

The New England electric grid is an 8,000-mile high-voltage transmission system that connects electric utilities, publicly-owned electric companies, power generators, suppliers, alternative resources and end users in the six-state wholesale electricity marketplace. This is a brief profile of the electric grid and wholesale markets serving Massachusetts based on information from New England's regional system planning process and wholesale market reports.

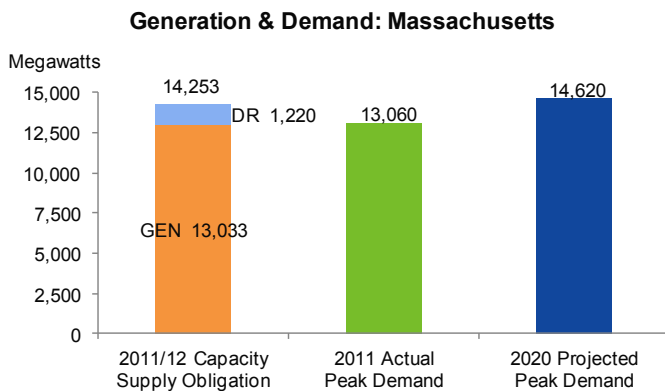
Introduction

Massachusetts represents approximately 46% of the population in New England and 46% of the region's total electricity consumption. The Greater Boston area, which includes the North Shore, represents about half of the state's electricity use.

The state relies on both in-state resources and imports of power over the region's transmission system to serve electricity customers. Transmission, generation and demand resources are being added to ensure that the reliability of the system is maintained. ●●●

Growth in Demand

In the 2011 Regional System Plan, ISO New England (ISO) forecasted the state's overall electricity demand to grow at a rate of 1.1% annually over the next decade. The ISO forecasted the state's peak (summer) demand to grow 1.4% annually over the next decade. Overall and peak-demand growth in Massachusetts are equal to the rate projected for the region.



New England's 2011 peak demand for electricity, which occurred on July 22, was the second highest on record. New England's overall demand for electricity fell sharply from 2007–2009, primarily due to the recession, then climbed in 2010, but has remained below 2003–2008 levels. The ISO issues a new 10-year forecast each year in April based on updated economic data.

In 2011, the ISO created a methodology for a discrete EE forecast to estimate the long-term effects of state-sponsored EE programs. This methodology will look beyond the EE committed three years into the future through the Forward Capacity Market (FCM).

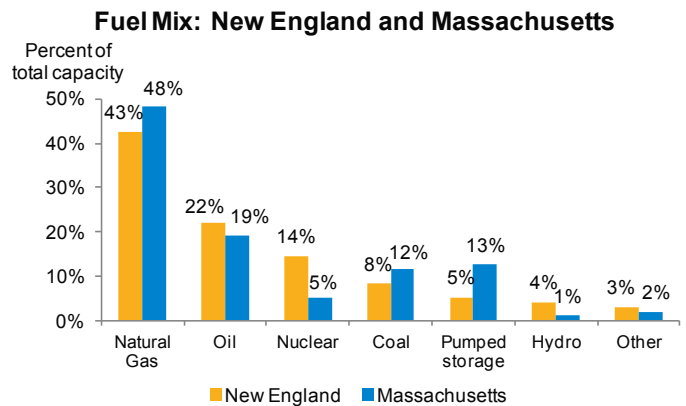
Governor Patrick set a goal to achieve zero load growth and the 2008 Green Communities Act sets goals of meeting at least 25% of the state's electricity needs with demand resources by 2020 and reducing total energy consumption by at least 10% by 2017. ●●●

Generating Resources

The total capacity of existing generating plants in Massachusetts is approximately 13,100 megawatts (MW). This is 41% of the total for New England. About 13,000 MW in Massachusetts cleared in the FCM with obligations to be available from June 1, 2011–May 31, 2012. Generator availability has increased systemwide in New England since the start of competitive markets, from 81% in 1999 to 88% in 2010. At any given time, however, individual generators may not operate due to planned or unexpected outages, environmental restrictions, or other reasons. Some resources do not operate because their offers to sell electricity in the wholesale market are above the market-clearing price. In Massachusetts, generators are owned and operated by private generation companies and municipal utilities. ●●●

