Alliance *Feb. and May `19*
2. San Jose Clean Energy *Feb `19*
3. CleanPowerSF *April `19*
4. Desert Community Energy *2020*
5. Western Community Energy *2020*
6. Cities of Baldwin Park, Commerce, Hanford, Pomona, Rialto, and Santa Paula *2020*
7. San Diego, North County Cities *2021*

Expansions of Existing CCAs

- Monterey Bay (Morro Bay, SLO) *2020*
- MCE (Solano County) *2020*
Growth of CCA Service in California
<table>
<thead>
<tr>
<th>CalCCA Members</th>
<th>Customer Accounts</th>
<th>Est Peak Load (MW)</th>
<th>Minimum RPS</th>
<th>Annual Load 2016 (GWh)</th>
<th>Annual Load 2017 (GWh)</th>
<th>Annual Load 2018 (GWh)</th>
<th>Annual Load 2019 (GWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Valley Choice Energy</td>
<td>25,000</td>
<td>100</td>
<td>35%</td>
<td>N/A</td>
<td>235</td>
<td>235</td>
<td>260</td>
</tr>
<tr>
<td>CleanPowerSF</td>
<td>110,000</td>
<td>375</td>
<td>40%</td>
<td>241</td>
<td>572</td>
<td>1,200</td>
<td>2,600</td>
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<tr>
<td>Clean Power Alliance</td>
<td>972,500</td>
<td>3,600</td>
<td>36%</td>
<td>N/A</td>
<td>N/A</td>
<td>967</td>
<td>10,295</td>
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<tr>
<td>East Bay Community Energy</td>
<td>556,000</td>
<td>700</td>
<td>38%</td>
<td>N/A</td>
<td>N/A</td>
<td>5,688</td>
<td>6,200</td>
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<tr>
<td>Lancaster Choice Energy</td>
<td>50,000</td>
<td>200</td>
<td>35%</td>
<td>590</td>
<td>590</td>
<td>590</td>
<td>600</td>
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<tr>
<td>MCE</td>
<td>470,000</td>
<td>1,050</td>
<td>60%</td>
<td>2,102</td>
<td>2,900</td>
<td>4,722</td>
<td>5,275</td>
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<tr>
<td>Monterey Bay Community Power</td>
<td>277,000</td>
<td>505</td>
<td>31%</td>
<td>N/A</td>
<td>N/A</td>
<td>2,090</td>
<td>3,202</td>
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<tr>
<td>Peninsula Clean Energy</td>
<td>293,000</td>
<td>644</td>
<td>50%</td>
<td>305</td>
<td>3,055</td>
<td>3,484</td>
<td>3,600</td>
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<tr>
<td>Pico Rivera Innovative Municipal Energy</td>
<td>17,600</td>
<td>60</td>
<td>50%</td>
<td>N/A</td>
<td>35</td>
<td>174</td>
<td>220</td>
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<tr>
<td>Pioneer Community Energy</td>
<td>79,500</td>
<td>250</td>
<td>33%</td>
<td>N/A</td>
<td>N/A</td>
<td>1,030</td>
<td>NA</td>
</tr>
<tr>
<td>Rancho Mirage Energy Authority</td>
<td>14,500</td>
<td>100</td>
<td>35%</td>
<td>N/A</td>
<td>N/A</td>
<td>185</td>
<td>300</td>
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<tr>
<td>Redwood Coast Energy Authority</td>
<td>62,000</td>
<td>125</td>
<td>40%</td>
<td>N/A</td>
<td>413</td>
<td>630</td>
<td>699</td>
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<tr>
<td>San Jacinto Power</td>
<td>14,500</td>
<td>65</td>
<td>35%</td>
<td>N/A</td>
<td>N/A</td>
<td>130</td>
<td>170</td>
</tr>
<tr>
<td>San Jose Clean Energy</td>
<td>332,500</td>
<td>1,081</td>
<td>45%</td>
<td>N/A</td>
<td>N/A</td>
<td>41</td>
<td>3,286</td>
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<tr>
<td>Silicon Valley Clean Energy</td>
<td>270,000</td>
<td>800</td>
<td>50%</td>
<td>N/A</td>
<td>2,123</td>
<td>3,736</td>
<td>3,898</td>
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<tr>
<td>Solana Energy Alliance</td>
<td>7,300</td>
<td>13</td>
<td>50%</td>
<td>N/A</td>
<td>N/A</td>
<td>37</td>
<td>65</td>
</tr>
<tr>
<td>Sonoma Clean Power</td>
<td>225,000</td>
<td>450</td>
<td>48%</td>
<td>2,187</td>
<td>2,381</td>
<td>2,406</td>
<td>2,502</td>
</tr>
<tr>
<td>Valley Clean Energy</td>
<td>54,200</td>
<td>219</td>
<td>42%</td>
<td>N/A</td>
<td>N/A</td>
<td>439</td>
<td>682</td>
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<tr>
<td>CalCCA Member Totals</td>
<td>3,830,600</td>
<td>10,300</td>
<td>43%</td>
<td>5,400</td>
<td>12,300</td>
<td>27,800</td>
<td>43,900</td>
</tr>
</tbody>
</table>

*Data includes preliminary estimates and forecasts; consult CalCCA or individual CCAs for final data.
A key aspect of the value proposition offered by MCE and other California CCAs is the requirement that renewable and clean energy be a major component of the customers' power supply mix.”

-Moody’s Investors Services
Long-Term Contracts Totaling 2,000 MW Signed with New Renewable Energy Projects as of November 2018
Integrated Resource Planning: GHG Emissions

2030 GHG Emissions Benchmark (MMT)

2030 GHG Emissions Benchmarks v. 2030 CCA Forecasted Emissions (MMT)

- Apple Valley Clean Energy
- Monterey Bay Community Power
- Pico Rivera Innovative Municipal Energy
- San Jacinto Power
- Peninsula Clean Energy
- East Bay Community Energy
- Clean Power San Francisco
- San Jose Clean Energy
- Redwood Coast Energy Authority
- Lancaster Choice Energy
- Pioneer Community Energy
- Rancho Mirage Energy Authority
- Marin Clean Energy
- Silicon Valley Clean Energy
- Clean Power Alliance
- Sonoma Clean Power
- Valley Clean Energy

CCA 2030 GHG Emissions Forecast per 2018 CPUC IRP Filing (MMT)
New Renewables by Type

Aggregate CCA New Build Resources by Type (MW)

- Instate wind
- OOS Wind
- Utility scale Solar
- Geothermal
- Battery Storage
“CCAs tend to offer their customers innovative and tailored programs that suit their communities’ preferences and interests.”

- UCLA Luskin Center for Innovation
CCA Focus: Disadvantaged Communities

“CCAs are especially well positioned to serve their communities with locally tailored projects, programs, and policies that advance resilience and service to historically disadvantaged communities.”

- Center for Climate Protection
CCA is…

• Taking action to address climate change

• Building a better future through innovation and collaboration

• Helping local communities solve problems and invest in solutions

• Bringing clean energy home

Moving Forward Together
We make energy work harder for our over four million home and business customers across North America

• One of the largest competitive retail energy suppliers of electricity, natural gas, and home and business energy-related services in North America

• More than 4,000 employees across North America serve over 4 million customers

• Some of the California businesses:
  • Retail electricity and gas
  • Wholesale provider and services for CCAs
  • Behind the meter solutions
Where is there retail choice?

The top five markets by percent of sales met by retail providers:
1. District of Columbia
2. Pennsylvania
3. Ohio
4. Illinois
5. Texas

Source: BNEF, EIA 861  Note: ‘Retail providers’ includes retail power providers or marketers, community choice aggregators, municipal aggregators
Retail choice success in Texas

*Electricity Reform and Retail Pricing in Texas*, Dr. Peter R. Hartley, Dr. Kenneth B. Medlock III, and Olivera Jankovska, Rice University, Center for Energy Studies, Baker Institute, June 2017.
California Direct Access

- Introduced in 1998, suspended in 2001, reopened in 2010 and expanded in 2018

- C&I customers only

- Was capped at 24,792 GWh/year, split proportionally by IOU load

- Available cap space is assigned via a yearly lottery program
SB 237 (Hertzberg, 2018) – Expands DA

• Raises the DA cap 4 TWh/yr from 24.8 to 28.8 TWhs
  – CPUC to issue an order by 6/1/2019

• Instructs the CPUC to recommend a phase-in “over which the further direct transactions shall occur for all remaining” C&I customers by 6/1/2020

“There is clear interest in expanding the range of options for customers to choose their energy,” said Michael Picker, President of the California Public Utilities Commission. “This is a responsible step in that direction.”
California Customer Choice Paper

• CPUC concerned over unforeseen impacts due to greater choice and distributed resources

• Key issues center around affordability, reliability, and meeting environmental goals

• Key items of DA interest:
  – Central procurement?
  – POLR responsibilities?
  – Customer protections
DA – Myths and Reality

• Comparisons to the 2000-2001 Energy Crisis are Misguided: The Energy Crisis was a failure of the competitive wholesale market, not the competitive retail market.

• Direct Access Providers Meet the Same Requirements as All Other Load Serving Entities

• Range of Direct Access Benefits: Brings and keeps jobs in California, supports customer clean energy goals, spurs new innovations.

UC makes bold commitment to 100 percent clean electricity

"Through our partnership with Direct Energy Business we're able to see where power is being consumed throughout the entire facility. This is going to allow us to target where the consumption is taking place and the bottom line is that this is going to make us a much more efficient organization. We appreciate what Direct Energy Business has done for us. In an era of ever increasing expenses Direct Energy Business came in and showed us how to actually decrease our expenses."

Tim Ryan
CEO, HONDA Center
COO, Anaheim Ducks
Choice in Other Western States

• Oregon
  – Limited C&I Direct Access in PGE and PacifiCorp service territory
  – New rules passed on “new load” DA
  – CCAs being considered

• Arizona
  – 200 MW APS C&I DA “buy-through” program
  – ACC recently ordered APS to expand and TEP to introduce; new docket opened

• Nevada
  – C&I customers are allowed to pay an exit fee to depart NVE service (704B); 10 departed in 2018
  – Voters approved full choice with 72% of vote in 2016, then rejected with 66% of vote in 2018
Scott Olson
Director, Western Government & Regulatory Affairs
Scott.Olson@directenergy.com
Energy Bar Association
2019 Western Chapter Annual Meeting
Community Choice Aggregation Panel
February 21-22, 2019
About NV Energy
“Aggregation” in Nevada
Nevada Revised Statutes section 704B
Other forms of customer bypass

Disclaimer: The views and opinions expressed in this presentation are those of the author and do not necessarily represent official policy or position of NV Energy or of its affiliated companies.
About NV Energy

- Headquartered in Las Vegas, with major operations in Reno and Carson City
- Approximately 2,500 employees
- 1.25 million electric and 162,000 gas customers
- Service to approximately 90% of Nevada population, along with annual tourist population in excess of 45 million

About NV Energy

- Provides electric services to Las Vegas and surrounding areas
- 910,000 electric customers
- 4,766 megawatts of owned power generation capacity\(^1\)

Net summer peak megawatts owned in operation or in transition as of October 31, 2016

- Provides electric and gas services to Reno and northern Nevada
- 340,000 electric customers and 162,000 gas customers
- 1,372 megawatts of owned power generation capacity\(^1\)
About NV Energy
“Aggregation” History

- Deregulation began in 1997
- Companies negotiated sale of generation assets
- 1999 unsuccessful bid to acquire Portland General Electric
- Western energy crisis resulted in deregulation being halted by the Governor of Nevada in 2001
- At that time a large portion electricity was supplied from out of state
- In 2001, AB661 (now NRS Chapter 704B) paved way for customers over 1 megawatt to utilize alternative energy providers in order to allow Nevada utilities to use existing generation resources to meet needs of other customers
- Nevada Legislature recognized the need for the development of new generation in the state in order to provide stable and reliable electricity and to provide for economic development in that State
NRS 704B
• A reliable and reasonably priced supply of electricity is critical to the economy of this state and to the health, safety and welfare of the residents of this state;

• The electric utilities in this state depend on regional energy markets to purchase approximately 50 percent of the electricity needed to serve their customers in this state, and such purchases are often made pursuant to agreements with terms of 1 year or less;

• The energy markets in the western United States currently are characterized by critical shortages in the supply of electricity and extremely high prices for electricity, both of which are damaging to the strength of the economy of this state and to the well-being of the residents of this state;

• The residents of this state would benefit from construction of new generation assets in this state and from access to other new electric resources, wherever located, that provide lower-priced electricity;

• The development and use of new generation assets and other new electric resources by eligible customers would permit the electric utilities in this state to reduce their dependence on purchases of excessively priced electricity from dysfunctional, short-term energy markets and would thereby reduce the average system costs for such electric utilities;
• Allows for commercial/industrial customers or governmental entities with an average annual load of 1 MW or greater to purchase electricity from an alternative energy supplier—NRS 704B.080

• Must apply for authorization with the Public Utilities Commission of Nevada (“Commission”)—NRS 704B.310

• Commission must grant the application unless they find it to be contrary to public interest—NRS 704B.310(5)

• Commission must consider whether:
  – Utility will be burdened by increased costs
  – Remaining customer will pay increased costs
  – Transaction will impair system reliability or ability of utility to provide electric service to remaining customers
  – Transaction will add energy, capacity or ancillary services to the supply in Nevada
NRS 704B mechanics

- Processed over 150 days from date of application—NRS 704B.310
- Litigated with Commission Regulatory Operations Staff (“Staff”), Nevada Attorney General’s Bureau of Consumer protection, the utility and applicant—Nevada Administrative Code (“NAC”) 704B.320
- Staff performs an impact fee analysis—NAC 704B.385
- Other parties, including applicant, can file an alternative analysis
- Application is deemed approved if no decision from the Commission before 150 days
- If approved customer becomes a distribution only customer of the utility
704B impact

• From 2001 to 2014 multiple 704B applications with only 1 customer transitioning to DOS service
  – Barrick Mines—built it’s own generating unit

• Since 2014
  – 20 applications filed with the Commission
    • 16 casino/gaming
    • 2 stadium/arenas
    • 2 data centers
  – 10 applications approved
    • 6 Nevada Power, 4 Sierra Pacific
  – Approximately 450 MW of load now being served by alternative energy suppliers
  – Approximately 122 customers and 5.9 million MWh eligible
Customer Bypass
Others examples of Customer Bypass

- Net metering
  - ~250 MW net metering customers in the state
- Community Solar
  - SB 392 (2017)
  - Vetoed
  - Expected 2019 legislative session
- Tenant Solar
  - Petition for Advisory Opinion allowing for apartment owners to build and own solar facilities to sell directly to tenants
  - Docket No. 18-10008
  - Commission denied the Petition
  - Expected 2019 legislative session
• Allows for the Colorado River Commission of Nevada to serve Governmental agencies water and waste water load that had been served by Nevada Power.
• While not required, follows the same mechanics of AB661 applications.
• Southern Nevada Water Authority, Las Vegas Water Reclamation District, City of Las Vegas, City of North Las Vegas, City of Henderson and the Clark County Reclamation District totaling just over 100 MW.
Question 3

- Ballot initiative to amend Nevada Constitution
  “Shall Article 1 of the Nevada Constitution be amended to require the Legislature to provide by law for the establishment of an open, competitive retail electric energy market that prohibits the granting of monopolies and exclusive franchises for the generation of electricity?”

- Needed voter approval in two elections
- NV Energy did not oppose the initiative in 2016
- Voters approved in 2016 with 72.36% of the vote

- 2018 NV Energy joined the Coalition to Defeat Question 3
No on 3 campaign built a broad bipartisan coalition of leading groups/organizations, hundreds of small businesses, and over 6,500 individuals.
Final Outcome—November 6, 2018

YES Votes | NO Votes
---|---
316,951 | 644,843
32.95% | 67.05%

“The most ruthlessly brilliant campaign in ballot initiative history.”
- Jon Ralston, Nov. 4, 2018
Exelon is an Industry Leader

- **$20B**: Being invested in utilities through 2020
- **$46M**: In 2016, Exelon gave approx. $46 million to charitable and community causes
- **10M**: Six utilities serving 10M electric and gas customers, the most in the U.S.
- **34,400**: employees
- **$31.4B**: Operating revenue in 2016
- **205 TWh**: Customer load served
- **32,700**: Megawatts of total power generation capacity
- **11,430**: transmission line miles for utilities
- **FORTUNE 100**: Exelon is a FORTUNE 100 company and was named to Fortune Magazine’s list of “World’s Most Admired Companies”
- **2.2M+**: Exelon’s Constellation business serves residential, public sector and business customers
- **8.5M**: Smart meters installed
Constellation: Who, What and Where we Serve

<table>
<thead>
<tr>
<th>Energy Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
<td>Approx 688 Bcf load in C&amp;I markets^</td>
</tr>
<tr>
<td>Retail Power</td>
<td>Approx 150.7 TWh C&amp;I load under contract^</td>
</tr>
<tr>
<td>Energy Efficiency</td>
<td>850,000 MWh Annual MWH Savings from EE Programs</td>
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<tr>
<td>Solar</td>
<td>300 MW customer sited, completed or under construction</td>
</tr>
<tr>
<td>Distributed Generation</td>
<td>157MW customer sited, completed or under construction</td>
</tr>
</tbody>
</table>

We serve approximately **2.2 million** customers, including **2/3** of the Fortune 100, approximately **214,200** Business & Public Sector customers, and about **2 million unique residential customers.**

*Updated January 2017*
GridChain Labs

Exploring how blockchain can enable efficiencies and new business models for Exelon, our customers & the energy industry

**Technology & Business Model Exploration**
Validate technology & business model hypotheses beyond the energy industry

**Existing Energy Market and Process Applications**
Explore the opportunities in Exelon’s existing markets for efficiency and growth

**Explore New Market Paradigms**
Explore how blockchain technology can be a disrupter or enabler to energy markets

**Inform Regulatory Agenda**
Help shape legislation to benefit and protect our customers
Blockchain Innovation Engagement

Thought - Partnership

Hands-On Experience

Internal Capabilities

Business model development
Developer integration
IT support
Legal / Regulatory education
Pilot Development
Applications in Energy

**TRANSACTIVE ENERGY**
- P2P Energy Trading
- Demand Response
- Electric Vehicle Charging
- Grid Flexibility

**ACCOUNTING**
- Retail Billing
- REC/Clean Energy Tracking
- Asset Registry
- Materials Traceability

**ASSET TOKENIZATION**
- Renewable Energy-Backed Token
- Clean Energy Mining
- Shared Renewable Energy Assets

**CYBERSECURITY**
- Identity Authentication
- IOT/DER Security
- Grid Security

Organization’s Primary Blockchain Use Case (n=94)
Application #1: Clean Energy Origin Tracking

Blockchain as a platform for tracking generator output and automation of Renewable Energy Credit (REC) certificate issuance, tracking, trading, and retirement.
Legal Considerations: Clean Energy Origin Tracking

• Adoption by ISO/RTOs and replacement of centralized entities
  • Will rule changes be necessary if blockchain replaces existing systems?

