Western Energy Markets Briefing

Seattle City Council
Economic Development, Technology & City Light Committee
January 11, 2023

Seattle City Light

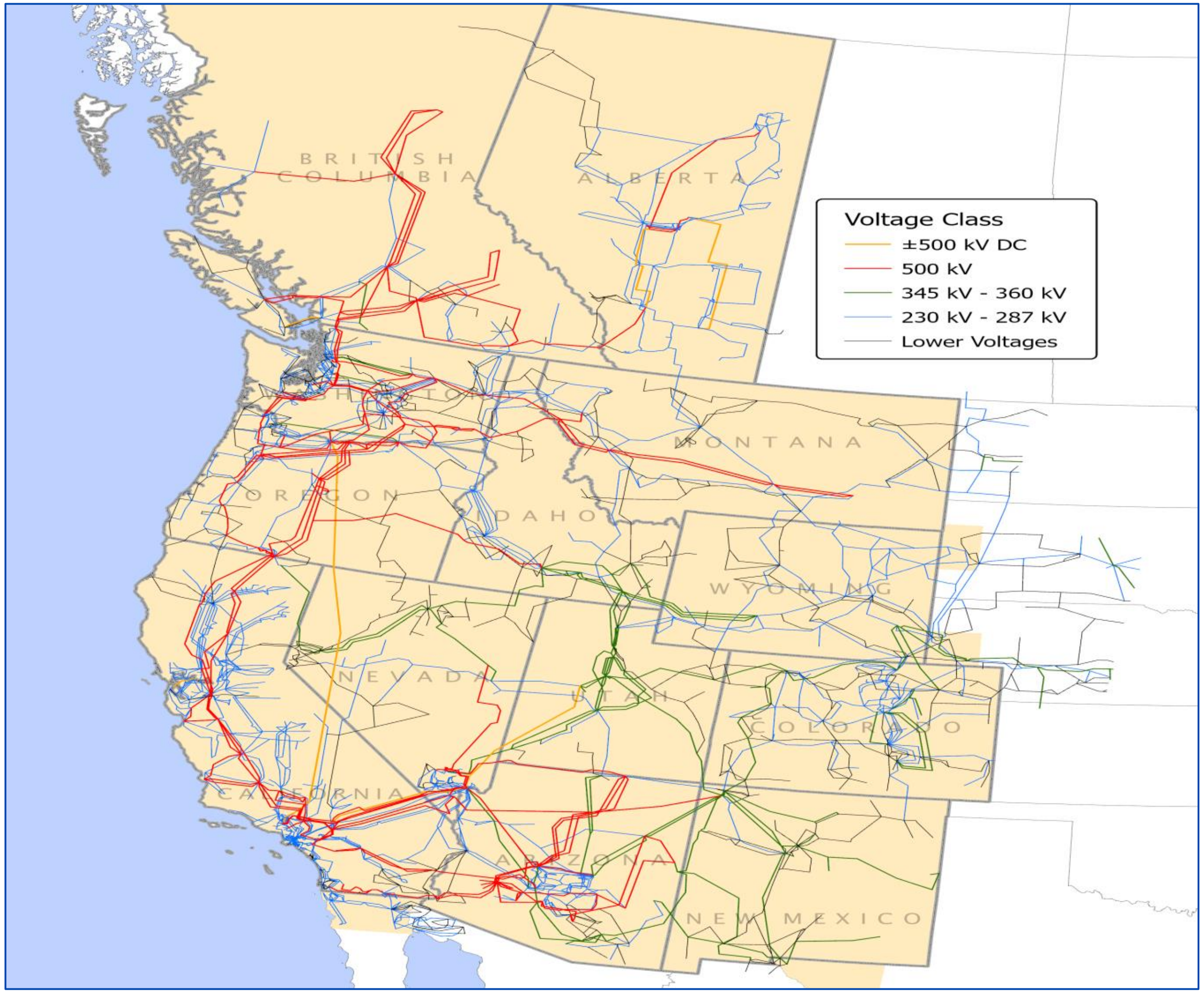
WE POWER SEATTLE

Presentation Flow

- The Western Interconnection
- Energy Participant Interdependence
- Historical Market Efforts
- Significant WEIM Success
- Current Focus
- Early Collaboration -The Resource Adequacy Element (WRAP)

