Nevada's Wholesale Energy Market

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NVEnergy

Wholesale vs. Retail Market

- Wholesale energy markets are regulated at the national level by the Federal Energy Regulatory Commission; energy is considered wholesale when it is possible it might be sold again before reaching the end customer.
- Wholesale energy markets allow for energy to be purchased and sold by a variety of market participants, including utilities, retail energy providers, municipal utilities, public utility districts, rural cooperatives, and energy marketers.
- Wholesale market participants often purchase and sell energy from supply resources (e.g., generation plants owned by independent power producers or utilities), allowing them to leverage economies of scale and pass reduced costs on to retail end-use customers.
- Retail energy markets are regulated by the state in which the retail sale occurs, and consist of retail providers selling energy to industrial, commercial and residential end users.
- The Energy Choice Initiative appears to contemplate a liquid and reliable wholesale market which ultimately feeds into a competitive retail market.

What wholesale market structure facilitates the objectives of the Energy Choice Initiative?

Objectives of the Energy Choice Initiative Constitutional Amendment:

- "economic and regulatory burdens be minimized . . . to promote . . . in choices in the electric energy market"
- "open, competitive, retail electric energy market"
- "safe, reliable, and competitively priced electricity"
- "reduce[d] cost to customers"
- "prohibit . . . monopolies and exclusive franchises . . . for the generation of electricity"

Existing wholesale market conditions in Nevada to consider:

- Nevada is not currently part of a power pool or centralized market for wholesale energy sales (excepting imbalance energy, covered later in presentation)
- Nevada total load is considerably smaller than the total loads of existing centralized markets
- Only one major transmission owner-operator in Nevada
- Nevada transmission system is currently sized to serve customers in Nevada
- Supply, transmission, and distribution is currently designed to serve Nevada's customers and unique load profile

