Acadia Center

EnergyVision 2030

New England

Companion Brief

An Achievable Vision for New England

Clean energy technologies offer an historic opportunity to build an energy future that produces large benefits: modernization of our energy systems, better options for all consumers to control energy costs, advanced economic growth, and dramatically reduced climate pollution. Many New England states are already leading this effort by excelling in energy efficiency, increasing renewable generation, and expanding market penetration of electric vehicles and heating systems. As New England states make these commitments, questions arise: how much impact will current efforts have? What can we do to make progress toward state and regional goals?

EnergyVision 2030 takes a comprehensive look at where efforts to expand clean energy resources can lead, how consumer adoption and market penetration rates can grow, and what increases in clean energy efforts are needed to attain emissions goals.

EnergyVision 2030 data show that progress is being made and with further strategic action expanding adoption of modern, market ready technologies can reduce emissions 45% by 2030: a target needed to put New England on the path to meet scientifically directed emissions reductions of 80% by 2050. By acting now to remove barriers, facilitate consumer adoption, and reform outdated rules and financial incentives that encourage investments in old and expensive energy choices, the region can benefit all residents and achieve its climate commitments.

EnergyVision 2030 suggests one pathway to advance adoption of clean energy technologies in four core areas—grid modernization, electric generation, buildings, and transportation—and demonstrates that even relatively modest increases of these technologies can significantly reduce emissions while delivering consumer and economic benefits.

Grid Modernization

Energy Grid

Today's grids—and the policies that govern them—are often out of sync with technological advances and consumer expectations for a clean, reliable energy system. Clean, local energy resources like energy efficiency, distributed renewable generation, and energy storage are tools that can solve grid problems instead of relying only on building expensive infrastructure projects. Updated rules, planning processes, and financial incentives can enable the adoption of technologies critical to meet 2030 and longer term emissions reduction targets.

Advanced communication and management systems can unlock the potential of flexible customer demand and managed usage, or load, to efficiently optimize the grid. These improvements will lower consumer energy bills, maximize the value of renewable energy generation, and reduce overall system costs. The modern grid will empower consumers to better control their energy use and costs, if it establishes fair rates for all consumers.

Massachusetts, Rhode Island, and Maine have all taken preliminary steps to start grid modernization processes, but much more must be done throughout the region to fully support a low-carbon grid.

Demand Optimization

To take full advantage of emissions-reducing technologies, the electric grid needs to be updated. Optimizing energy usage allows us to reduce demand on the grid strategically, ultimately reducing the peak level of demand when the grid is most strained and expensive to run. Optimization can supply energy according to user needs and when renewable generation is available. It can be accomplished through demand response, active load management, and energy storage. Demand response (DR) provides the ability to reduce or shift energy consumption during periods of high demand, traditionally done through coordination between utilities and large customers. Active load management (ALM) is similar to DR but automated so that large numbers of smaller customers can participate, often without a discernible change in service. Energy storage, such as batteries, can store power and release it later.

Acadia Center analysis shows that **demand optimization could contribute a total of 5,138 MW of resources in New England by 2030,** reducing the need for additional generation and related infrastructure.