• State regulatory proceedings
  • Will states see blockchain as solution for REC tracking systems? Ex. Nevada

• Potential to ease regulatory burdens
  • Will blockchain facilitate compliance by transparent tracking?

• Regulation of Tokens
  • SEC: Tokens are securities subject to US securities laws.
  • CFTC: Tokens are commodities subject to CFTC regulation.
  • US Treasury (FinCEN): Issuers of tokens are money services businesses.
  • IRS: Cryptocurrency is taxed as property, not currency.
Application #2: Peer-to-Peer / Transactive Energy

I can sell you 5MWh at $39/MWh

I need 10MWh

Blockchain as a solution for integrating distributed energy resources, renewables, and smart technologies and facilitating transactions between energy producers and energy consumers in the grid of the future.
Legal Considerations: Transactive Energy

• Sellers of electricity must be licensed
  • Utility or alternative supplier is the licensed seller of electricity.

• New concept of regulation of sales between end users
  • Who will regulate sales between end users? States? FERC?

• Utilities and alternative suppliers
  • Will interest lead to expansion of retail choice? Who will take the lead?

• Regulatory proceedings exploring elements of transactive energy
  • Examples: Arizona, New York, Illinois

• Use of smart contracts
Blockchain as a solution for enhancing efficiency and transparency of wholesale electricity and natural gas trading.
Legal Considerations: Wholesale Energy Trading

• Potential FERC implications:
  • Tariff changes to address replacement of centralized processes
  • Electronic Quarterly Reports (EQRs)
  • Immutability – how will errors be corrected? Refunds per section 206?

• Development of industry standards
  • ex. NAESB

• Platform development issues:
  • Corporate governance
  • Antitrust considerations
  • Confidentiality and data privacy
  • Intellectual property ownership
Thank you.

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Blockchain Basics for Energy Lawyers

February 21, 2019
What is a “blockchain”?

Basic answer

1. Digital data records – called blocks – which are linked by a “cryptographic hash”** to the previous block (the “chain”),

2. Where each block contains the cryptographic hash, a timestamp and the data, and

3. Where each block is recorded identically on multiple distributed ledgers that are not controlled by a central entity,

4. Meaning modification requires a majority consensus of network participants to correct all copies.

** a mathematical algorithm that is generally infeasible to be reverse engineered
What is “blockchain”? 

**Complicated answer:** A software stack that is

1. stored in the cloud and secured by cryptography,

2. built on an underlying platform protocol layer (Ethereum, Corda, Hyperledger) that is governed by a consensus mechanism (proof of work/stake) determined by the participants,

3. on top of which middle-wear can be deployed to address concerns like security or personal identity,

4. on top of which “dApps” can be deployed for a specific audience/user base (what the real world sees, not the coders), and

5. in many cases, this software is open source.
Consortium Blockchains

A consortium blockchain provides value only if the various constituents are willing to collaborate, requiring:

- A common business objective including clearly defined benefits
- Governance rules (who, how to join, what rights members have)
- Day to day operations management (including indemnification, finances)
- Compliance with regulations (including privacy, antitrust and industry specific)
- Clearly defined rules governing development and use of intellectual property
- A legal structure defining choice of law, force majeure, exit, dissolution
Examples of Energy Consortia Blockchains

BP/Royal Dutch Shell energy consortium
Climate Change Coalition
Energy Blockchain Consortium
Energy Web Foundation
Use Cases for Blockchain Cut Across All Industries

- **Technology & Communications**
  - Distributed Networking Platform Technology
  - IoT Device Registration

- **Consumer Products & Services**
  - Digital Rights Management
  - Supply Chain Management
  - Social Network Engagement Rewards

- **Financial Services**
  - Issuance and Settlement of Securities & Commodities
  - Public and Private Stock Ledgers

- **Life Sciences & Healthcare**
  - Recordkeeping and Auditing
  - Supply Chain Provenance
  - Identity Management

- **Energy & Natural Resources**
  - Tokenized Energy Credits
  - Smart Grid
  - Equipment Automation and Smart Contracts

- **Aerospace & Transportation**
  - Supply Chain Management
  - Inventory Management
How are tokens relevant?

A token is a unit of value, a digital representation of something else - e.g., an hour of solar energy, a currency, a share of stock of a corporation, a voucher to redeem for physical items, an access ticket, a unit in a rewards program, or a vote.

In **public** networks, tokens provide an incentive to unrelated parties who do not know or trust each other to fulfill the purpose of a specific blockchain. Tokens can provide access to the network or compensation for work on the network.

In **private** networks, tokens are less essential to creating value within the network – there are generally no miners or nodes who need payment to validate transactions. Instead, immutability and transparency may be sufficient incentives to participate in the network.
How are smart contracts relevant?

At the most basic level, a smart contract is an “if/then” logic statement that allow the performance of transactions without the use of trusted intermediaries.

More specifically, smart contracts:
• Are the code that run applications on the chain
• Define the rules and penalties for a transaction
• Can automatically enforce obligations (e.g., payment of VAT)
• Are stored on the blockchain, giving it security and immutability
• May require inputs from an oracle or third party

Enterprise uses: financial derivatives, insurance premiums, property transfers, identity verification, crowdfunding, automated payments for flight cancellations.

A smart contract is neither inherently smart, nor inherently a legal contract
Smart Contracts: Use Cases

- Supply Chain Management
- Government and Smart Cities
- Real Estate Registries
- Self-Sovereign Identity
- Capital Markets and Venture Capital
Disclaimer

The information in this presentation is for informational purposes only and not for the purpose of providing legal advice. You should contact your attorney to obtain advice with respect to any particular issue or problem. The opinions expressed in this presentation are the opinions of the speaker(s) and may not reflect the opinions of Perkins Coie LLP or any individual attorney.
Blockchain Today

Cryptocurrency

Distributed Ledger

Blockchain
Multiple DLT/Blockchains

Frequent Payments

Contracts

Store of Value

Privacy

Other

DASH

ethereum

bitcoin

MONERO

CASH

Grin

@karenhsummer
BlockCypher: Blockchain Web Services

Federal, State & Local
Healthcare
Insurance
Supply Chain
Telco
Payments & Trade Finance
Energy
Retail
Real Estate
Exchanges

Middleware and Infrastructure

Gartner
Cool Vendors in Blockchain Platforms
Published: 31 May 2017   ID: G03328873
Analyst(s): Ray Valdes | Rajesh Kandaswamy | Joerg Fritsch | Fabio Chesini
Blockchain-As-A-Service

Do It Yourself (to scale):

- Time: 2 years
- Resources: SysAdmins, Developers, Ops, DevOps, product managers, LOB, security, architects, machines
- Cost: $M annually

BLOCKCYPHER

- Time: 1 hour to set up blockchain + use case session
- Resource: Project manager
- Cost: Scale linearly

@karenhsumar
U.S. Department of Energy
Peer-to-Peer Transactions in the Lab

Goal: Laboratory testing for enabling distributed energy markets and facilitating increased penetration of DER in the retail utility market.

Description:
• Transactions between two homes in ESIF
• Develop an application for executing time-series contract
• Leverage BlockCypher’s APIs
• Cryptographically sign smart meter readings
• Settled on an existing cryptocurrency platform
# Example Revenue Stream

## Incentive: $432 / year / home

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market price ($/kWh)</td>
<td>$0.1900</td>
</tr>
<tr>
<td>Transaction Fees ($/Tx)</td>
<td>$0.0044</td>
</tr>
<tr>
<td>Energy Sale Price ($/kWh)</td>
<td>$0.1041</td>
</tr>
<tr>
<td>Generated (kWh)</td>
<td>7,417</td>
</tr>
<tr>
<td>Sold (kWh)</td>
<td>4,152</td>
</tr>
<tr>
<td>Payout ($/yr)</td>
<td>$432</td>
</tr>
</tbody>
</table>
Home 1 – Buyer Home: Major Appliances + HVAC + PV + Battery

Home 2 – Seller Home: Major Appliances + HVAC + PV
DER MARKETPLACE

SELLER
- Solar Panel
- P2P App: Signed Encrypted Reading
- Foresee: Encrypted Reading
- Meter: Reading

BLOCKCYPHER
- Embedded meter reading (no value transaction)
- Payment transaction

BUYER
- P2P App
- Foresee
- Battery and Devices

POWER EXCHANGE OVER ELECTRIC GRID

@karenhsumer
P2P Workflow

**SELLER**
- p2p app
- foresee
  - Exports Electricity
  - Meter Data to BlockCypher
  - Receive Payment

**BUYER**
- p2p app
- foresee
  - Consumes Electricity
  - Receive & Decrypt Data
  - Payment Made via BlockCypher

@karenhsumar
EV Charging Workflow

**CHARGER**
- App & Meter
- Load Switch/controller

**BUYER**
- App & Meter
- Controller

### Timeline
- **Select Charger, Make Request**
- **Consumes Electricity**
- **Interpret Request, Establish contract**
- **Exports Electricity**
- **Meter Data to BlockCyper**
- **Receive & Decrypt Data**
- **Receive Payment**
- **Payment To Charging Station & Utility**

@karenhsumar
What’s Next? Policy/Regulation for DER

Customer Technology Stack

Market Layer
- Bidding
- Contracts
- Payments
- Price Signals

Energy Management Systems
- Home Energy Mgmt System
- DER Control

Energy Resource or Service
- Wind
- Water
- Solar
- Storage
- Devices
Questions?

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@karenhsumar
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29. **Energy Imbalance Market**

29.1 **General Provisions.**

(a) **Operation of EIM.** Pursuant to Section 29, the CAISO shall expand operation and settlement of the Real-Time Market to provide for the purchase and sale of balancing Energy in any Balancing Authority Area for which the Balancing Authority executes an EIM Entity Agreement with the CAISO.

(b) **EIM Tariff Obligations.** EIM Market Participants shall comply with –

1. the provisions of Section 29; and
2. other provisions of the CAISO Tariff that apply to the extent such provisions –

(A) expressly refer to Section 29 or EIM Market Participants;
(B) are cross referenced in Section 29; or
(C) are not limited in applicability to the CAISO Controlled Grid, the CAISO Balancing Authority Area, or CAISO Markets other than the Real-Time Market.

(c) **Inconsistency Between Provisions.** If there is an inconsistency between a provision in Section 29 and another provision of the CAISO Tariff regarding the rights or obligations of EIM Market Participants, the provision in Section 29 shall prevail to the extent of the inconsistency.

(d) **Suspension of EIM Entity Participation.**

1. **Temporary Suspension.** The CAISO may, within 60 days following an EIM Entity Implementation Date for an EIM Entity, and pursuant to the terms of a Market Notice, temporarily suspend the participation of that EIM Entity in the Real-Time Market for a period not to exceed 60 days if market or system operational issues adversely impact any portion of the EIM Area, provided that the ISO may continue operation of the Real-Time Market without the participation of the EIM Entity for a reasonable additional period of time in order to implement a resolution of the market or system operational issues.
(2) **CAISO Termination.** If the CAISO is not able to identify a resolution of the EIM-related market or system operational issues within 60 days after issuance of the Market Notice of temporary suspension of EIM participation by an EIM Entity, the CAISO may, upon issuance of a subsequent Market Notice, terminate participation by the EIM Entity in the Real-Time Market and may extend the suspension of EIM participation by the EIM Entity for a time sufficient to process the termination of the EIM Entity Agreement.

(3) **Reinstatement.**

(A) **After Temporary Suspension.** The CAISO may reinstate EIM operations after a temporary suspension of EIM participation by an EIM Entity by issuing a Market Notice announcing the intended reinstatement no less than 5 days in advance of the reinstatement date.

(B) **After CAISO Termination.** The CAISO may only reinstate EIM operations with respect to an EIM Entity after termination of EIM participation by an EIM Entity pursuant to a filing accepted by FERC.

(4) **EIM Entity Action.** In the event the CAISO issues a Market Notice of the temporary suspension of EIM participation by an EIM Entity, the EIM Entity shall continue to submit EIM Base Schedules and the associated meter data to enable continued operation of the Real-Time Market until the CAISO issues a subsequent Market Notice either that –

(i) the cause of the temporary suspension has been resolved and the EIM Entity has been reinstated, in which case EIM participation by the EIM Entity shall return to normal; or

(ii) EIM participation by the EIM Entity has been terminated.

(5) **CAISO Action.** In the event the CAISO issues a Market Notice of the temporary suspension of EIM participation by an EIM Entity, the CAISO shall –

(i) prevent EIM Transfers and separate the EIM Entity Balancing Authority Area from operation of the Real-Time Market in the EIM Area in
accordance with the provisions of the Business Practice Manual for the 
Energy Imbalance Market;

(ii) suspend Settlement of Real-Time Market charges with respect to the 
EIM Entity in accordance with the provisions of the Business Practice 
Manual for the Energy Imbalance Market; and

(iii) issue a subsequent Market Notice either that (i) the cause of the 
temporary suspension has been resolved and the EIM Entity has been 
reinstated, in which case EIM participation by the EIM Entity shall return 
to normal, or (ii) EIM participation by the EIM Entity has been terminated.

29.2 EIM Entity Access to the Real-Time Market

(a) **In general.** The CAISO shall –

(1) provide open and non-discriminatory access to the Real-Time Market, including 
the Energy Imbalance Market, in accordance with the provisions of the CAISO 
Tariff; and

(2) make available for use in the Real-Time Market the transmission capacity that is 
available in Real-Time –

(A) on the CAISO Controlled Grid; and

(B) for which an EIM Entity provides EIM Transmission Service Information 
pursuant to Section 29.17.

(b) **Implementation of Access as an EIM Entity.**

(1) **EIM Implementation Agreement.** A Balancing Authority that wishes to become 
an EIM Entity must first execute an EIM Implementation Agreement with the 
CAISO that establishes –

(A) the activities the parties must undertake to enable the Balancing 
Authority to participate in the Real-Time Market;

(B) the EIM Entity Implementation Date;

(C) the implementation fee the Balancing Authority must pay to the CAISO 
for the start-up costs the CAISO incurs to accommodate the participation

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of the Balancing Authority in the Real-Time Market as provided in the agreement; and

(D) the obligation of the Balancing Authority to enter into an EIM Entity Agreement governing its participation in the Real-Time Market.

(2) **FERC Approval.** The EIM Entity Implementation Date must be not less than six months and not more than twenty-four months after the date that the EIM Implementation Agreement between the CAISO and the Balancing Authority is accepted by FERC.

(3) **Implementation Period.** The CAISO shall in its discretion determine the EIM Entity Implementation Date based on the complexity and compatibility of the Balancing Authority’s transmission and technology systems with the CAISO systems and the planned timing of the CAISO’s implementation of software enhancements.

(4) **Market Simulation and Parallel Operations.** The CAISO and the prospective EIM Entity shall engage in –

(A) a market simulation that accounts for the prospective EIM Entity’s implementation circumstances sufficient to meet the readiness criteria set forth in Section 29.2(b)(7); and

(B) at least 30 days of parallel operations representing the Energy Imbalance Market to support the CAISO and the prospective EIM Entity’s readiness certification required by section 29.2(b)(6), an adequate period of which must occur prior to the readiness determination required by section 29.2(b)(5).

(5) **Readiness Determination.** No later than 30 days prior to the prospective EIM Entity Implementation Date as established by the EIM Implementation Agreement, the CAISO will determine, in consultation with the prospective EIM Entity, whether the systems and processes of the prospective EIM Entity will be ready for the prospective EIM Entity’s participation in the Energy Imbalance
Market according to the criteria set forth in Section 29.2(b)(7) as measured by the thresholds specified in the Business Practice Manual for the Energy Imbalance Market, or consistent with any exceptions to thresholds, for certifying the prospective EIM Entity’s readiness.