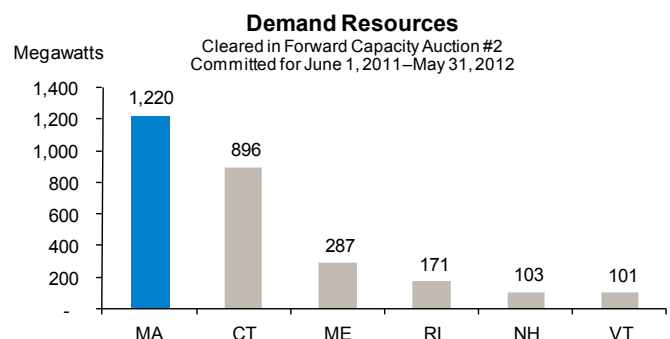
Fuel Mix

Natural gas and oil are the primary fuels for more than 60% of the existing generating capacity in the state and region. ●●●



Demand Resources

New England has about 2,800 MW of customer-side Demand Resources (DR), that can reduce demand on the power grid through both active measures, such as shifting to on-site distributed resources, and passive measures, such as energy efficiency (EE). DR is growing with efforts to more fully integrate it into the wholesale electricity markets. Massachusetts has about 1200 MW of DR with obligations in the FCM—equivalent to 9% of the state's peak demand. ●●●



Proposals for New Resources

In New England, the FCM provides opportunities for existing and new generation (supply), DR, and imports to compete to provide the capacity resources the region needs to meet future reliability requirements.

Resources must qualify, clear (i.e., be selected) in the auction, and then perform when called by the ISO to be eligible for capacity payments.

Through a series of annual auctions, ISO has procured resources to meet reliability needs for the five-year period June 1, 2010–May 31, 2015. In this period these auctions cleared:

- More than 1700 MW of *new* generation resources from Massachusetts, representing 47% of the new generation cleared in New England, and
- About 1300 MW of *new* DR from Massachusetts, representing 47% of the new DR cleared in New England.

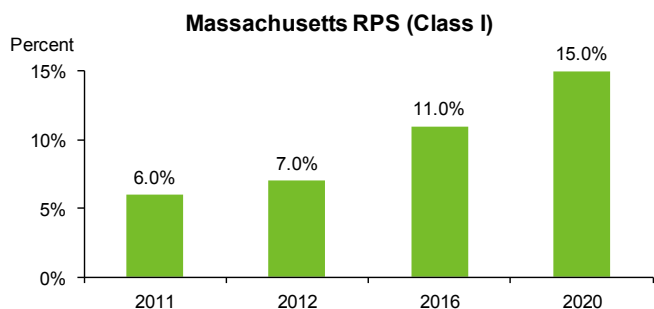
The ISO will conduct the sixth auction (FCA-6) in April 2012, for resources needed in the 2015–2016 timeframe.

Connecting New Generating Resources

In order to connect to the grid, a proposed generator must be studied and approved under the ISO's Generator Interconnection Procedures to ensure the project will not adversely impact the reliability of the electric grid. This is known as the "queue" process. About 1700 MW of proposals in Massachusetts have entered the queue (primarily natural-gas-fired generation and wind power) as of December 2011. This represents 35% of the proposals in New England. Historically, not all of the proposals in the queue have been developed, but it is an indication of the potential for new resources. ●●●

Renewable Resources

To meet Massachusetts' renewable portfolio standard (RPS), utilities and competitive suppliers must obtain specified percentages of the electricity they provide to customers from renewable sources, or make alternative compliance payments. Massachusetts has two classes of renewable resources that include certain types of solar, wind, ocean energy, biomass, hydro, landfill gas, geothermal, and fuel cells. Renewables developed in 1998 or later are Class I; resources developed before 1998 are Class II. The Class-I RPS increases to 15% in 2020.

