
# CETA Carbon and Electricity Markets Stakeholder Work Group

January 15, 2020

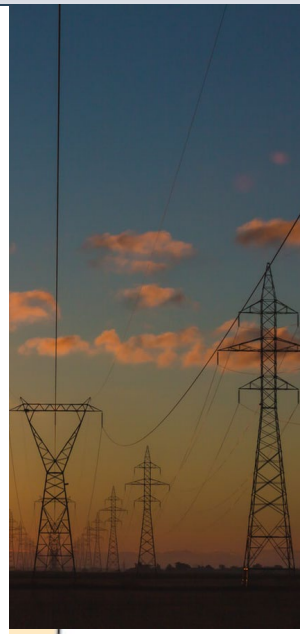
# Overview of Electricity Markets

- Balancing loads and resources
- Role of electricity markets in balancing loads and resources
- Provide foundational understanding of the market and grid management

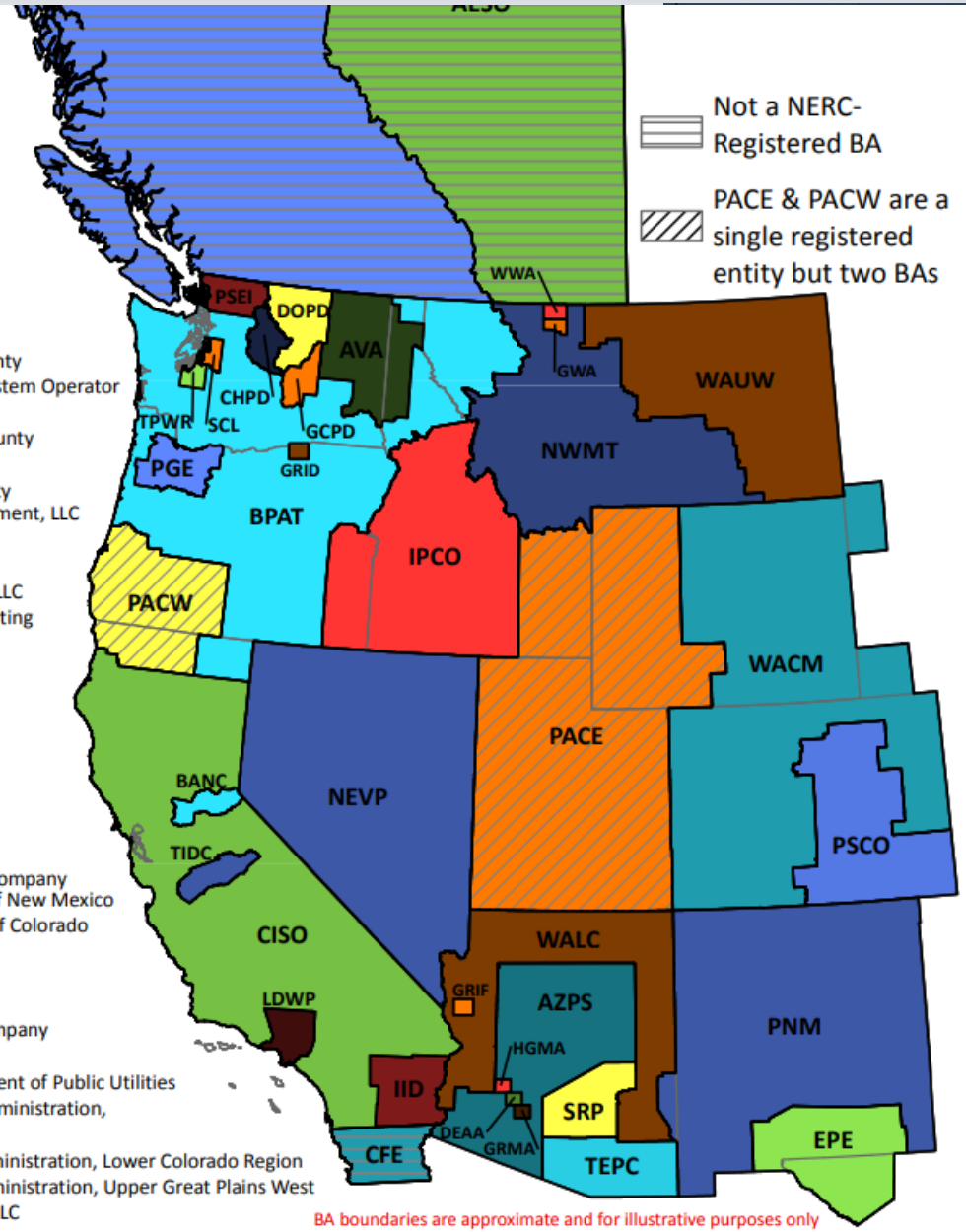
# Work Group Charge - CETA

- 13(1): …convene stakeholder group to examine:
  - Integration with carbon and electricity markets outside the state, and
  - Compatibility with linked cap-and-trade program.
- 13(2): …other issues pertinent to its review…
- 13(3): UTC and Commerce must adopt rules:
  - Retail electric load met with market purchases, and
  - Prohibits double counting with other programs.
  - Deadline…..June 2022