(6) **Readiness Certification.**

(A) **Certification.** The CAISO and the prospective EIM Entity shall each file a market readiness certificate with the Federal Energy Regulatory Commission at least 30 days prior to the EIM Entity Implementation Date in which a senior office of each entity attests –

(i) that the processes and systems of the prospective EIM entity have satisfied or will have satisfied the readiness criteria set forth in Section 29.2(b)(7) as of the EIM Entity Implementation Date;

(ii) to any known issues requiring resolution prior to the EIM Entity Implementation Date in accordance with section 29.2(b)(8);

(iii) to any exceptions from the established thresholds specified in the Business Practice Manuals, and that despite such exceptions the criteria were met or will be met as specified in 29.2(b)(7); and

(iv) that the EIM Entity Implementation Date is conditional on the resolution of the known issues identified in the certificates and any unforeseen issues that undermine the satisfaction of the readiness criteria set forth in Section 29.2(b)(7).

(B) **Delay or Re-Certification.** If, subsequent to readiness certification pursuant to Section 29.2(b)(6)(A), the CAISO or the prospective EIM Entity determines that it cannot proceed with implementation on the EIM Entity Implementation Date, the CAISO or the prospective EIM Entity will notify the Federal Energy Regulatory Commission of the delay, the reason for the delay, the new EIM Entity Implementation Date if it can be determined, and whether it will need to re-issue a portion or all of the
(7) **Readiness Criteria.**

(A) **Prospective EIM Entity Full Network Model Integration.** The Full Network Model of the prospective EIM Entity is integrated into the Full Network Model such that –

(i) the Load, EIM Internal Intertie and EIM External Interties and Generating Unit definition in the Full Network Model is consistent with the Load, EIM Internal Intertie and EIM External Interties and Generating Unit definition in the prospective EIM Entity network model file that it delivered to the CAISO;

(ii) the SCADA measurements used in the prospective EIM Entity’s EMS model match the measurements observed by the CAISO through the CAISO EMS;

(iii) the State Estimator solution is equivalent or superior to the prospective EIM Entity’s state estimator solution for its Balancing Authority Area; and

(iv) the physical representation of the prospective EIM Entity network matches the Base Market Model that accounts for non-conforming load, behind-the-meter generation, Pseudo-Ties, and Dynamic Schedules, and third party transmission service provider and path operator information that the CAISO agrees is used to support EIM Transfers and Real-Time Dispatch in the Energy Imbalance Market, as applicable.

(B) **Operations Training.** Prior to the start of parallel operations as set forth in Section 29.2(b)(4), all operations staff identified by the prospective EIM Entity who will have responsibility for EIM operations, transactions and settlements, have completed –
(i) the introduction to Energy Imbalance Market training module;

(ii) the specific hourly and daily tasks and duties for normal operation training module; and

(iii) the assessment of market results and response to contingencies and abnormal situations training module.

(C) **Forecasting Capability.** The CAISO and, to the extent the prospective EIM entity will use its own forecasts or is otherwise required to provide forecasting information to the CAISO, the prospective EIM Entity have demonstrated their respective forecasting capability through –

(i) the definition of EIM Demand forecast boundaries based on the conforming and non-conforming Load characteristics, as applicable;

(ii) the accuracy of the CAISO forecast of EIM Demand based on historical actual Load data for the defined EIM Demand forecast boundaries;

(iii) the identification of weather stations locations used in forecasting, as applicable; and

(iv) the identification of the source of Variable Energy Resource forecasts pursuant to Section 29.11(j).

(D) **Balanced Schedules.** The prospective EIM Entity’s Scheduling Coordinator has demonstrated it has the –

(i) ability to balance EIM Demand and EIM Supply for the prospective EIM Entity’s Balancing Authority Area;

(ii) ability to pass the capacity test, as set forth in Section 29.34(l);

and

(iii) ability to pass the flexible ramping sufficiency test, as set forth in Section 29.34(m).
(E) **System Readiness and Integration.**

(i) **Readiness.** The prospective EIM Entity and the CAISO have tested the functional and system elements in accordance with functional and system testing documentation posted on the CAISO Website.

(ii) **System Integration.** The prospective EIM Entity and the CAISO have tested system integration testing in accordance with the system integration testing documentation posted on the CAISO Website.

(iii) **Certificates.** The prospective EIM Entity has issued all necessary certificates to its employees that require system access to perform EIM-related job functions.

(F) **Settlements.** The CAISO and the prospective EIM Entity have demonstrated that —

(i) the CAISO Settlement Statements and Invoices match the operational data published to stakeholders or fed into the settlement system and the resulting calculations correspond to the formulas defined in the CAISO Tariff and applicable Business Practice Manuals during market simulation and parallel operations; and

(ii) the Settlement Statements and Invoices of the prospective EIM Entity allocating charges and credits to its customers accurately reflect system and market data during parallel operations.

(G) **Outage Management System.** The prospective EIM Entity has verified its ability to submit and retrieve accurate and correct outage information to and from the CAISO within the required timelines.
(H) Communications between the CAISO and the prospective EIM Entity.

(i) **Messaging.** The process and procedures used for voice and electronic messaging between the prospective EIM Entity and the CAISO are identified and incorporated into the prospective EIM Entity’s operating procedures before the start of market simulation specified in Section 29.2(b)(4)(A).

(ii) **Training.** The operations staff identified by the prospective EIM Entity who will have responsibility for EIM operations, transactions and settlements are trained on the relevant Operating Procedures and tools used for EIM related communications before the start of parallel operations specified in Section 29.2(b)(4)(B).

(iii) **Third Party Transmission Service Providers.** Third party transmission service provider and path operator information that the CAISO agrees is used to support EIM Transfers and Real-Time Dispatch is made available by the CAISO to the prospective EIM Entity during parallel operations.

(I) **Market Simulation.**

(i) **Prospective EIM Entity Identification.** The CAISO has established and the prospective EIM Entity has tested all necessary SCIDs and Resource IDs established for the prospective EIM Entity’s Balancing Authority Area.

(ii) **Day in the life simulation.** The prospective EIM Entity operations staff identified by the prospective EIM Entity who will have responsibility for EIM grid operations, have completed end-to-end daily market workflow with no critical defects.
(iii) **Structured scenarios simulation.** The prospective EIM Entity operations staff identified by the prospective EIM Entity who will have responsibility for EIM operations, transactions and settlements, have executed and passed all structured scenarios provided by CAISO with all significant issues resolved.

(iv) **Unstructured scenarios simulation.** The prospective EIM Entity operations staff identified by the prospective EIM Entity who will have responsibility for EIM operations, transactions and settlements, have executed and passed all unstructured scenarios provided by the prospective EIM Entity, with significant issues resolved.

(v) **Market results reports.** Market results are appropriate based on inputs, and the prospective EIM Entity and CAISO executive project sponsors approve the results.

(vi) **Market quality review.** The CAISO prices are validated based on input data for parallel operations specified in Section 29.2(b)(4)(B).

(J) **Parallel Operations Plan.** The period of parallel operations specified in Section 29.2(b)(4)(B) runs consistently and in accordance with the prospective EIM Entity specific parallel operations plan.

(K) **Additional Criteria**

(i) **Execution of Necessary Agreements.** The prospective EIM Entity has complied with Section 29.4(c)(2) and executed any necessary agreements for operating as an EIM Entity, including any non-disclosure agreements required for the exchange of information.

(ii) **Operating Procedures.** Prior to the start of parallel operations pursuant to Section 29.2(b)(4)(B), the CAISO and the
prospective EIM Entity have defined, completed, and tested operating procedures for the prospective EIM Entity and its Scheduling Coordinator’s participation in the Energy Imbalance Market.

(iii) **Identification of EIM Available Balancing Capacity.** The prospective EIM Entity has identified EIM Participating Resources and non-participating resources that it intends to designate in the EIM Resource Plan as EIM Available Balancing Capacity.

(iv) **Flexible Capacity Requirements.** The CAISO has received and stored all historical data from the prospective EIM Entity necessary and sufficient for the CAISO to perform the flexible ramp requirement, and the CAISO has established flexible capacity requirements for the prospective EIM Entity’s Balancing Authority Area and for the combined EIM Area including the prospective EIM Entity.

(v) **Monitoring.** Sufficient and adequate data is available to the CAISO and the Department of Market Monitoring to enable market monitoring as of the Implementation Date.

(8) **Readiness Reporting.** The CAISO shall report on the CAISO Website periodically, but not less than monthly during market simulation pursuant to Section 29.2(b)(4)(A) and not less than twice a month during parallel operations pursuant to Section 29.2(b)(4)(B), on progress towards achieving the readiness criteria in Section 29.2(b)(7), including providing information explaining any exceptions to or deviations from the readiness thresholds granted according to the standards and procedures for granting exceptions or deviations set forth in the Business Practice Manual for the Energy Imbalance Market, and the reasons therefore, and publish such reports on its website in advance of and in support of

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the certificate to be filed pursuant to Section 29.2(b)(6).

29.3 [Not Used]

29.4 Roles and Responsibilities

(a) CAISO Balancing Authority Obligations.

(1) Reliability Responsibilities. Nothing in Section 29 shall alter the CAISO’s responsibilities under the other sections of the CAISO Tariff, under any agreement not required by Section 29, or under NERC Reliability Standards or any other Applicable Reliability Criteria as the Balancing Authority for the CAISO Balancing Authority Area and the transmission operator for the CAISO Controlled Grid.

(2) Operating Responsibilities. During any interruption of the normal operation of the Real-Time Market, the CAISO as Balancing Authority shall remain responsible for managing the resources in its Balancing Authority Area and the flows on transmission lines internal to the CAISO Balancing Authority Area, including imports and exports, for the duration of the interruption.

(b) EIM Entity.

(1) Balancing Authority Obligations.

(A) EIM Entity as Balancing Authority. An EIM Entity must be a Balancing Authority registered and certified as such under the applicable authorities.

(B) Reliability Responsibilities. Nothing in Section 29 shall alter an EIM Entity’s responsibilities under NERC Reliability Standards as the Balancing Authority for the EIM Entity Balancing Authority Area and, to the extent applicable, as the transmission operator for transmission facilities within its Balancing Authority Area.

(C) Operating Responsibilities. During any interruption of the normal operation of the Real-Time Market, the EIM Entity as Balancing Authority shall remain responsible in accordance with Section 29.7 for managing
the resources in its Balancing Authority Area and the flows on internal transmission lines, including imports into and exports out of its Balancing Authority Area, for the duration of the interruption.

(D) **Inadvertent Energy.** An EIM Entity remains responsible for tracking inadvertent Energy and administering the payback of inadvertent Energy for its Balancing Authority Area through processes established by WECC.

(2) **EIM Entity Agreement.** An EIM Entity must execute an EIM Entity Agreement no later than ninety (90) days before the EIM Entity Implementation Date.

(3) **EIM Entity Obligations.** An EIM Entity shall –

(A) perform the obligations of an EIM Entity in accordance with the EIM Entity Agreement, Section 29, and other provisions of the CAISO Tariff that by their terms apply to EIM Entities, subject to the limitations specified in Section 29.1(b)(2)(C);

(B) ensure that each EIM Transmission Service Provider in its Balancing Authority Area has provisions in effect in the EIM Transmission Service Provider’s transmission tariff, as necessary or applicable, to enable operation of the Real-Time Market in its Balancing Authority Area;

(C) qualify as or secure representation by no more than one EIM Entity Scheduling Coordinator;

(D) review and validate information about available transmission capacity submitted to it by an EIM Transmission Service Provider and transmit such validated information to its EIM Entity Scheduling Coordinator;

(E) provide the CAISO and its EIM Entity Scheduling Coordinator with information regarding the transmission capacity available to the Real-Time Market, including any information regarding Transmission Constraints of which it is aware;
(F) define Load Aggregation Points in its Balancing Authority Area;

(G) determine and inform the CAISO which resource types are eligible to participate in the Real-Time Market as resources and which transmission service providers or holders of transmission rights are EIM Transmission Service Providers; and

(H) inform the CAISO whether or not the EIM Entity intends to utilize the CAISO’s Demand Forecast consistent with Section 29.34(d).

(4) **EIM Entity Termination of EIM Participation.**

(A) **EIM Entity Agreement.** An EIM Entity that wishes to terminate participation in the Real-Time Market must terminate the EIM Entity Agreement pursuant to its terms.

(B) **Notice.** Delivery to the CAISO of a written notice of termination pursuant to the terms of the EIM Entity Agreement shall represent the commitment by the EIM Entity to undertake all necessary preparations to disable the Real-Time Market within the EIM Entity Balancing Authority Area.

(C) **Actions Following Notice.** Upon receipt of such notice, the CAISO shall undertake all necessary preparations to disable the Real-Time Market within the EIM Entity Balancing Authority Area, as outlined in the Business Practice Manual for the Energy Imbalance Market, including issuance of a Market Notice within five Business Days after receipt of such notice.

(5) **EIM Entity Corrective Actions.** If the EIM Entity takes corrective action, subject to the provisions of an open access transmission tariff, to address an issue with EIM implementation or EIM operation, or the EIM Entity issues a notice of termination –

(A) the EIM Entity shall take those actions provided in Section 29.1(d)(4) during the implementation of its corrective action; and
(B) the CAISO shall issue a Market Notice in accordance with Section 29.1(d)(1) and take those actions provided in Section 29.1(d)(5) during the implementation of the EIM Entity corrective action.

(c) **EIM Entity Scheduling Coordinator.**

(1) **Certification.** An EIM Entity Scheduling Coordinator must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator.

(2) **EIM Entity Scheduling Coordinator Agreement.** An EIM Entity Scheduling Coordinator must enter an EIM Entity Scheduling Coordinator Agreement with the CAISO, which shall satisfy the obligation to enter a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EIM Entity.

(3) **Representation.** An EIM Entity Scheduling Coordinator-

(A) may represent a Market Participant other than an EIM Entity, but only if it enters a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant;

(B) may not also be an EIM Participating Resource Scheduling Coordinator or a Scheduling Coordinator for a Participating Generator, Participating Load, or Demand Resource Provider, unless the EIM Entity Scheduling Coordinator is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358; and

(C) may represent more than one EIM Entity if it has certified to the CAISO in the manner described in the Business Practice Manual for the Energy Imbalance Market that it has informed each EIM Entity of the multiple representation.

(4) **Obligations.** An EIM Entity Scheduling Coordinator shall-

(A) perform the obligations of an EIM Entity Scheduling Coordinator under the EIM Entity Scheduling Coordinator Agreement and Section 29;

(B) perform the obligations of a Scheduling Coordinator under provisions of
the CAISO Tariff described in Section 29.1(b);

(C) register in the manner set forth in the Business Practice Manual for the Energy Imbalance Market all non-participating resources in the Balancing Authority Area of each EIM Entity that it represents and update such information in a timely manner;

(D) verify in the manner set forth in the Business Practice Manual for the Energy Imbalance Market that all EIM Resources within the Balancing Authority Area of each EIM Entity represented by the EIM Entity Scheduling Coordinator have been registered with the CAISO;

(E) submit the Interchange schedules with other Balancing Authorities at the defined Interchange scheduling locations, including creating and processing E-Tags in accordance with NERC, North American Energy Standards Board, and WECC standards and business practices for bilateral schedules between Balancing Authority Areas that are arranged no less than 20 minutes in advance of the Dispatch Interval of the Real-Time Market in which the Interchange will occur and that are included in an EIM Resource Plan;

(F) match E-Tags and manage schedule curtailments at the defined Interchange scheduling locations with other Balancing Authorities;

(G) provide EIM Transmission Service Information in accordance with Section 29.17;

(H) settle all financial obligations arising out of the Real-Time Market for the EIM Entity, including financial settlement with non-participating resources and non-participating load within the EIM Entity Balancing Authority Area;

(I) submit EIM Base Schedules, EIM Resource Plans and other required information on behalf of the EIM Entity;
(J) register with the CAISO, consistent with the provisions in the Business Practice Manual for the Energy Imbalance Market, all non-participating resources that the EIM Entity Scheduling Coordinator may designate as EIM Available Balancing Capacity in its EIM Resource Plan; and

(K) create with the CAISO a Default Energy Bid consistent with the rules specified in Section 39.7.1 for all non-participating resources that the EIM Entity Scheduling Coordinator may designate as EIM Available Balancing Capacity in the EIM Resource Plan.

(5) **Governmental Entities.** Notwithstanding Section 29.4(c)(3)(B), a governmental entity that is an EIM Entity Scheduling Coordinator may also be an EIM Participating Resource Scheduling Coordinator or a Scheduling Coordinator for resources participating in the CAISO Markets if it agrees to comply with standards of conduct equivalent to those set forth in 18 C.F.R. § 358.

(d) **EIM Participating Resources.**

(1) **Eligibility.** The owner or operator of an EIM Resource is eligible to become an EIM Participating Resource if the EIM Resource –

(A) meets the eligibility requirements established by the EIM Entity in whose Balancing Authority Area the resource is located or scheduled or to which it may be dynamically transferred; and

(B) is capable of delivering Energy, Curtailable Demand, Demand Response Services, or similar services within the time specified by Section 29 for the Real-Time Market in which its EIM Participating Resource Scheduling Coordinator will submit Bids.

(2) **EIM Participating Resource Agreement.** An EIM Participating Resource must execute an EIM Participating Resource Agreement.

(3) **Obligations.** An EIM Participating Resource shall –

(A) perform the obligations of an EIM Participating Resource under the EIM Participating Resource Agreement and Section 29;
(B) perform the obligations applicable to Market Participants and resources under the provisions of the CAISO Tariff described in Section 29.1(b); and

(C) if it represents a Generating Unit, Load of a Participating Load, Proxy Demand Resource, or other qualified resource, perform the obligations required for the resource under the provisions of the CAISO Tariff described in section 29.1(b).

