Free markets. Real solutions.

R STREET'S ELECTRICITY 101 SERIES
NO. 4

August 2016

TRADITIONALLY REGULATED VS. COMPETITIVE WHOLESALE MARKETS

INTRODUCTION

In the 1990s and 2000s, U.S. states chose either to restructure their wholesale electricity markets fully or partially, or to retain regulation of vertically integrated monopoly utilities.[1] Generally, the Southeast and Mountain West states have retained the traditional regulatory model, opting not to join regional transmission organizations and independent system operators (RTO/ISOs).[2] In these regions, investments in utility infrastructure must be approved by state regulators. Utilities usually operate their own electricity systems and incorporate exchanges with other utilities. These take the form of "bilateral trading," where the price and terms of each transaction are set through a negotiation process between two parties.

Texas, Illinois, Ohio and most mid-Atlantic and Northeast states transitioned to competitive wholesale and retail markets. These areas joined or formed RTO/ISOs to operate organized wholesale electricity markets. This reduced regulation of generation and shifted some regulatory oversight of generation and transmission from the states to the federal government.[3] Today, the Electric Reliability Council of Texas (ERCOT); PJM Interconnection LLC (PJM); the New York Independent System Operator (NYISO); and ISO New England (ISO-NE) span primarily or entirely restructured states.

Some states that retained the monopoly-utility model allowed their utilities to join RTO/ISOs. Specifically, the Midcontinent Independent System Operator (MISO), Southwest Power Pool (SPP) and California Independent System Operator (CAISO) consist primarily of monopoly-utility service territories. These utilities relinquished their role as grid operators to the RTO/ISO. While these utilities "compete" in the organized markets, they generally do not use market signals to guide their behavior. State regulators still approve utility investments and their costs and market revenues are passed through to a captive customer base. The trend for utilities to join RTO/ISOs has expanded since the 2000s. In 2013, MISO integrated utilities spanning most of Arkansas, Louisiana, Mississippi and some of Texas. CAISO expanded outside of California in 2014, while SPP has also grown recently.

Utilities or independent power producers, also known as merchants, can engage in bilateral trades outside or within RTO/ISOs. Bilateral-only areas have comparatively low liquidity, in part because trading requires greater negotiation. RTO/ISOs instead use standardized electricity products in short-term markets. Bilateral-only and restructured RTO/ISO areas take somewhat similar approaches to operating their electricity systems, but sharply diverge in infrastructure-investment models.

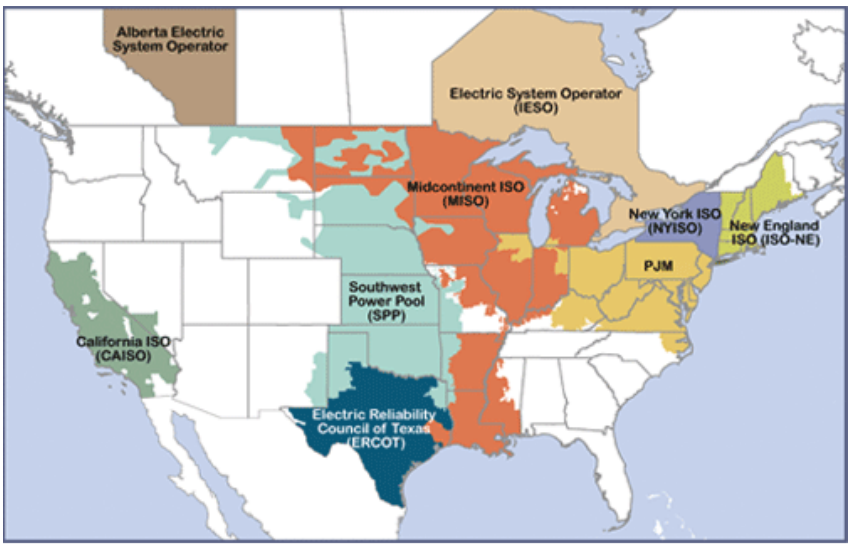
GRID OPERATION

A grid operator can be a utility, a party that has pooled utility resources or an RTO/ISO. All grid operators balance supply and demand in real time by issuing operational instructions to power plants. This begins with "unit commitment," where the grid operator signals a plant to turn on or off. Once in operation, plants receive instructions from the grid operator on the appropriate level of output, or dispatch. For example, the grid operator may "commit" a 1,000 megawatt (MW) natural-gas combined cycle plant to turn on one day in advance and then dispatch it at 800 MW (80 percent of its capacity, or maximum output). If demand increases 50 MW, the operator may increase the dispatch of the plant to 850 MW.