# Biggest Machine In The World



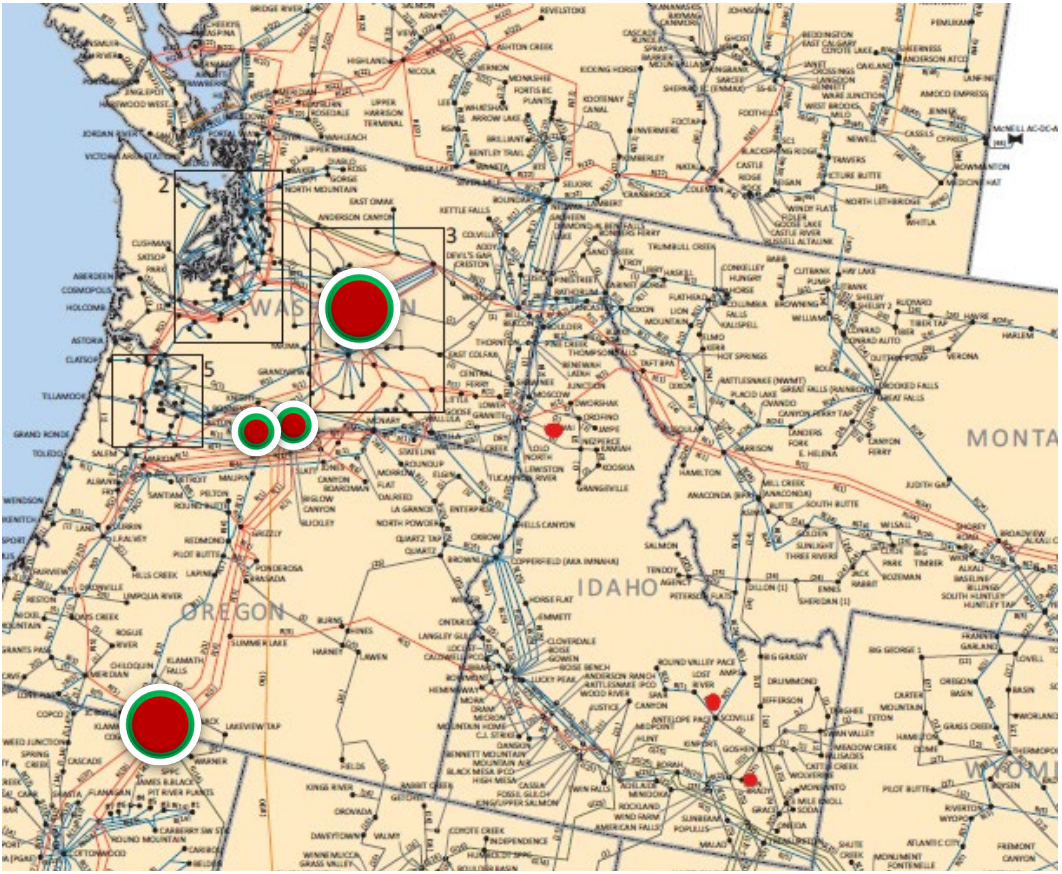
AESO - Alberta Electric System Operator
AVA - Avista Corporation
AZPS - Arizona Public Service Company
BANC - Balancing Authority of Northern California
BCHA - British Columbia Hydro Authority
BPAT - Bonneville Power Administration-Transmission
CFE - Comision Federal de Electricidad
CHPD - PUD No. 1 of Chelan County
CISO - California Independent System Operator
DEAA - Arlington Valley, LLC
DOPD - PUD No. 1 of Douglas County
EPE - El Paso Electric Company
GCPD - PUD No. 2 of Grant County
GRID - Gridforce Energy Management, LLC
GRIF - Griffith Energy, LLC
GRMA - Gila River Power, LP
GWA - NaturEner Power Watch, LLC
HGMA - New Harquahala Generating Company, LLC
IID - Imperial Irrigation District
IPCO - Idaho Power Company
LDWP - Los Angeles Department of Water and Power
NEVP - Nevada Power Company
NWMT - NorthWestern Energy
PACE - PacifiCorp East
PACW - PacifiCorp West
PGE - Portland General Electric Company
PNM - Public Service Company of New Mexico
PSCO - Public Service Company of Colorado
PSEI - Puget Sound Energy
SCL - Seattle City Light
SRP - Salt River Project
TEPC - Tucson Electric Power Company
TIDC - Turlock Irrigation District
TPWR - City of Tacoma, Department of Public Utilities
WACM - Western Area Power Administration, Colorado-Missouri Region
WALC - Western Area Power Administration, Lower Colorado Region
WAUW - Wester Area Power Administration, Upper Great Plains West
WWA - NaturEner Wind Watch, LLC



# Regional Markets – Transactions for Deliver and Exchange of Electricity

- Price – Term – Quantity – Location – Quality
  - Price:  $27/MWh
  - Term:  June 2020 On Peak Hours (6am-10pm M-S)
  - Quantity: 25 MW every hour
  - Location:  Mid-Columbia (MIDC)
  - Quality/Firmness:  Firm with Liquidated Damages
- Enabling agreements such as WSPP provide the boilerplate provisions (invoicing, payment, netting, dispute resolution, etc.)