(e) EIM Participating Resource Scheduling Coordinator.

(1) Certification. An EIM Participating Resource Scheduling Coordinator must be either an existing Scheduling Coordinator or must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator.

(2) EIM Participating Resource Scheduling Coordinator Agreement. An EIM Participating Resource Scheduling Coordinator must enter an EIM Participating Resource Scheduling Coordinator Agreement with the CAISO, which shall satisfy the obligation to enter a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EIM Participating Resource.

(3) Representation. An EIM Participating Resource Scheduling Coordinator—

(A) may represent a Market Participant other than an EIM Participating Resource, but only if it enters a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant;

(B) may not also be an EIM Entity Scheduling Coordinator unless the EIM Participating Resource Scheduling Coordinator is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358;

and

(C) may represent more than one EIM Participating Resource.

(4) Obligations. An EIM Participating Resource Scheduling Coordinator must—

(A) perform the obligations of an EIM Participating Resource Scheduling Coordinator under the EIM Participating Resource Scheduling Coordinator Agreement.
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Coordinator Agreement and Section 29;

(B) perform the obligations of a Scheduling Coordinator under the provisions of the CAISO Tariff described in Section 29.1(b);

(C) ensure that the entity it represents has obtained any transmission service necessary to participate in the Energy Imbalance Market under the terms of the CAISO Tariff or the tariff of another transmission service provider, as applicable;

(D) register in the manner set forth in the Business Practice Manual for the Energy Imbalance Market all EIM Participating Resources that it represents, provide such information to the EIM Entity Scheduling Coordinator, and update such information in a timely manner.

(5) **Governmental Entities.** Notwithstanding Section 29.4(e)(3)(B), a governmental entity that is an EIM Participating Resource Scheduling Coordinator may also be an EIM Entity Scheduling Coordinator if it agrees to comply with standards of conduct equivalent to those set forth in 18 C.F.R. § 358.

29.5 [Not Used]

29.6 Communications

(a) **EIM Entity.** The EIM Entity shall meet the technical and communication requirements specified in the Business Practice Manual for the Energy Imbalance Market, which shall be based on the Inter-Control Center Communication Protocol and Reliability Standards.

(b) **EIM Communications and OASIS.** Section 6 shall govern communications and information availability regarding the participation of EIM Market Participants in the Real-Time Market except that –

(1) references to internal resources shall be deemed to include EIM Resources;

(2) references in Sections 6.2.2.1 and 6.5.2.1 to the CAISO Controlled Grid and references in Sections 6.5.4.2.2(a) and 6.5.5.1.1 to CAISO Balancing Authority Area shall be deemed references to the EIM Area; and

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(3) the provisions of Section 6.3.1 that authorize the CAISO to communicate directly with Generators and Demand Response Providers to ensure System Reliability shall not apply to Generators and Demand Response Providers in the EIM Entity’s Balancing Authority Area or pseudo-tied from an external Balancing Authority Area to the EIM Entity Balancing Authority Area.

(c) **Loss of Communications.**

(1) **Procedures.** The CAISO and each EIM Entity and EIM Entity Scheduling Coordinator shall establish procedures to address an interruption of Real-Time Market communications, which shall include steps to be taken to restore communications and address any impact on system or market operations as provided in Section 29.

(2) **Responsibilities.** An EIM Entity that loses communication with the CAISO remains responsible for managing its Balancing Authority Area imbalance needs without balancing Energy from the Real-Time Market.

(d) **Variable Energy Resource Forecast Communications.** If the EIM Participating Resource Scheduling Coordinator for a Variable Energy Resource elects to use an independent forecasting service, it must make data transfer arrangements with the CAISO for the CAISO to receive the forecast in a format and on a schedule set forth in the Business Practice Manual for the Energy Imbalance Market.

29.7 **EIM Operations Under Normal and Emergency Conditions.**

(a) **CAISO Controlled Grid Operations.** Section 7 shall not apply to EIM Market Participants in their capacities as such.

(b) **Normal EIM Operations.** The CAISO shall administer the transmission capacity made available to the Real-Time Market to manage Energy imbalances in the EIM Area under normal operations.

(c) **Load Curtailment.** The CAISO will not issue Dispatch Instructions to an EIM Entity Scheduling Coordinator with respect to Load or Demand that has not been bid into the Real-Time Market.
(d) **Dispatch Instructions for EIM Participating Resources.** The CAISO will not issue Dispatch Instructions to an EIM Participating Resource Scheduling Coordinator with respect to Supply that has not been bid into the Real-Time Market.

(e) **EIM Transfers.** The CAISO shall manage EIM Transfers as aggregate Dynamic Schedules with each EIM Entity Balancing Authority Area, which –

1. shall not require individual resource E-Tags;
2. shall not constitute inadvertent Energy;
3. shall reflect intra-hour incremental EIM Transfers between the CAISO Balancing Authority Area and each EIM Entity Balancing Authority Area;
4. shall be updated by the CAISO within 60 minutes after the end of each Operating Hour to include the integrated Energy during the hour for the sum of all EIM Transfers between each Balancing Authority Area in the EIM Area in accordance with WECC business practices for purposes of inadvertent Energy accounting; and
5. shall be subsequently updated as necessary consistent with the requirements of WECC, NERC, and North American Energy Standards Board standards and business practices.

(f) **Dynamic Imbalance Schedule to Net EIM Transfers.** The CAISO will –

1. model changes in the net five-minute scheduled EIM Transfers that result from Real-Time Dispatch as a Dynamic Schedule between the CAISO and EIM Entity for AGC control accuracy; and
2. calculate the dynamic net scheduled EIM Transfers for the CAISO and each EIM Entity Balancing Authority Area and derive from these dynamic net scheduled EIM Transfers the Dynamic Schedules on EIM Internal Interties for E-Tag purposes.

(g) **EIM Manual Dispatch.** The EIM Entity may issue an EIM Manual Dispatch to an EIM Participating Resource or a non-participating resource in its Balancing Authority Area, outside of the Market Clearing of the Real-Time Market, when necessary to address

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reliability or operational issues in the EIM Entity Balancing Authority Area that the CAISO is not able to address through normal economic Dispatch and congestion Management.

(h) **EIM Entity Actions in Response to an EIM Manual Dispatch.** If the EIM Entity issues an EIM Manual Dispatch to address circumstances on its system –

1. the EIM Entity shall immediately inform the CAISO, as specified in the Business Practice Manual for the Energy Imbalance Market, if the EIM Entity Balancing Authority Area is under manual operation;

2. the EIM Entity shall immediately inform the CAISO of the EIM Manual Dispatch to any EIM Participating Resource or non-participating resource by submitting the EIM Manual Dispatch instruction for the affected resource to the CAISO as specified in the Business Practice Manual for the Energy Imbalance Market; and

3. the EIM Entity remains responsible for informing the Reliability Coordinator of the circumstances creating the need for the EIM Manual Dispatch and may enforce Transmission Constraints, as may be required.

(i) **CAISO Actions in Response to Notification of EIM Manual Dispatch.** Upon receipt of notice of an EIM Manual Dispatch, the CAISO shall –

1. reflect the EIM Manual Dispatch in the Real-Time Market;

2. disregard an EIM Manual Dispatch in the determination of the Locational Marginal Price; and

3. treat an EIM Manual Dispatch to an EIM Participating Resource or non-participating resource as FMM or RTD Instructed Imbalance Energy for Settlement.

(j) **EIM Disruption.**

1. **Declaration.** The CAISO may declare an interruption of EIM Entity participation in the Real-Time Market when in its judgment –

   (A) operational circumstances (including a failure of the Real-Time Market operation to produce feasible results in the EIM Area or other CAISO Market Disruption) in the EIM Area have caused or are in danger of

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causing an abnormal system condition in the CAISO Balancing Authority Area or an EIM Balancing Authority Area that requires immediate action to prevent loss of Load, equipment damage, or tripping system elements that might result in cascading Outages, or to restore system operation to meet Applicable Reliability Criteria; or

(B) communications between the CAISO and EIM Market Participants are disrupted and prevent an EIM Entity, EIM Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator from accessing CAISO systems to submit or receive information.

(2) CAISO Response to EIM Disruption. If the CAISO declares an interruption of EIM Entity participation in the Real-Time Market, the CAISO may in its judgment, among other things-

(A) separate the affected EIM Entity Balancing Authority Area from the EIM Area and maintain the Real-Time Market for other Balancing Authority Areas in the EIM Area by enforcing a net transfer constraint for the affected Balancing Authority Area to separate it from the remainder of the EIM Area;

(B) reduce or suspend EIM Transfers between one or more Balancing Authority Areas in the EIM Area;

(C) instruct one or more EIM Entities to maintain system balance within their Balancing Authority Area without RTM Dispatch; or

(D) in addition or as an alternative, use market results in the Real-Time Market in accordance with Section 7.7.9 or take any of the actions specified in Section 7.7.6 with respect to the Real-Time Market, except that if Section 7.7.9 calls for the use of Day-Ahead Market results, the CAISO will use –

(i) the price specified in the EIM Entity’s open access transmission tariff as the LMP;

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the EIM Entity’s EIM Base Schedule as the schedule;

(iii) the EIM Bid Adder from the most recent corresponding interval that is available as the EIM Bid Adder; and

(iv) the emissions rate set by the California Air Resources Board for an unspecified source multiplied by the daily Greenhouse Gas Allowance Price.

(3) **EIM Entity Responsibility.** In response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO, all EIM Entities shall follow NERC Reliability Standards applicable to their roles as Balancing Authorities in an effort to alleviate operational and system conditions and restore routine operations.

(4) **EIM Entity Scheduling Coordinator Responsibility.** All EIM Entity Scheduling Coordinators shall promptly inform the CAISO of actions taken by the EIM Entities they represent in response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO through updates to their EIM Base Schedules, Interchange E-TagS, transmission limit adjustments, or Outage and derate information, as applicable.

(5) **System Restoration.** The CAISO shall reinstate normal operation of the Real-Time Market in the EIM Area at such time as it determines that the conditions that caused the interruption of EIM Entity participation in the Real-Time Market have been resolved.

(k) **Congestion Management and Unscheduled Flow.**

(1) **Inability to Resolve Congestion.** The CAISO will provide information to EIM Entities about Congestion that the Real-Time Market cannot resolve.

(2) **Initiation of Unscheduled Flow Procedures.** The CAISO or an EIM Entity may initiate WECC’s unscheduled flow mitigation procedure if applicable for conditions in its Balancing Authority Area.
(3) **EIM Entity Action.** When the WECC unscheduled flow mitigation procedure is initiated, each EIM Entity shall adjust its schedules as determined by the WECC procedure and immediately inform the CAISO of the changes.

(4) **CAISO Action.** When WECC's unscheduled flow mitigation procedure is initiated, the CAISO shall reflect the affected EIM Market Participant schedules in the Real-Time Market as determined by the WECC procedure, EIM Entity, CAISO Operating Procedures, and Business Practice Manuals for the CAISO Balancing Authority Area and EIM Entity Balancing Authority Areas.

### 29.8 [Not Used]

### 29.9 Outages and Critical Contingencies.

(a) **Applicability of Section 9.** Section 9 shall not apply to EIM Market Participants except as referenced in Section 29.9.

(b) **Transmission Scheduled Outages.**

1. **Responsibility.** The EIM Entity shall be responsible for performing engineering studies with regard to, and modeling and approving, Outages on transmission facilities for maintenance purposes within the EIM Entity Balancing Authority Area, including making any necessary arrangements for this purpose regarding the transmission capacity made available by an EIM Transmission Service Provider to the Real-Time Market.

2. **Notice.** The EIM Entity Scheduling Coordinator shall submit notice of transmission Outages approved by the EIM Entity to the CAISO by the means set forth in the Business Practice Manual for the Energy Imbalance Market and at least seven Business Days prior the planned Outage.

3. **Notice of Modification.** The EIM Entity Scheduling Coordinator may submit a notice of modification of an approved transmission Outage and any resulting updates to EIM Intertie limits to the CAISO by the means set forth in the Business Practice Manual for the Energy Imbalance Market and in accordance with the deadlines set forth in Section 9 and Section 29.9.
(4) Contents of Notice. The EIM Entity Scheduling Coordinator notices of approved transmission Outages shall include –

(A) the start and finish date for each Outage for maintenance purposes; and

(B) such information other than start and finish date as is required in Section 9.3.6 for transmission Operators seeking approval of Outages.

(c) Generation Maintenance Outages.

(1) Responsibility. The EIM Entity shall be responsible for performing engineering studies with regard to, and modeling and approving, Outages of EIM Resources and non-participating resources for maintenance purposes within the EIM Entity Balancing Authority Area.

(2) Notice. The EIM Entity Scheduling Coordinator shall submit notice of Outages of EIM Resources and non-participating resources approved by the EIM Entity to the CAISO by the means set forth in the Business Practice Manual for the Energy Imbalance Market and at least seven Business Days prior to the planned Outage.

(3) Contents of Notice. The EIM Entity Scheduling Coordinator notices of approved Outages of EIM Resources and non-participating resources shall include—

(A) the start and finish date for each Outage for maintenance purposes; and

(B) such information other than start and finish date as is required in Section 9.3.6 for Operators seeking approval of Generating Unit Outages.

(d) Actions Regarding Scheduled Outages.

(1) CAISO Evaluation of Scheduled Outages. The CAISO will implement the transmission and Generation Outages approved by the EIM Entity through the Day-Ahead Market process and will inform the EIM Entity Scheduling Coordinator of any anticipated overloads.

(2) EIM Entity Action. Based on the information provided by the CAISO to the EIM Entity Scheduling Coordinator, the EIM Entity shall take such action to adjust or

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cancel Outages as it determines to be necessary

(3) **Notice to Reliability Coordinator.**

(A) **EIM Entity Responsibility.** The EIM Entity is responsible for informing the Reliability Coordinator of scheduled Outages.

(B) **CAISO Facilitation.** Upon request of an EIM Entity, and without assuming any liability, the CAISO will provide the Reliability Coordinator with Outage information submitted to the CAISO by the EIM Entity on behalf of the EIM Entity.

(e) **Forced Outages.** An EIM Entity Scheduling Coordinator shall comply with the reporting provisions of Section 9 with regard to Forced Outages of transmission facilities within the Balancing Authority Area of the EIM Entity it represents and an EIM Participating Resource Scheduling Coordinator shall comply with the reporting provisions of Section 9 with regard to Forced Outages of Generating Units it represents as EIM Resources.

(f) **Transmission Limits.** An EIM Entity Scheduling Coordinator must notify the CAISO by the means specified in the Business Practice Manual for the Energy Imbalance Market with respect to transmission limits on the transmission capacity made available to the Real-Time Market within the EIM Entity Balancing Authority Area that need to be enforced in the Real-Time Market, including:

(1) physical MVA or MW limits under base case and contingencies;

(2) scheduling limits for EIM Intertie transactions based on E-Tags; and

(3) contractual limits on Transmission Interfaces where the EIM Transmission Service Provider has transmission rights.

29.10 **Metering and Settlement Data.**

(a) **Telemetry Requirements.** The EIM Entity shall ensure that each EIM Resource and non-participating resource in an EIM Entity Balancing Authority Area that is not a Generating Unit or is a Generating Unit with a rated capacity of 10 MW or greater (including each aggregated resource with a total rated capacity of 10 MW or greater) and each EIM Intertie has telemetry meeting the requirements of the Business Practice

(b) **Metering for Settlement Purposes.** The EIM Entity shall ensure that each EIM Participating Resource and non-participating resource in an EIM Entity Balancing Authority Area becomes either a CAISO Metered Entity or a Scheduling Coordinator Metered Entity and complies with the requirements of Section 10 except as provided in Section 29.10(c).

(c) **Exception to Requirements of Section 10.3.9.** In the absence of metering standards set by a Local Regulatory Authority, EIM Participating Resources and non-participating resources in an EIM Entity Balancing Authority Area may qualify as Scheduling Coordinator Metered Entities without the need for third party certification if the CAISO determines that the applicable metering standards meet or exceed the standards for CAISO Metered Entities.

(d) **Interchange Meter Data.** Metering for Settlement purposes is required for all EIM Interties.

(e) **EIM Energy Imbalance with an External Balancing Authority Area.** For each EIM External Intertie Bid that clears the FMM resulting in a 15-minute EIM External Intertie schedule –

1. the EIM Entity Scheduling Coordinator must submit to the CAISO the corresponding hourly transmission profile and 15-minute Energy profiles from the respective E-Tags, which must reflect the Point of Receipt and Point of Delivery that was declared in the FMM Bid submittal, at least 20 minutes before the start of the Operating Hour; and

2. the EIM Entity Scheduling Coordinator must provide an updated Energy profile to the extent required by Section 30.5.7.

29.11 **Settlements and Billing for EIM Market Participants.**

(a) **Applicability.** Section 29.11, rather than Section 11, shall apply to the CAISO Settlement with EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators, except as otherwise provided, but not to other Scheduling
(b) **Imbalance Energy.**

(1) **FMM Instructed Imbalance Energy.**

(A) **Calculation.**

(i) **EIM Participating Resources.** The CAISO will calculate an EIM Participating Resource’s FMM Instructed Imbalance Energy in the same manner as it calculates FMM Instructed Imbalance Energy under Section 11.5.1.1, except that references to the Day-Ahead Schedule in the relevant Appendix A definitions shall be deemed references to the EIM Base Schedule and that the CAISO will include any Energy from an EIM Manual Dispatch of the EIM Participating Resource in the FMM that is identified by the EIM Entity Scheduling Coordinator prior to the start of the FMM.