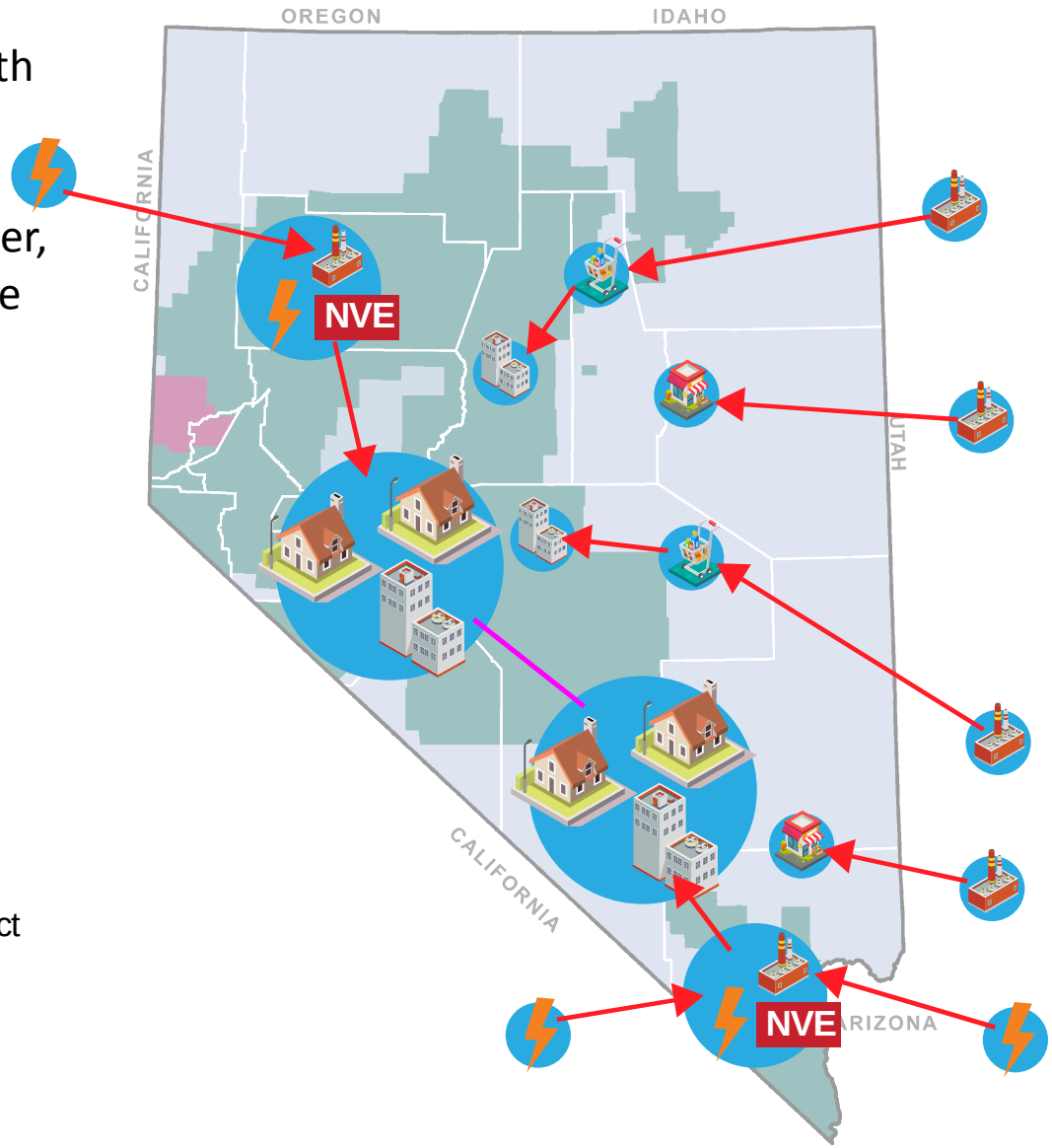
Energy Supply to Customers: Today

NV Energy currently serves the majority of Nevada's retail load with its own energy portfolio.

Rural cooperatives, municipal power, public utilities, and retail access are served by other providers.

Legend

- Power Purchases
- Generation Plant(s)
- NV Energy Supply Assets
- NV Energy Retail Load
  (1.25 million electric customers)
- CoOp/Municipal/Public Utility District
- Retail Access Customer
- Retail Provider

