Energy Justice Intervenor 2024

Session 1: Utility History, Development, Regulation Transcript

The Grid Today
Electricity is generated at power plants and moves through a complex system, referred to as the *grid*, made up of electricity substations, transformers, and power lines that connect electricity producers and consumers. Most local grids are interconnected for reliability and commercial purposes, forming larger, more dependable networks that enhance the coordination and supply of electricity.
Power plants generate electricity that is delivered to customers through transmission and distribution power lines. High-voltage transmission lines, such as those that hang between tall metal towers, carry electricity over long distances to meet customer needs.
Higher voltage electricity is more efficient and less expensive for long-distance electricity transmission whereas lower voltage electricity is safer for use in homes and businesses. So, transformers at substations increase or step up or reduce, step down, voltages to adjust to the different stages of the journey from the power plant on long-distance transmission lines to distribution lines that carry electricity to homes and businesses.
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An Interconnected Grid
Local grids are interconnected to form larger networks for reliability and commercial purposes.
At the highest level, the U.S. power system in 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.

- The Eastern Interconnection encompasses the area east of the Rocky Mountains and a portion of the Texas panhandle.
- The Western Interconnection encompasses the area from the Rockies to the west.
- The Electric Reliability Council of Texas (ERCOT) covers most of Texas

The Eastern and Western Interconnections in the United States are also linked with the Canadian power grid. The 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. This redundancy helps prevent transmission line or power plant failures from causing interruptions in service to retail customers.
That is the basic infrastructure supporting the delivery of electricity to consumers. Before discussing the other players involved in electricity delivery and how the grid operates, let's discuss utilities and their role.
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Utility History
Electric utilities began to spring up in major cities during the 1880s, and by the 1900s, they had spread across the United States with *the electricity system containing three distinct parts pictured here.*
While investor-owned utilities served urban areas and industrial customers prior to World War I, a drive for universal service was launched in the 1930s with the creation of the Rural Electrification Administration,

now the Rural Utilities Service, which led to the development of rural electric co-ops with federal funding support.
The desire for energy infrastructure continued to spread, and communities formed publicly-owned municipal utilities to provide electricity. By 1923, over 3,000 communities formed municipal utilities. Utilities thus became natural monopolies. 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, which make it inefficient for more than one entity to provide a given product or service; in this case, that would be transmission and distribution services.
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Types of Utilities
Now to get into more specifics, municipal or Public Utilities bill customers for electricity in a manner similar to IOUs. They use customer revenues to pay for power lines and power plants, purchase electricity from other utilities, and operate and maintain utility systems. Net revenue is, at least in theory, either reinvested in the municipal utility or in other public services at the local level. *Publicly owned utilities provide electricity to around 25-30% of all energy users in the US today.*
A Rural Electric Cooperative (REC) is a member-owned utility that exists to provide electricity for its members. Today, the US has over 800 Rural Electric Co-ops, serving about 14% of Americans and there are many local efforts to return electric co-ops back to their democratic roots as many have become sites of nepotism appointments.
About 75% of the US population is served by investor-owned utilities, or IOUs. These private companies are subject to state regulation and financed by a combination of shareholder equity and bondholder debt. Most IOUs are large (in financial terms), and many have multi-fuel or multistate operations. Quite a few are organized as holding companies with multiple subsidiaries or have sister companies controlled by a common parent corporation.
Municipal utilities and rural electric cooperatives are often not regulated or lightly regulated by PUCs, since they are supposedly “member/customer regulated.
In the US there are a few federally owned power authorities—including the Bonneville Power Administration and the Tennessee Valley Authority, among others— which also generate, buy, sell, and distribute power.
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The Regulatory Compact
This brings us to what is known as The Regulatory Compact. Effectively, regulation constitutes an agreement of sorts between a utility and the government: the utility accepts an obligation to serve the public in return for the government’s promise to approve and allow rates that will compensate the utility fully for the costs it incurs (including returns on investment) to meet that obligation.
The general objective of regulation is to ensure safe, adequate, and reliable service at prices sufficient, but not more than sufficient, to compensate a utility.
This process is overseen and led by what we know as Public Utilities or Public Service Commissions. In some states, commissioners are appointed, and in others, they are elected.
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Utility Goals
At a high level, utilities are motivated to

- Protect shareholders or investors
- Increase profits
- and Decrease costs

Now, utilities generally have 2 types of costs that you see outlined here
Utilities can collect their spending on *operating expenses* from you and me, on our bills. They generally cover their costs, but they don't get anything extra beyond what they spend.
But with *capital expenses*—that is, physical infrastructure, like poles and wires—utilities can collect the money they invested *plus an additional percentage they keep as profit*.
When it comes to their bottom line, utilities are incentivized to make more costly investments. The more they spend on physical infrastructure, the more profit they stand to make.
And lastly, utilities aim to minimize outside influence on their operations and to maintain a positive brand image. They want to be seen favorably by the public as that can help them when they appear before commissions and asking for additional costs to be approved.
Okay, now let's break down some other aspects of the grid and energy markets.
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Wholesale vs Retail Electricity Markets and Regulated vs Deregulated Markets