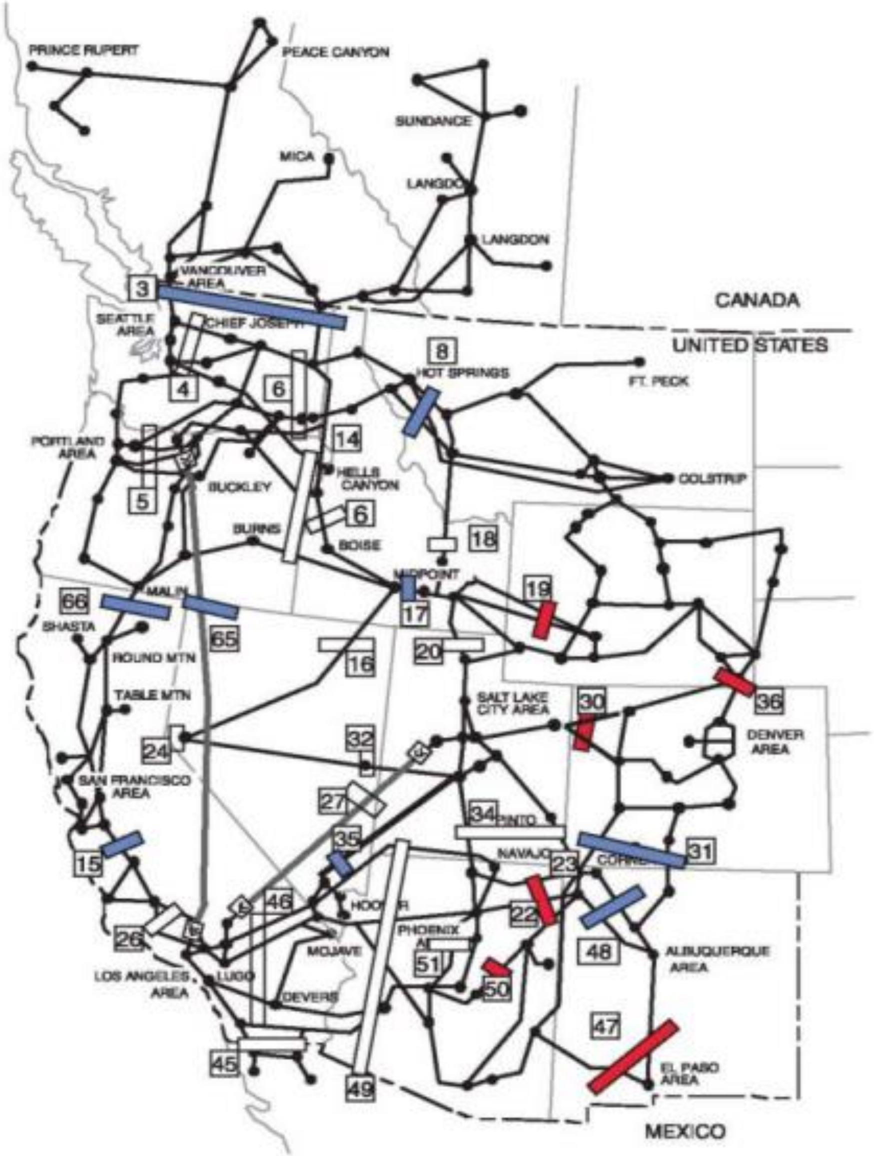
"The Wise Ones" Steve Smith, 2016

Western Interconnection Transmission System

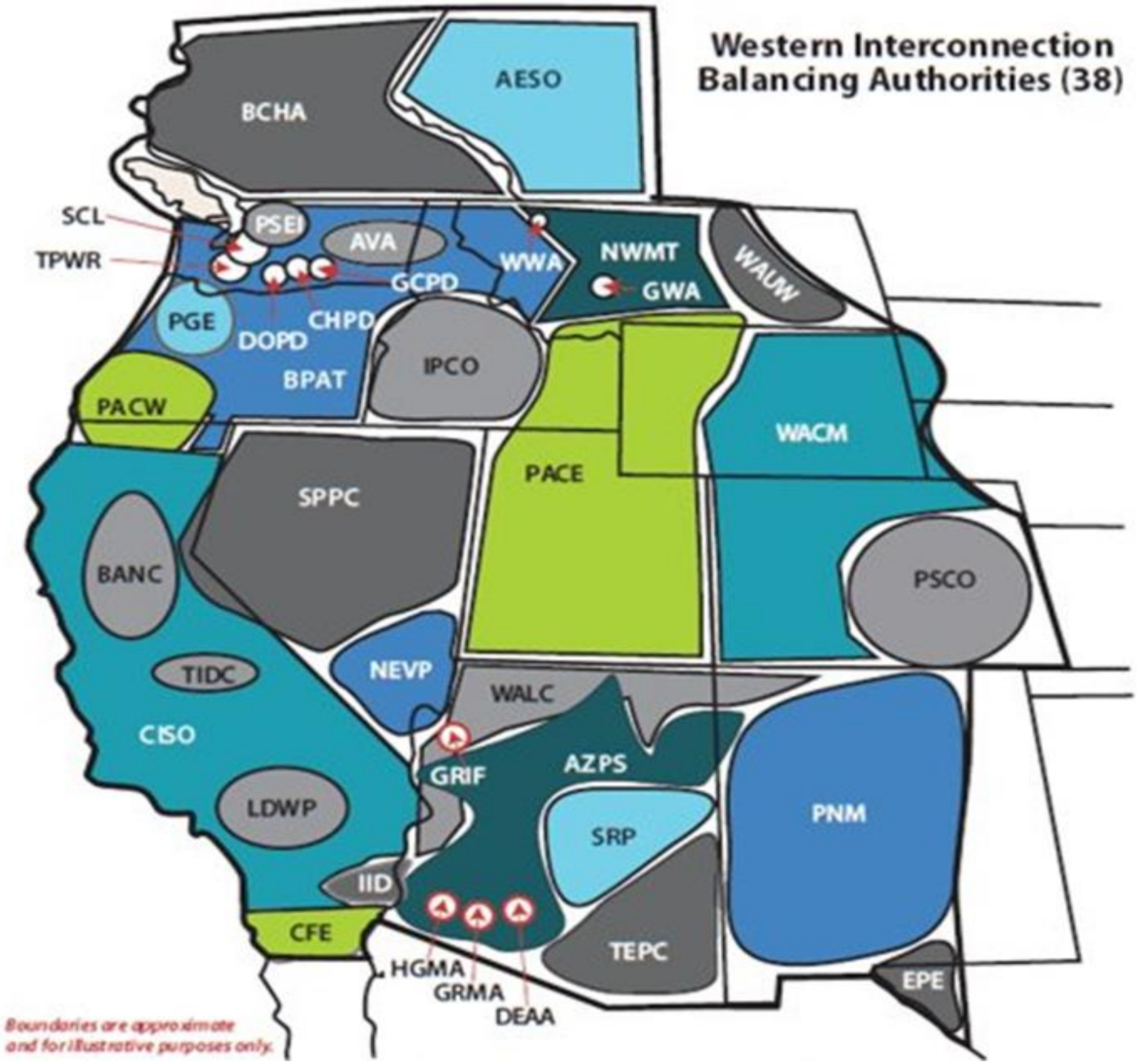


A Single Western Interconnected Grid

- More than 1.8 Million Square Miles
- All or Part of 14 US States plus British Columbia, Alberta & Northern Baja
- Population > 80 Million
- Large Share of Generation from Hydroelectric and Variable (wind and solar) Resources