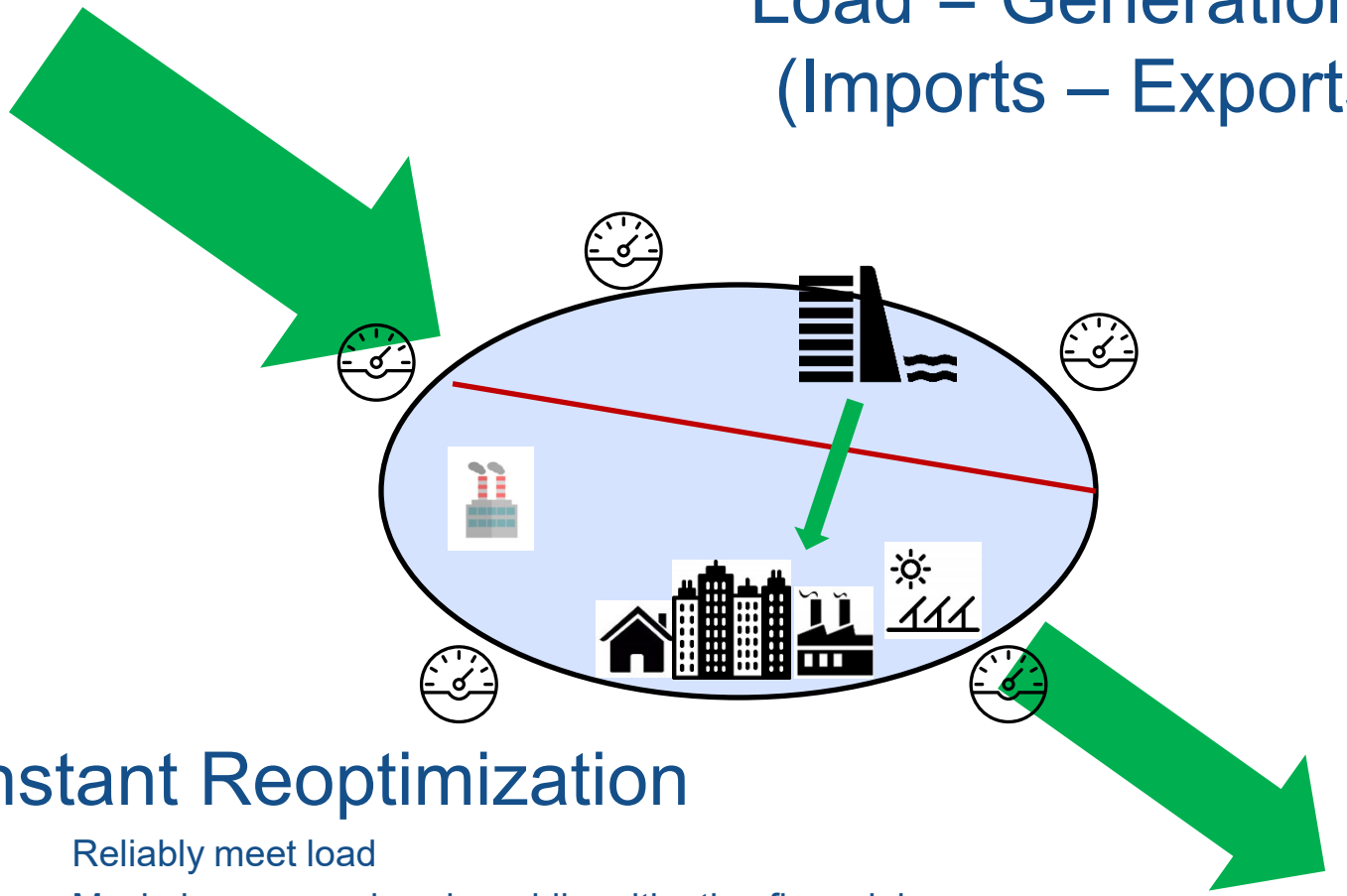
# Delivery: Scheduling and Tagging




- Buyer and seller notify each other of delivery arrangements for transactions day-ahead.
  - Source
  - Transmission arrangements to move power to and from delivery point
  - Intermediate purchasers and sellers of the energy
- Information is entered into an electronic tag that must be fully approved to become effective.
- Tags may be updated/modified in realtime to address changing conditions on the grid

# Balancing the Balancing Authority Area

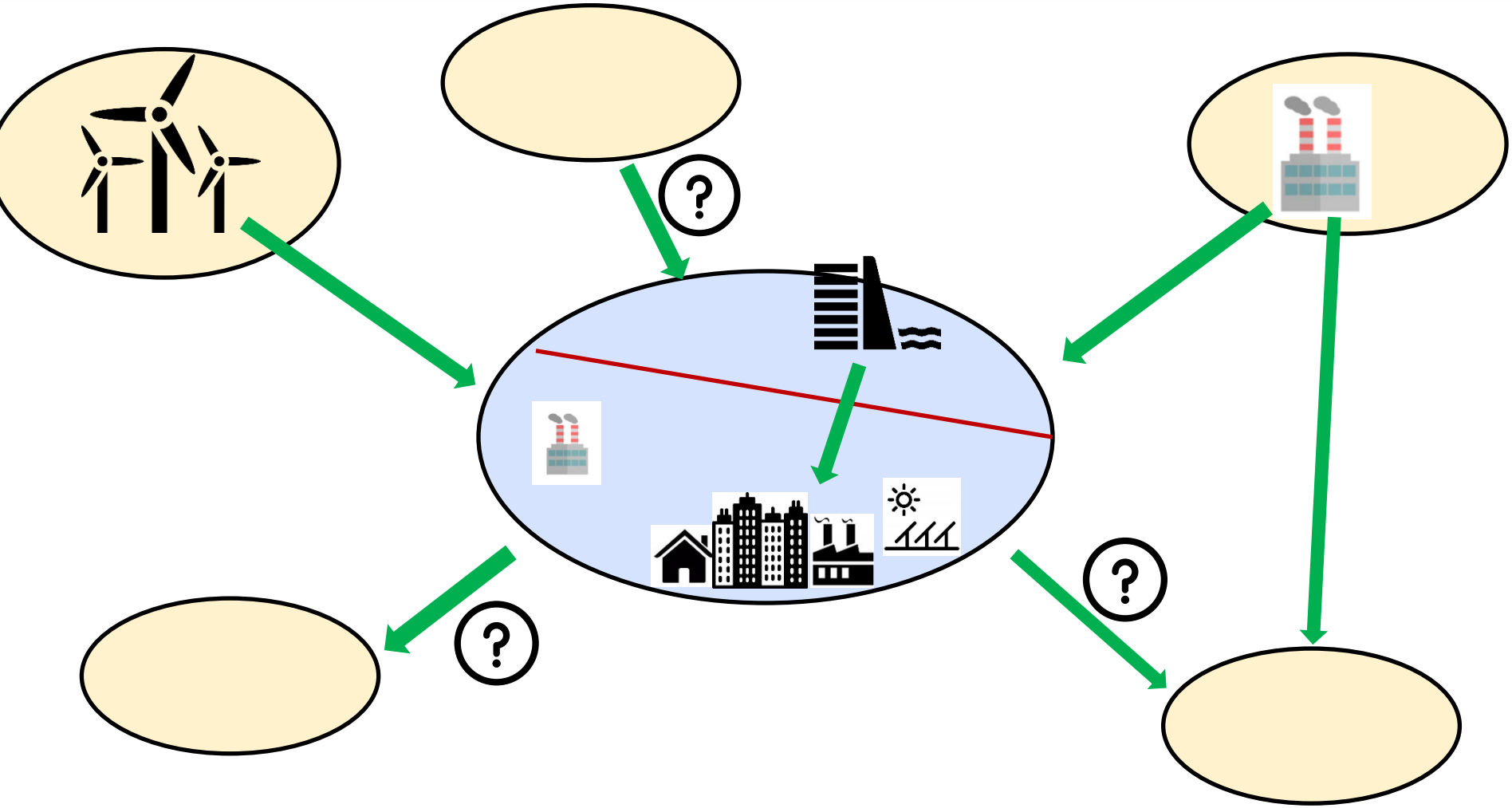
Load = Generation +
(Imports – Exports)



