



## Empowering New England with Clean Energy

*Clean Energy 2025 - How New England Governors can blaze the trail to a clean energy future*

July 2014

New England is well on its way to a clean energy future. In some parts of the country clean energy is subject to debate, but in New England, it is a clear opportunity. At the end of the pipeline and with no coal, oil, or natural gas of our own, New England pays top dollar for the fuels we import for electricity, heating, and transportation, and our states suffer from price volatility, supply shortages, and money that leaves the local economy to meet our energy needs. For New England, energy security means capturing the homegrown resources of wind, solar, biomass, and energy efficiency – that is, clean energy. Blessed with the intellectual, financial, and human capital to develop the technologies, products, and services that capitalize on these resources – and sell them to the world – New England has its future in clean energy.

In 2014, all six of the New England states have gubernatorial elections. That means, in at least some cases, New England's clean energy future will be in the hands of new leadership. To assist the region's next Governors, the NECEC Institute undertook analysis of the potential for the next stage of clean energy growth and the policies necessary to make the most of it. It is our pleasure to present this report – *Empowering New England with Clean Energy* – to all the aspirants to state leadership in our region.

There is a strong foundation to build on. New England has seen notable clean energy progress in the last half dozen years, with more than double the amount of renewable energy generated from wind, solar, biomass and other renewables. New England states lead the nation in energy efficiency investment, and in money saved by households and businesses. The region has begun to develop a world-class industry creating technologies, products and services to serve a rapidly growing global clean energy market. If fostered and supported, this sector will continue to thrive, creating jobs that range from development and manufacturing of innovative new clean energy technologies to be deployed throughout the world, to local installation of renewable energy and energy efficiency technologies that save money and meet the needs of energy consumers throughout New England.

New England needs leaders who will *champion* clean energy and the policies that support its continued growth and contribution to the region's economy, energy system and environment. The next New England Governors should strive to enable energy markets that drive innovation, scale clean energy in a cost-effective manner and advance our region to a 21<sup>st</sup> century energy system. *Empowering New England with Clean Energy* provides an overview of the clean energy policies that the next New England governors should embrace to grow the region's clean energy economy to a position of global leadership, and advance the region on its path to a clean energy future that creates a more sustainable and resilient economy, drives job growth, and protects our environment. These policies fall into five areas:

- **Renewable Energy:** Renewable energy is New England's only indigenous energy resource and is becoming increasingly cost-effective as markets have grown. The next New England Governors should commit to consistent policies that extend and expand standards, renewable credits, financing mechanisms, competitive procurement structures, as well as support for large projects, community-scale, distributed generation and new technologies, to increase renewable energy and related companies and jobs.
- **Energy Efficiency:** Energy efficiency is our least cost energy resource. The region's next Governors should support policies that create and grow market opportunities for energy

efficiency, expand codes and disclosures that accelerate building efficiency investments, expand programs for deeper building retrofits and adoption of new technologies, and consider new “green bank” financing models to lower capital costs and accelerate return on energy efficiency investment.

- **Innovation:** The next New England Governors should commit to creating and expanding policies and programs to support innovation, entrepreneurial development and market acceleration for next generation clean energy technologies and innovative business models.
- **21<sup>st</sup> Century Electricity System:** The region’s next Governors should commit to policies that will foster the creation of a modernized electric grid, with two-way information and power flows, that can link and serve as a platform for both centralized power plants and customer-sited distributed generation, while enabling demand reduction, and new innovations and energy services.
- **Carbon Reduction:** The next New England Governors should endorse their state’s participation in the Regional Greenhouse Gas Initiative and work to strengthen it by exploring options to expand RGGI to other states and other sectors of the economy, as well as develop policies and roadmaps for natural gas to be a bridge, not a barrier, to a low-carbon economy in the long term.

## Renewable Energy

New England is at the end of the energy pipeline and sends billions of dollars outside the region’s economy each year to pay for imported fossil fuels for electricity and transportation, making the region vulnerable to high and volatile energy prices. Diversifying the region’s energy supply with renewable energy is the only way New England can keep its energy dollars in the region, and the most efficient way to allow energy consumers to secure the stable energy prices that aren’t subject to price volatility, needed to grow our economy and to clean our environment.