(ii) **Non-Participating Resources.** The CAISO will calculate the FMM Instructed Imbalance Energy of non-participating resources in an EIM Entity Balancing Authority Area in the same manner as it calculates FMM Instructed Imbalance Energy under Section 11.5.1.1, except that references to the Day-Ahead Schedule in the relevant Appendix A definitions shall be deemed references to the EIM Base Schedule and that the CAISO will include any Energy from an EIM Manual Dispatch or EIM Auto-Match of the EIM non-participating resource in the FMM that is identified by the EIM Entity Scheduling Coordinator prior to the start of the FMM.

(B) **Settlement.** The CAISO will settle –

(i) the FMM Instructed Imbalance Energy with the EIM Participating Resource Scheduling Coordinator for EIM Participating

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(ii) with the applicable EIM Entity Scheduling Coordinator for non-participating resources in an EIM Entity Balancing Authority Area.

(2) **RTD Instructed Imbalance Energy.**

(A) **Calculation.**

(i) **EIM Participating Resources.** The CAISO will calculate an EIM Participating Resource’s RTD Instructed Imbalance Energy in the same manner in which it calculates RTD Instructed Imbalance Energy under Sections 11.5.1.2 and 11.5.5, except that the CAISO will include any Energy from an EIM Manual Dispatch of the EIM Participating Resource in the RTD that is identified by the EIM Entity Scheduling Coordinator.

(ii) **Non-Participating Resources.** The CAISO will calculate the RTD Instructed Imbalance Energy of non-participating resources in an EIM Entity Balancing Authority Area in the same manner in which it calculates RTD Instructed Imbalance Energy under Section 11.5.1.2 and 11.5.5, except that the CAISO will include any Energy from an EIM Manual Dispatch or EIM Auto-Match of the EIM non-participating resource in the RTD that is identified by the EIM Entity Scheduling Coordinator.

(B) **Settlement.** The CAISO will settle the RTD Instructed Imbalance Energy –

(i) with the EIM Participating Resource Scheduling Coordinator for EIM Participating Resources; and

(ii) with the applicable EIM Entity Scheduling Coordinator for non-participating resources in an EIM Entity Balancing Authority Area.

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(3) Uninstructed Imbalance Energy.

(A) EIM Participating Resources.

(i) Calculation. For EIM Participating Resources and an EIM Entity Balancing Authority Area’s dynamic import/export schedules with external resources, the CAISO will calculate Uninstructed Imbalance Energy in the same manner in which it calculates Uninstructed Imbalance Energy under Section 11.5.2.1.

(ii) Settlement. The CAISO will settle the Uninstructed Imbalance Energy with the EIM Participating Resource Scheduling Coordinator or the EIM Entity Scheduling Coordinator, as applicable.

(B) Non-Participating Resources.

(i) Calculation. For non-participating resources in an EIM Entity Balancing Authority Area, the CAISO will calculate Uninstructed Imbalance Energy in accordance with Section 11.5.2, except that the CAISO will treat an EIM Base Schedule as a Day-Ahead Schedule and the CAISO will treat an EIM Manual Dispatch and an EIM Auto-Match as a Dispatch Instruction.

(ii) Settlement. The CAISO will settle the Uninstructed Imbalance Energy for non-participating resources in an EIM Entity Balancing Authority Area at the applicable RTD Locational Marginal Price in accordance with Section 11.5.2.1 with the applicable EIM Entity Scheduling Coordinator and will treat EIM Balancing Authority Demand in the same manner as the CAISO treats CAISO Demand under that Section.

(C) Non-Participating Load.

(i) Calculation. For non-participating Load in an EIM Entity Balancing Authority Area, the CAISO will calculate Uninstructed
Imbalance Energy in accordance with Section 11.5.2.2, except that the CAISO will determine deviations based on the EIM Base Load Schedule.

(ii) Settlement. The CAISO will settle Uninstructed Imbalance Energy for non-participating Load in an EIM Entity Balancing Authority Area at the applicable Default LAP Hourly Real-Time Price in accordance with Section 11.5.2.2 with the applicable EIM Entity Scheduling Coordinator and will treat EIM Balancing Authority Demand in the same manner as the CAISO treats CAISO Demand under that Section.

(c) Unaccounted For Energy of EIM Entities.

(1) Calculation. The CAISO will calculate Unaccounted For Energy for each EIM Entity Balancing Authority Area as the difference between metered Demand, and the sum of the metered Supply and the metered values at the interties, adjusted for losses.

(2) Settlement. The CAISO will settle Unaccounted For Energy with the applicable EIM Entity Scheduling Coordinator at the applicable Hourly Real-Time LAP price.

(d) Charges for Over- and Under-Scheduling of EIM Entities.

(1) Under-Scheduling Charges.

(A) Level 1 Charge. If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area exceeds the EIM Base Schedule of Supply submitted by the EIM Entity by more than 5% but less than or equal to 10% and by at least 2 MW, the CAISO shall charge the applicable EIM Entity Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 125% of the Hourly Real-Time LAP Price.

(B) Level 2 Charge. If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area exceeds the EIM Base
Schedule of Supply submitted by the EIM Entity by more than 10% and by at least 2 MW, the CAISO shall charge the applicable EIM Entity Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 200% of the Hourly Real-Time LAP price.

(2) Over-Scheduling Charges.

(A) Level 1 Charge. If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area is less than the EIM Base Schedule of Supply submitted by the EIM Entity by more than 5% but less than or equal to 10% and by at least 2 MW, the CAISO shall pay the applicable EIM Entity Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 75% of the Hourly Real-Time LAP Price.

(B) Level 2 Charge. If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area is less than the EIM Base Schedule of Supply submitted by the EIM Entity by more than 10% and by at least 2 MW, the CAISO shall pay the applicable EIM Entity Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 50% of the Hourly Real-Time LAP Price.

(3) Distribution of Revenues.

(A) Apportionment. The CAISO will calculate the total daily excess revenues received from under-scheduling charges and over-scheduling charges under Section 29.11(d)(1) and (2) and apportion them to Balancing Authority Areas in the EIM Area that were not subject to either under-scheduling or over-scheduling charges during the Trading Day according to metered Demand.
(B) **Allocation.** The CAISO will allocate—

(i) the amounts apportioned to EIM Entity Balancing Authority Areas pursuant to Section 29.11(d)(3)(A) to the applicable EIM Entity Scheduling Coordinator; and

(ii) the amounts apportioned to the CAISO Balancing Authority Area pursuant to Section 29.11(d)(3)(A) to Scheduling Coordinators in the CAISO Balancing Authority Area according to metered Demand.

(4) **Exemption.** An EIM Entity will be exempt from under-scheduling and over-scheduling charges under Section 29.11(d)(1) and (2) if it uses the Demand Forecast prepared by the CAISO in its EIM Resource Plan and it approves EIM Base Schedules for its resources within +/- 1% of the CAISO Demand Forecast, as determined according to the Business Practice Manual for the Energy Imbalance Market.

(e) **Neutrality Accounts.**

(1) **In General.** The CAISO will collect neutrality amounts from EIM Market Participants to recover differences in Real-Time Market payments made and Real-Time Market payments received.

(2) **Real-Time Congestion Offset.** The CAISO will assess EIM Entity Scheduling Coordinators a Real-Time Congestion Offset allocation calculated pursuant to Section 11.5.4.1.1.

(3) **Real-Time Imbalance Energy Offset Allocation.** The CAISO will assess EIM Entity Scheduling Coordinators a Real-Time Imbalance Energy Offset allocation calculated pursuant to Section 11.5.4.1.

(4) **Real-Time Marginal Cost of Losses Offset.** The CAISO will allocate the Real-Time Marginal Cost of Losses Offset to EIM Entity Scheduling Coordinators pursuant to Section 11.5.4.1.2.
(5) **Other Neutrality Adjustments.** The CAISO will levy additional charges on or make additional payments to EIM Market Participants as adjustments in accordance with Section 11.14.

(f) **Real-Time Bid Cost Recovery.**

(1) **In General.** The CAISO will provide EIM Participating Resources RTM Bid Cost Recovery.

(2) **Calculation of Real-Time Bid Cost Recovery.** The CAISO will calculate Real-Time Bid Cost Recovery in accordance with Section 11.8.4, except that the CAISO will treat a non-zero EIM Base Schedule of an EIM Participating Resource as an IFM Self-Schedule and the corresponding intervals as IFM self-commitment intervals.

(3) **Application of Real-Time Performance Metric.** The CAISO will adjust the RTM Energy Bid Cost, the RTM Market Revenues, and RTM Minimum Load Costs determined pursuant to Section 29.11(f)(2) by multiplying the Real-Time Performance Metric with those amounts for the applicable Settlement Interval pursuant to the rules specified in Section 11.8.4.4 and its subsections, except that the CAISO will treat an EIM Base Schedule as a Day-Ahead Schedule.

(4) **Allocation of EIM Entity RTM Bid Cost Uplift.**

(A) **Calculation of Charge.** The Net RTM Bid Cost Uplift will be determined for each EIM Entity Balancing Authority Area in accordance with the methodology set forth in Section 11.8.6.

(B) **Settlement.** The CAISO will assess the Net RTM Bid Cost Uplift calculated for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator in accordance with Section 11.8.6.6.(ii).

(g) **[Not Used]**
(h) **EIM Initial Fee.** The CAISO will charge Balancing Authority Areas that enter into an EIM Implementation Agreement pursuant to Section 29.2(b) an initial fee to cover a share of the capital and operations and maintenance costs associated with setting up the Real-Time Market to accommodate the participation of the Balancing Authority as an EIM Entity. The fee will be established by the EIM Implementation Agreement entered into pursuant to Section 29.2(b)(1) as accepted by FERC.

(i) **EIM Administrative Charge.**

1. **In General.** The CAISO will charge EIM Market Participants an EIM Administrative Charge consisting of the real-portions of the Market Services Charge and the System Operations Charge.

2. **Market Services Charge.** The Market Services Charge shall be the product of the Market Services Charge for each Scheduling Coordinator as calculated according to the formula in Appendix F, Schedule 1, Part A, the real-time market percentage as calculated in the cost of service study according to Appendix F, Schedule 1, Part A, and the sum of Gross FMM Instructed Imbalance Energy (excluding FMM Manual Dispatch Energy) and Gross RTD Instructed Imbalance Energy (excluding RTD Manual Dispatch Energy Standard Ramping Deviation, Ramping Energy Deviation, Residual Imbalance Energy, and Operational Adjustments).

3. **System Operations Charge.** The System Operations Charge shall be the product of the System Operations Charge for each Scheduling Coordinator, as calculated according to the formula in Appendix F, Schedule 1, Part A, the real-time market percentage as calculated in the cost of service study conducted according to Appendix F, Schedule 1, Part A, and the absolute difference between metered energy and the EIM Base Schedules.

4. **Minimum EIM Administrative Charge.** The CAISO will calculate the minimum EIM Administrative Charge as the product of the sum of the real-time activities associated with market services charge and the real-time activities chart.
associated with system operations, as well as –

(A) five percent of the total gross absolute value of Supply of all EIM Market Participants; plus

(B) five percent of the total gross absolute value of Demand of all EIM Market Participants.

(5) **Withdrawing EIM Entity.** If the EIM Entity notifies the CAISO of its intent to terminate participation in the Energy Imbalance Market and requests suspension of the Energy Imbalance Market in its Balancing Authority Area under Section 29.4(b)(4), the CAISO will charge the EIM Entity the minimum EIM Administrative Charge calculated under Section 29.11(i)(4) during the notice period.

(6) **Application of Revenues.** The CAISO will apply revenues received from the EIM Administrative Charge against the costs to be recovered through the Grid Management Charge as described in Appendix F, Schedule 1, Part A.

(j) **Variable Energy Resource Forecast Charge.**

(1) **In General.** The CAISO will charge EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators a fee for the Variable Energy Resource forecasting services in accordance with Appendix F, Schedule 4.

(2) **Waiver.** The CAISO will waive the Variable Energy Resource forecast charge if an EIM Entity has an independent forecast for its Variable Energy Resources and provides the independent forecast to the CAISO.

(k) **Transmission Service.** The CAISO will charge EIM Market Participants for transmission service according to Section 29.26.

(l) **Settlement.** With regard to the CAISO’s assessment and payment of charges to, and collection of charges from, EIM Market Participants pursuant to Sections 11 and 29.11, the CAISO shall assess, pay and collect such charges, address disputed invoices, assess, pay and collect Settlement-related fees and charges, including those under Sections 11.21, 11.28, and 11.29, and make any financial adjustments in accordance with the terms and schedule set forth in Section 11.

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(m) **Charges Related to RTM Participation of Interties.** In the event that an EIM Entity enables participation in the Real-Time Market on EIM External Interties, the EIM Entity Scheduling Coordinator shall also be subject to any applicable charges under Sections 11.31 and 11.32.

(n) **EIM Transfers and Settlement for Contingency Reserve Obligations.** The CAISO shall allocate Operating Reserve Obligations to EIM Entity Scheduling Coordinators for EIM Transfers as follows –

1. EIM Entity Scheduling Coordinators will receive a payment equal to three (3) percent of the hourly MW EIM Transfer into the CAISO Balancing Authority Area multiplied by the hourly user rate for Spinning Reserves and Non-Spinning Reserves, as calculated per Section 11.10.3.3 and 11.10.4.3, respectively; and

2. EIM Entity Scheduling Coordinators will receive a charge equal to three (3) percent of the hourly MW EIM Transfer out of the CAISO Balancing Authority Area multiplied by the hourly user rate for Spinning Reserves and Non-Spinning Reserves, as calculated per Section 11.10.3.3 and 11.10.4.3, respectively.

(o) **Application of Persistent Deviation Metric.**

The CAISO will modify the Bid Cost Recovery calculations described in Section 29.11(f) and Residual Imbalance Energy payments in Section 11.5.5 as described in Section 11.17, except that the CAISO will treat an EIM Base Schedule as a Day-Ahead Schedule.

(p) **Flexible Ramping Product.** The CAISO will allocate and settle payments and charges for the Flexible Ramping Product according to Section 11.25, where the CAISO will consider EIM Base Schedules of non-participating resources as Self-Schedules.

(q) **EIM Transfer System Resource Settlement Information.** The CAISO will provide EIM Entities with non-binding Settlement information associated with Energy transfer schedule changes from their respective base schedules between EIM Entity Balancing Authority Areas if –

1. the EIM Entities provide the CAISO with a mutually agreed upon location for the settlement of such schedule changes; and

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(2) the EIM Entities request that the CAISO provide such information.

(r) **EIM Transfer System Resource Settlement.**

(1) **EIM Transfer System Resource Registration.** The CAISO will provide each EIM Entity with financially binding Settlement of Energy transfer schedule changes from its respective base schedules between EIM Entity Balancing Authority Areas if —

(A) each EIM Entity that shares an EIM Internal Intertie and desires such Settlement agrees upon a to/from EIM Transfer system resource pricing location in their respective EIM Entity Balancing Authority Area;

(B) each EIM Entity Scheduling Coordinator registers the agreed upon to/from EIM Transfer system resource pricing locations, including the ratio of the pricing at each location to be shared among them, in accordance with the procedures in the Business Practice Manual for the Energy Imbalance Market; and

(C) each EIM Entity Scheduling Coordinator submits E-Tags that associate Energy transfer schedule changes with the registered EIM Transfer system resource.

(2) **Settlement for EIM Transfer System Resource Changes.** The CAISO will settle EIM Transfer system resource changes established pursuant to Section 29.11(r)(1) as —

(A) FMM Instructed Imbalance Energy or RTD Instructed Energy based on the Settlement Interval in which the E-Tag is received, without regard for other Energy types identified in Sections 11.5.1.1 or 11.5.2.2, or as an Operational Adjustment if the E-Tag is received after the end of the Operating Hour for purposes of Energy accounting in accordance with the applicable WECC business practices;

(B) based on the difference between the E-Tag and the EIM Transfer system resource base schedule;
(C) at the ratio of the Locational Marginal Prices for each registered financial EIM Transfer system resource location; and

(D) excluding any contribution that the base EIM Transfer system resource might have otherwise had on the Real-Time Imbalance Energy Offset pursuant to Section 29.11(e)(3) and RTM Bid Cost Recovery pursuant to Section 29.11(f).

29.12 Creditworthiness

(a) Requirements. EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators shall comply with the credit and other requirements of Section 12.

(b) Credit Default. In the event of a failure to satisfy the credit or other requirements in Section 12, the consequences specified in Section 12 shall apply to EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators.

29.13 Dispute Resolution

(a) Invoices. Confirmation and validation of any dispute associated with the participation of EIM Market Participants in the Real Time Market is subject to Section 11.29.8 and shall be managed through the CAISO’s customer inquiry, dispute, and information system and as provided in the Business Practice Manual for the Energy Imbalance Market.

(b) Other Disputes. EIM Market Participants shall be subject to dispute resolution pursuant to Section 13.

29.14 Uncontrollable Forces, Indemnity, Liabilities, and Penalties

The provisions of Section 14 regarding Uncontrollable Forces, indemnity, liability, and penalties shall apply to the participation of EIM Market Participants in the Real-Time Market.