## Constant Reoptimization

1. Reliably meet load
2. Maximize economic value while mitigating financial risk.

# Balancing Authority Example



# Optimizing and Reoptimizing

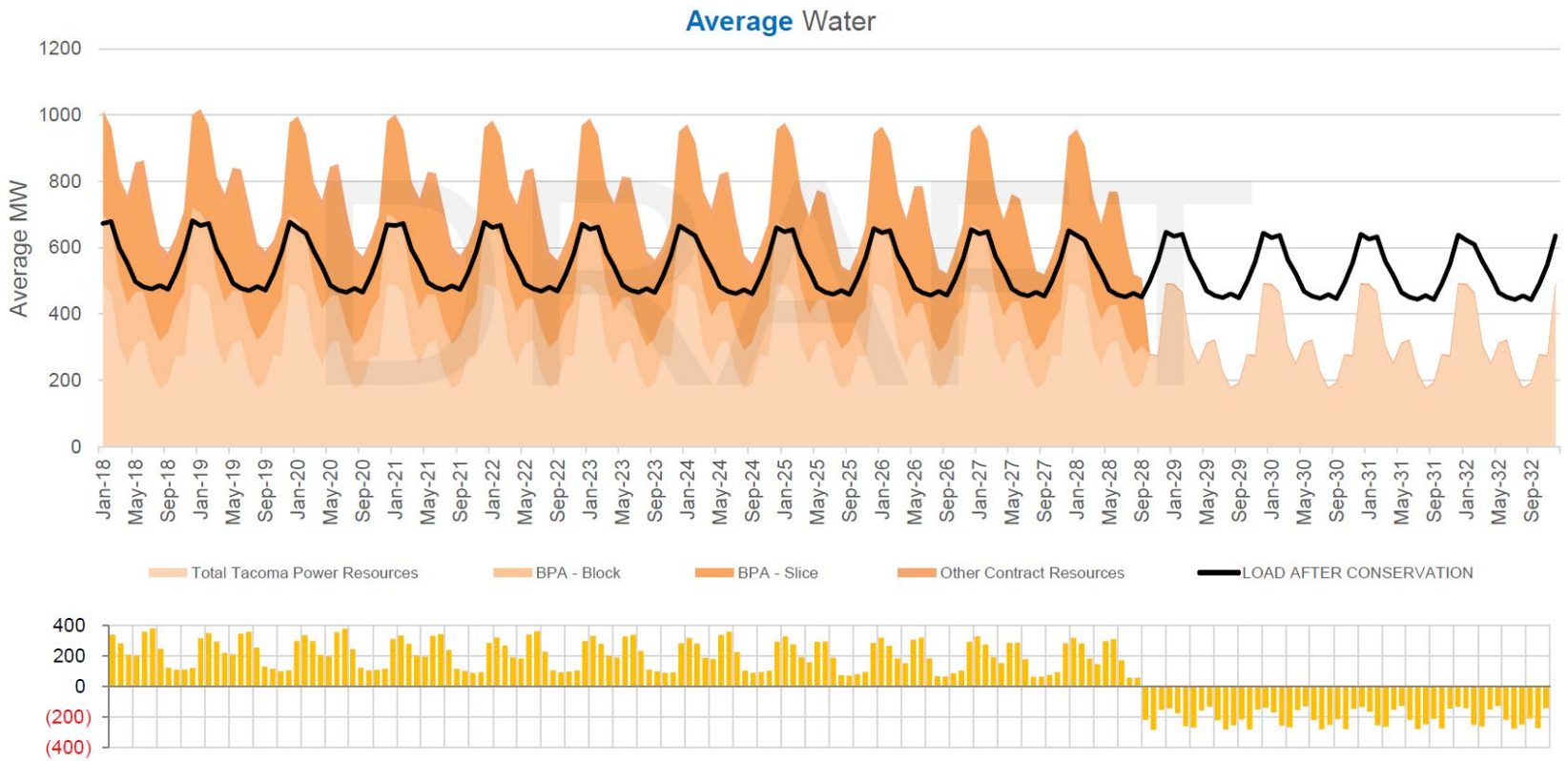
- Long-term Resource Planning
  - Multi-year outlook
  - Shape the resource portfolio (generation and long-term contracts) to meet multiple competing objectives
- Long-term Hedging Program
  - Typically 3-5 years.
  - Layoff or adjust risk profile as appropriate
  - Manage at the quarterly/monthly on and off-peak granularity.
  - Incorporate additional details
- Day Ahead
  - Refine the next-day hourly plan with actual load projections, expected generation, contract deliveries.
  - Trading in NW is generally at the on and off-peak granularity although with some super-peak as well.
  - Scheduling/tagging activities to ensure paths and delivery are known.
- Real Time
  - Hour ahead refinement of day-ahead schedule and planning.
- Within Hour (EIM)
  - Multiple BAs are rebalanced within-hour through bid settlement process for redispatch of generating resources.