U.S. electricity markets have both wholesale and retail components.
Wholesale markets involve the sales of electricity among electric utilities and electricity traders before it is eventually sold to consumers.
Retail markets then, involve the sales of electricity to consumers.
Both wholesale and retail markets can be traditionally regulated or competitive markets.
So, what is the difference between regulated and deregulated or competitive markets?
Utilities in **deregulated** markets are prohibited from generation and transmission ownership and are only responsible for distribution, operations, and maintenance from the point of grid interconnection to the meter, and billing ratepayers. And when deregulation first began, utilities had to sell off their generator assets.
In deregulated markets, electricity prices are set by the market with some federal oversight of wholesale market operations.
In **regulated** markets, utilities are typically vertically integrated monopolies, meaning they are solely responsible for generating, transmitting, and distributing electricity to their customers; they operate as monopolies. In traditionally regulated markets, utilities determine the mix of resources that they use to generate electricity, with approval from state public utility commissions.
It's important to remember that in a traditionally regulated market, customers bear the risk of investments because utilities can recover costs through rates, or what customers are charged. So if a commission, approves a power plant to be built but there are construction issues or delays for instance, customers are responsible for paying for those costs over time.
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Retail Electricity Markets

Retail markets are determined at the state level.
Competitive retail electricity markets (blue) allow electricity consumers to choose between different retail suppliers. This is what's known as customer choice.
Since many electric suppliers can exist within a region with customer choice, electric retailers offer competitive prices to acquire customers. For customers who choose not to select an independent power supplier, their local utility is still obligated to provide them with electricity that the utility will purchase from generators.
Retail competition can help lower a customer's electric bill and allow them to tailor their energy use preferences, as many people may be drawn to choosing a clean energy supplier, for instance.
However, independent suppliers require contracts that can lock customers into a set price for several years, which can negatively impact a customer if that rate is higher than what their local utility is offering.
In these competitive markets, municipally owned utilities may not offer their customers retail choice.

And, it is important to note that the market is not always divided clearly between traditionally regulated markets and competitive market states. Some states, like California, are partially restructured markets and only permit certain consumers to engage in retail choice.
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Wholesale Markets
Some parts of the U.S. wholesale electricity market are traditionally regulated, which again, means that vertically integrated utilities are responsible for the entire flow of electricity to consumers.
Other parts of the wholesale market are restructured competitive markets where utilities and competitive retailers do not generate their own electricity, so they must acquire power elsewhere.
Centralized wholesale markets—in which generators sell power and **load-serving entities** purchase it and sell it to consumers allow investment risk in power plants falls to the electric suppliers and not to customers.
These markets are run by independent system operators (ISOs) and regional transmission organizations (RTOS). ISO is an umbrella term that captures both ISOs and RTOs and they act as grid operators.
ISOs and RTOs were formed in response to two orders by the Federal Energy Regulatory Commission. They are intended to foster competition and guard against market manipulation among power suppliers; facilitate grid planning and operations to ensure reliability; and guarantee that all types of power suppliers have access to the electricity grid.
About two-thirds of U.S. electricity consumers live in a region where transmission is managed by an ISO or RTO.
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Energy, Capacity, and Ancillary Service Markets
RTOs typically run three kinds of markets that determine wholesale prices for electricity services: energy markets, capacity markets, and ancillary services markets
Energy markets are auctions that are used to coordinate the production of electricity on a day-to-day basis.
RTOs typically run two energy markets: the day-ahead and real-time markets. The **day-ahead market**, which represents about 95 percent of energy transactions, is based on forecasted load for the next day and typically occurs the morning prior in order to allow generators operation prep time.
The remaining energy market transactions take place in the **real-time market**, which is typically run once every hour and once every five minutes to account for real-time load changes that must be balanced at all times with supply.
Some RTOs run a capacity auction to provide retailers with a way to procure their capacity requirements while also enabling generators to recover fixed costs, i.e., costs that do not vary with electricity production that may not be covered in the energy markets alone.
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.
This is high-level information about these 3 markets; if you want to learn more specifics about how these markets function, please check out the resources in the presentation.
Okay, let's move on to talk about FERC briefly and how they interact with all of these markets
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FERC Jurisdiction
The **Federal Energy Regulatory Commission (FERC)** is a federal agency tasked with regulating interstate transmission of electricity, natural gas, and oil.

FERC is an independent agency run by five commissioners nominated by the President and approved by the Senate. Commissioners serve 5 year terms and the President selects one commissioner as Chairman. FERC is bipartisan and by law cannot have more than three commissioners from one political party.

However, politics can still influence FERC decisions. Because the number of commissioners is odd, one party—usually the President's party—typically has more members. This then influences voting outcomes, which require a simple majority.

FERC serves as an economic regulator for interstate transmission of electricity and oversees the reliability standards for the bulk power system, the interconnected system of power plants and transmission lines.

In this role, FERC must approve how rates are set for wholesale electricity and for transmission. FERC's legal authority derives from the Federal Power Act, which tasks the agency with ensuring that wholesale rates are "just and reasonable" and not "unduly discriminatory or preferential."

FERC also regulates electricity reliability under section 215 of the Federal Power Act. The **North American Electric Reliability Corporation (NERC)**, a nonprofit organization, is responsible for creating enforceable reliability standards for the North American bulk power system. NERC then must submit these standards to FERC for approval. Reliability standards govern frequency and voltage levels, resource adequacy, cybersecurity, transmission planning, emergency preparedness and planning, and more.

While much of FERC's regulatory power over electricity is limited to interstate wholesale electricity sales, the agency's actions indirectly affect several components of the bulk power system.

For example, FERC does not typically approve the construction of new transmission lines, which is normally up to states and local authorities. However, FERC does regulate transmission rates and cost recovery, which can influence how much transmission infrastructure gets built. Similarly, although FERC does not approve the siting of power plants, its regulation of wholesale electricity markets can affect what types of power plants are constructed.

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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.

Stakeholders can influence FERC's regulatory process by initiating a proceeding under section 205 or section 206 of the Federal Power Act. 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." And the commissioners review the presented information to ultimately make a vote on the matter.