29.15 [Not Used]

29.16 [Not Used]

29.17 EIM Transmission System

(a) Information. Each EIM Entity shall –
(1) deliver EIM Transmission Service Information to the CAISO regarding the network topology information associated with transmission capacity that it owns, controls, or has a contractual entitlement to that may be used in the Real-Time Market;

(2) deliver EIM Transmission Service Information to the CAISO regarding the network topology information associated with transmission capacity that each other EIM Transmission Service Provider owns, controls, or has a contractual entitlement to within the EIM Entity Balancing Authority Area that may be used in the Real-Time Market;

(3) update the EIM Transmission Service Information no less frequently than the timelines for updates to the Full Network Model as provided in the CAISO Tariff and Business Practice Manual for the Energy Imbalance Market; and

(4) ensure that the EIM Transmission Service Information is accurate and complete.

(b) **Effectiveness.** The EIM Transmission Service Information shall only be used for operation of the CAISO Markets in accordance with the procedures set forth in the Business Practice Manual for the Energy Imbalance Market.

(c) **Availability.** Each EIM Entity shall ensure that all EIM Transmission Service Providers in its Balancing Authority Area make available for use in the Real-Time Market transmission capacity that is included in the EIM Transmission Service Information and that is not otherwise encumbered, reserved, scheduled, or being used by its transmission customers or by others.

(d) **Information on Availability.** Each EIM Entity Scheduling Coordinator shall inform the CAISO in the manner and by the deadlines specified in the Business Practice Manual for the Energy Imbalance Market regarding the availability of the transmission capacity identified in the EIM Transmission Service Information for use in the Real-Time Market.

(e) **EIM Transfer Limit.** A Balancing Authority that has entered into an EIM Implementation Agreement to become an EIM Entity shall establish and inform the CAISO of the maximum EIM Transfer limit at least ninety days prior to the EIM Entity Implementation
Date in accordance with the Business Practice Manual for the Energy Imbalance Market.

(f) **EIM Transfer Availability.**

1. **In General.** The ISO will model individual constraints for each EIM Transfer limit submitted by each EIM Entity that makes transmission available on an EIM Internal Intertie.

2. **Use of Interchange Transmission Rights.** The EIM Entity Scheduling Coordinator shall determine the EIM Transfer limit made available for use in the Real-Time Market through interchange transmission rights and communicate that limit to the CAISO prior to the start of the next Dispatch Interval in accordance with the procedures and timelines for submission and acceptance in the Business Practice Manual for the Energy Imbalance Market.

3. **Use of Available Transfer Capability.** The EIM Entity Scheduling Coordinator shall determine the EIM Transfer limit made available to the Real-Time Market through available transfer capability in accordance with its tariff and communicate that limit to the CAISO prior to the start of the next Dispatch Interval in accordance with the procedures and timelines for submission and acceptance in the Business Practice Manual for the Energy Imbalance Market.

4. **Multiple EIM Transfer Limits.** If there are two or more EIM Entity Balancing Authority Areas that share the same EIM Internal Intertie, the CAISO’s Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch will enforce the individual EIM Transfer limit for each EIM Entity Balancing Authority Area while allowing Energy to wheel through the EIM Entity Balancing Authority Areas based on the transmission made available for use in the Real-Time Market.

5. **EIM Transfers and CAISO Scheduling Points.** EIM Transfers shall compete for Available Transfer Capability at interties that are an EIM Internal Intertie and a CAISO Scheduling Point.
(6) **EIM Transfer Limit Constraints.** The CAISO’s Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall enforce the EIM Transfer limit and the associated physical limit at each EIM Internal Intertie.

(7) **EIM Transfer Schedule Cost.**

(1) **In General.** The CAISO’s Security Constrained Economic Dispatch in the Fifteen Minute Market and Real-Time Dispatch shall use an EIM Transfer schedule cost associated with EIM Transfers at each EIM Internal Intertie to determine the optimal scheduling path for EIM Transfers, which in all intervals shall be less than $0.01.

(2) **Objectives.** The CAISO shall use the lowest EIM Transfer schedule cost determined based upon the objectives of –

(A) maximizing the use of the transmission capacity made available for EIM Transfers in both the Fifteen-Minute Market and Real-Time Dispatch;

(B) minimizing the number of E-Tags required to comply with the WECC scheduling practices; and

(C) minimizing the impact of outages or curtailments on the E-Tags used to account for EIM Transfers based on historical outage and curtailment data for each EIM Internal Intertie.

(3) **EIM Transfer Schedule Cost Publication.** The CAISO will publish the EIM Transfer schedule cost associated with each EIM Internal Intertie in the Business Practice Manual for the Energy Imbalance Market.

(4) **EIM Transfer Schedule Cost Adjustment.** The CAISO may adjust the EIM Transfer schedule costs to maintain the path priorities established by the criteria in Section 29.17(g)(2) when an EIM Entity Balancing Authority Area is added or subtracted from the EIM Area, as seasonal transmission system ratings change, or the transmission system topology changes.
(5) **Locational Marginal Price.** The CAISO will reflect the EIM Transfer schedule cost in the Marginal Cost of Congestion.

29.18 [Not Used]

29.19 [Not Used]

29.20 **Confidentiality**

The confidentiality provisions of Section 20 shall apply to participation of EIM Market Participants in the Real-Time Market.

29.21 [Not Used]

29.22 **Miscellaneous Provisions in Addition to Section 22.**

Section 22 and the additional miscellaneous provisions of Section 29.22 shall apply to the Energy Imbalance Market.

(a) **Tax Liability.** To the extent that the CAISO would incur any tax liability as a result of the participation of EIM Market Participants in the Real-Time Market, as market operator or as central counterparty to Energy Imbalance Market transactions, for example, the CAISO will pass those taxes on to the EIM Entity Scheduling Coordinator for the EIM Entity area where the transactions triggered the tax liability.

(b) **Purchasing Selling Agent.** Neither the CAISO nor the EIM Entity is a “Purchasing Selling Entity” for purposes of E-Tagging or EIM Transfers, nor shall either be listed as a “Purchasing Selling Entity” for purposes of E-Tagging or EIM Transfers.

(c) **Title to Energy.** Title to Energy in the Real-Time Market passes directly from the entity that holds title when the Energy enters the CAISO Controlled Grid or the transmission system of an EIM Transmission Service Provider, whichever is first following Dispatch, to the entity that removes the Energy from the CAISO Controlled Grid or the transmission system of a EIM Transmission Service Provider, whichever last precedes delivery to Load.

29.23 [Not Used]

29.24 [Not Used]

29.25 [Not Used]
29.26 Transmission Rates and Charges.

(a) Transmission Charges for CAISO Facilities.

(1) Access Charge. Transmission service charges for Real-Time Market transactions serving Load within the CAISO Balancing Authority Area that use the CAISO Controlled Grid are governed by Section 26.

(2) Wheeling Access Charge. EIM Transfers from the CAISO Controlled Grid to another EIM Entity Balancing Authority Area using the contractual or ownership rights of an EIM Entity shall not constitute Wheeling Out and shall not be subject to the Wheeling Access Charge under Section 26.

(b) Non-CAISO Facilities. The determination and charges for transmission service for Real-Time Market transactions on facilities that are part of the contractual or ownership rights made available to the Real-Time Market by an EIM Transmission Service Provider through an EIM Entity will be the responsibility of the EIM Entity that made the facilities available, except that the EIM Entity shall ensure that no EIM Transmission Service Provider imposes a separate charge for EIM Transfers that use its facilities, provided that charges for transmission service in excess of contractual limits shall not be considered a separate charge.

29.27 CAISO Markets and Processes.

(a) In General. Except as provided in subsection (b) of this section, the provisions of Section 27 that are applicable to the Real-Time Market shall apply to EIM Market Participants.

(b) Transition Period for New EIM Entities.

(1) Transmission Constraint Relaxation. For a period of six months following the Implementation Date of a new EIM Entity, the provisions of Section 27.4.3.2 and the second sentence of Section 27.4.3.4 shall not apply to constraints that are within Balancing Authority Areas of the new EIM Entity or affect EIM Transfers between the Balancing Authority Areas of the new EIM Entity and any other EIM Entity that is subject to this subsection (b). For those intervals that experience
infeasibilities described in those provisions, the CAISO shall instead determine prices consistent with the provisions of Sections 27, 34, and Appendix C, that would apply in the absence of Section 27.4.3.2 and the second sentence of Section 27.4.3.4.

(2) **Flexible Ramping Product.** For a period of six months following the EIM Entity Implementation Date of a new EIM Entity, when the transmission and/or power balance constraints as specified in Sections 27.4.3.2 and 27.4.3.4, respectively, are relaxed, the CAISO shall set the Flexible Ramping Product parameter for pricing purposes, for the new EIM Entity Balancing Authority Area, at an amount between and including $0 and $0.01.

(3) **Extension of Transition Period Pricing.** Any extensions of the initial six-month transition period, as approved by the Federal Energy Regulatory Commission, are specified below. Sixty days prior to the expiration of the transition period, the CAISO will post on the CAISO website an assessment of whether an extension of the transition period, for up to an additional six months, is needed for the applicable EIM Entity. The CAISO will post an update to such assessment prior to the expiration of the transition period should there be any changes to its posted conclusions.

(A) [reserved]

(4) **Reports.** During the term of the transition period, the CAISO will submit monthly reports with the Commission on the infeasibilities observed in the applicable EIM Entity Balancing Authority Area, the nature of the issues causing the infeasibility

(c) **Automated EIM Mirror.** If the CAISO updates an Interchange E-Tag for a schedule change outside of the Market Clearing of the Real-Time Market for System Resources and Scheduling Points and the associated energy is generated at, wheeled through, or consumed at an EIM Entity Balancing Authority Area, the CAISO can automatically EIM Mirror the schedule change using the relevant EIM Mirror System Resource if requested by the EIM Entity in accordance with the procedures specified in the Business Practice
Manual for the Energy Imbalance Market

(d) **Base GDFs for Aggregated EIM Non-Participating Resources.** The CAISO will allow
base Generation Distribution Factor submission for aggregate EIM non-participating
resources through the submission of EIM Base Schedules and will distribute the base
schedule and any imbalances of aggregate EIM non-participating resources using the
submitted base GDFs, if available, or otherwise the registered default base GDFs for the
resource in the Master File, normalized for Outages and remedies adopted to address
the issues identified.

29.28 **Inter-SC Trades**

EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators may not
submit Inter-SC Trades.

29.29 **[Not Used]**

29.30 **Bid and Self-Schedule Submission for CAISO Markets.**

(a) **In General.** The provisions of Section 30 that are applicable to the Real-Time Market, as
supplemented by Section 29.30, shall apply to EIM Market Participants.

(b) **Start Up and Minimum Load.** For the Proxy Cost determination of Start-Up Cost and
Minimum Load Costs, the CAISO will utilize the Market Services Charge and System
Operations Charge reflected in the EIM Administrative Charge.

(c) **EIM Available Balancing Capacity Energy Bid Curve for EIM Participating
Resources.** For each Trading Hour, the CAISO will apply Energy Bids submitted for EIM
Participating Resources, which may be subject to mitigation pursuant to Section 29.39,
towards the EIM Available Balancing Capacity as provided in Section 29.30(e).

(d) **EIM Available Balancing Capacity Bids Used for EIM Available Balancing Capacity
Served by Non-Participating Resources.** The CAISO will create an Energy Bid Curve
based on the Default Energy Bid established by the EIM Entity Scheduling Coordinator
and the CAISO pursuant to Section 29.4(c)(4)(K) for all non-participating resources that
the EIM Entity Scheduling Coordinator may identify as EIM Available Balancing Capacity,
and will apply such bids to the EIM Available Balancing Capacity as provided in Section
29.30(e).

(e) **Treatment of Energy Bid Curves for EIM Available Balancing Capacity.** For each Trading Hour the CAISO will allocate the categories of the EIM Resource Plan specified in Section 29.34(e)(3)(C) and (D) as follows.

1. **Upward Capacity.** For upward capacity above the EIM Base Schedule, the CAISO will –

   (A) allocate the Spinning and Non-Spinning Reserves down from the upper regulating limit as registered in the Master File, taking into account any PMax rates; and then

   (B) allocate EIM Upward Available Balancing Capacity to the Energy Bid Curve starting at the highest value of the Energy Bid Curve that does not overlap with Spinning or Non-Spinning Reserves.

2. **Downward Capacity.** For downward capacity below the EIM Base Schedule, the CAISO will allocate EIM Downward Available Balancing Capacity to the Energy Bid Curve starting at its lowest value, taking into account any PMin rates.

3. **Remaining Capacity.** The CAISO will use any remaining portion of the Energy Bid Curve after the allocations in Section 29.30(e)(1) and 29.30(e)(2) for Dispatch under any condition, except that for non-participating resources the CAISO will adjust the EIM Upward Available Balancing Capacity and EIM Downward Available Balancing Capacity towards the EIM Base Schedule so that there will not be any remaining capacity for Dispatch.

29.31 **Day-Ahead.**

EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators may not submit Bids in the CAISO’s Day-Ahead Market on behalf of EIM Market Participants that they represent in their capacity as an EIM Entity Scheduling Coordinator or EIM Participating Resource Scheduling Coordinator.
29.32 Greenhouse Gas Regulation and EIM Bid Adders.

(a) EIM Bid Adders.

(1) In General. EIM Participating Resources will have an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations, which may include the cost of allowances, uncertainty on the final resource specific emission factor, and other costs of greenhouse gas regulation compliance.

(2) EIM Bid Adder.

(A) Bid Submission. EIM Participating Resource Scheduling Coordinators for EIM Participating Resources located in an EIM Entity Balancing Authority Area outside of California may submit an EIM Bid Adder as a separate hourly Bid component to recover costs of compliance with California Air Resources Board greenhouse gas regulations, which must include a price and quantity and the price portion of which must be equal to or less than 110% of the EIM Participating Resource’s greenhouse gas maximum compliance cost as determined in accordance with section 29.32(a)(3).

(B) Default Treatment. If an EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California does not submit an EIM Bid Adder, the CAISO will assume that the EIM Participating Resource will not be selected for delivery to the CAISO Balancing Authority Area.

(3) Determination of EIM Greenhouse Gas Maximum Cost. Each day the CAISO will determine the greenhouse gas maximum compliance cost for each EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California as set forth in the EIM Business Practice Manual, based on –

(A) the EIM Resource’s highest incremental heat rate; the applicable Greenhouse Gas Allowance Price; and the EIM Participating Resource’s
emission rate, as set forth in the applicable U.S. Environmental Protection Agency publication and registered in the Master File; or

(B) a price determined in accordance with the negotiated rate option procedures in section 39.7.1.3.1; or,

(C) with respect to, and only with respect to, Bids at EIM External Interties, the carbon dioxide equivalent emission rate of the resource with the highest such rate in the WECC region and the applicable Greenhouse Gas Allowance Price index.

(4) **EIM Bid Adder Price.** The price included in the EIM Bid Adder shall not be less than $0/MWh and the sum of the price component of the EIM Bid Adder and the Energy cost portion of the Bid cannot exceed $1000/MWh.

(b) **Consideration of EIM Bid Adders in Market Clearing.**

(1) **Dispatch of EIM Participating Resources with Nonzero Bid Adders.** The CAISO’s Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall take into account EIM Bid Adders in selecting Energy produced by EIM Participating Resources located in an EIM Entity Balancing Authority Area outside of California for import into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California up to the associated MW quantity included in the EIM Bid Adder, but not when selecting EIM Participating Resources to serve Load outside of the combined area of the CAISO Balancing Authority Area and other EIM Entity Balancing Authority Areas within California.

(2) **EIM Participating Resources EIM Bid Adder MW Quantity.** The CAISO’s Real-Time Unit Commitment and Real-Time Dispatch will limit the maximum EIM Bid Adder MW quantity of an EIM Participating Resource to a value equal to the EIM Participating Resource’s dispatchable Bid range between the EIM Participating Resource’s BASE Schedule and the EIM Participating Resource’s effective upper economic Bid, considering any applicable derates and ancillary operations.

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services capacity reservations, for the relevant Operating Hour.

(3) **Dispatch of EIM Participating Resources Bid Adders of Zero.** The CAISO’s Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall not dispatch EIM Participating Resources outside the CAISO Balancing Authority Area for delivery into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California if the MW quantity included in the EIM Bid Adder is zero.

(c) **Effect on Locational Marginal Price.** Using the methodology described in Appendix C, the CAISO will include the marginal EIM Bid Adder as a negative component in the Locational Marginal Prices for EIM Entity Balancing Authority Areas in addition to those specified in Appendix C and Section 27.

(d) **Notice to EIM Participating Resource.** The CAISO will notify the EIM Participating Resource Scheduling Coordinator through the Dispatch Instruction of the megawatt quantity of any Energy of an EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California that is deemed to have been imported into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California as a result of the Market Clearing of the Real-Time Market.

(e) **Compensation.** The CAISO will allocate the Net Imbalance Energy Export optimally to EIM Participating Resource Scheduling Coordinators and will distribute revenues from the EIM Bid Adder to EIM Participating Resources pursuant to that allocation.

(f) **Reporting Requirements.** The CAISO will report to each EIM Participating Resource Scheduling Coordinator the portion of the FMM Energy Schedule and the portion of RTD Energy Dispatch that is associated with Energy deemed to have been imported to the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California from all EIM Resources as part of the Real-Time Market results publication from each of its EIM Resources.

29.33 [Not Used]
29.34 EIM Operations

(a) **In General.** Section 34, as supplemented by provisions in Section 29.34, will govern the operation of the Real-Time Market within the EIM Area.