# Example: Hydro Planning

## Critical Water vs. Average Water

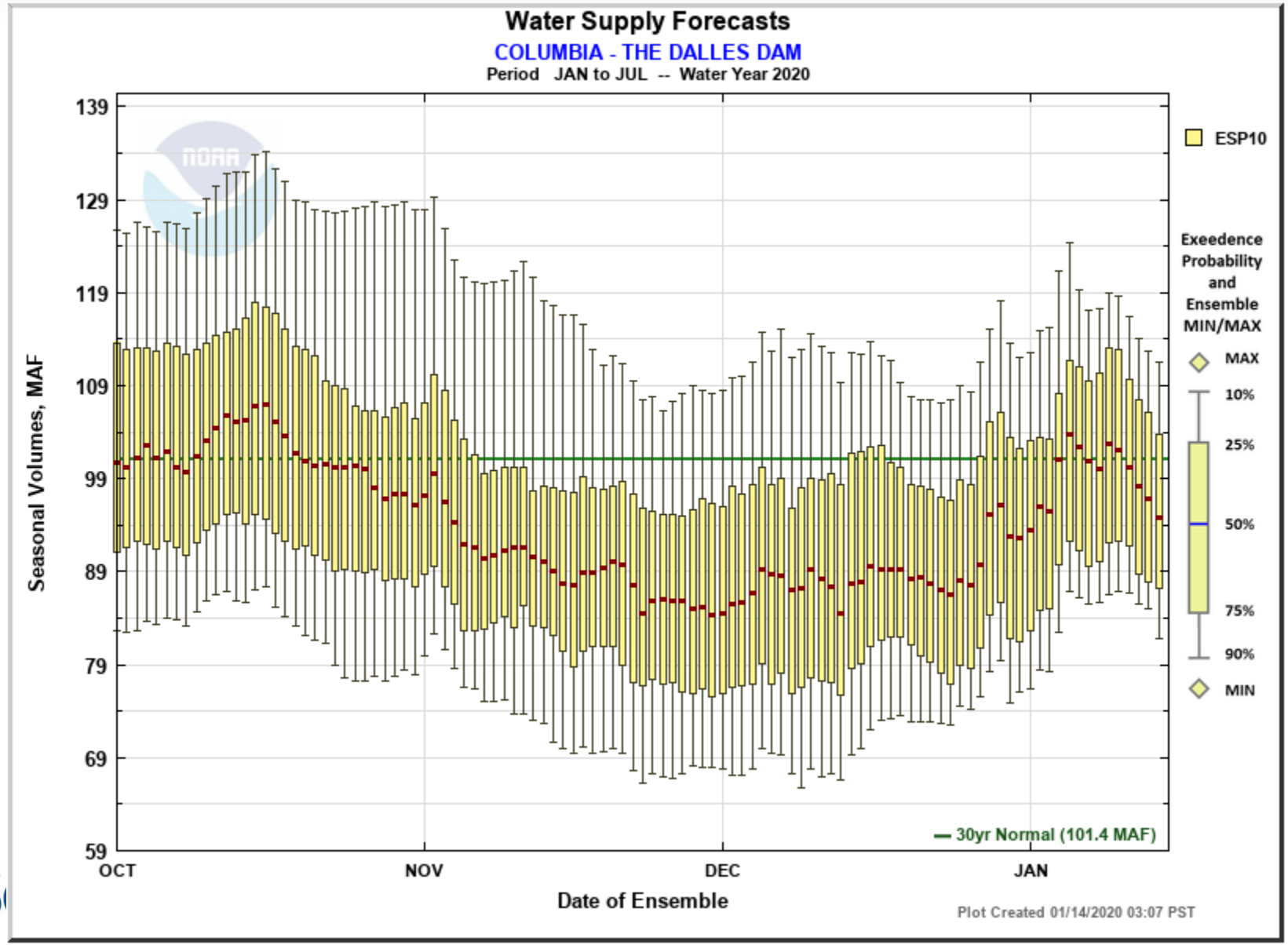
Tacoma Power Overview

### Energy: Long-Term Load-Resource Balance



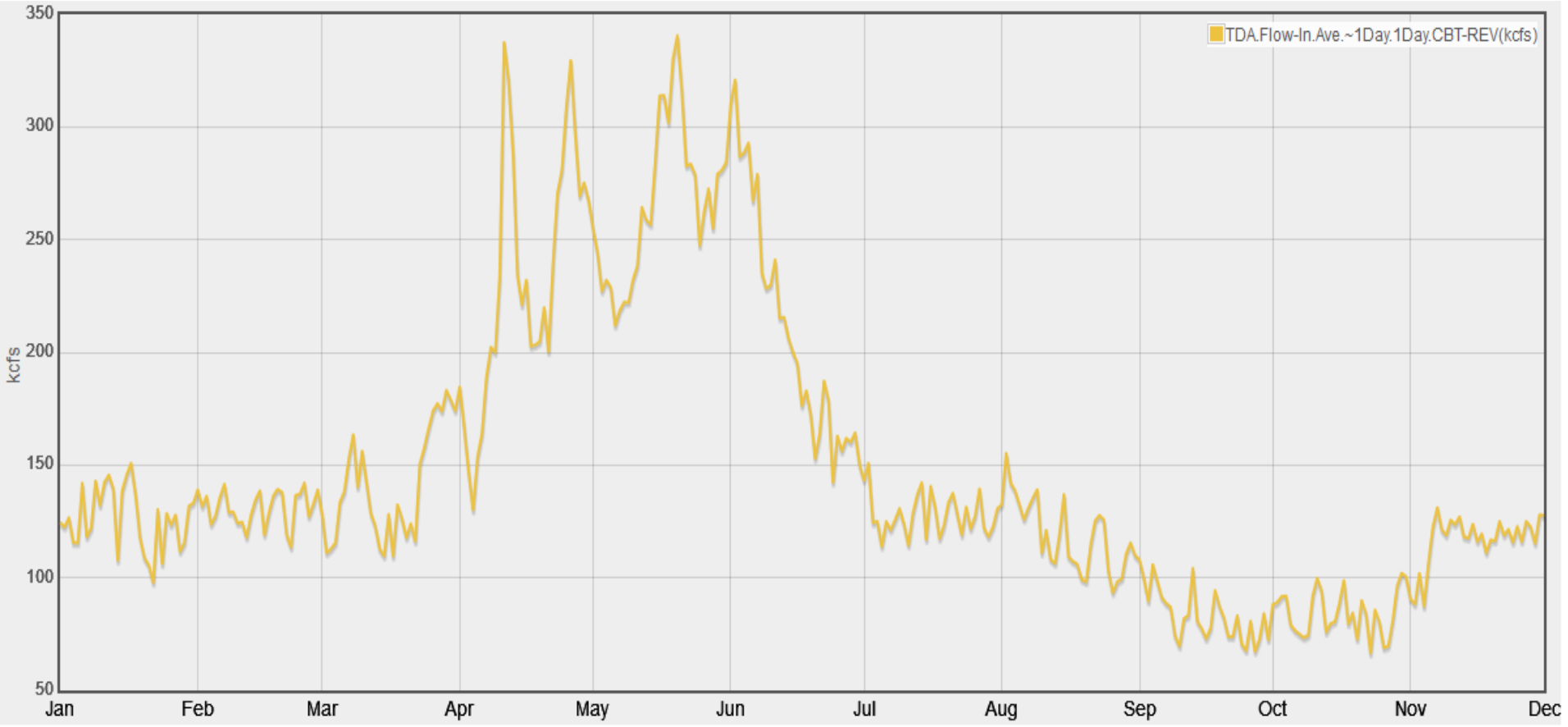
# Example: Hydro Planning

## Snowpack and Volume Forecast

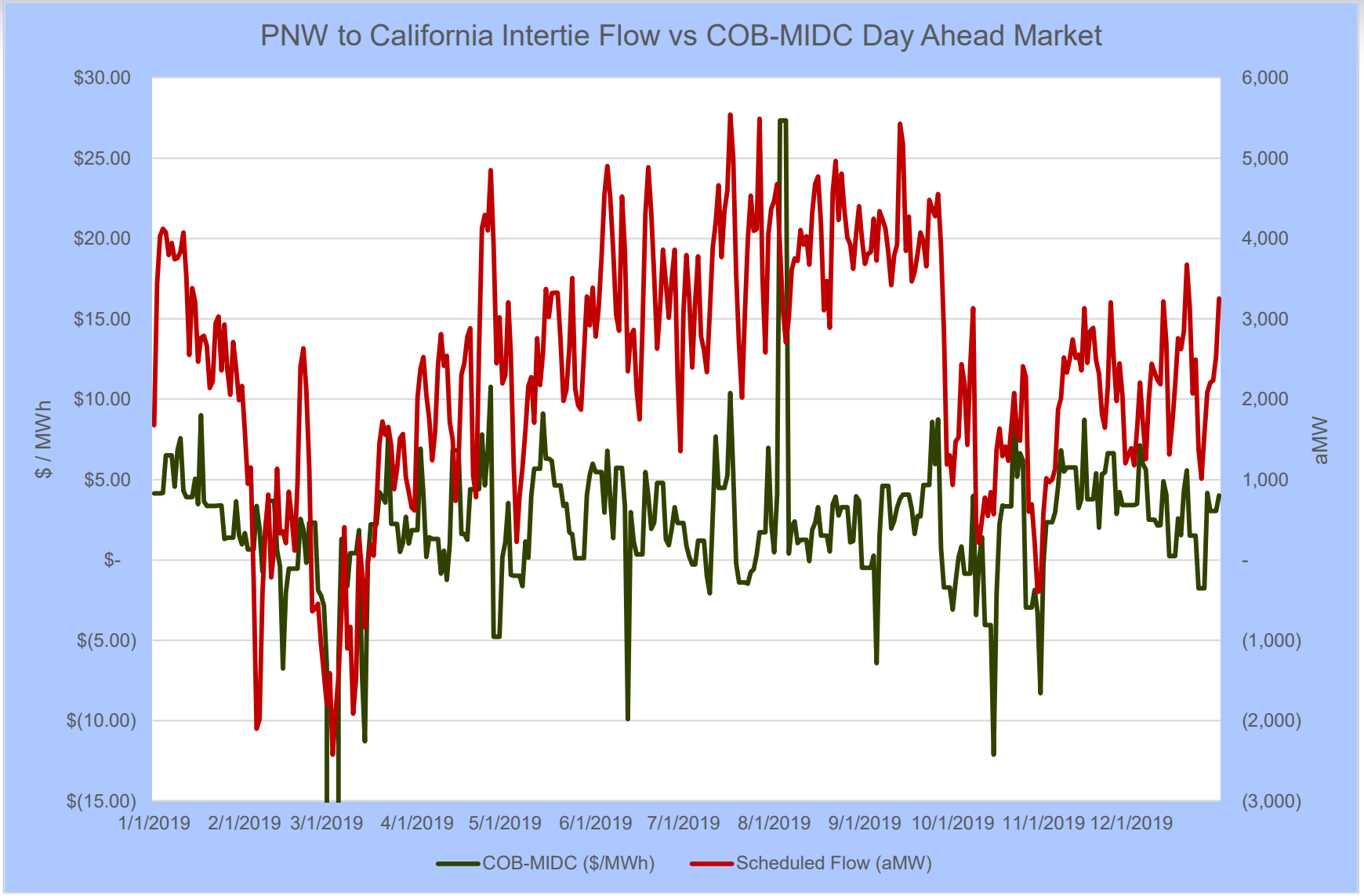