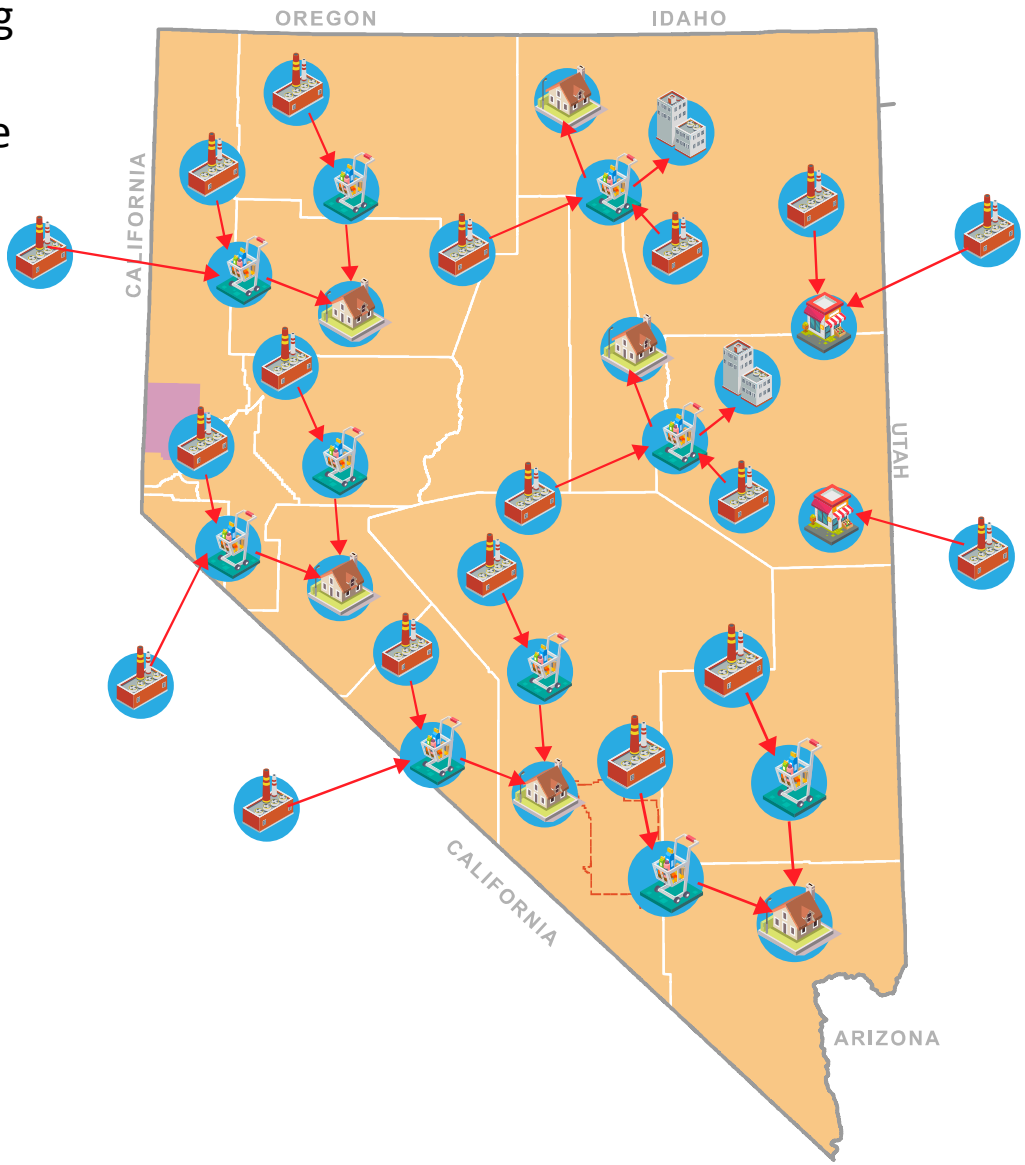


Energy Supply to Customers: Tomorrow

More retail providers will be serving smaller fractions of the total retail load in Nevada. They could procure from multiple sources, including both generation capacity they own and supply procured through the wholesale market.

Legend

- Generation Plant(s)
- Residential Customer
- CoOp/Municipal/Public Utility District
- Commercial/Industrial Customer
- Retail Provider