(b) **Applicability.** EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators will submit EIM Base Schedules and other necessary information to the CAISO for use in the Real-Time Market pursuant to Section 29.34 and not pursuant to Section 34.

(c) **Submission Deadlines.** If an EIM Entity Scheduling Coordinator or EIM Participating Resource Scheduling Coordinator fails to submit an EIM Base Schedule according to the timelines established in this Section 29.34, the CAISO will not accept the EIM Base Schedule or use it in the Real-Time Market.

(d) **Demand Forecast.**

(1) **In General.** In accordance with procedures set forth in the Business Practice Manual for the Energy Imbalance Market, the CAISO shall develop short-term and mid-term Demand Forecasts by Demand Forecast zone within each EIM Entity Balancing Authority Area, separately from the CAISO Balancing Authority Area.

(2) **Short Term Forecast.** The CAISO’s short-term Demand Forecast for an EIM Entity Balancing Authority Area shall produce a value every five minutes for the duration of the CAISO’s Dispatch horizon, which has five-minute granularity and extends several Dispatch Intervals.

(3) **Mid-Term Forecast.** The CAISO’s mid-term Demand Forecast for an EIM Entity Balancing Authority Area shall produce hourly values for the next hour through the next 7 days.

(4) **EIM Entity Scheduling Coordinator Demand Forecast.**

(A) **In General.** An EIM Entity Scheduling Coordinator may opt to provide a non-binding EIM Entity Demand Forecast, net of behind-the-meter Generation that is not registered as an EIM Resource, as part of the...
hourly EIM Base Schedules.

(B) **Timing and Scope.** The EIM Entity Scheduling Coordinator must provide any such Demand Forecasts by 10:00 a.m. for the next 7 days.

(C) **Updates.** The EIM Entity Scheduling Coordinator must update any such Demand Forecast for each Operating Hour and the following 6 to 10 hours and submit the update to the CAISO no later than 75 minutes prior to the start of that Operating Hour, as part of its hourly EIM Base Schedule submission.

(D) **Effect on Bid Requirement.** If the EIM Entity Demand Forecast is less than the CAISO Demand Forecast, then the EIM Entity’s EIM Resource Plan must include sufficient Bids to cover the difference in Demand Forecasts.

(5) **Posting.** Between 6:00 p.m. of the seventh day prior to the start of the Operating Day and 6:00 p.m. of the day prior to the Operating Day, the CAISO shall post and update hourly Demand Forecasts by Demand Forecast zone.

(e) **EIM Resource Plan.**

(1) **In General.** By 10:00 a.m. of the day preceding the Operating Day, the EIM Entity Scheduling Coordinators on behalf of non-participating resources and EIM Participating Resource Scheduling Coordinators on behalf of EIM Participating Resources, must submit all applicable components of the EIM Resource Plan as set forth in Section 29.34(e)(3).

(2) **Scope.** The EIM Resource Plan components must cover a seven day horizon (with hourly detail for each resource) beginning with the Operating Day.

(3) **Contents.** The EIM Resource Plan shall comprise –

(A) EIM Base Schedules of EIM Entities and EIM Participating Resources;

(B) Energy Bids (applicable to EIM Participating Resources only);

(C) EIM Upward Available Balancing Capacity;

(D) EIM Downward Available Balancing Capacity;
(E) EIM Reserves to Meet NERC/WECC Contingency Reserves
   Requirements; and

(F) if the EIM Entity Scheduling Coordinator is not relying on the CAISO’s
   Demand Forecast, a Demand Forecast.

(4) Contents of EIM Base Schedules. EIM Base Schedules of EIM Entities must
   include hourly-level Demand Forecasts for EIM, hourly-level schedules
   for resources, and hourly-level scheduled Interchanges.

(5) Adjustment Prior to Submission of Real-Time EIM Base Schedules. The
   EIM Entity Scheduling Coordinator may adjust the components of the EIM
   Resource Plan prior to the submission of Real-Time EIM Base Schedules up to
   75 minutes before the Operating Hour.

(f) Real-Time EIM Base Schedules.

(1) In General.

(A) Initial Submission. EIM Entity Scheduling Coordinators, EIM
   Participating Resource Scheduling Coordinators, and non-participating
   resources in the EIM Entity Balancing Authority Area that wish to submit
   real-time hourly EIM Base Schedules, or, with regard to non-participating
   resources, wish to submit EIM Base Schedule information pursuant to
   Section 29.34(f)(4), must submit such schedules or other information
   consistent with the requirements of the Business Practice Manual for the
   Energy Imbalance Market and at least 75 minutes before the start of the
   Operating Hour.

(B) Interim Revisions. EIM Entity Scheduling Coordinators, EIM
   Participating Resource Scheduling Coordinators, and non-participating
   resources in the EIM Entity Balancing Authority Area may revise hourly
   Real-Time EIM Base Schedules, or, with regard to non-participating
   resources, revise EIM Base Schedule information submitted pursuant to
   Section 29.34(f)(4), meeting the requirements of the Business Practice
Manual for the Energy Imbalance Market at or before 55 minutes before
the start of the Operating Hour.

(C) **Final Revision.** EIM Entity Scheduling Coordinators may further revise
hourly Real-Time EIM Base Schedules, including EIM Base Schedules
for EIM Participating Resources, at or before 40 minutes before the start
of the Operating Hour.

(2) **EIM Base Schedule for EIM Participating Resources.** The EIM Base
Schedule for each EIM Participating Resource must be within the Economic Bid
range of the submitted Energy Bids for each Operating Hour for EIM Resources,
which the CAISO will make available to the EIM Entity without price information.

(3) **EIM Base Schedule for Imports and Exports.** EIM Base Schedules must –
(A) disaggregate Day-Ahead import/export schedules between the EIM
Entity Balancing Authority Area and the CAISO Balancing Authority Area;
(B) identify the relevant EIM Interties for imports and exports to an EIM
Entity Balancing Authority Area from Balancing Authority Areas other
than the CAISO Balancing Authority Area; and

(C) include approved, pending, and adjusted e-tags for imports and exports.

(4) **EIM Base Schedule Aggregation.** In response to a request by an EIM Entity
Scheduling Coordinator, the CAISO will establish an electronic interface by which
non-participating resources, Loads, and other customers of the EIM Entity may
submit EIM Base Schedule information to the EIM Scheduling Coordinator and
the CAISO.

(g) **Initial EIM Base Load Schedule.** The CAISO will derive an initial EIM Base Load
Schedule for each EIM Entity from the Demand Forecast used for the EIM Entity
Balancing Authority Area, estimated Transmission Losses, and an assumed Load
distribution, pursuant to the methodology set forth in the Business Practice Manual for the
Energy Imbalance Market.
(h) **Energy Bids.** EIM Participating Resource Scheduling Coordinators may submit Energy Bids in accordance with the timelines, processes, and requirements applicable to other resources submitting Energy Bids under Section 34.

(i) **Interchange Schedules with Other Balancing Authorities.**

(1) **In General.** EIM Entity Scheduling Coordinators must submit Interchange Schedules with other Balancing Authority Areas at the relevant EIM Interties and must update these Interchange Schedules with any adjustments, when applicable, as part of the hourly EIM Resource Plan revision.

(2) **Economic Bidding of EIM Intertie Transactions.** An EIM Participating Resource Scheduling Coordinator may bid a transaction at an EIM External Intertie into the FMM if the EIM Entity supports economic bidding of EIM External Intertie transactions and the relevant transmission service providers or path operators support 15-minute scheduling at the EIM External Intertie under FERC Order No. 764.

(j) **CAISO Validation.** The CAISO Markets systems will validate the initial EIM Resource Plan by 1:00 p.m. on the day before the Operating Day, and within 15 minutes of the submission of EIM Base Schedules or adjustments to EIM Base Schedules, the CAISO will validate the EIM Resource Plan and notify the EIM Entity Scheduling Coordinator:

(1) if the EIM Resource Plan is not balanced;

(2) if the EIM Resource Plan provides insufficient Flexible Ramping Product capacity to meet requirements determined pursuant to Section 29.34(m); and

(3) if the CAISO anticipates Congestion based on the submitted EIM Resource Plans.

(k) **EIM Resource Plan Balance.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules according to Section 29.34(f)(1)(c), Supply in the EIM Base Schedules does not balance the Demand Forecast, the CAISO will adjust the Demand in the EIM Base Schedule to equal Supply.
EIM Resource Plan Evaluation.

(1) **Requirement.** The EIM Base Schedules for resources included in the EIM Resource Plan must balance the Demand Forecast for each EIM Entity Balancing Authority Area.

(2) **Insufficient Supply.** An EIM Resource Plan shall be deemed to have insufficient Supply if the sum of EIM Base Schedules from non-participating resources and the sum of the highest quantity offers in the Energy Bid range from EIM Participating Resources, including Interchange with other Balancing Authority Areas, is less than the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority Area.

(3) **Excess Supply.** An EIM Resource Plan shall be deemed to have excessive Supply if the sum of EIM Base Schedules from non-participating resources and the sum of the lowest quantity Bids in the Energy Bid range from EIM Participating Resources is greater than the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority Area.

(4) **Additional Hourly Capacity Requirements.**

(A) **In General.** If the CAISO determines under the procedures set forth in the Business Practice Manual for the Energy Imbalance Market that a Balancing Authority Area in the EIM Area has historically high import or export schedule changes between forty minutes and twenty minutes before the start of the Trading Hour, the CAISO will add to the Balancing Authority Area in the EIM Area’s capacity requirements an additional requirement.

(B) **Additional Capacity Requirement.** On a monthly basis, according to procedures set forth in the Business Practice Manual for the Energy Imbalance Market, the CAISO will calculate for each Balancing Authority...
Area in the EIM Area histograms of the percentage of the difference between imports and exports scheduled at forty minutes before the start of the Trading Hour and the final imports and exports at twenty minutes before the start of the Trading Hour based on the submitted E-Tags at those times and calculate additional upward and downward requirements for the capacity test component of the resource sufficiency evaluation.

(m) **Flexible Ramping Sufficiency Determination.**

(1) **Review.**

(A) **EIM Entity Balancing Authority Areas.** The CAISO will review the EIM Resource Plan pursuant to the process set forth in the Business Practice Manual for the Energy Imbalance Market and verify that it has sufficient Bids for Ramping capability to meet the EIM Entity Balancing Authority Area upward and downward Ramping requirements, as adjusted pursuant to Sections 29.34(m)(2), (3), and (5).

(B) **CAISO Balancing Authority Area.** The CAISO will review the Day-Ahead Schedules in the CAISO Balancing Authority Area and verify that it has sufficient Bids for Ramping capability to meet the CAISO Balancing Authority Area upward and downward Ramping requirements, as adjusted pursuant to Sections 29.34(m)(2), (3), (5), and (6).

(2) **Determination of EIM Diversity Benefit.** The CAISO will calculate separately the upward and downward EIM diversity benefit as the difference between the sum of the upward and downward Uncertainty Requirements for all Balancing Authority Areas in the EIM Area, and the Uncertainty Requirement for the EIM Area.

(3) **Effects of EIM Diversity Benefit.** For each Balancing Authority Area in the EIM Area, the CAISO will reduce the upward and downward Uncertainty Requirements by the Balancing Authority Area’s pro rata share of the upward and downward EIM diversity benefit in the EIM Area as may be limited by –
(A) the available net import EIM Transfer capability into that Balancing Authority Area in the case of an upward Uncertainty Requirement; and

(B) the available net export EIM Transfer capability from that Balancing Authority Area in the case of a downward Uncertainty Requirement.

(4) **Determination of Flexible Ramping Sufficiency Credit.** The CAISO will calculate for each Balancing Authority Area in the EIM Area, the upward flexible Ramping sufficiency credit as the outgoing EIM Transfer from that area and the downward flexible Ramping sufficiency credit as the incoming EIM transfer into that area.

(5) **Effect of Flexible Ramping Sufficiency Credit.** The CAISO will reduce the upward Uncertainty Requirement of a Balancing Authority Area in the EIM Area by its upward flexible Ramping sufficiency credit, and will reduce the downward Uncertainty Requirement of a Balancing Authority Area in the EIM Area by its downward flexible Ramping sufficiency credit.

(6) **Incremental Requirements.**

(i) **In General.** If the CAISO determines under the procedures set forth in the Business Practice Manual for the Energy Imbalance Market that an EIM Balancing Authority Area has historically high import or export schedule changes between T-40 and T-20, the CAISO will add to the EIM Entity’s flexible capacity requirement an additional incremental requirement.

(ii) **Additional Incremental Requirement.** On a monthly basis, according to procedures set forth in the Business Practice Manual for the Energy Imbalance Market, the CAISO will calculate for each EIM Entity Balancing Authority Area histograms of the percentage of the difference between imports and exports scheduled at T-40 and the final imports at T-20 based on the E-Tags submitted at T-40 and T-20 and calculate additional incremental and decremental requirements for the capacity
test component of the resource sufficiency evaluation.

(n) **Effect of Resource Plan Insufficiency.**

(1) **Resource Plan Balance.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules as provided in Section 29.34(f)(1)(c), the EIM Resource Plan has insufficient supply as determined according to Section 29.34(l)-

(A) the CAISO will not include the EIM Entity Balancing Authority Area in the Uncertainty Requirement of the EIM Area;

(B) the CAISO will hold the EIM Transfer limit into or from the EIM Entity Balancing Authority Area, as specified in Section 29.34(n)(2), at the value for the last 15-minute interval.

(2) **Flexible Ramping Insufficiency.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules as provided in Section 29.34(f)(1)(c), the CAISO determines-

(i) that an EIM Entity Balancing Authority Area has insufficient upward Ramping capacity according to Section 29.34(m), the CAISO will take the actions described in Section 29.34(n)(1)(A) and (B) in the upward and into the EIM Entity BAA direction; and

(ii) that an EIM Entity Balancing Authority Area has insufficient downward Ramping capacity according to Section 29.34(m), the CAISO will take the actions described in Section 29.34(n)(1)(A) and (B) in the downward and from the EIM Entity BAA direction.

(o) **Transmission Constraint Relaxation.** If an EIM Entity Scheduling Coordinator's approved EIM Resource Plan does not have sufficient Bids to resolve Congestion, the CAISO will relax the relevant Transmission Constraints in the Market Clearing and the EIM Entity will become responsible for managing its congested Transmission Constraints through other means, and the CAISO will determine prices for Congestion consistent with Transmission Constraint relaxation parameters established in the Business Practice.

(p) Operating Reserves.

(1) Schedules.

(A) **EIM Entity Responsibility.** Each EIM Entity is responsible for its contingency reserves, or share of such contingency reserves under the terms of a reserve sharing group agreement, and it and the reserve sharing group are responsible for deploying operating reserves, including regulating reserves, in conformance with NERC and WECC requirements.

(B) **EIM Entity Scheduling Coordinator Responsibility.** The EIM Entity Scheduling Coordinator shall –

(i) include any Energy deployed from reserves in the hourly EIM Base Schedules, if time permits, in which case they will be settled in the Real-Time Market;

(ii) otherwise include the Energy deployed from reserves as EIM Manual Dispatches, if time does not permit;

(iii) immediately inform the CAISO of events requiring Dispatch of operating reserves and resource EIM Base Schedule adjustments in response to contingencies;

(iv) if a resource’s actual response differs from the resource EIM Base Schedule adjustment, provide a resource EIM Base Schedule update showing the actual resources dispatched during the event by no later than 1:00 a.m. seven days after the Operating Day in which the event occurred; and

(v) inform the CAISO of the amount of resource capacity that is reserved for contingency reserve responsibility by either ensuring that an Energy Bid for the resource is below the

November 1, 2018
Section 29
maximum operating limit of the resource or reducing the
maximum operating limit of the resource.

(C) **CAISO Actions.**

(i) **Prior to Update.** Until the CAISO receives resource operating
limit updates from an EIM Entity Scheduling Coordinator, the
CAISO will continue to send Dispatch Instructions based upon
pre-event operating limits.

(ii) **After Update.** After EIM Base Schedule updates are received
and Dispatches in the Real-Time Market reflect the updated Self-
Schedules and operating limits, the CAISO shall account for the
Dispatches in the net scheduled Interchange values that it
provides to EIM Entity Scheduling Coordinators.

(2) **Updates to Data for Reserve Sharing Event.**

(A) **Responsibilities.** Immediately following a reserve sharing event
impacting the EIM Entity Balancing Authority Area-

(i) the EIM Entity must submit information regarding the assistance
provided, including impacts to Balancing Authority Area Load
schedules for each participant involved in the reserve sharing
event; and

(ii) the EIM Entity Scheduling Coordinator must submit to the CAISO
EIM Manual Dispatch instructions for resources in the EIM Entity
Balancing Authority Area deployed in response to the reserve
sharing event, pursuant to the reserve sharing group’s criteria.

(B) **Offsets.** Until 1:00 a.m. seven days following the reserve sharing event
impacting the EIM Entity Balancing Authority Area, the EIM Entity may
offset the Load schedules created by the reserve sharing event by
entering resource to Load schedules, reflecting generation resources
actually utilized to assist in the event.
(q) **Variable Energy Resources.** Provisions of Section 34 specifically applicable to Variable Energy Resources and Eligible Intermittent Resources appear in Sections 34.1.3, 34.1.6, 34.2.2, 34.5.1. 34.13.2.

(r) **Use of EIM Available Balancing Capacity.**

(1) **In General.** The CAISO will use EIM Available Balancing Capacity identified in the EIM Resource Plan to address power balance constraint infeasibilities in the EIM Balancing Authority Area for which the EIM Available Balancing Capacity is designated by the responsible EIM Entity Scheduling Coordinator, while simultaneously participating in Congestion Management.