# Example: Hydro Planning

## Flow at The Dalles for 2019



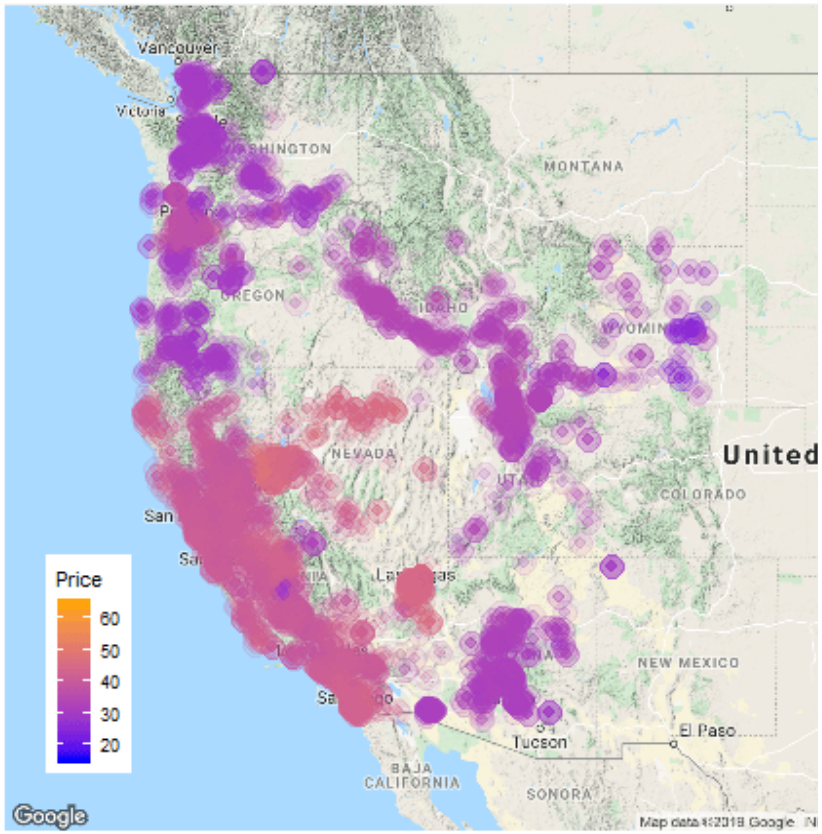
# California Intertie



# HA Electricity Markets in the West - 2019

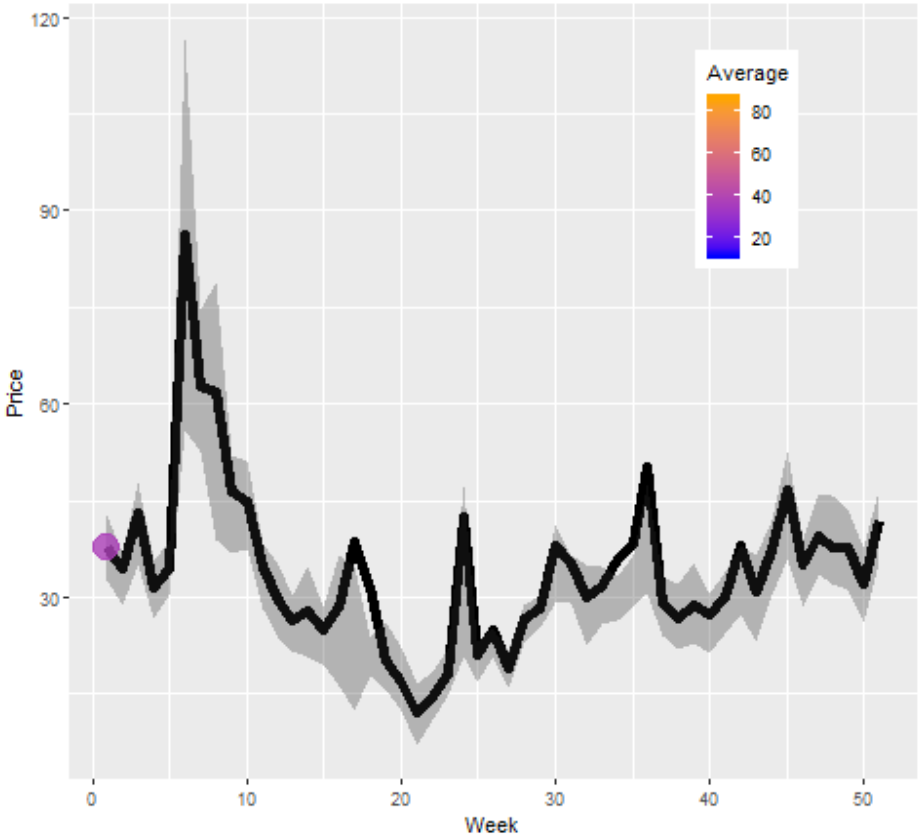
Weekly 2019 Hour Ahead Market Average Hourly Prices

