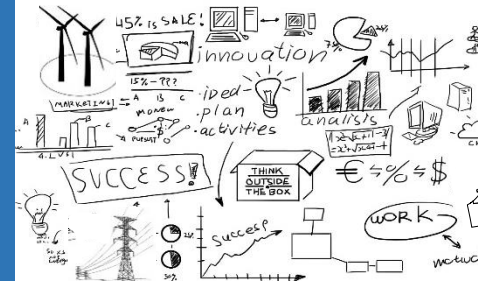


Power Switch

The Future of the Electric Power System in the Northeast and the Disruptive Power of Innovation



Quick Take

The Northeast states have been at the vanguard of the changes that are transforming how electricity is produced and delivered in the United States. *Power Switch*, a new report from M.J. Bradley & Associates, explores the trends that are reshaping the electric power markets in the Northeast, and the future challenges and opportunities for the states in this region.

Rapid advancements in technology, low gas prices, and policy choices have already led to significant changes within the electric power markets. In New York and New England, for example, coal-fired generation has declined by more than 80 percent since 2005. Looking ahead, there are more changes to come with continued advances in technology, further adjustments to the Regional Greenhouse Gas Initiative (RGGI) (the nation's first carbon trading market), and new clean energy targets. The Northeast states have been successful in cutting carbon pollution from the electric sector while growing their economies. Now, they have broader ambitions to reduce emissions economy-wide. This will require more policy innovation, more investments, and a smarter and more nimble electric grid.

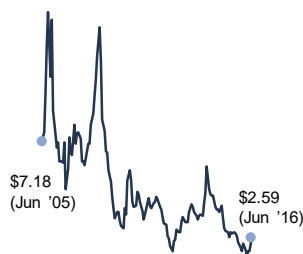
These changes create challenges, but also exciting new opportunities for the region. The future of the electric system will include more interconnected devices, more intermittent renewables, and a more distributed grid. We hope that this report will be a helpful introduction to these topics, as state leaders and stakeholders continue to pursue policy frameworks to drive innovation, economic development, and a low carbon energy future. The industry is at a crossroads, there will be significant changes ahead, and a new constant of disruption, innovation and economic opportunity.

“Thanks to breakthroughs in high performance computing and materials science, a whole generation of vastly improved or entirely new technologies is likely to be unleashed on us in the very near future. And that surge of innovation will not stop. It will, in fact, accelerate.”

Peter Kelly-Detwiler, Northbridge Energy Partners

Some of the Key Trends Shaping the Northeast Electric System

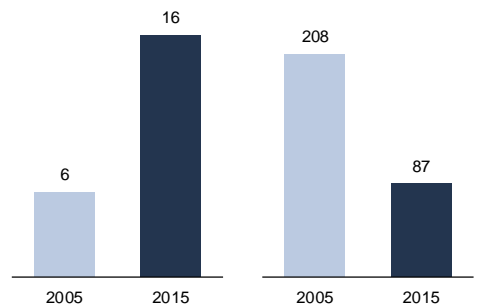
U.S. Henry Hub (\$/MMBtu)



64%

Decline in natural gas spot price

Northeast Generation (TWh)



184%

Increase in non-hydro renewable generation

58%

Decline in coal-fired generation

Source: U.S. Energy Information Administration (EIA) Henry Hub Sport Price, Fuel Consumption for Electricity from the State Energy Data System and Form 923 Monthly Generation and Fuel Consumption; MJB&A Analysis.

Transformational change – is already well underway

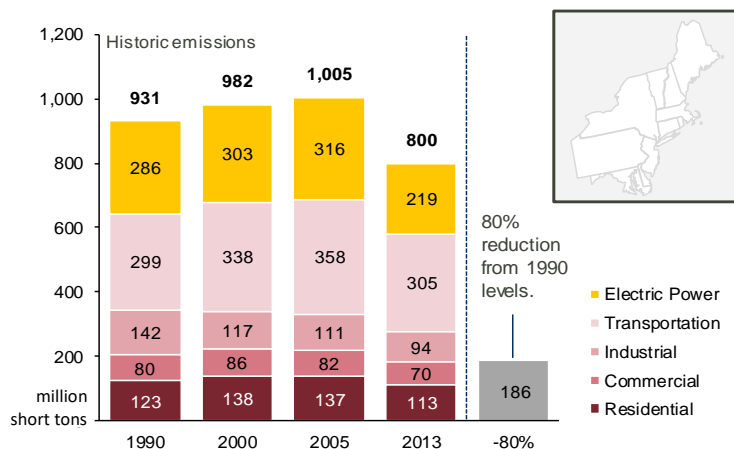
Technology innovation is giving energy producers and consumers new options to generate, use, manage, store, and save electricity. In Rhode Island, the first commercial offshore wind project in the U.S.—the Block Island Wind Farm—will begin commercial operation in 2016, and Massachusetts recently passed a new energy law that requires utilities to procure a combined 1,600 megawatts of offshore wind by 2027. New York leads the region in on-shore wind generation, and is seeking to meet 50 percent of its electricity needs with renewable sources by 2030. Vermont is pursuing a policy of “energy transformation” by switching to cold-climate heat pumps and electric vehicles. States throughout the region are working to advance energy storage technology through procurement mandates, pilot programs, and market design changes. In Boothbay Maine, battery technology has been deployed to alleviate strain on the transmission system. The Northeast has long embraced innovative energy policies and technologies, and continues to be at the vanguard of the transition that is reshaping the U.S. electric system.

Ambitious goals ahead – but tools are available

Many of the Northeast states have set ambitious mid-term and long-term economy-wide, carbon reduction goals, with most aiming to achieve an 80 percent reduction in carbon emissions by 2050. A pathway to achieve these targets would be to continue decarbonizing electricity production and supply with more clean energy, while at the same time transitioning transportation and heating buildings from fossil fuels to electric power. The basic building blocks to achieve such an outcome are already largely known today, like electric vehicles, energy efficiency, wind and solar, fast ramping gas plants, transmission, advanced lighting and controls, cold climate heat pumps, and energy storage devices. However, they have yet to be deployed at the scale required to meet the goals set by the states. The rapid pace of innovation that we are witnessing with these technologies indicate that such a transition will become increasingly feasible, as companies continue to enter and compete in this new economic space and consumers embrace new clean energy options.

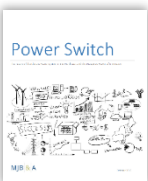
“As the electric system transitions to low- and zero-carbon technologies, electrification will offer an important opportunity for reducing carbon emissions throughout the economy. Greater reliance on electricity for transportation and heating offers the opportunity for dramatically reducing air pollution emissions.”

Northeast CO₂ Emissions and 80% Reduction Goal



Source: U.S. Energy Information Administration (EIA), Carbon Dioxide Emissions from Fossil Fuel Consumption by Sector by State, Released October 26, 2015.

For questions and comments, please contact:



Christopher Van Atten
Senior Vice President
M.J. Bradley & Associates, LLC
vanatten@mjbradley.com +1.978.369.5533

Power Switch (and companion video) is available at: www.mjbradley.com/market-trends

