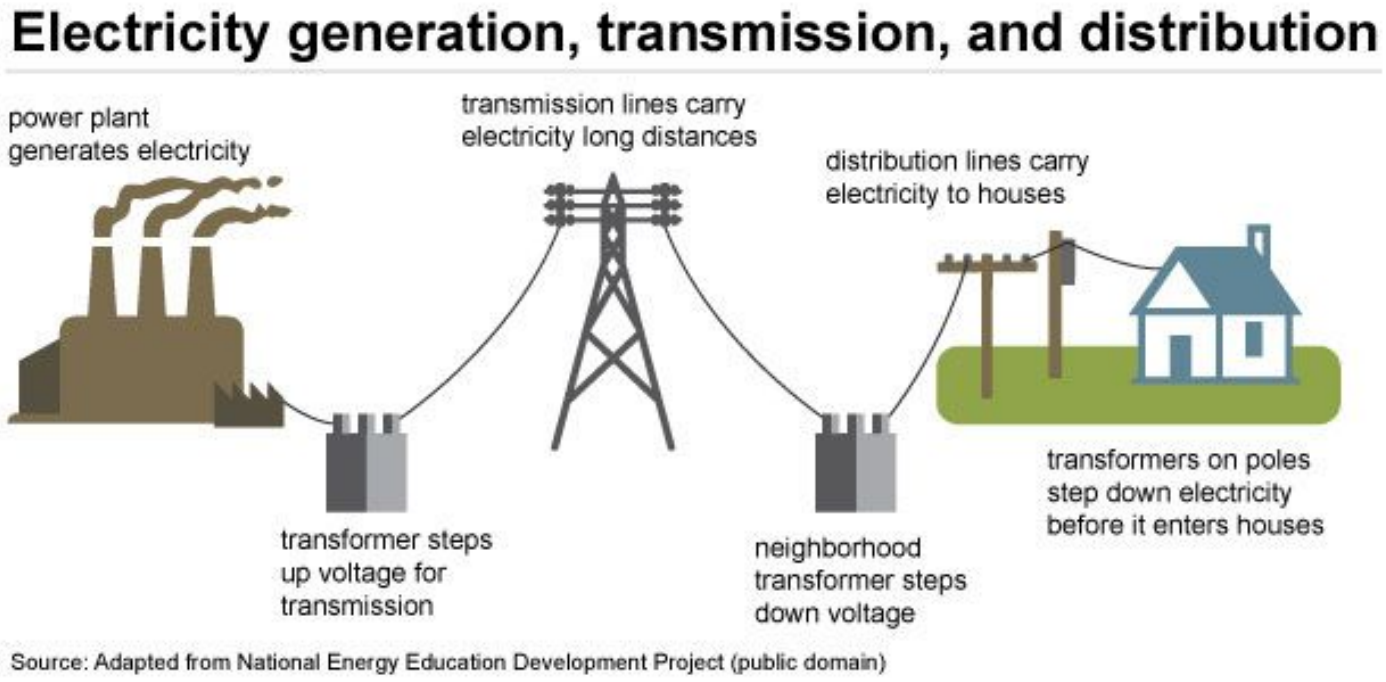
Utility History, Development, Regulation

Tuesday, April 2nd

Agenda

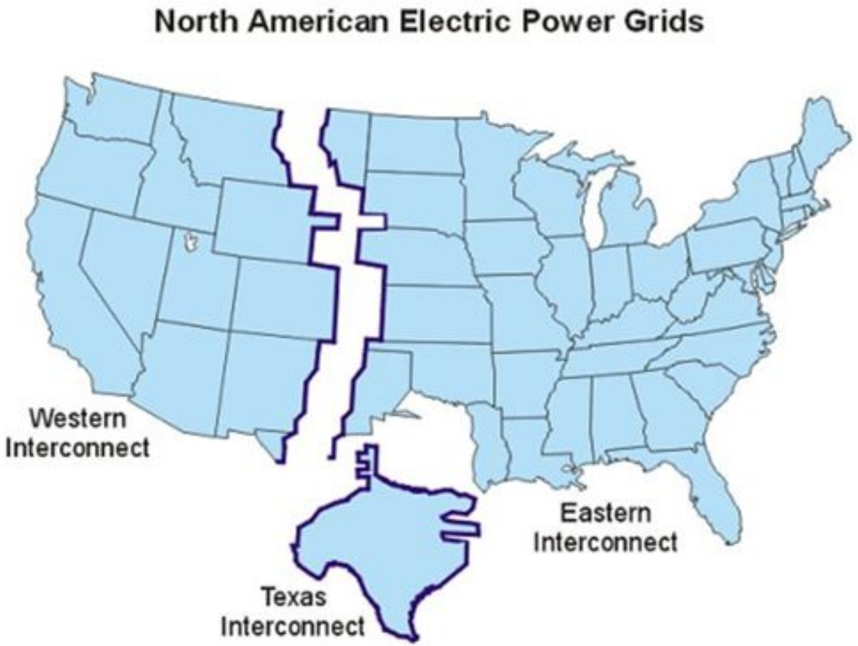
- Grid Infrastructure
- Utility History
- Types of Utilities
- The Regulatory Compact
- Wholesale and Retail Markets
- FERC Jurisdiction