Electric Generation

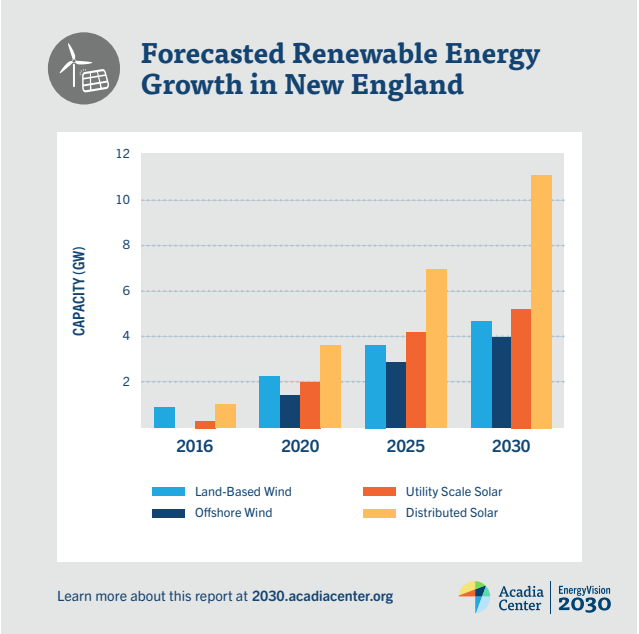
Solar and wind power are emerging as cost-effective alternatives to traditional fossil-fueled generation sources. New England has vast untapped solar, land-based wind, and offshore wind resources. Harnessing this clean, low-cost generation is critical to meeting the 2030 emissions target.

Grid-Scale Generation

The sources of electricity generation in New England have shifted significantly from 2001 to the present. Coal use declined from 16% to 4% and natural gas increased from 29% to 49%.[1] This shift initially reduced greenhouse gas emissions by pushing out less-efficient coal plants, but the region's increasing overreliance on natural gas will provide the states with few additional emissions benefits and increases risks of price volatility or supply disruption. Expanding renewable generation is a less risky alternative that provides stable costs, mitigates fuel price risk, and reduces emissions.

To realize the benefits of renewables and meet the 2030 emissions target, **42% of New England's generation needs to be Class I renewable (i.e. primarily wind and solar) in 2030**—nearly double the requirements under current state renewable portfolio standards (RPSs). To achieve this scale of renewable energy generation, New England can increase solar 12-fold and land-based wind six-fold. 7,400 MW of offshore wind is already leased for development.

The Regional Greenhouse Gas Initiative (RGGI) cap and trade program can help support this development, and New England must work with the other RGGI states to solidify and build on the program's success.



Distributed Generation

Distributed generation (DG) such as rooftop solar provides emissions-free renewable energy that advances energy independence and can reduce the need for utilities to build new transmission and distribution infrastructure. To reach the 2030 emissions target, **10.9 GW of distributed solar[2] capacity** will need to be added across New England. To ensure widespread adoption of distributed energy resources, the region must reform how regulators assign monetary value to local, distributed solar. States must also develop appropriate compensation models and planning processes to put solar in reach of all customers.

Buildings

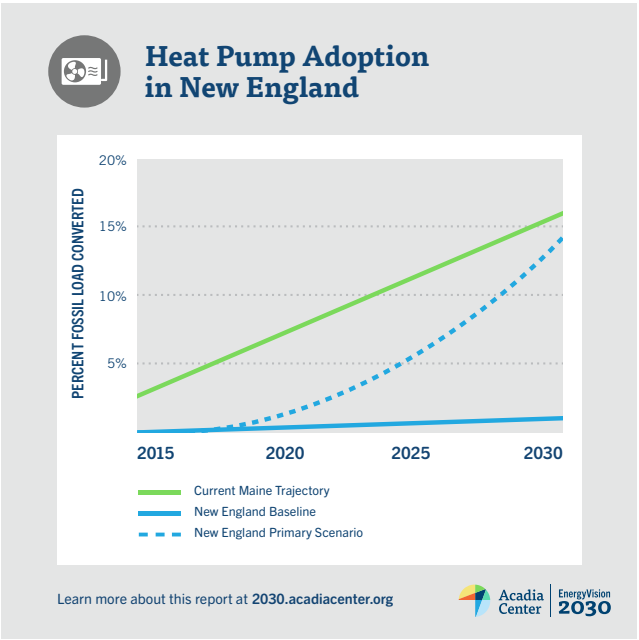
Buildings offer significant energy efficiency investment opportunities that can be combined with clean heating technologies to provide deep emissions reductions.