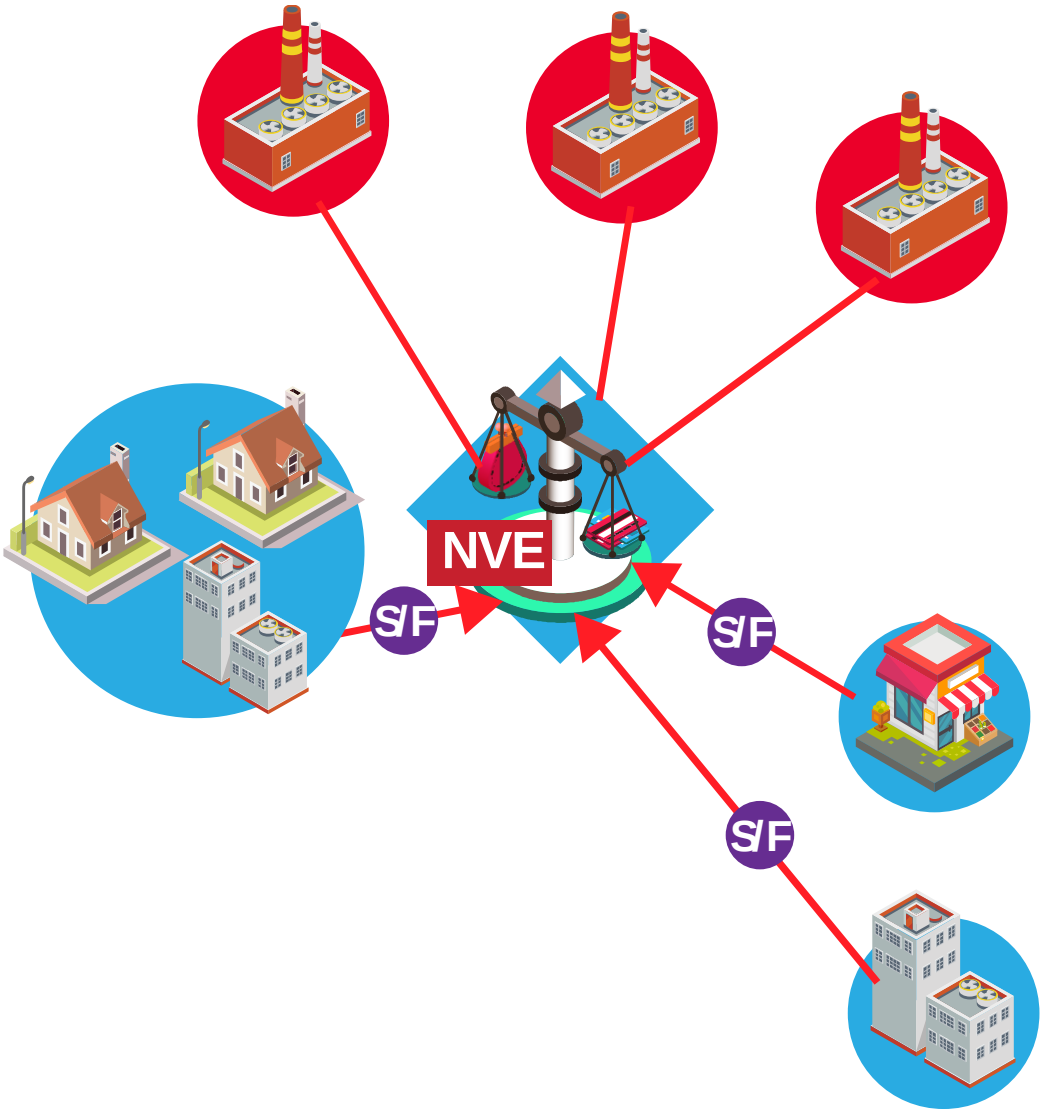


Transmission and Balancing Services: Today

NV Energy provides transmission service and balances all supply and demand in Nevada except Valley Electric Association.