Over the last decade, the region’s electric grid has shifted from one predominantly fueled by oil, coal and nuclear to one fueled by natural gas. With nearly 50 percent of our energy coming from natural gas<sup>1</sup>, the region is exposed to significant price volatility and seasonal supply constraints. Natural gas cannot become a larger part of the mix without increasing our vulnerability. To meet our long-term GHG reduction goals and continue to scale the value and competitiveness of renewables, gas fired generation as a percentage of the mix needs to be reduced over the long term by adding a diverse array of renewables and other non-emitting resources.

The good news it is that the amount of renewable energy powering our region has been steadily growing, due in large part to forward-thinking public policy and increasingly innovative and competitive energy markets that are driving distributed generation and energy efficiency, as well as large utility scale renewable energy power plants. These market signals and increasingly competitive procurement mechanisms have contributed to double-digit annual cost declines for renewables, with onshore wind already becoming competitive with other forms of generation. It is expected that by 2020, 15 percent of the region’s energy will come from renewable sources and hydro. However, many of the states’ current renewable energy policies, standards and programs, which were designed to achieve 2020 goals, are in need of expansion. The region’s next Governors should establish policies to drive the development of renewable energy beyond 2020. Governors in 2015 must prioritize the next major clean energy transition in the 2025 to 2030 timeframe with the following policy commitments:

- Expand each state’s Renewable Portfolio Standard by an accelerating annual rate, targeting 25% renewables by 2025
- Commit to supporting programs that spur onshore renewable energy deployment, such as competitive solicitations, Long Term Contracting, Renewable Energy Credits, bulk community-

---

<sup>1</sup> ISO-NE, 2014 Regional Electricity Outlook

buying programs such as “solarize,” new financing structures that lower capital cost and financing terms, and growing private sector competition combine to drive down the cost of renewable energy for consumers.

- Implement innovative policies to spur the same shifts for the region’s largest energy resource— offshore wind. With five to ten gigawatts of potential energy resources, offshore wind is truly New England’s ticket to mastering its energy future and achieving a carbon free economy. The next New England Governors should commit to working together to create a roadmap that lays out policies and programs that create markets for offshore wind to achieve grid parity by 2030.

## **Energy Efficiency**

Energy efficiency is the easiest, cleanest and cheapest way to meet New England’s energy needs, save energy consumers money and create local jobs in the regional economy. The combination of old housing stock and high energy prices compared to the rest of the country makes energy efficiency a no brainer for New England. The region’s nation-leading energy efficiency policies have spurred more than \$3.3 billion in energy efficiency investments. This investment is expected to deliver \$19.5 billion dollars in economic benefits, and billions of dollars that will recirculate into the New England economy.<sup>2</sup> Despite such achievements, the region has just begun to tap the potential of energy efficiency. A mere one percent of buildings have seen significant energy efficiency upgrades. At the current rate, it will take 50 years to upgrade all of New England’s housing and building stock.

The next New England Governors should make pursuing all cost-effective energy efficiency a policy priority. They should commit to applying innovative approaches to drive energy efficiency adoption, embracing new technologies, financing mechanisms and business models that can open the door to broader and deeper impact energy efficiency projects that scale across neighborhoods, communities and municipalities. In addition, the next New England Governors should establish the following policies to create and promote more market opportunities for energy efficiency, while educating homeowners, building owners and businesses about energy efficiency and its associated economic and environmental benefits.

- Accelerate state’s annual electric savings targets to achieve 15 percent demand reduction by 2025
- Require utilities to submit and implement plans for reducing peak demand, which represents one of the largest areas of potential bill savings for New England customers
- Establish Home Energy Ratings, which would be disclosed before the sale of any home, and Building Energy Reporting and Disclosure Ordinances, requiring larger buildings to report annual energy and water use, and update and enforce compliance with more stringent building energy codes
- Accelerate the introduction of new technologies, models and projects into energy efficiency markets, such as treating voltage optimization<sup>3</sup> and combined heat and power (CHP) as an energy efficiency resource, expanding deep energy retrofits, and supporting investments in next generation building controls.

To further expand energy efficiency, the next Governors should expand innovative “green bank” financing programs, similar to those in Connecticut and New York, that utilize public/private structures to lower financing costs and offer long-term repayments to enable deep energy efficiency projects (often combined with onsite renewable generation) that pay for themselves from day one.