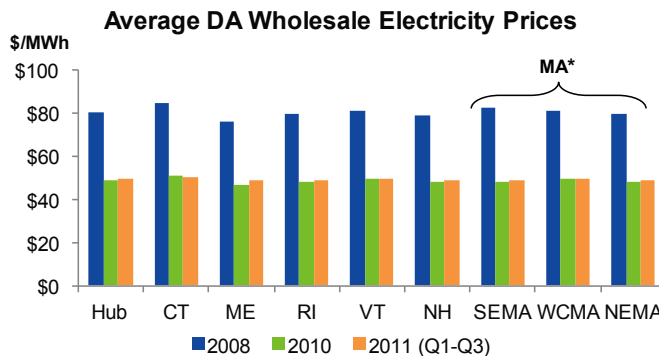


Massachusetts also has an alternative energy portfolio standard that includes innovative energy technologies such as combined heat and power, flywheel energy storage, and coal gasification with carbon capture and sequestration. In 2010, the Patrick Administration announced the *Massachusetts Clean Energy and Climate Plan for 2020* to reduce greenhouse gas emissions 25% below 1990 levels by 2020. The plan proposes evaluation of a clean energy performance standard to increase non-emitting sources in the electricity mix, such as wind, solar and hydropower, and the use of cleaner fossil fuels, such as natural gas, as a bridge to a clean energy future. ●●●

Wholesale Market Prices

Locational pricing is a key feature of New England's wholesale electricity markets. The ISO administers Day-Ahead (DA) and Real-Time (RT) Energy Markets and calculates prices for eight zones in New England. Each state is one zone, except for Massachusetts.

Average wholesale prices have dropped with lower demand and fuel prices. Prices remain well below 2008 levels. The cost of out-of-merit generation needed in transmission-constrained areas fell dramatically from \$180 million in 2008 to less than \$4 million in 2010 and 2011 (YTD) largely due to transmission upgrades in Southwest Connecticut and Southeast Massachusetts. ●●●



* Massachusetts has three zones: Southeastern Mass. (SEMA), Western/Central Mass. (WCMA), and Northeastern Mass./Boston (NEMA/Boston).

Transmission

Northeast Utilities (NU) and National Grid are developing transmission projects known as the New England East-West Solution (NEEWS) to improve the ability to move power between east and west in New England and strengthen reliability in Greater Springfield, Connecticut and Rhode Island. NSTAR and National Grid are developing transmission projects to address long-term reliability needs in the North Shore/Merrimack Valley area and in lower Southeast Massachusetts. The ISO is studying reliability needs in the Greater Boston and Western Mass areas. Changes in the forecast of electricity demand or development of market-based responses to system needs can affect the need for transmission projects, and the ISO re-evaluates these needs as part of the planning process. ●●●

Strategic Planning Initiative

ISO and stakeholders are evaluating several key risks that will impact the region's power system and wholesale electricity markets. Near-term risks include resource performance and flexibility, and increased reliance on natural gas-fired capacity. Long-term risks include potential retirement of generators, integration of a greater level of variable resources (e.g., wind and solar), and alignment of markets with planning. ●●●

About ISO New England

ISO New England is the Independent System Operator responsible for ensuring the reliable operation of the New England electric grid, administration of the region's wholesale electricity markets, and administration of the regional Open Access Transmission Tariff, including regional system planning. The ISO is a not-for-profit corporation governed by an independent Board of Directors. The ISO does not own transmission or generation assets and has no financial interest in any companies participating in the region's wholesale electricity markets. ●●●

Sources and Additional Information

U.S. Census Bureau, *2011 Regional System Plan, 2010 Annual Markets Report*, FCA results, and other public ISO information.

ISO New England: www.iso-ne.com

MA Dept. of Public Utilities and Dept. of Energy Resources: www.mass.gov (State Agencies: Energy & Environmental Affairs)