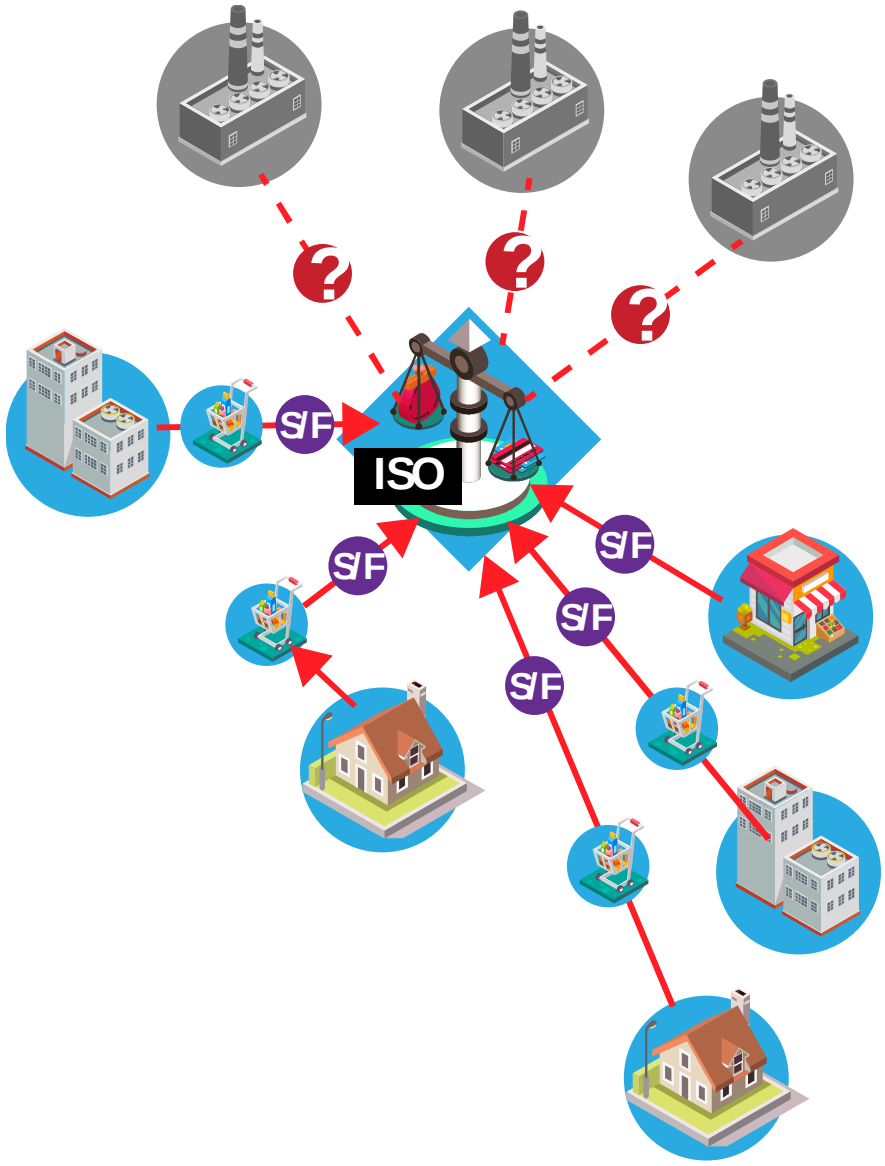
Legend

- S/F — Supply Schedule and Load Forecast
- NVE — Transmission Service Provider and Balancing Authority
- Retail Access Customer
- NV Energy Retail Load (1.25 million electric customers)
- NV Energy Owned Generation Plant
- CoOp/Municipal/Public Utility District



Transmission and Balancing Services: Tomorrow

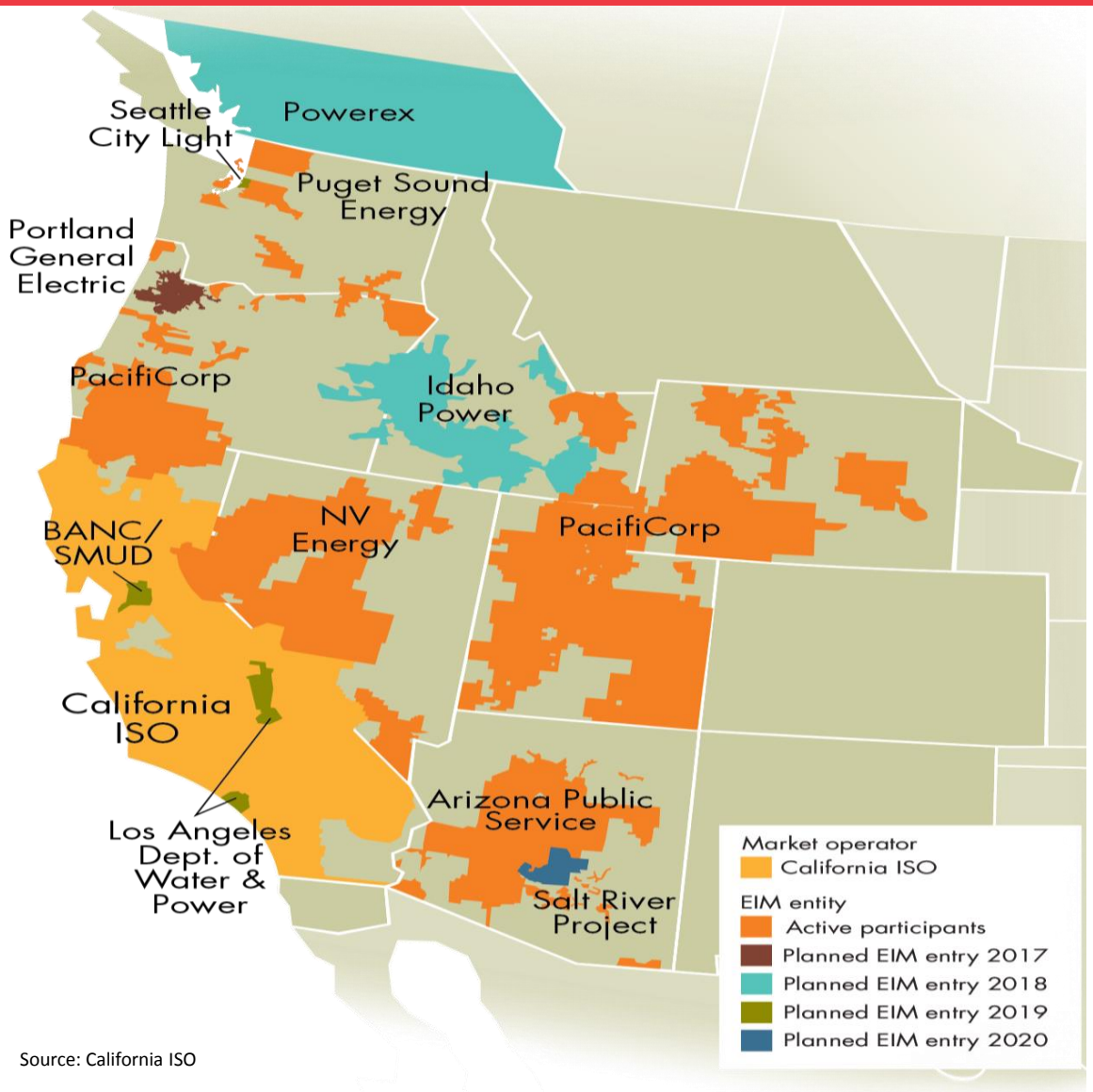
System Operator will provide transmission service and balance all supply and load on the system.



