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Electricity Regulation and Markets: Federal and State Roles

NCEL session on Market Options in the West

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Electricity Service Includes Wholesale and Retail Services

1. Generating Station
   Electricity is typically generated by a steam- or hydro-driven turbine at the power plant.

2. Step-Up Transformer
   The power is then ramped up to high voltage for long-distance transmission.

3. Transmission
   Next, a series of high voltage lines transmit the electricity through the power grid.

4. Step-Down Transformer
   Power is then reduced to a lower voltage for use in homes and businesses.

5. Subtransmission Customer
   The electricity then passes through a series of switches to distribution lines.

6. Customers
   Power is then delivered to customers via local lines.

WHOLESALE

RETAIL
Utility Roles and Responsibilities

- Provide service to anyone who requests it
- Adhere to strict safety standards
- Adhere to reliability standards
- Provide adequate service
- Be responsive to customer needs
Investor-Owned Utility Structures Vary

- Distribution Only Utilities
  - Provides distribution service, often in an RTO

- Vertically Integrated Utilities
  - Provide distribution service, may be a control area operator, may own generation, may or may not be in an RTO

- Alternative Suppliers
  - Includes retail suppliers and exempt wholesale generators
The Federal Energy Regulatory Commission (FERC)

- Regulates Wholesale Rates and Services
  - Electric transmission in interstate commerce
  - Electric wholesale & interstate power sales
  - Gas pipeline transportation/LNG/storage

- Oversees Reliability
  - Certified the North American Electric Reliability Corporation—NERC
  - approve proposed standards and review NERC-imposed penalties
Electric Transmission

- **Eastern Interconnection**, covering the region east of the Rockies, excluding most of Texas, but including adjacent Canadian provinces except Québec;

- **Western Interconnection**, from the Rockies to the Pacific Coast, again including adjacent Canadian provinces; and

- Electric Reliability Council of Texas (**ERCOT**), covering most of Texas
Control Areas and Balancing Authorities

- Some grid areas are managed by individual utilities, mostly large investor-owned ones, and some by the federal power marketing agencies.
- These are called control areas or balancing authorities.
- In the Western interconnection, there is no region-wide RTO or ISO, so the individual control-area operators must coordinate with each other to ensure region-wide reliability of service.
Reliability

- Real-time balancing of customer demand and system supply to ensure reliable service requires sophisticated control of power plants and transmission.

- The US is divided into eight reliability planning areas, under NERC oversight.

- NERC has adopted specific reliability standards for transmission reliability that are legal requirements under FERC authority.
Within the NERC regions, several types of entities coordinate supply with demand:

- Regional transmission organizations (RTOs),
- Independent system operators (ISOs), and
- Individual utility control areas.

RTOs and ISO both.

- Plan, operate, dispatch, and provide open-access transmission service under a single (FERC-approved) tariff; and
- Purchase balancing services for the transmission system, and they manage various markets for energy and other grid services.
What FERC Does NOT Regulate

- Local electric distribution (including related rates, terms, and conditions of service)
- Retail sales of energy (including related rates, terms, and conditions)
- What generation and transmission gets built (including choice/siting/construction) - but hydroelectric generation is an exception and IS under FERC authority
What do state PUCs regulate?

- Regulate all investor-owned utilities or “IOUs” in their state
- In general, do not regulate municipal utilities, coops, or public power districts
- One or more state agencies are responsible for issuing permits necessary to build and operate generation and transmission, pre-empting local authorities
Caution: PUC and PSCs are Unique
Two Core PUC Areas of Regulation

- Rates and Service Terms
  - Utility Revenue Requirement (incl. return on equity)
  - Cost Allocation, rates and terms of service for each customer class
- Authority over the utility’s choice of power sources to serve its consumers
  - **Portfolio Standards**: Renewables, energy efficiency, other resources.
  - **Integrated Resource Planning** (IRP) -- a long-term plan prepared by a utility to guide future energy efficiency, generation, transmission & distribution investments.
  - **Construction Authorization**. Many state commissions have the authority to proposed power plants.
  - **General Authority**. Regulators are broadly empowered to “regulate in the public interest.” “Public interest” always includes cost and reliability considerations and, depending on state statutes, may include consideration of environmental regulation, economic justice, or economic development considerations.
PUCs Regulate Distribution Planning

Source: Adapted from U.S. Department of Energy (2015). *United States Electricity Industry Primer*
And...

- Mergers/Acquisitions
- Affiliated Interests
- Competitive Activities
- Environmental Effects of Utility Activity
- Accounting Policies
- Securities Issuance

- Service Standards
- Resource Planning
- Energy Efficiency*
- Low-Income Programs
- Any Issue Assigned by Legislature
- Any Issue Brought by Complaint
Who Does What – More Acronyms for Another Day

Source: National Renewable Energy Laboratory
The West is Special …
Jeff Ackermann
CNEE and RAP
What’s unique about the western grid?
Put Another Way…. A lot of Space to Cover
An Interconnection with WECC Reliability Oversight
Focusing on the West…
And Excluding the (CA ISO) Organized Market Portion
What else makes the West unique?

Various “homegrown” energy resources
And Various State Energy Policies

Zero carbon, 100% clean/renewable energy goals
And what else shapes the Western market discussion?
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at [raponline.org](http://raponline.org)
RAP Extra Slides: Regulatory Roles and Definitions
Who decides?

- FERC: Regulates transmission and wholesale sale of electricity and natural gas in interstate commerce and established NERC as the Electric Reliability Organization.
- PUCs: Jurisdictional authority over Distribution Systems and input to the Regional Advisory Body authorized by EPAct 2005.
- NERC: The Electric Reliability Organization authorized by FERC under section 215 of EPAct 2005 to establish technical reliability standards for Bulk Electric System operations (includes 7 regional reliability organizations).
Useful Definitions

• Bulk Power System:
  • Facilities and control systems necessary for operating an interconnected transmission network
  • Electricity from generation facilities needed to maintain reliability

• Bulk Electric System:
  • All transmission elements operated at 100 kV or higher as well as real and reactive power resources connected at 100 kV or higher
  • Does not include facilities used in local distribution
  • Many specific inclusions/exclusions (see NERC)
Who provides technical foundations? (used by NERC, FERC and PUCs)

- IEEE: Professional organization of electronic and electrical engineers that establishes standards
- ANSI: American National Standards Institute is a non-profit consensus-based organization that establishes standards, including electrical standards and codes
- NESC: National Electrical Safety Code establishes safety standards to protect electrical workers and users of electric systems (published by IEEE every 5 years)
- IEC: International Electrotechnical Commission establishes international standards
Some Useful Definitions

• Transmission: Bulk Power System power lines that carry current at 120 kV or higher (exact voltage delineation may vary)
• Sub-transmission: Carry power stepped down from Transmission lines, “typically” 34.5 to 69 kV
• Distribution: Distribution System power lines “typically” 69 kV or lower
• DER: Distributed Energy Resource (1547) includes resources that inject energy into the grid (synchronous and asynchronous DG, Storage), does not include resources that withhold use of energy
• IBR: Inverter-Based Resources (wind, solar and storage) are asynchronously connected to the Bulk Power System with power electronics