---

<sup>2</sup> ENE, *Energy Vision*

## **Clean Energy Innovation and Regional Competitiveness**

New England's clean energy researchers, entrepreneurs, engineers, business executives, labor and investors are driving economic growth, stimulating creation of new jobs and businesses, and helping create a cleaner energy system as they develop new and innovative clean technologies and services. The new innovations being developed by the region's leading entrepreneurs will not only keep New England on its clean energy path but can also scale to solve some of the world's greatest energy challenges. With its density of academic and research institutions, and with one of the leading innovation economies in the entire world, New England will always attract talented business people who want to start companies in the region. With our innovation resources as a solid foundation, there are numerous steps the next New England Governors can take to further and foster clean energy research and entrepreneurship to ensure that innovative clean energy companies start, grow and stay in the region.

Clean energy innovation and company growth mirrors many aspects of other innovation sectors that have been strong parts of the New England economy, including information technology and life sciences. The region's states have played a variety of roles to support growth of these industries, and to address funding, siting and institutional barriers to regional growth. Clean energy innovations have particular challenges that need the public and private sectors to take a combination of actions. The private sector needs to lead with entrepreneurs and investors taking appropriate private sector risks. And the public sector needs to provide additional support and market structure assistance at two stages:

- 1) Initial seed funding and access to technical and venture development assistance to enable technical and business proofs of concept that are often a prerequisite for private investment; and even more so
- 2) Partnership and funding at pilot / demonstration and early commercial scale-up – a stage only partially supported by private capital, and where ventures look for sites to deploy and scale their company in close proximity to partnerships and markets.

The next New England Governors should commit to creating and expanding policies and programs to support innovation, entrepreneurial development and market acceleration for next generation technologies. This can be done through the creation of an economic development agency or state clean energy center (such as the Massachusetts Clean Energy Center), whose sole mission is to expand the clean energy economy and provide support for clean energy innovation. Such an entity should support:

- Programs that fund research and early-stage company milestones: Grant and/or investment programs for incubators, accelerators and individual clean energy companies at formation, seed and early stages to solve the financing and venture assistance gap.
- Programs and mechanisms that support pilot / demonstration / site assessment / manufacturing projects: These include a variety of economic development tools such as tax treatment and special development zones; competitive opportunities for partial public sector funding for pilot, demonstration and first-of-a-kind projects and manufacturing investments; as well as regulatory changes that enable utilities and other major companies to invest in pilot and demonstration projects for promising new cleantech technologies.
- State subsidized internship programs: Provide stipends for companies to hire summer interns, are an example of a low-cost, high-impact way to support cleantech startups, while building a stronger more experienced clean energy workforce and keeping talent in the state.
- "Leading by Example" Early Adopter programs that involve State agencies and assets, and also provides State assistance to municipalities, colleges, universities and others to be first customers for new cleantech innovations.

## **Advance a 21st Century Electricity System**

New England has one of the most reliable electric grids in the world, but it was built on a model of large, centralized, fossil fuel power plants and one-way power flows across a network that lacks the ability to send real-time information to the grid operator, or real-time market signals to consumers to use energy more effectively. In recent decades the use of new clean energy technologies has fundamentally changed the energy landscape. Today, consumers are increasingly asking for more control over their energy use, sources and costs and are installing “distributed” (rather than centralized) energy resources, such as rooftop solar, energy efficiency and demand response. In addition, more large-scale renewable energy generation, which operates intermittently, is replacing dispatchable fossil fuel power plants. While renewable energy and efficiency are experiencing accelerating growth and delivering benefits across the region, this dramatic shift has exposed significant limitations of our current electricity grid, with little two-way communications capability and real-time network management to effectively integrate distributed and renewable generators and changing patterns of usage.

Looking ahead to 2025, we may see 10 times the number of households with solar PV and other distributed generation technologies. There could be hundreds of thousands of electric vehicles plugging into the grid to recharge and integrate into home and neighborhood micro-grids. And there will be new technologies we cannot even imagine today. These smarter homes, appliances and buildings, as well as the potential for neighborhood and campus micro-grid systems will effectively change our electricity system from the historical centralized generation model, to a distributed network of smart local sub-networks, real-time information and communication, supported by pricing signals that help efficiently balance supply and demand.