Legend

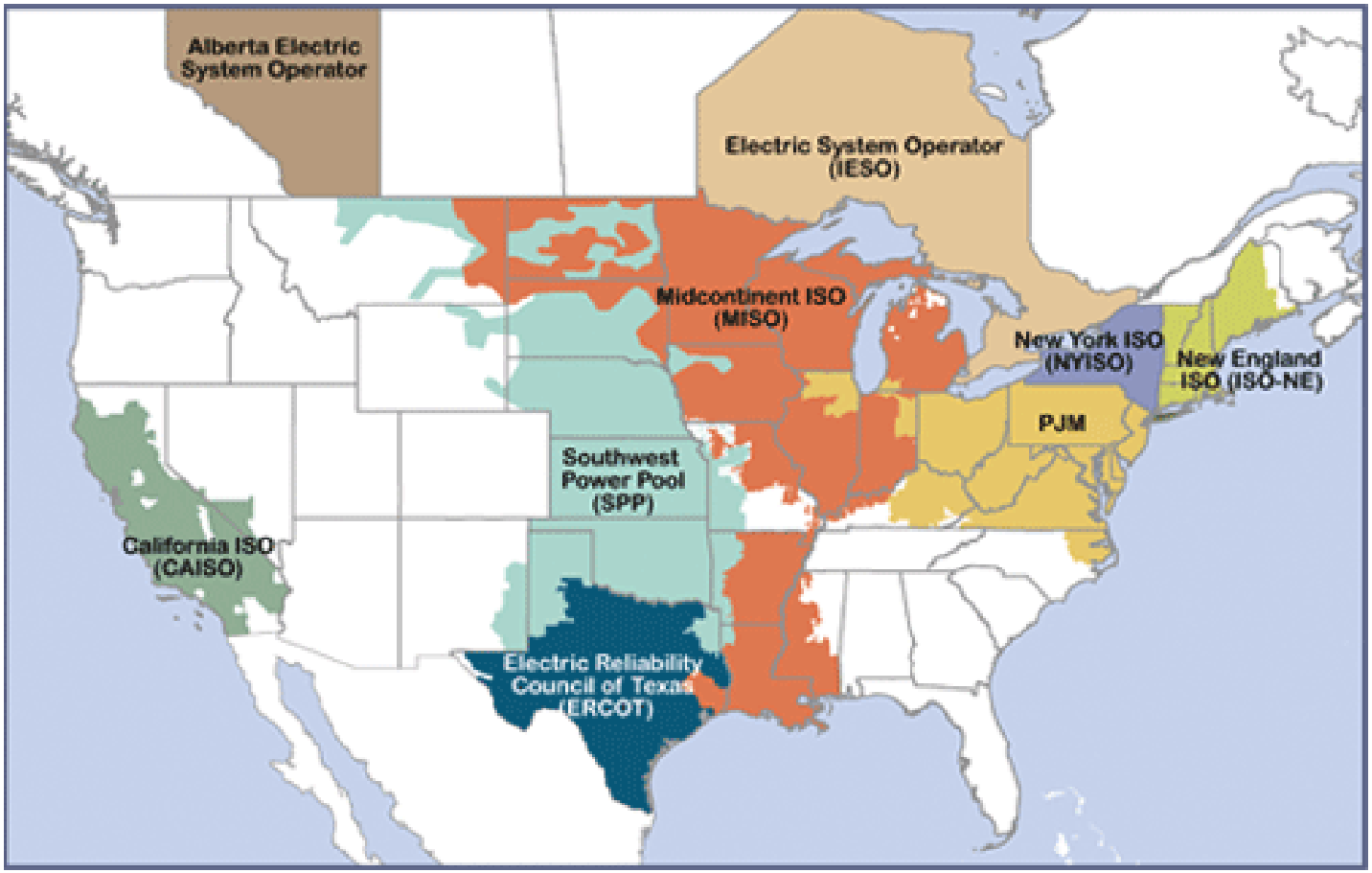
- S/F — Supply Schedule and Load Forecast
- Independent System Operator Providing Transmission Service and Balancing
- Residential Customer
- Commercial/Industrial Customer
- Generation Plant(s)
- CoOp/Municipal/Public Utility District
- Retail Provider