(2) **Resource Sufficiency Evaluations.** The CAISO will not apply the EIM Available Balancing Capacity towards its evaluation of the resource sufficiency tests specified in Section 29.34(k), (l), and (m).

(3) **Real-Time Market Scheduling Run.** In each interval of the Real-Time Market, the CAISO will use the EIM Available Balancing Capacity in the run of the market optimization used to establish scheduling priorities by-

(A) adding a penalty price factor to EIM Available Balancing Capacity Energy Bid prices so that the EIM Available Balancing Capacity is dispatched to address power balance violations, after Effective Economic Bids submitted for EIM Participating Resources in the respective EIM Balancing Authority Area not associated with the EIM Available Balancing Capacity have cleared, while respecting the economic merit order of the EIM Available Balancing Capacity Energy Bid prices;

(B) enforce a constraint that prevents the release of EIM Upward Available Balancing Capacity in excess of the difference between the EIM Entity’s demand and the supply of Effective Economic Bids cleared within the applicable EIM Balancing Authority Area, minus the import transfer into that EIM Balancing Authority Area; and
(C) enforce a constraint that prevents the release of EIM Downward Available Balancing Capacity in excess of the difference between the supply of Effective Economic Bids cleared within the applicable EIM Balancing Authority Area and the EIM Entity’s demand, minus the export transfer out of that EIM Balancing Authority Area.

(4) **Real-Time Market Pricing Run.** For each interval of the Real-Time Market, in the run of the market optimization used to set binding schedules and prices, the CAISO will –

(A) use the EIM Available Balancing Capacity released in the run of the market optimization to establish scheduling priorities based on the Energy Bid Curves for EIM Participating Resources and non-participating resources created pursuant to Sections 29.30(c) and (d), respectively;

(B) change the load forecast for the EIM Balancing Authority Area by a small tolerance to allow for price determination;

(C) clear the Real-Time Market and establish prices based on the pricing parameters in Sections 27.4.3.2 and 27.4.3.4, if the amount of EIM Available Balancing Capacity released in the scheduling run is not sufficient to clear the potential infeasibility identified in the scheduling run.

(s) **EIM Auto-Match.**

(1) **Designation.** An EIM Entity may submit a designation to the Master File of EIM non-participating resources, up to the number specified in the Business Practice Manual, in its Balancing Authority Area to automatically match import/export schedule changes outside of the Market Clearing of the Real-Time Market because of changes to E-Tags at one or more designated EIM Interties or Scheduling Points, up to the number designated in the Business Practice Manual for the Energy Imbalance Market.
(2) **Duration of Designation.** Any designation under paragraph (1) of this subsection shall remain in effect until the EIM Entity notifies the CAISO that it is terminating the designation by a submission to the Master File.

(3) **CAISO Actions in Response to Intertie Schedule Change.** If an EIM Entity designates a non-participating resource under paragraph (1) of this subsection, the CAISO, upon identification of an associated EIM Intertie or Scheduling Point schedule change outside of the Market Clearing of the Real-Time Market, shall –

(A) reflect a matching schedule change to the EIM non-participating resource in the Real-Time Market using the EIM Auto-Match feature; and

(B) omit the EIM Intertie or Scheduling Point schedule change from the historical intertie schedule over/under-scheduling histogram for the determination of additional capacity test requirements for relevant EIM Balancing Authority Area(s) under Sections 29.34(l)(4)(B) and 29.34(m)(6)(ii) that are registered for EIM Auto-Match in accordance with the procedures specified in the Business Practice Manual for the Energy Imbalance Market.

**29.35 Market Validation and Price Correction**

Market validation and price correction for the Energy Imbalance Market shall be governed by Section 35, except that, for a period not to exceed 90 days after an EIM Entity Implementation Date, the time allowed for the CAISO’s correction of Real-Time Market prices shall be 10 Business Days.

**29.36 [Not Used]**

**29.37 Rules of Conduct**

All EIM Market Participants shall be subject to the provisions of Section 37 except for Section 37.2.

**29.38 Market Monitoring**

The CAISO Department of Market Monitoring shall provide market monitoring services for the participation of EIM Market Participants in the Real-Time Market, including –

(a) monitoring markets administered by the CAISO for actual or potential ineffective market rules, market abuses, market power, violations of FERC or CAISO Market rules
prohibiting provision of false information, or market manipulation;

(b) coordinating with CAISO business units that review and monitor the performance and quality of the CAISO Markets;

(c) providing recommendations about potential market design flaws or ineffective market rules to the CAISO and FERC; and

(d) referring a matter to FERC if the Department of Market Monitoring determines there is sufficient credible evidence that a violation of FERC or CAISO Market rules has occurred.

29.39 EIM Market Power Mitigation.

(a) **EIM Market Power Mitigation Procedure.** The CAISO shall apply the Real-Time Local Market Power Mitigation procedure in Section 39.7 to the Energy Imbalance Market, including EIM Transfer constraints into an EIM Entity Balancing Authority Area on an EIM Internal Intertie, except as provided in Section 29.39.

(b) **Competitive Path Assessment.** The CAISO shall conduct the competitive path assessment to determine for each EIM Entity Balancing Authority Area whether a path is competitive or non-competitive, consistent with Section 39.7.2, except that –

(1) EIM Participating Resource Scheduling Coordinators shall submit information required by the CAISO to perform the competitive path assessment;

(2) the competitive path assessment shall not exclude EIM Participating Resources from the test used to determine the competitiveness of Transmission Constraints on the basis that they may be net buyers of Energy in the Real-Time Market; and

(3) the CAISO may establish different Reference Buses for each Balancing Authority Area, which need not be within the Balancing Authority Area, for calculating the LMP decomposition which is used to trigger Bid mitigation, based on the topology of each Balancing Authority Area and consideration of the bus at which the Marginal Cost of Congestion component of Locational Marginal Prices is least influenced by market power.
(c) **Locational Marginal Price Decomposition.** The CAISO shall perform the Locational Marginal Price decomposition for each EIM Entity Balancing Authority Area using the results of the competitive path assessment and the Congestion pricing results of the pre-market run to determine which resources may have local market power due to Congestion on a non-competitive Transmission Constraint, consistent with Section 34.2.3 and 39.7.

(d) **Default Energy Bids.** The CAISO shall use the methods and standards set forth in Section 39.7 to determine Default Energy Bids for EIM Participating Resources, except that the CAISO will use the Market Services Charge and System Operations Charge reflected in the EIM Administrative Charge.

29.40 [Not Used]

29.41 [Not Used]

29.42 [Not Used]

29.43 [Not Used]

29.44 **Flexible Ramping Product**

The CAISO will procure Flexible Ramping Product for the Energy Imbalance Market as set forth in Section 44, except that the CAISO will consider the EIM Base Schedules of non-participating resources as Self-Schedules for the calculation of Flexible Ramping Product requirements.
Energy Bar Association
2019 Western Chapter Annual Meeting
February 22, 2019

John C. Anders
Assistant General Counsel
Western Market Evolution and Development

- How did development of the EIM get started?

- Why has the EIM been such a success?

- Will extending markets to the day-ahead succeed?

- What comes next in the evolution of markets?
Western Market Expansion: Regulatory Considerations Related to Use of Transmission

Sarah Edmonds
Portland General Electric
Director, Transmission Services

Energy Bar Association Western Chapter
Annual Meeting
February 2019
Portland General Electric

- Portland, Oregon
- 125+ Years old
- Home of the first ever “high tension” transmission line (1890 from Willamette Falls to Portland)
- Largest utility in Oregon
- Approximately 900K customers (88% residential)
- Residential rate: 11.42 cents/kw
- 2017 Peak Load: 3976 MW
- Joined the Energy Imbalance Market (EIM) October 2017

**2017 Energy Supply**

- Coal, 15%
- Natural Gas, 28%
- Hydro, 15%
- Wind, 9%
- Purchased Power, 33%
Transmission: superhighway for EIM benefits...

- Transmission availability to the market plays a pivotal role in delivering EIM benefits and obtaining market-based rate authority
Estimated maximum transfer capacity for EIM Entities operating as of Q3 2018
### EIM Benefits

Gross benefits from EIM since November 2014

$564.88 million

<table>
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<tr>
<th>Q4 2018 Gross Benefits by Participant</th>
<th>(millions $)</th>
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<td>Arizona Public Service</td>
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</table>
Market-Based Rate (MBR) Authority

Committed transmission is a key consideration

- The Federal Energy Regulatory Commission (FERC) grants market-based rate authorization for wholesale sales of electric energy, capacity and ancillary services by sellers that can demonstrate that they and their affiliates lack or have adequately mitigated market power. [https://www.ferc.gov/industries/electric/gen-info/mbr.asp](https://www.ferc.gov/industries/electric/gen-info/mbr.asp)

- An EIM participant must demonstrate that there are no frequently binding transmission constraints that would limit imports into its home Balancing Authority Area (BAA) (or the BAA where it’s gen is located) such that the home BAA shouldn’t be deemed an EIM submarket itself, or, to be within an EIM submarket. *Arizona Public Service Co., 156 FERC ¶ 61,148, at P 28 (2016)*
  - MBR in EIM is an important operational tool; it can be used for managing fuel-constrained participating resources like hydro to ensure that these resources are dispatched when they are most needed.
  - FERC has granted MBR where EIM sellers have demonstrated that transmission capacity *committed* to the EIM exceeds expected demand for in-hour imbalance energy. *Puget Sound Energy, Inc., 156 FERC ¶ 61,242, at P 12 (2016); Portland General Electric Company, 160 FERC ¶ 61,131, at P 16 (2017)*
How does transmission work in the EIM?

- Transmission capacity for EIM comes from two main sources:

1. **Interchange Rights Holder (IRH) Transmission** contributed by a transmission customer at an EIM transfer point: IRH Transmission is firm. IRH Transmission in the EIM has already been purchased from the transmission provider; there is no incremental transmission service charge to any other EIM participants or any allocation of incremental revenues.

2. **Available Transfer Capability (ATC) Transmission** contributed by a transmission provider at an EIM transfer point using any unscheduled transmission within a scheduling interval. Use of ATC in EIM is considered non-firm. ATC Transmission in the EIM has not been purchased from the transmission provider; *there is no incremental charge to any other EIM participants or any allocation of incremental revenues.*
EIM “Wheel Throughs”

### TABLE 3: Estimated wheel through transfers in Q4 2018

<table>
<thead>
<tr>
<th>BAA</th>
<th>Net Export</th>
<th>Net Import</th>
<th>Wheel Through</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZPS</td>
<td>325,227</td>
<td>121,580</td>
<td>306,653</td>
</tr>
<tr>
<td>CISO</td>
<td>393,149</td>
<td>905,963</td>
<td>212,642</td>
</tr>
<tr>
<td>IPCO</td>
<td>75,652</td>
<td>239,138</td>
<td>91,853</td>
</tr>
<tr>
<td>NEVP</td>
<td>134,185</td>
<td>177,799</td>
<td>346,543</td>
</tr>
<tr>
<td>PACE</td>
<td>792,070</td>
<td>75,036</td>
<td>75,904</td>
</tr>
<tr>
<td>PACW</td>
<td>430,822</td>
<td>66,377</td>
<td>299,342</td>
</tr>
<tr>
<td>PGE</td>
<td>50,008</td>
<td>302,013</td>
<td>21,937</td>
</tr>
<tr>
<td>PSEI</td>
<td>122,841</td>
<td>125,345</td>
<td>102,066</td>
</tr>
<tr>
<td>PWRX</td>
<td>27,934</td>
<td>338,638</td>
<td>31,513</td>
</tr>
</tbody>
</table>

### GRAPH 2: Estimated wheel through transfers in Q4 2018
If transmission is so important to the success of the market, why is it provided for “free” in the EIM?

A great deal of the transmission made available to the EIM has already been purchased. The other portion may not have been purchased but is provided very close to real-time when it might have otherwise gone unscheduled and unused. EIM participants and CAISO share and mutually benefit from transmission made available in real-time through EIM; this is called “reciprocity.”
Questions?

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Overview

- Current Developments in the West
- What Have Been Key Elements of Success
- Reviewing Past RTO/Market Initiatives
  - Where Were the Trip Wires
- How Can We Avoid Them and Keep Progress Moving
Driving Forces of Change

- Changes to the Generation Fleet
  - State Policies
  - Economics of Renewable Energy
  - Rooftop Solar and Customer Preference
  - Retirement of Existing Fossil Plants
- Customer Choice 2.0
  - CCAs, Direct Access, Distributed Energy Resources
Reliability Challenge: The Duck Curve

Net Power for Load (NPL) for 02/26/2017

When the sun goes down, quick & available power is needed to match customer electric demand.
PURPA Generation

- April 2017 – 128 online PURPA contracts
- Approximately 1,115MW nameplate capacity
Can Wholesale Markets Help Solve Associated Operational and Economic Issues?

- Many Think So
- Many Have Tried Before
- What Lessons Can be Learned
- What Can be Done Differently
Western Market Flotsam and Jetsam

- Pacific Northwest
  - RTO West
  - Grid West
  - IndeGo
  - Northwest Power Pool MC Initiative
- Desert Southwest and Rocky Mountain Regions
  - Desert Star
  - Mountain West Transmission Group
- PacifiCorp Initiative to Become a Cal ISO Participating Transmission Owner
What Have Been the Obstacles?

- Transmission Cost/Revenue Allocation
  - Impacts on Existing Costs and Wheeling Revenues
  - Planning and Allocating the Cost of New Facilities
- Jurisdictional Concerns
  - The West Has Lot of Public Power
  - How Will Market Development Affect FPA 201(f) Jurisdictional Limitations
    - City of Vernon
  - Particular Circumstances of Power Marketing Administrations
- Governance - How To Address California ISO Governance
Along Comes the Cal ISO Energy Imbalance Market

- Cal ISO and PacifiCorp
  - Didn’t Depend on Westwide Consensus
  - Largely Bilateral Discussion
  - Materialized Out of Long PUC EIM Effort that Had Gone Nowhere
  - Didn’t Require an Array of Regulatory Approvals Only FERC
Basic Structure of EIM

- It is Voluntary
  - Unit Participation in the Market is Voluntary
  - Commitment of Excess Transmission is Voluntary
- There are No Charges for Use of Transmission
  - Reciprocity
  - Contribution of Transmission in Return for Optimization of Market over Transmission Systems of Other Participants
  - Avoid Vernon Type Analysis of Public Power Transmission Revenue Requirement and FERC Review
- It Does Not Consolidate Balancing Authority Areas
EIM Expansion

- 13 Entities Operating or Slated to Operate in the EIM
- Public Power Foray into EIM
  - BANC/SMUD 2019
  - LADWP, SCL, SRP 2020-21
- Likely More To Follow
  - Public Service of New Mexico
  - Northwestern Energy
- Ongoing BPA Consideration
EIM Augmentation

- CAISO Planning Changes to Its Own Day Ahead Market
  - Responding to Renewable Integration Challenges
- CAISO Poised to Consider Extended Day Ahead Participation to EIM Entities (EDAM)
  - Greatly Expand Trading within the Single Optimization
  - Affects on Liquidity of Other Bilateral Markets
  - 2021-22 Implementation
- Dependent Upon Ongoing Feasibility Assessment
California Has No Magic Serum To Usual RTO Obstacles

- Overcoming Usual Obstacles to RTO Formation Unlikely
  - Joint Planning and Cost Allocation
    - California ISO Transmission Costs Are Trending Into Mid-$20’s MW/h
    - Neighbors at Some Small Fraction
  - Governance
    - Three Attempts to Change Cal ISO Governance by Statute Have Failed
    - Little Incentive for Round 4
  - Procurement Rules So Disparate
    - California Load is Disaggregating
    - Other States Remain Vertically Integrated
    - The “How” of Measuring Adequacy Differs Greatly Between Subregions
Need to Scope EDAM to Reflect Realities and Past Trip Wires

- BA Consolidation is Likely Off the Table
  - This Has Been A Common Talking Point for Many that Advocate a Western RTO

- Implicates a Change of Paradigm
  - Shifts Reliability Responsibilities
  - Transfers Control of Assets
  - Necessitates More Complex Discussion of Common Adequacy Rules

- Likely Triggers More Extensive Regulatory Approval Process
Trip Wires Continued

- Transmission Planning and Cost Allocation Issues Must be Minimized
  - Attempt to Create Joint Planning Region May Doom Progress
- Existing Facility Cost Differentials Not Likely to be Overcome
  - No One Wants to Pay California’s High Costs
  - California Entities Don’t Want to Additional Regional Costs
Working Within Governance Change Limitations

- EDAM is an Extension of the Cal ISO Markets, Just Like EIM
- Rewriting Governance is Unlikely
  - Statutory Changes Have Failed Repeatedly
  - Cal ISO Still Has Ongoing Corporate Obligations that are Hardwired into law
- EIM Governance Worked Within These Limitations Successfully
  - Focus on Meaningful Changes But Within Basic Structure
Conclusions

- West is Undergoing Significant Growth of Common Wholesale Markets
- EIM is by All Measures a Success
- Next Steps May Expand Markets by Function and Geographic Reach
  - Make Sure Steps are Measured
  - Have Reasonable Expectations
    - Avoid BA Consolidation
    - Minimize Transmission Cost Implications
    - Work Within Governance Parameters
- Markets Are Evolving Without Regulatory or Legislative Fiat. Let them do so.