The Grid Today



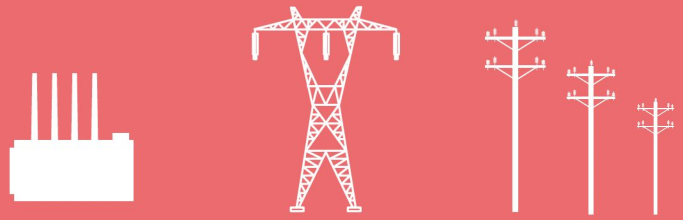
An Interconnected Grid

- The Lower 48 states is made up of three main interconnections, which operate largely independently from each other with limited transfers of electricity between them.
- Network structure of the interconnections helps maintain the reliability of the grid by providing multiple routes for power to flow and allowing generators to supply electricity to many load centers.
- Redundancy helps prevent transmission line or power plant failures from causing interruptions in service to retail customers.



Utility History

- Initially created to invest in a public service in major cities in the 1880s
- **Natural monopolies** occur when, for practical reasons, a service or good is only provided by one entity in a region.
- They exist due to high fixed costs (expenses that do not change depending on the amount of goods or services produced), which make it inefficient for more than one entity to provide a given product or service.
- Transmission and distribution services are natural monopolies because building more than one set of power lines in a given area is not practical.



Generation:
the power plants (largely coal and hydroelectric power at the time)

Transmission:
big, high-voltage lines that take the energy created in the generation stage across long distances to substations located in communities

Distribution:
smaller lines that take the energy from local substations to houses, factories, or buildings

Types of Utilities

Three types of Electric Utilities

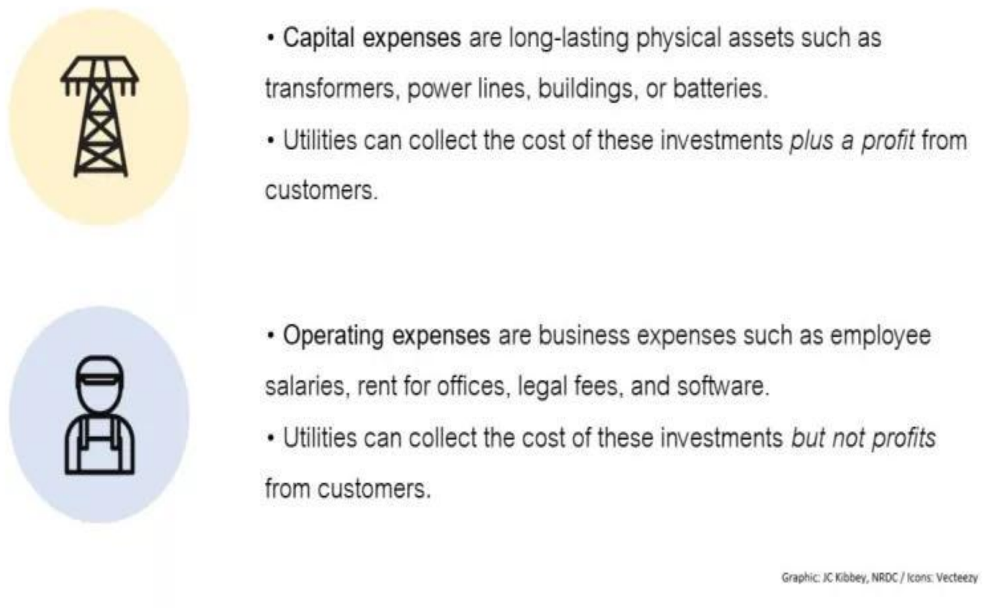
	PUBLIC POWER UTILITIES	RURAL ELECTRIC COOPERATIVES	INVESTOR-OWNED UTILITIES
BUSINESS MODEL	✓ Not for profit, community-owned	✓ Not for profit, member-owned	✓ For profit, share-holder owned
REGULATED BY STATE PUBLIC UTILITY COMMISSION	✓ Very limited instances	✓ Some	✓ All
GOVERNED BY	✓ Elected/appointed boards– mayors, city council members, citizens	✓ Member-elected boards	✓ Private boards
FINANCIAL CONTRIBUTION TO LOCAL GOVERNMENT	✓ Exempt from most taxes; instead make payments in lieu of taxes or transfers to the general fund	✓ May neither pay taxes nor other contributions to local government	✓ Pay taxes to local government

