

The Wholesale Electricity Market

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Issue

This report broadly describes the wholesale electricity market.

Summary

In a deregulated electric industry such as Connecticut's, electricity is bought, sold, and traded as a commodity, and as such, it has both wholesale and retail markets. The wholesale market generally involves sales of electricity from power generators to commodity traders, retail electric suppliers, and electric distribution companies (EDCs, e.g., Eversource and United Illuminating) who then ultimately sell it to consumers in the retail market. The suppliers and EDCs purchasing wholesale electricity to pass on to their retail customers are generally known as "load-serving entities" (LSEs).

In New England's regional wholesale market, LSEs purchase wholesale electricity through a combination of bilateral transactions (e.g., contracts negotiated directly with power generators) and purchases on the two wholesale electricity markets administered by the region's electric grid operator, the Independent System Operator - New England (ISO-NE). The two ISO-NE markets are known as the day-ahead market and the real-time market.

Retail Electric Sales

In Connecticut, most consumers can choose to purchase their electricity from a retail supplier or through their EDC's "standard offer" (for residential customers) or "last resort" service (for larger commercial and industrial customers). Regardless of which option a retail customer chooses, the EDCs and retail suppliers must purchase the power they provide to their customers in New England's regional wholesale market.

For additional information about Connecticut's retail electric rates, see OLR Report [2015-R-0108](#).

Power generators may also participate in certain ISO-administered markets designed to promote the electric grid's reliability and stability. In these markets, the generators generally contract to be available to produce or adjust their power generation if needed (similar to a retainer paid to an attorney to ensure that he or she will be available to a client). For example, in the forward capacity market, generators contract to provide generating capacity three years in advance.

Bilateral Transactions

According to the Federal Energy Regulatory Commission's (FERC) [Energy Primer: A Handbook of Energy Market Basics](#), bilateral transactions occur between two parties, typically outside of an ISO-administered market. They can occur through direct contact and negotiation, a voice broker, or an electronic brokerage platform and can range from standardized contract packages to customized complex contracts known as structured transactions.

Because transactions involving the movement of energy from one point to another require the parties to also reserve capacity on the electric transmission system, the parties usually do so when they arrange the power contract. They also make any necessary arrangements with the grid operator to allow the power under contract to be put into the transmission system when it is actually generated.

Markets Administered by ISO-NE

Day-Ahead Market

The day-ahead market allows LSEs to purchase wholesale electricity the day before they provide it to their retail customers, making up for any demand that hasn't already been met through bilateral transactions. The market produces financially binding schedules for producing and consuming electricity that gives power generators and LSEs a way to schedule their activities for the next day and allows ISO-NE to ensure that enough power is being generated to meet demand ([FERC Energy Primer](#)).

FERC and ISO-NE

ISO-NE and the wholesale electricity markets it administers are under the jurisdiction of the Federal Energy Regulatory Commission (FERC). FERC encouraged the creation of independent system operators in the 1990s when many states were deregulating their electric industries. Under FERC's authorization, ISO-NE (1) operates the grid, (2) administers the wholesale markets, and (3) performs power system planning.

The day before the power is actually generated, market participants submit offers to supply and bids to purchase the power, which are applied to each hour of the day for each pricing location within the system. Supply offers are influenced by production costs (particularly fuel and operating costs). Purchasing bids reflect the amount of electricity the LSE needs to obtain for the next day.

Under what is known as “Market Rule 1,” ISO-NE then determines how much power is necessary to meet the aggregate bids and “stacks” the supply offers from lowest to highest cost. Starting with the least expensive and moving up, it selects offers until it has enough to meet the aggregate demand. All of the generators selected are paid the price bid by the last generator whose power was needed to meet the demand (i.e., the “marginal clearing price”).

For example, if ISO estimated that it needed 10,000 megawatt hours and six generators each offered to supply 2,000 megawatt hours for \$5, \$6, \$7, \$8, \$9, and \$10 respectively, ISO would choose the five lowest bidding generators (which would add up to 10,000 MWH) and each would be paid \$9 per MWH (the highest bid needed to meet the load estimate). For additional details about the Day-Ahead Market’s auction system and its impact on wholesale prices, see OLR Report [2011-R-0135](#).

LSE Wholesale Procurement

LSEs obtain approximately 65% of their power through medium-term or long-term contracts handled outside the ISO markets (i.e., bilateral transactions); 30% in the day-ahead market; and 5% in the real-time market.

Real-Time Market

ISO-NE’s real-time market allows market participants to buy and sell wholesale electricity during the course of the operating day. It allows LSEs to balance any differences between the power they procured on the day-ahead market and their actual real-time demand within each hour. For generators, the market provides additional opportunities to sell extra power.

According to [FERC](#), real-time market prices are significantly more volatile than those on the day-ahead market due to demand uncertainty, transmission and generator forced outages, and other unforeseen events. However, the market clears a much smaller volume of energy than the day-ahead market (typically about 5% of the scheduled energy).

ISO-NE clears the real-time market using supply offers, real-time demand, and offers and bids to sell or buy energy over external interfaces. It dispatches rates and dispatch targets in real time, which are five-minute price and megawatt signals based on the aggregate offers of generators to produce the required amount of energy ([FERC Energy Primer](#)). The market also establishes the real-time locational marginal price that is either paid or charged to participants in the day-ahead market for demand or generation that deviates from the day-ahead commitments (see: <https://www.iso-ne.com/markets-operations/markets/da-rt-energy-markets>).

Other Wholesale Market Components

Power generators may also participate in certain ISO-NE-administered markets created to help insure the power grid's stability and reliability. Brief descriptions of these markets are below.

Forward capacity market. In the forward capacity market (FCM), ISO-NE holds an annual auction in which generators bid and contract to provide generating capacity three years in advance. The FCM encourages participation by new generating resources and allows the wholesale market overall to prepare for other resources leaving the system. ISO-NE recently began exploring a [proposal](#) to change the FCM to address concerns about the effects of state-subsidized new resources participating in the FCM, including depressed prices and excess capacity. Among other things, the proposal would (1) introduce a new two-stage, two-settlement process by adding a secondary market known as a substitution auction and (2) provide financial incentives for existing, high-cost capacity resources to transfer their capacity obligations to subsidized new resources and permanently exit the capacity market (similar to a "severance payment"). If adopted, the proposal could be implemented in 2019.

Forward reserve market. In this market, ISO-NE compensates generators for making available their uncommitted operating capacity within 10 or 30 minutes to meet unexpected system contingencies, such as unexpected outages.

Regulation market. In this market, ISO-NE compensates generators to either increase or decrease their output every four seconds to balance variations in demand and system frequency.

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