- About 136,000 Miles of High Voltage Transmission Lines – Many Long to connect Hydro and Other Remote Generation with Population Centers



Western Interconnection Balancing Authorities



Regulatory Oversight

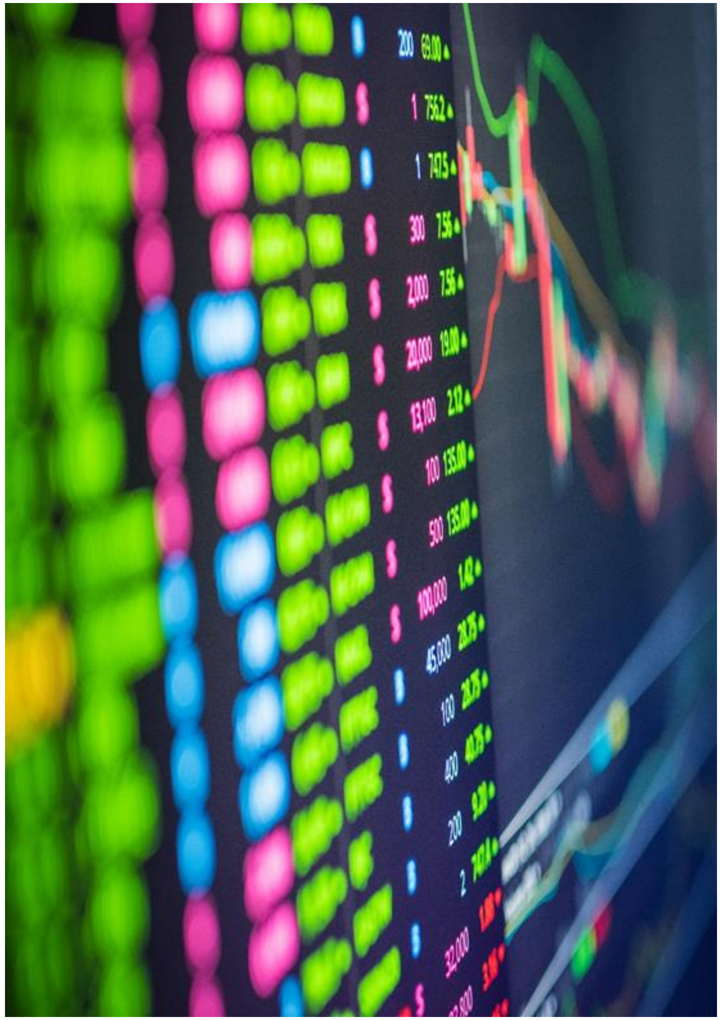
- Critical Infrastructure Protection Requirements
- Operations & Planning Standards
- Open Access Transmission Tariffs
- Market Behavior Rules
- Regional Transmission Planning
- Required Reliability Coordinator
- Mandatory Enforceable Reliability Standards