The Regulatory Compact

- 1930s: Agreement struck to create regulated monopoly utilities (usually investor-owned)
- In exchange for their service, utilities are allowed to recover costs and a profit = **revenue requirement**
- Service should be
  - Safe
  - Adequate
  - Reliable
  - Equitable (equity arguments are more common today)
- Public Utility or Public Service Commissions should represent the public interest

Utility Goals

- Protect shareholders
- Increase profits
- Decrease costs
    - Utilities make profit investing in infrastructure that provide energy services to customers
- Minimize outside influence
- Maintain a positive brand image



Wholesale vs Retail & Regulated vs Deregulated Markets

- Utilities in **deregulated (or restructured)** markets are *only responsible* for delivering electricity to their customers; electricity is generated by other entities.

- **Regulated** markets feature *vertically integrated utilities* that own or control the total flow of electricity from generation to meter.

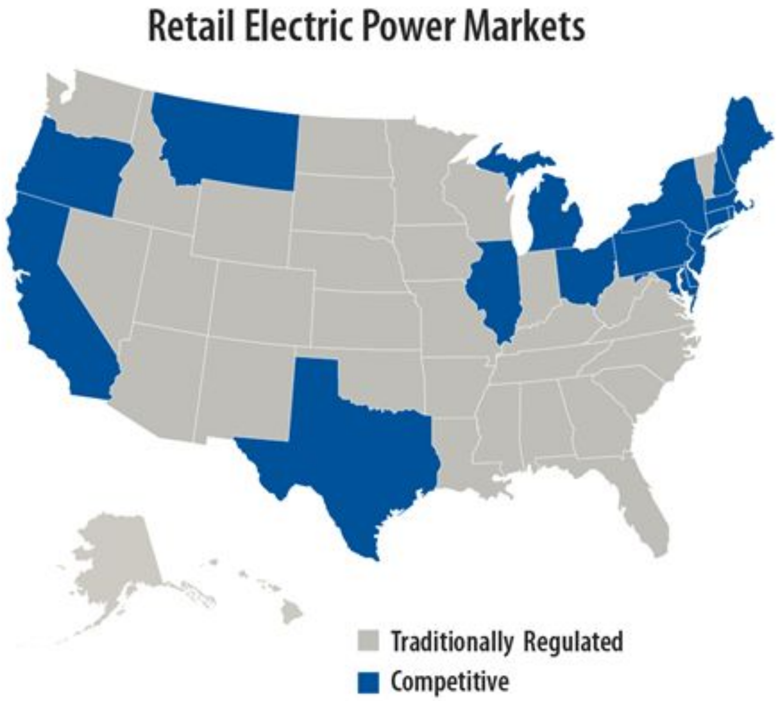
Wholesale vs. Retail Segments of Electricity Service

1 Generating Station	2 Step-Up Transformer	3 Transmission	4 Step-Down Transformer	5 Subtransmission Customer	6 Customers
Electricity is typically generated by a steam- or hydro-driven turbine at the power plant.	The power is then ramped up to high voltage for long-distance transmission.	Next, a series of high voltage lines transmit the electricity through the power grid.	Power is then reduced to a lower voltage for use in homes and businesses.	The electricity then passes through a series of switches to distribution lines.	Power is then delivered to customers via local lines.
WHOLESALE			RETAIL		

