

Reliable electricity



The region requires it

A reliable supply of electricity is a foundation of our prosperity and quality of life. Without it, our world literally grinds to a halt—businesses cannot plan and operate productively, hospitals and schools cannot provide their essential services, and residents cannot depend on the electricity they need simply to live their daily lives. Without reliable electricity, the financial and societal costs would be enormous.

That's why every one of New England's 6.5 million households and businesses counts on ISO New England to help "keep the lights on" every minute of the day, every day of the year.

As electricity use grows and energy costs increase nationwide, it is up to ISO New England to assure New Englanders have reliable, competitively priced electricity today and in the future.

ISO New England ensures it

In 1997, the Federal Energy Regulatory Commission created ISO New England to serve as the independent organization responsible for overseeing the restructured, or deregulated, wholesale electricity industry in the northeastern states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

We fulfill three essential roles:

First, we operate the regional bulk electric power system—from ensuring enough power plants operate each day to meet everyone's electricity needs to directing the flow of power over the six-state network of high-voltage transmission lines. Think of the ISO as the air traffic controller for the production and distribution of electricity in New England.

Yet we own none of the infrastructure—power plants, transmission lines, and other power resources—whose operations we oversee centrally from the ISO's state-of-the-art control center. The efficient, minute-to-minute operation of these facilities is critical to the health of New England's economy and the well-being of the region's 14 million residents.

Second, we administer the region's wholesale electricity markets. Here, the ISO acts as an electronic auction house for buying and selling electricity at the wholesale level. With a total market value in excess of \$10 billion in energy transactions annually, the competitive markets determine the wholesale price of electricity for all of New England.

The ISO also monitors the markets to ensure a fair and effective marketplace for both buyers and sellers of electricity.

While serving as a wholesale commodity exchange for electricity, our board of directors and 400 employees maintain strict financial independence from any company doing business in the region's wholesale electricity marketplace.

Third, we plan for the future expansion of this dynamic system to keep up with the region's growing appetite for electricity.

Competitive markets deliver it

When suppliers of any product or commodity compete, they introduce efficiencies, invest in improvements, and reduce their costs to attract customers.

To harness the power of competition and bring these benefits to the region's electricity industry, ISO New England launched wholesale markets in 1999. Since that time, these competitive markets have nourished a bulk power system that is more:

- **Reliable:** More than \$8 billion in private investment in critically needed resources, such as new power plants, transmission projects, and demand-response/energy-efficiency programs, has helped New England stay ahead of its increasing demand for electricity.
- **Economical:** Wholesale energy prices in New England, adjusted for fuel costs, have remained fairly stable since 1999 despite increased demand. This competitive pricing is essential as the cost of natural gas and oil—the fuels that run most of the region's electricity generators—increases.
- **Environmentally-friendly:** The use of efficient and cleaner-burning power plants—introduced since the inception of competitive markets—has reduced emissions, including those thought to contribute to global climate changes.

Having created a solid foundation from which to deliver competitive market outcomes and a reliable bulk electricity system, ISO New England is dedicated to creating even greater long-term benefits for New England's citizens.

Challenges face it

In sustaining a successful energy strategy, ISO New England works with the region's electricity industry and state policy makers to address the region's difficult, but not insurmountable, energy challenges.

- **Developing and Maintaining Sufficient Electricity Supply:** Electricity use continues to grow as technology drives business operations and more households use air conditioning and high-tech electronic devices. One way to keep up with consumer demand is to encourage the development of new power plants through market pricing incentives. Another way is to slow the growth in demand, particularly in areas that use the most electricity.
- **Developing a Diverse Set of Electricity Resources:** More than half of New England's electricity is produced by plants that operate on natural gas or oil. This means that the price of electricity will closely track the price of these fuels. A mixture of new power plants that operate on diverse fuels, such as wind, hydro, new-technology coal, biomass, and nuclear, would help control consumer prices. Smaller, more flexible plants that would not operate every day, but could start quickly in response to power emergencies, are also needed.
- **Connecting Wholesale and Retail Electricity Pricing:** Encouraging consumers and businesses to use less electricity will save them money and lessen the need to build additional power plants. Because there is no direct link between wholesale electricity prices and retail rates, consumers have no way of seeing how their consumption patterns affect the price of electricity. Adopting new retail rate structures that allow retail rates to fluctuate at different times of the day would give consumers the opportunity to manage their power costs by adjusting their electricity use when prices are high.
- **Improving the Transmission System:** While more than \$2 billion has been invested in transmission upgrades, some limitations in the transmission network, or grid, still prevent electricity from getting to where it needs to go. Continued improvements must be made for the system to operate most efficiently.

A concerted effort to increase and diversify our electricity supply, become more energy efficient, and upgrade our bulk power system infrastructure will help control costs and bolster reliability.