Week: 1



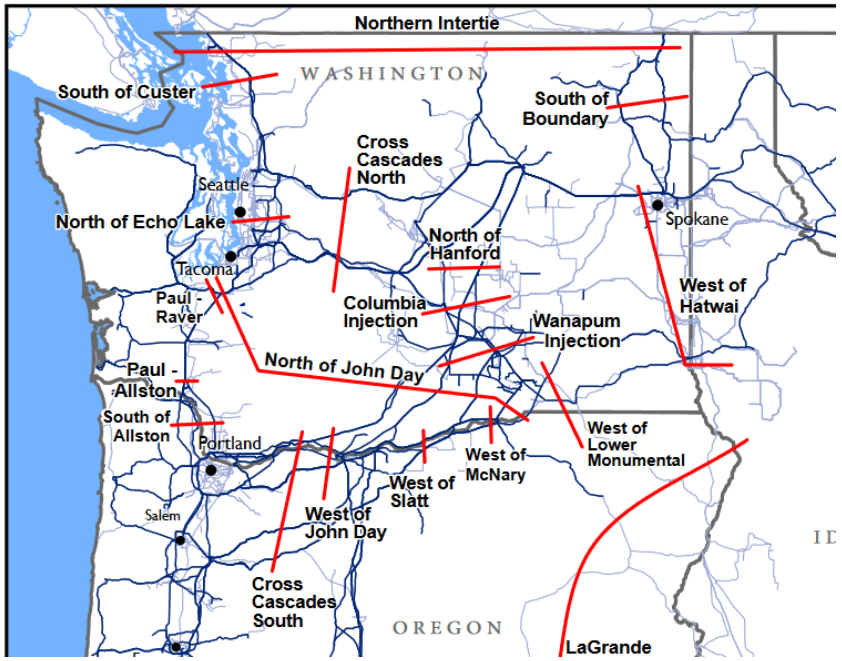

Weekly 2019 Hour Ahead Market Average WECC EIM Daily Price

Week: 1



# Topics for Another Day

- California Issues
  - Treatment of RECs (Buckets 1-3)
  - Carbon program – auctions, source enforcement, FJD
- Utilities and Balancing Authority Areas with multi-state load service areas
- Role of IPPs
- Role of Consumers
- Transmission Implications
- Organized Markets
  - EDAM

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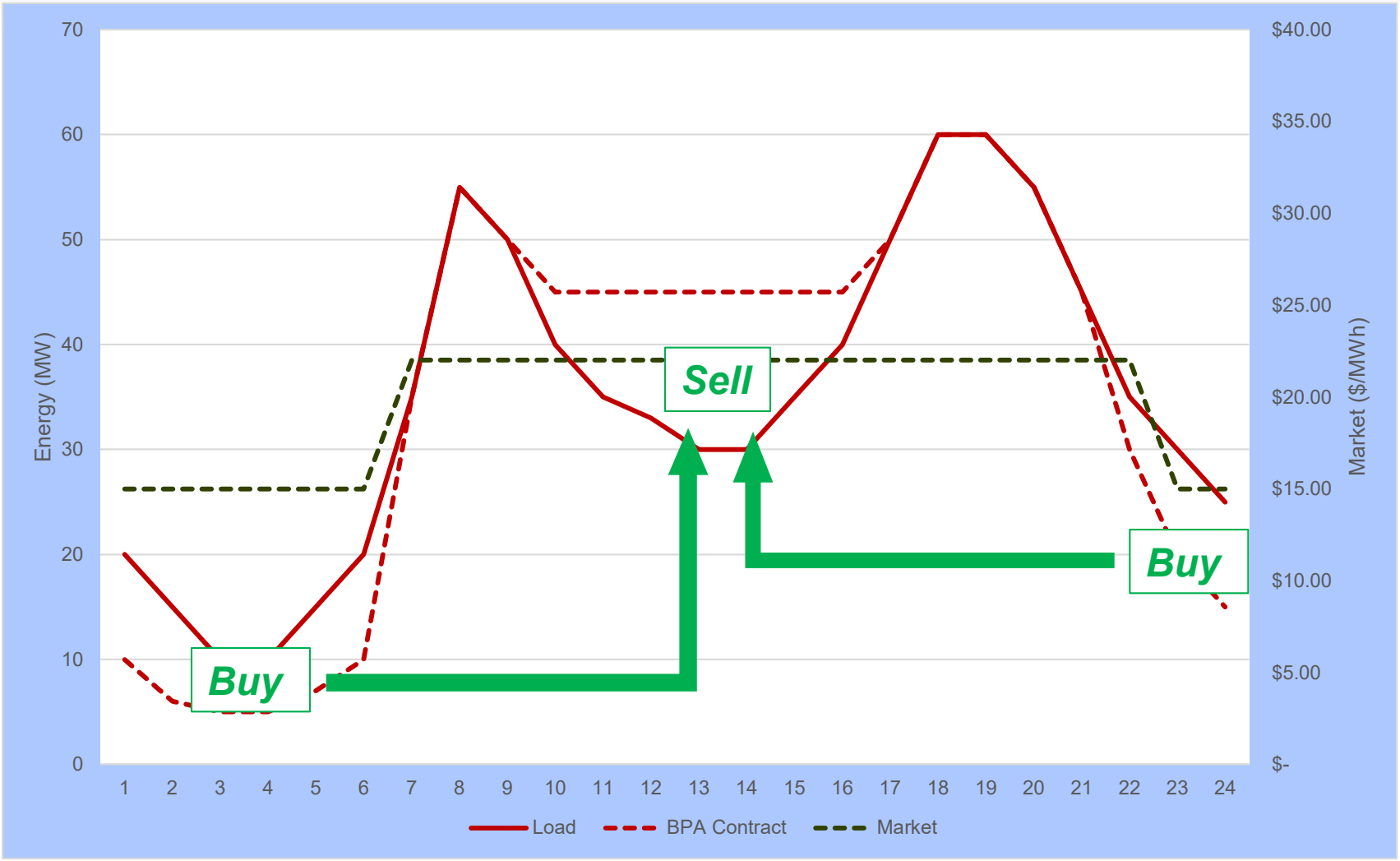
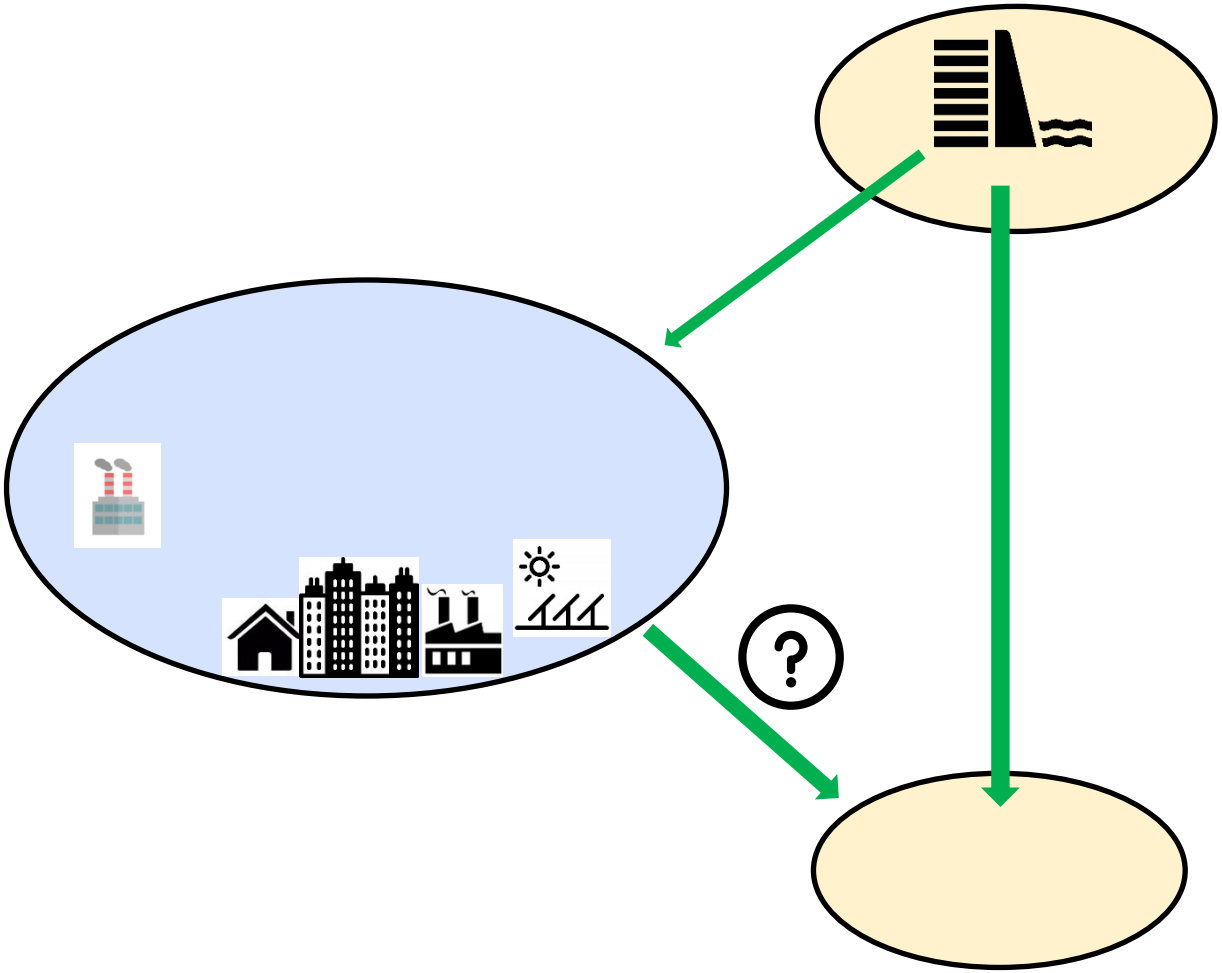
# Slice and Load Factoring