FERC Federal Energy Regulatory Commission

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

WECC
Electric Reliability and Security for the West

Regional Energy Market Stages of Evolution



- Bilateral Only (before 2015)
- Western Energy Imbalance Market (WEIM, 2014-Present)
- Day-Ahead Market (Incremental Step)
- Full Regional Transmission Organization/Independent System Operator (RTO/ISO)

Market Opportunities – Past Regional Attempts

- Indego
- California ISO and CalPX Formed
- RTO West/Grid West
- WestConnect (SW)
- MC Initiative
- **Energy Imbalance Market**

Seattle City Light's WEIM Participation

Pre- and Post- Market Participation

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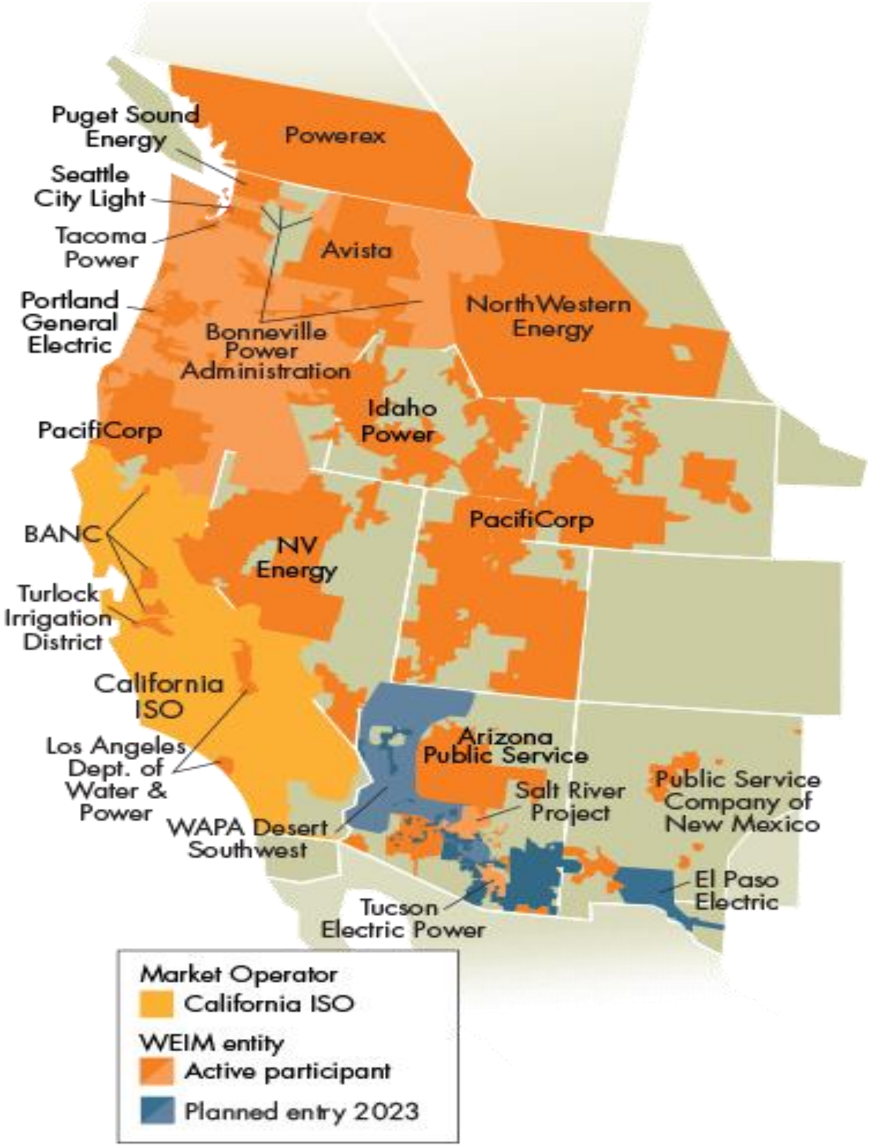
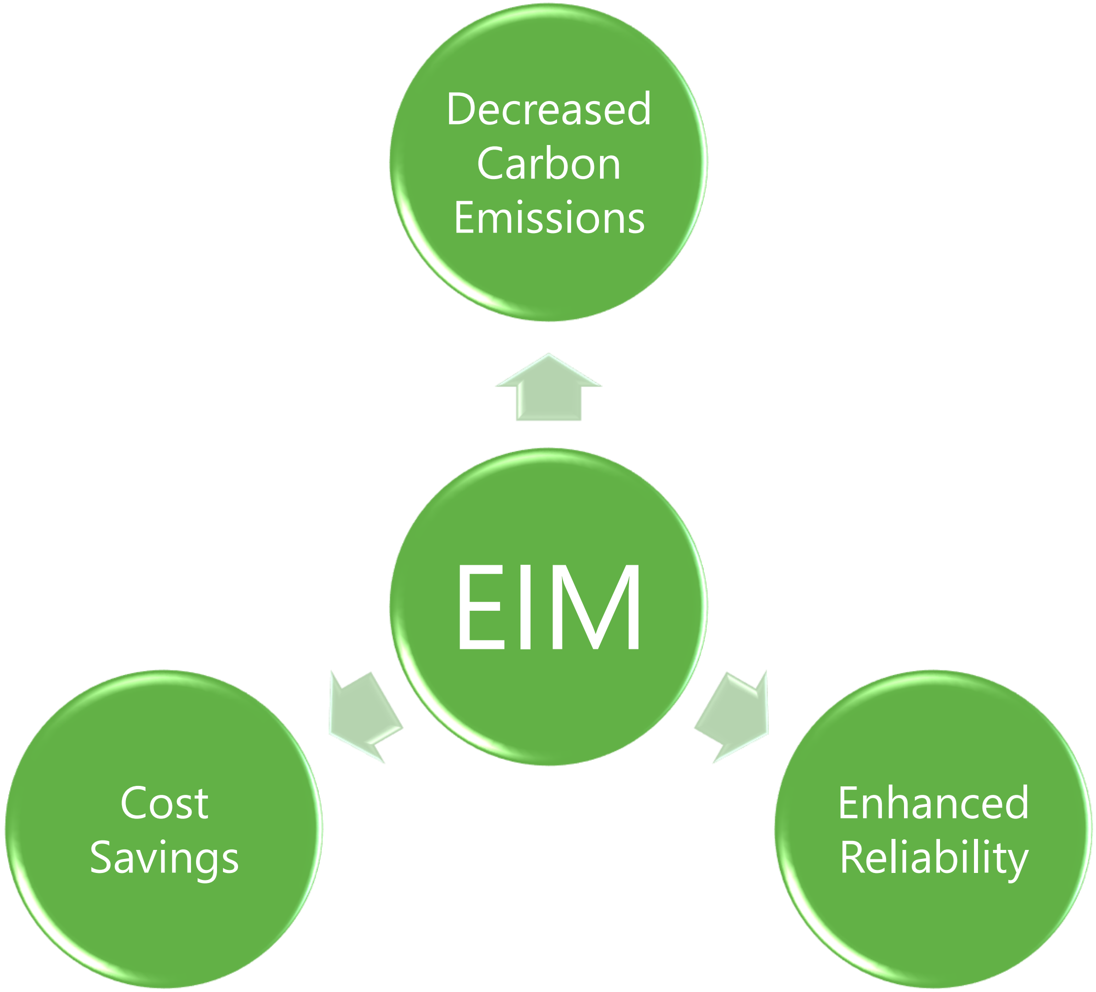
Western Energy Imbalance Market (WEIM)



- California ISO – Started in 2014
- Seattle City Light – Joined April 1, 2020
- Cost Savings to Meet Demand
- Improves Integration of Renewable Energy
- Over 80% of Load in the West Participating

WEIM Decision – Recapping Our Why?