Pooling resources lowers the cost of dispatching an electricity system. This is what prompted the formation of "power pools" in the 1970s and 1980s. Power pools use a central dispatcher to administer interchange between utilities by dispatching the lowest-cost resources to meet demand. These served as early predecessors to most RTO/ISOs.

RTO/ISOs have more precise and advanced techniques to commit and dispatch resources than power pools. RTO/ISOs

FIGURE I: U.S. AND CANADIAN RTO/ISO TERRITORIES



SOURCE: Federal Energy Regulatory Commission

dispatch resources in five-minute intervals, whereas non-RTO/ISO areas usually do so every hour. This provides better precision to adjust generation to match rapid fluctuations in electric supply and demand. RTO/ISOs also have sophisticated modeling systems that increasingly let them "look ahead" to better position resources for expected and unexpected changes in grid conditions. This advantage becomes more pronounced with growing amounts of wind and solar generation, which increase variability and uncertainty in grid operations.

A key operational advantage for RTO/ISOs is their superior commitment and dispatch of resources to manage transmission congestion. Transmission constraints can develop quickly with great variation from location to location. RTO/ISOs use short-term markets that reflect the marginal cost to serve load at very granular geographic levels. This provides price signals that reflect market fundamentals better than bilateral-only areas.

Organized short-term markets provide superior price transparency and liquidity relative to bilateral-only markets. But organized markets do not replace bilateral transactions altogether. Rather, bilateral trading can complement organized markets, while the efficiency and transparency of organized markets benefit bilateral markets.

INFRASTRUCTURE INVESTMENT

Infrastructure investment mechanisms differ sharply between regulated utilities and merchants. A state regulator must deem a proposed utility investment prudent before allowing the cost to be passed through to captive ratepayers. Such regulatory oversight serves as a surrogate for competition in the monopoly-utility model. By contrast, organized markets harnesses competition between independent power producers.

RTO/ISOs have responsibility for short-term grid reliability and PJM, NYISO, ERCOT and ISO-NE must ensure adequate generation and transmission resources exist. RTO/ISOs generally cannot require investments of their members. Instead, they must rely on market mechanisms to create financial incentives for investment. Specifically, organized markets use price outcomes to signal investment from independent power producers. When market revenues exceed the cost of investment, it spurs new investment.

MISO, SPP and CAISO rely on regulated state processes for the long-term procurement of generation to operate the grid reliably. From a utility's perspective, these processes generally rely on least-cost integrated resource planning. Each utility planning on a separate "island" does not usually result in the least-cost resource mix for the entire RTO/ISO system. This approach also largely ignores RTO/ISO market prices, which send more accurate investment signals than an integrated resource plan would support. Given this mismatch, these RTO/ISOs have not adopted market designs fully to signal merchant investment.

A monopoly franchise removes the incentive to innovate to increase market share. Guaranteed cost recovery for "prudently incurred" expenses diminishes the incentive to control costs. The regulated model also insulates utilities from market risks and most policy risks, such as changes in fuel prices or government subsidies. This and a guaranteed attractive rate of return make utility investments relatively safe for investors. This investment appeal grants utilities

cheap access to capital, but provides little incentive for them to manage risk well.

A competitive environment shifts risk management to merchants, who also have an incentive to control costs and innovate. For example, given the cheap natural gas environment of recent years, merchants have not opted not to invest in new high-risk coal and nuclear plants, as some utilities have done. Merchants have also led the way in reducing power-plant operating costs. They also have an incentive to extract revenue from markets in a manner that can harm market performance (e.g., market manipulation), which is why the RTO/ISOs and their independent market monitors use market power mitigation controls. On the whole, market monitors have determined that the outcomes of the organized markets have been competitive.

CONTACT
If you have questions regarding this subject, please contact Electricity Policy Manager Devin Hartman or Outreach Director Lori Sanders at the R Street Institute at 202-525-5717.

ENDNOTES

1. A vertically integrated utility owns its generation, transmission and distribution facilities. Under restructuring, a utility only owns the distribution facilities.

2. The domestic RTO/ISOs are ISO New England (ISO-NE); New York Independent System Operator (NYISO); PJM Interconnection LLC (PJM); Midcontinent Independent System Operator (MISO), Southwest Power Pool (SPP), California Independent System Operator (CAISO) and Electric Reliability Council of Texas (ERCOT).

3. This shift in regulatory authority did not occur in most of Texas, because ERCOT operations are not considered to constitute interstate commerce.