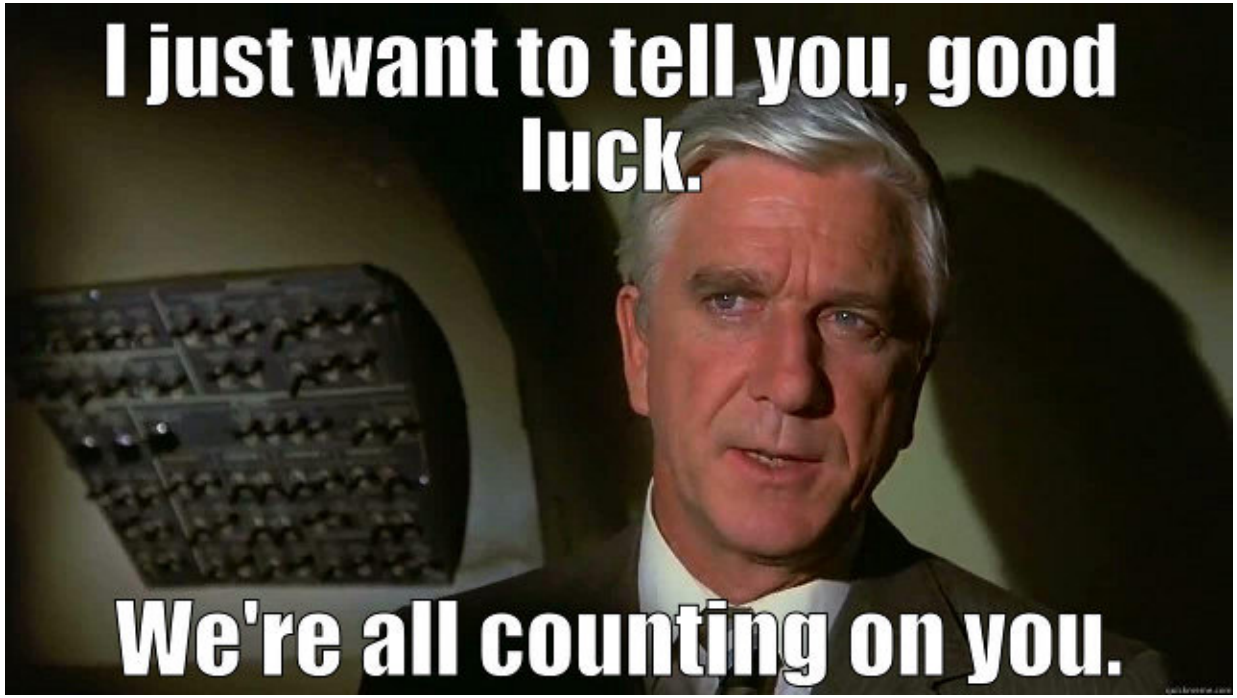


# Transmission De-optimization



# Closing

- June 2022
  - Retail electric load met with market purchases, and
  - Prohibits double counting with other programs.

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