WEIM's Three Primary Benefits



Environmental & Economic Benefits Achieved

- Cost-effective Integration of Renewable Energy
  - Variable Energy Resources (Wind/Solar) Forecasts Incorporated into the Market Solution
- Avoided Carbon Emissions
  - 310,856 metrics tons of $C0_2$ savings through avoided regional renewable energy curtailments
- Net EIM Transfers for City Light
  - 586,377 MWh Net Exports
  - 529,504 MWh Net Imports
- SCL Customer Financial Benefit - $30.73M

Energy Market Opportunities

Current and Emerging

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The Time is Right

- Mutual Dependence
- Cooperation
- Willing Collaboration
- Individual Interests
- Shared Desirable Outcomes
  - Carbon Reduction
  - Improved Reliability
  - Cost Reduction

Specific Organized Market Opportunities

- California Independent System Operator
  - EDAM (Extended Day Ahead Market) Design & Implementation
  - Possible Future ISO Expansion
- Southwest Power Pool Markets Plus
  - Eastern Interconnection Market Operator
  - Designing for Day Ahead Market
  - Possible RTO Expansion into West
- Western Markets Exploratory Group
  - Like Minded Utilities (25)
  - Exploratory – Wide Ranging Possibilities

Why Now? Current and Emerging Opportunities

- Opportunity to Leverage Western EIM Success
- Challenges of Climate Change,
  - Drought, Wildfire and Reduced Hydropower
- Increasing Customer Demands
  - More and Cleaner Electricity Development
- Maximize and extend the value of resource diversity
  - Hydropower is an exceptional asset for integrating new renewables
- Regional collaboration is timely
  - Recent momentum suggests opportunity to capture the moment

Why Now? Current and Emerging Opportunities

- Renewed Interest in Transmission Expansion & Transmission Efficiencies
- State & Federal Regulatory/Legislative Pressure
  - Carbon Reduction Goals & Transition to Cleaner Resource Mix
- Electrification Increasing Loads
- Continued Expansion of Intermittent Resources
- Pressures on Reliability and Affordability

Desirable Western Market Attributes

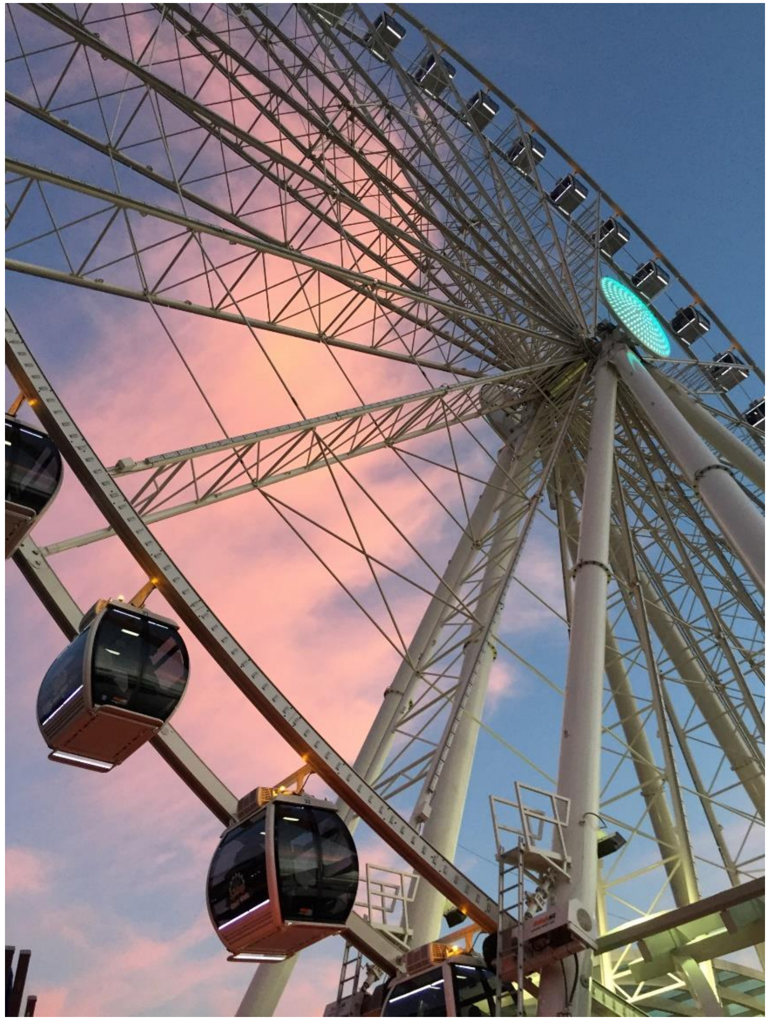
- A "Well-designed" Market
  - Should Produce Overall Benefits for Entire Market Footprint
  - Should Create Efficiency and Reduce Overall Customer Costs
- Examples of Anticipated Benefits:
  - Reduced Production Costs
  - Investment Cost Savings
  - Potential Balancing Area Consolidation
  - Ability to Realize Benefits of Resource, Peak, and Weather Diversity
  - Improved Reliability