Market Operations and Energy Imbalance Market



Source: California ISO

Expanding Market Operations in the Future



Source: www.ferc.gov

Market Monitoring

- In today's market in Nevada, wholesale energy sales – including NV Energy's sales of its excess supply – are subject to FERC's oversight for market power; FERC authorizes sales at market- or cost-based rates based on whether owner has concentrated ownership in the market. In this way, FERC ensures that energy prices are just and reasonable.
- In a centralized market, FERC approves the rules of participation and the algorithms used to produce the clearing prices. In this way FERC ensures that energy prices as a matter of market settlements are just and reasonable.
- FERC requires the centralized markets it oversees to have an independent market monitor. The market monitor watches prices and supply to determine if market operations is producing the expected outcomes.
- Market monitors investigate surprising outcomes for three possibilities: (1) the design of the rule is flawed and is not functioning as desired or expected; (2) the market operator's systems are flawed in some way and not implementing the design as intended; (3) the market participants are not following the market rules in the manner intended.
- Intentional behavior meant to distort or circumvent the outcome intended by the market rules is referred to FERC enforcement for further investigation and possible prosecution.
- Market monitoring resources must be sized in proportion to the size and complexity of the market in question.

What wholesale market structure facilitates the objectives of the Energy Choice Initiative?

- Existing wholesale market in Nevada:
  - entities submit power supply schedules and load forecasts to NV Energy's open access scheduling system;
  - NV Energy accepts and executes schedules subject to reliable grid operations;
  - Power flows through transmission system, into distribution system, and to end use customers;
  - Retail providers settle with wholesale providers and bill their retail customers.
- Join an existing Regional Transmission Organization (RTO):
  - Requires adequate connectivity between systems;
  - Requires appropriate governance structure deemed equitable by all participating state authorities;
  - Requires negotiation of existing transmission rate and allocation of administration/operator fees (stakeholder process can be lengthy)
- Create a new RTO
  - Lengthy process to coordinate interest, operational and economic evaluations, state policies, state regulatory processes
  - Lengthy process to develop market rules and consider service provider options
  - Regulatory process could be iterative
  - Project to integrate and launch highly technical

Steps to Establish Full Market Operations

- Determine if initial market will be for Nevada only or include other potential participating transmission owners
- Determine/negotiate unified transmission system cost allocations
- Exploration/study phase
  - Transmission studies
  - Cost benefit studies of energy optimization
  - Operational and administrative costs
  - Contracted services costs
  - Balancing authority functions
    - IT infrastructure
    - Transmission planning/system studies
    - Resource adequacy
    - Regulatory and reliability standards compliance
    - Ancillary services procurement
- Stakeholder processes to establish market rules
- Regulatory processes to approve market and rules
- Systems integration, vendor procurement, stakeholder education
- Testing
- Launch