Energy Efficiency

New England is a national leader in investing in energy efficiency. Not only is efficiency the lowest cost and cleanest energy choice, it provides enormous economic gains, creates jobs, and saves consumers money. It also provides healthier, more comfortable spaces in which to live and work. Energy efficiency works hand in hand with coordinated improvements in our energy system: by reducing overall demand for energy, energy efficiency allows renewable energy resources to ramp up and it offsets increased electricity demand from electric vehicles and heat pumps.

Many New England states have strong efficiency plans, but states must continue to show a sustained commitment to energy efficiency in order to reduce energy consumption and minimize costs. Leading states like Massachusetts and Rhode Island have achieved the highest electric savings rates in the country—approaching 3% annually—demonstrating the large market potential that exists for cost-effective efficiency investments. **New England must achieve at least 2.5% annual efficiency goals** on average to reduce emissions from electricity generation and offset additional demand from new technologies.

In addition to electric efficiency, heating fuel efficiency must also increase through building weatherization. **Natural gas and delivered fuel (fuel oil and propane) efficiency savings must increase to 1.4% and 1.2% per year,** respectively, to help achieve New England's emissions goals. To achieve these targets, states need to capture all cost-effective efficiency, sustaining or improving their current efforts.



Heat Pumps

Heat pumps are an efficient electric renewable heating and cooling technology for residential and commercial buildings. They use air to air exchangers or ground source loops to transfer heat between the inside and outside of a building. Even in the coldest weather, a heat pump is far more efficient than traditional electric heating and can displace heating from oil and gas at very low temperatures. Acadia Center modeling shows **that 14% of oil, gas, and propane heating systems in homes** and businesses need to convert to heat pumps by 2030 to put the region on track to meet its emissions goals. To capture this potential, heat pumps must be promoted through incentive programs, consumer education, workforce training, and electric rate design.

Transportation

Transportation is the largest source of emissions in New England and traditionally the most difficult emissions sector to address, but rapidly evolving technology offers deep reduction potential.

Electric Vehicles

An electric vehicle (EV) emits less than half of the CO2 of a conventional vehicle, and EVs will produce even fewer emissions as technology improves and more electricity is produced by renewables.[3] EVs are a practical, commercially available technology that can save consumers money, even at today's low gas prices. CT, MA, RI, and VT have committed to put about 537,000 zero emission vehicles on the road by 2025.[4] These commitments can be expanded to include all New England states and strengthened through an ambitious but achievable 2030 target: **14% of cars and light trucks and 2.5% of medium-duty trucks electrified.** Deployment will require smarter electric rates that make EVs more attractive to drivers and consumer incentives to facilitate EV purchases. Pricing transportation emissions will accelerate EV adoption while raising funds for rebates, electric vehicle charging infrastructure, transit, and other transportation sector investments.

Increasing Mobility Options

In both rural and more congested areas, improving the availability of driving alternatives such as public transit, walking, biking, carpooling, and ride-hailing services can reduce the number of vehicle miles traveled (VMT) and related emissions. To meet emissions targets by 2030, **New England can slow projected VMT growth from 11% under current policies to 5%**, a VMT reduction of 5% over a 15-year period. To put this in perspective, VMT in the Northeast dropped 5% in the period of 2007 to 2011, an equivalent reduction in only 4 years. The region can reach this target in several ways: transit programs can expand in urbanized states with below average numbers of public transportation commuters such as Connecticut and Rhode Island. Rural areas can expand bus and on-demand ride services to improve connectedness. States can improve zoning regulations to create vibrant, walkable communities, improve connectedness, and preserve open space.

References

1 https://www.eia.gov/electricity/data/eia923/
2 In EnergyVision 2030, distributed solar refers to commercial, municipal, community, and residential solar.
3 Acadia Center analysis, EnergyVision, 2014: http://acadiacenter.org/document/energyvision/
4 Acadia Center et al. Charging Up: http://acadiacenter.org/document/charging-up/

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