ISO New England's wholesale electricity markets

- For every hour of every day, electric utility companies and competitive suppliers forecast customers' electricity consumption, and "bid" through the Internet to buy wholesale power at a specified price per unit of production, called a megawatt-hour (MWh).
- Similarly, power plants "offer" into the auction to produce a certain amount of electricity at a specified price per MWh.
- The point where total demand equals total supply determines each hour's generation needs and wholesale "clearing" price.
- All producers that offer their resources at or below the clearing price are scheduled to generate power and earn the clearing price for their production.
- The markets are run a day before the operating day and again in real time to accommodate any changes in supply and demand.
- Wholesale electricity demand and price can rise and fall depending on weather, time of day, and economic conditions.
- The ISO's sophisticated "settlement" system bills utility companies for power purchases and passes payments on to producers.
- Approximately 300 companies participate in New England's wholesale electricity marketplace.

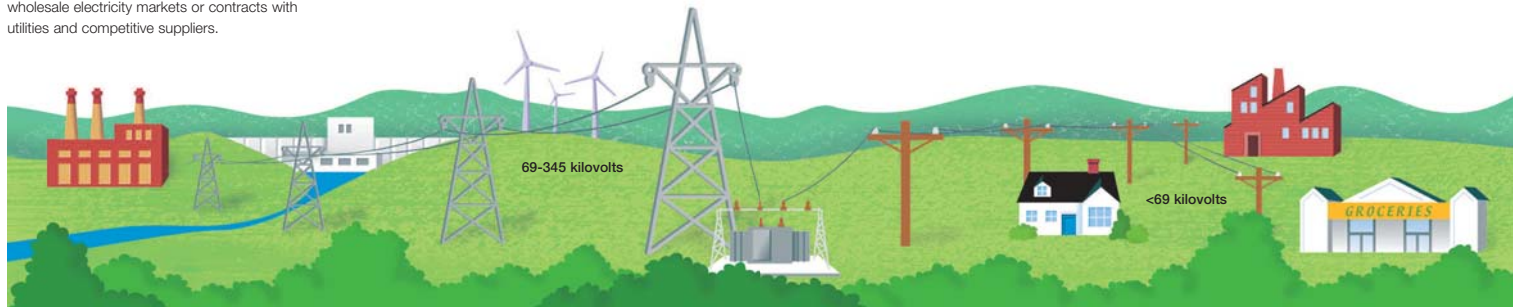
How electricity flows

Electricity is **produced** in New England by more than 350 generating resources—natural gas and oil-fired power plants, hydroelectric dams, coal or nuclear stations, biomass plants, among others. Generators sell the electricity through either the wholesale electricity markets or contracts with utilities and competitive suppliers.

New England's 8,000 miles of **high-voltage transmission lines**, owned by transmission companies, move electricity from generators to **substations**, where it is "stepped down" in voltage to feed into **local distribution lines**.

Electric utilities and competitive suppliers buy electricity either through the wholesale markets or contracts with power producers; local utilities **distribute** the electricity to businesses and homes.

The region's 6.5 million households and businesses create the **demand** for electricity, which must be produced the instant it is needed.



Bulk Power System (Wholesale Electricity)

Local Distribution System (Retail Electricity)

ISO New England's bulk power system dispatch

- To meet the hourly forecast of electricity consumption, the ISO dispatches the power plants that are scheduled through the markets, starting with the plant that submitted the lowest supply offer. At the same time, the ISO schedules the delivery of electricity through the high-voltage transmission lines.
- Electricity cannot be stored, so the ISO takes the pulse of the power grid every four seconds to make sure sufficient power flows instantaneously to meet customer needs.
- As consumption grows throughout the day, the ISO dispatches the next least-cost plant to serve electricity demand.
- If consumption is higher than anticipated, or a power plant or transmission line "trips off line" unexpectedly, the ISO can immediately bring on power production held in reserve or import electricity from outside New England.
- When demand is highest, such as on hot summer days, commercial "demand-response" customers reduce their electricity use or start up their own generators in exchange for financial compensation, thereby reducing overall demand and wholesale prices.
- Consumers also may be asked to conserve electricity when demand is very high.

The role of ISO New England

Running the Regional Wholesale Electricity Markets

ISO New England runs competitive wholesale markets to balance the region's daily electricity supply and demand. We don't actually buy or sell electricity; the power producers, utilities, and other energy providers do. Rather, we administer and monitor the markets.

Scheduling Electricity Production and Transmission

Though we own no power plants or transmission lines, the ISO dispatches and directs the flow of power around the clock to ensure electricity supply meets demand as economically and efficiently as possible based on market prices.

Planning for Reliable Electricity in the Future

The ISO analyzes and estimates New England's 10-year electricity generation and transmission needs and informs New England's energy stakeholders, such as state regulators, energy companies, and consumer groups. As an independent entity, we also provide unbiased market analysis and transparent data to the region's industry.

Stakeholders use this information to make business and policy decisions that help ensure the markets work well and provide for the continued development of a reliable bulk power system infrastructure.



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