Desirable Western Market Outcomes

- Market Formation Should Facilitate the Integration of Existing and Additional Renewable Resources
- Must Have Processes that Can Accommodate and Don’t Conflict with Individual State Clean Energy Requirements
- Focus Should be on Results for the Market as a Whole, Not Only on Specific Outcomes for Specific Participants
- Well-functioning Markets will Emphasize Resource and Transmission Efficiency and Transparency, and Provide Incentives Based on Availability, Scarcity and Risk

Seattle City Light Specific Interests

- Positive Customer Benefits:
  - Enhanced Reliability
  - Reduced Operational/Resource Costs
- Hydro Attributes Not Compromised and Appropriately Valued
- Increased Market Transmission Availability to Allow Increased Access to New Resources
- Renewable Resource Development Facilitated to Decarbonize Regional Mix



Seattle City Light's Current Western Markets Activities

- CAISO Extended Day Ahead Market (EDAM)
- Western Markets Exploratory Group (WMEG)
- Southwest Power Pool Markets Plus (SPP Markets +)
- Linkage to:
  - Resource Adequacy (WRAP Program)
  - CETA/CCA Obligations (WA and CA)
- Regulatory Aspects
- Coordination & Communication

Timeline, Coordination and Communication

2023
- EDAM Design Complete & Tariff Drafted
- Markets + Phase 1 Design Work
- WMEG Benefit/Cost Analyses and Scope Evaluation

2024
- EDAM Implementation
- SPP Markets+ Design Continues
- WMEG Next Steps

2025
- CAISO EDAM Anticipated Launch
- SPP Goal of Expanding RTO to West
- Possible Market Actions Beyond Day Ahead

2030
- RTO Required in Colorado & Nevada

FIRST LOOK: Moving the West forward on Resource Adequacy

Western Resource Adequacy Program (WRAP)

