TIBER CREEK GROUP

HOW POWER GETS BOUGHT, SOLD, & BALANCED

TYPES OF RETAIL ELECTRICITY MARKET STRUCTURES

DEREGULATED, or "Retail Choice" Markets

Utilities are typically responsible for delivering electricity to customers, while the actual electricity is generated by independent entities, then sold through competitive wholesale markets. In these regions, **customers may choose their electricity supplier.**

VS

REGULATED, or "Vertically Integrated" Markets

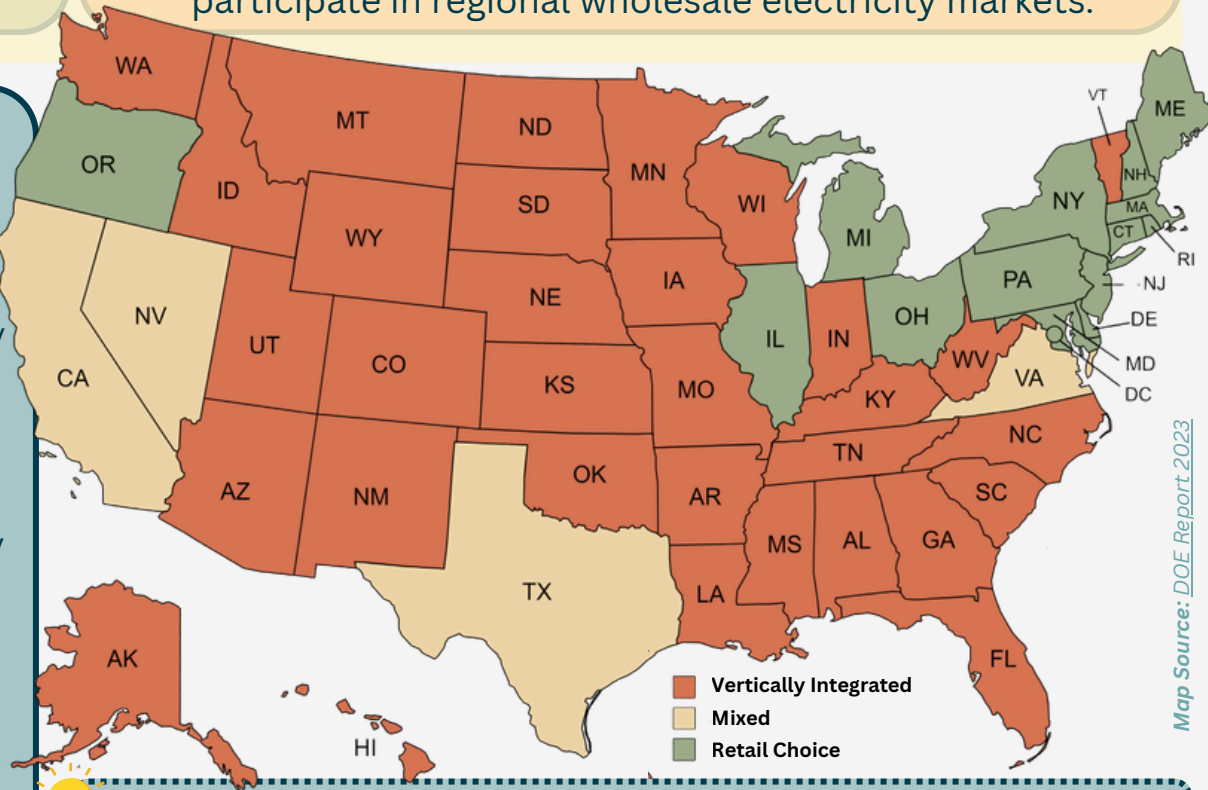
A single utility provides bundled electric service, including generation, transmission, & distribution, at rates regulated by state public utility commissions. Utilities may also buy & sell electricity through bilateral contracts and can participate in regional wholesale electricity markets.

WHOLESALE ELECTRICITY MARKET TYPES

ENERGY MARKETS use auctions to match electricity supply with demand on a **day-ahead and real-time basis**. These operate in many regions across both vertically integrated and retail choice states.

CAPACITY MARKETS use a similar auction system to energy markets, but **generators are paid for keeping their plants available to operate**, if needed, to ensure generation is available to serve load at peak times or in times of scarcity.

ANCILLARY SERVICES MARKETS pay for **reliability services,** like frequency regulation and operating reserves, that keep the grid stable and able to respond quickly to disruptions. This type of market also operates via auctions.



Map Source: DOE Report 2023

These regional wholesale markets facilitate the purchase & sale of electricity to balance supply and demand across the grid. They can operate across both vertically integrated and retail choice regions.

HOW IT WORKS: WHOLESALE ELECTRICITY AUCTIONS

OBJECTIVE

Match electricity supply with demand, selecting the lowest-cost resources while maintaining grid reliability.

Regional Transmission Organizations (**RTOs**) and Independent System Operators (**ISOs**) are nonprofits that **manage and plan transmission systems, maintain real-time grid reliability, and administer wholesale electricity markets.** They serve ~2/3 of the U.S.'s power supply. RTOs/ISOs **operate across both vertically integrated and retail choice regions,** though not all areas of the U.S. are part of an RTO/ISO. In non-RTO/ISO regions, utilities are responsible for most generation, procurement, & system operations within their service territories, and can participate in regional bilateral trading. RTOs/ISOs are **regulated by FERC**, except for Texas' ISO, ERCOT, which operates independently.

PREPPING

RTOs typically run two different wholesale markets:

1. **The day-ahead market:** Where most electricity is planned and priced a day in advance using forecasts of demand, weather, and generator availability.

2. **The real-time market:** Typically run every 5-15 minutes to make corrections & balance the grid as actual conditions differ from day-before forecasts.

AUCTION/BIDDING

1. Generators **bid their electricity** at different prices, while utilities & other buyers **request electricity to meet demand.**

2. Offers are stacked from lowest to highest cost, while accounting for system constraints. Then the market selects enough electricity to meet demand, i.e. **the market "clears."**

3. All selected generators receive the **same market-clearing price per MWh**. Ready to dispatch.

EXECUTION

After the day-ahead market clears, the dispatch schedule is set, generally in order of lowest to highest offer price, and accounting for transmission system and reliability constraints. System operators send instructions to generators, telling each **how much electricity to produce, and at what times.**

Operators monitor the grid continuously, using real-time, capacity, and ancillary markets to course-correct.

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