Making the Wholesale Market Rules

- Time: Establishing a new structure will require time and process to determine the best solutions for each of the needed market functions.
- Partners: Nevada may want to join with other western states, which will require efforts to identify neighbors that may be interested in participating and entities that are willing to provides the services.
- Entry: Nevada can dive into a new structure with full market operations, or choose to "roll-out" its entry by starting with basics and adding new market functions incrementally.
- Process: The decisions on what the ultimate design should be and how to get there is a matter of formal stakeholder engagement, producing a record that supports requesting authorization from FERC for the design when it is time to do so.
- Costs: Integration with and/or development of new systems for the new functions plus ongoing costs of system and market operations.
- Who: Stakeholders include the following as well as other interested parties and policy makers.
  - Generators;
  - Energy marketers;
  - Retail providers;
  - Transmission owner(s);
  - System operator (transmission service provider and balancing authority);
  - Load (end use customers);
  - States and state regulatory authorities; and
  - Market operator

Creation of a Full Market Operations

- Establish a body to run stakeholder processes
- Develop technical papers to support stakeholder processes to develop market behavior rules, market operator rules, system operator rules, algorithms, and settlement formulas
- Market rule ("tariff") development should address the following:
  - All energy products (day ahead, real time, fifteen minute bidding for variable resources, ramping, reliability must run)
  - All ancillary service products (voltage support, regulation, frequency response, contingency reserves)
  - All capacity products (planning reserves and capacity margins annually, monthly, hourly)
  - Congestion revenue rights
  - Virtual or financial trading on system (no delivery or acceptance of power)
  - Transmission ownership rights
  - Access to transmission system
  - Transmission charges and billing
  - System operations in normal and emergency conditions (scheduling, forecasting, emergency dispatch, generation and load curtailments)
  - Outages and outage management
  - Metering
  - Creditworthiness
  - Dispute resolution
  - Market monitoring
  - Market power mitigation
  - Settlements and billing processes
  - Collecting revenue requirement for cost of administration and operations

Appendix

More on Steps and Considerations to Building Full Market Operations
(non-exhaustive list of items and considerations)

Preliminary Explorations

- Potential Participating Transmission Owners
  - Partners with common objections for market
  - Coordination with various governing authorities
  - Ease of grid integration (connectivity, congestion, etc.)
  - Governance structure
- How to Spread and Share Transmission Costs
  - Relative costs of various transmission systems
  - Sharing or separating those costs among total load
  - Cost allocation of new lines in unified system
- Cost-Benefit Studies
  - Savings and revenue from optimized energy dispatch
  - Costs to implement, operate, and participate

Preliminary Explorations

- Regional Transmission Organization Services
  - Cost evaluation of joining existing Regional Transmission Organization (if feasible)
  - Cost evaluation of contracting for tariff administration, system operator services and market operator services
- Other Balancing Authority Considerations
  - Vendors for IT infrastructure (energy management, metering, scheduling, settlements, other software)
  - Procurement of Ancillary Services
  - Reliability coordinator
  - Transmission planning
  - Resource adequacy
  - Compliance – regulatory and reliability
  - Stakeholder processes

Creation of Full Market Operations

- Submission of market rules (tariff) to FERC for approval;
- Regulatory processes before state and local authorities;
- Implementation of Integration Plan
  - Memoranda of Understanding among participating members regarding implementation and commitment to launch
  - Appoint persons for governance positions
  - Selection and adaptation of software suite and vendors to be used for system and market operations
  - Build full network model
  - Build generation specifications data base for optimization model and dispatch
  - Develop system needs on market participant and transmission owner side
    - Network model
    - Bidding software for generation, demand response, ancillary services providers, virtual bidders, congestion revenue rights holders
    - Settlements software and shadow settlements software
    - Forecasting software – load and variable energy resources
    - Energy scheduling software
    - Outage management software
  - Engage stakeholders in education and training
  - Negotiate pre-existing contract and rights issues
  - Testing