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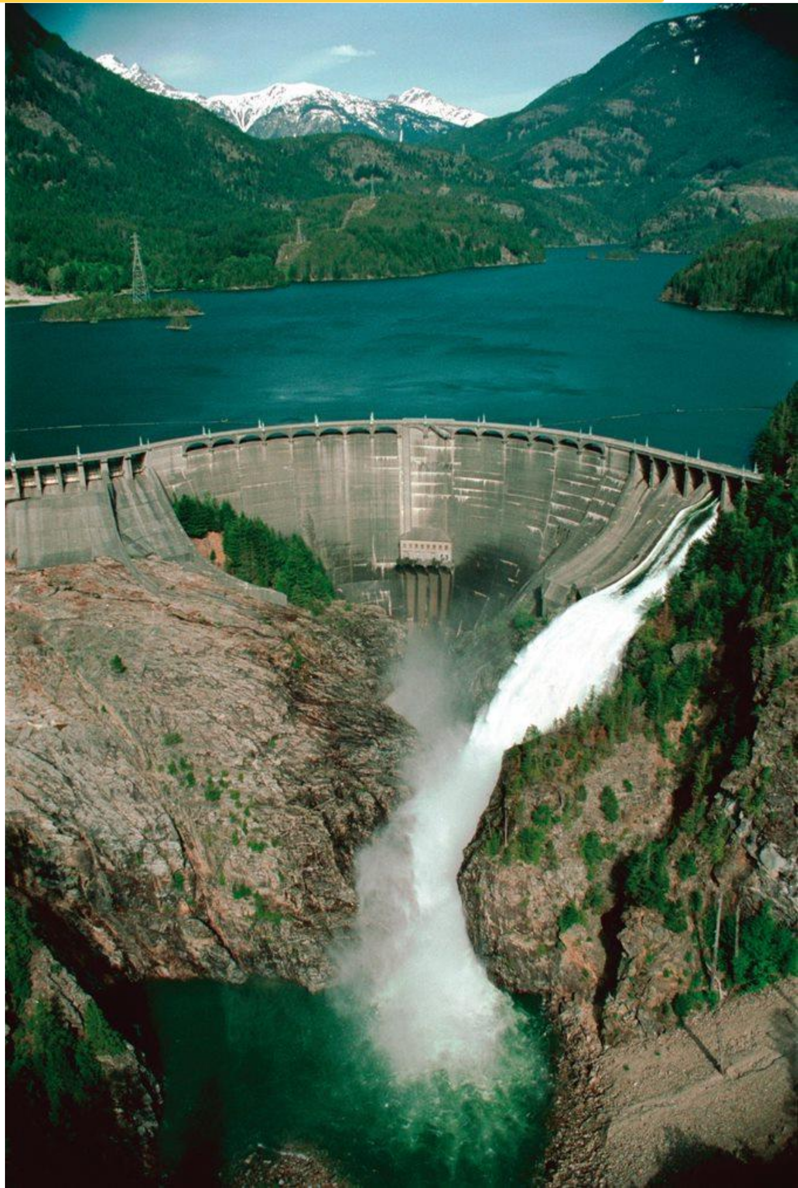
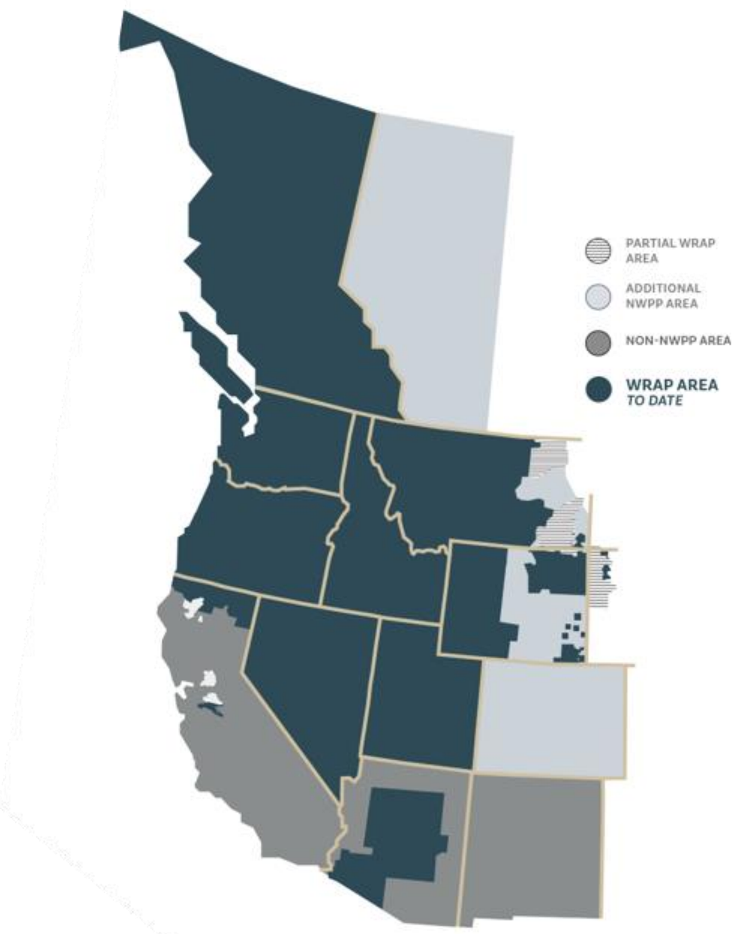
Why Now? Resource Adequacy & Reliability Challenges

- Recent studies demonstrate resource shortfall by mid-2020s across western U.S.
- Driven by multiple factors
  - Retirement of fossil generation
  - Increasing intermittent renewables
  - Load growth: Data center & agricultural sectors; acceleration of transportation and building electrification
  - Drought conditions and extreme weather events



Resource Adequacy

- Reliability Focus – ensuring sufficient resources to serve electricity demand
- Western Resource Adequacy Program (WRAP)
  - Related Parallel Development
  - Successful Regional Collaboration
  - Solid Operational & Governance Model
  - Enhances Reliability
  - Is **NOT** an Organized Market



WRAP Current Status & Timeline

- City Light plans to request City Council approval this Spring to join WRAP

Program Development | Non-Binding Phase | Transitional Phase | Fully Binding Program

December 2022
- City Light executes work order to continue to participate in program development
- City Light executes non-binding MOU indicating interest in program participation and City Light's intended binding date of Summer 2028

February 2023
- Expected FERC approval - Tariff becomes effective
- Program is operational in non-binding phase

Spring 2023
- City Light requests Council approval to execute WRAPA

May 2023
- Deadline to make changes for Summer 2025 binding season

Summer 2025
- Earliest potential binding program

May 2026
- Deadline for City Light to withdraw from binding program participation

Summer 2028
- City Light starts binding program participation

Questions?