Source: NY ISO

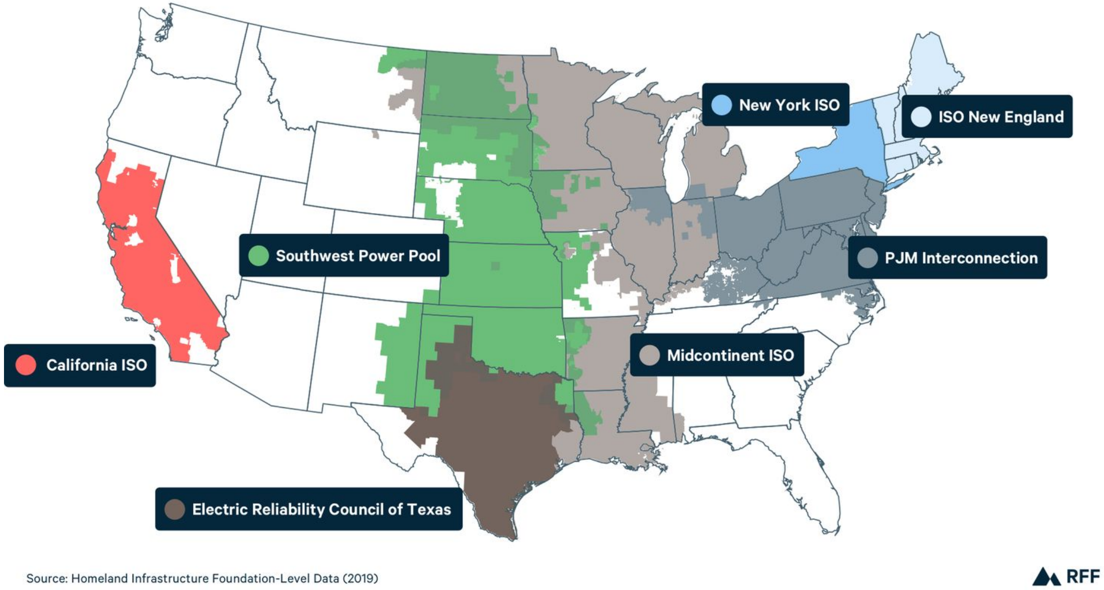
Retail Electricity Markets

- In deregulated areas, electricity customers have the option of selecting an electric supplier (aka **customer choice**) rather than being required to purchase electricity from their local electric utility
- Local utility is still in charge of delivering the electricity and billing for that service
- Sets up competitive rates for customers and can open up clean energy options
- Important to be mindful of contract terms when selecting an alternative supplier



Wholesale Electricity Markets

- Regulated markets (white on map)
- Northeast, Midwest, Texas, and California are restructured competitive markets (colored in on map)
- Independent System Operators and Regional Transmission Organizations were established by FERC Orders
  - Foster competition and open up grid access to power suppliers
  - Safeguard against market manipulation
  - Ensure reliability



Energy, Capacity, and Ancillary Service Markets

- **Energy markets** are auctions that are used to coordinate the production of electricity on a day-to-day basis.
  - Day-ahead market
  - Real-time market
- Payments to generators in the **capacity market** are essentially a reward for that generator being available to operate and provide electricity if needed. Consequently, if generators are unavailable to operate during a time when they are called upon, they may face fees under capacity performance requirements.
- RTOs use the **ancillary services market** to reward other attributes that are not covered in the energy or capacity markets. Ancillary services typically include functions that help maintain grid frequency and provide short-term backup power if a generating unit stops.

FERC Jurisdiction

- The **Federal Energy Regulatory Commission (FERC)** is a federal agency tasked with regulating interstate transmission of electricity, natural gas, and oil.
- 5 Commissioners; 5 year terms
- Since many RTOs operate wholesale markets that encompass multiple states, they are regulated by FERC (with the exception of ERCOT)
- FERC has oversight of all wholesale power transactions on the two large, interconnected grids: the eastern and western interconnects
- FERC also has the ability to indirectly influence state level decisions via their oversight of the bulk power system

FERC Orders

- FERC regulates wholesale electricity by issuing orders. FERC can issue orders of its own accord or in response to complaints filed with the agency.
- In a section 205 proceeding, a public utility (a term that includes RTOs) proposes changes to existing rates or market rules. The utility must prove that the proposed changes would result in “just and reasonable” rates
- In a section 206 proceeding, the complainant challenges an existing rule as “unjust and unreasonable.”

Questions?

Next Steps

1. Recording, slides, and resources will be posted to the cohort landing page
2. Invitations for next sessions will be shared this week (Tuesdays at 12 CST)

Sources

- Electricity Explained from EIA
- Energy Primer: A Handbook of Energy Market Basics
- Electricity Regulation in the US: A Guide from RAP
- Future of Power Explainer Series from Resources for the Future