The Northeast and the nation are just starting to consider the changes that need to take place in our electricity system to respond to the changing demands of customers and the innovative new technologies being deployed on the grid. Efforts to develop a modern, 21<sup>st</sup> century electric grid are underway in Massachusetts and New York and should be a key policy priority throughout the region. This effort will require changes to the regulatory framework that oversees utility investments in infrastructure, new roles for utilities as a platform and partners to clean energy products and services, all unleashing more innovation and competition to provide valuable new energy services to consumers. This modern system must include utilities and the clean energy industry working together to provide access to energy data and deliver innovation and new ways of meeting customer needs.

The discussion on the role of utilities and our electricity system has begun with how to integrate increasing amounts of distributed generation and demand side resources, reduce outages, improve efficiency and increase resiliency. This effort is also looking ahead to how to create and transition to a 21st century electricity system that will enable a cleaner, more reliable and resilient electric grid that will strengthen our economy and society. This transition is still in the early stages. It will need the political leadership of the next state administrations to ensure a successful outcome.

New England's next governors should commit to advancing modernization of the electricity system by adhering to the following principles:

- Openness to innovations that enhance customer choice and control.
- Integration of renewables, energy efficiency, demand response, energy storage, and a host of new technologies through a more intelligent and dynamic grid in order to capture their full benefits for customers.
- Evolution of the role of utilities to become platform managers of an efficient, smart and cleaner grid that enables cost-effective energy services for customers from a variety of service providers, including third-parties.

- A utility regulatory framework that is forward-looking, performance-based, transparent and encourages planning and investment that will drive the efficiencies, innovation and the resiliency that a growing economy needs.
- Investment in the distribution grid infrastructure and integration services that become enablers to increasing levels of renewables, storage, micro grids, and grid-connected smart resources, and new technologies that are not yet part of today's energy system.
- Engagement of a broad group of stakeholders to educate, inform and garner support for the framework and investment needed to create a robust, resilient efficient and clean energy system.

## **Carbon Reduction**

From 2000 to 2010, New England saw regional carbon emissions drop 12 percent, due largely to the increase in cleaner energy generation, such as natural gas and renewables, and energy efficiency.<sup>4</sup> This reduction in carbon emissions accelerated from 2009 to the present due in part to the region's participation in the nine-state Regional Greenhouse Gas Initiative (RGGI)—the nation's first market-based regulatory program to reduce greenhouse gas emissions. The region's carbon emissions drop has been accompanied by economic growth and a decline in energy costs, proving that reducing carbon emissions is also good for economic growth and the region's effort to rebuild its economy on clean energy. In fact, from 2000 to 2010, the economies of the ten Northeast states participating in RGGI grew twice as fast per capita as other states while per capita carbon dioxide emissions declined 25 percent faster. Recent data shows that a steady drop in electricity prices has accompanied reductions in the region's carbon emissions.<sup>5</sup>

The next New England Governors can reduce the environmental impact of the region's electricity system by committing to supporting and continuing to strengthen RGGI. This regional initiative has provided more than \$1.6 billion in economic value, created 16,000 jobs, and will save customers nearly \$1.1 billion on electricity bills and an additional \$174 million on natural gas and heating oil bills over the next decade.<sup>6</sup> These results have taken place largely because most RGGI funds have been directed to energy efficiency programs. It is vital to the growth of the region's economy that the next New England Governors commit to maintaining this mechanism.

New England's foresight in establishing RGGI puts the region ahead of others for compliance with the US Environmental Protection Agency's (EPA) draft Carbon Pollution Standard rules, which were released on June 2, 2014. Once finalized the rules will mandate state-specific carbon emission reduction rates that states must meet by 2030. Nationally, the rule implements a 30 percent carbon emissions reduction rate by 2030 with the New England states requirements ranging from 13 percent to 46 percent (MA - 38%, CT - 30%, RI 14%, ME - 13.5%, NH - 46%) Each state will be required to produce state-specific plans for how they will meet those targets. RGGI should be the main compliance mechanism in the New England states' compliance plans, and the next New England Governors should support the expansion of RGGI through 2030 to meet the EPA requirements. Additionally, as leaders of this unique regional cap and trade program, the next Governors should actively promote RGGI's benefits and value to other states, seeking to expand RGGI where appropriate beyond the current nine states. Expansion of RGGI to other states could create a larger and more efficient market for trading, and lower costs for GHG reduction compliance.

The regions next Governors should also lead in the development of state and regional roadmaps, policies, standards and market mechanisms to ensure that all aspects of our energy system become cleaner and a driver for our transition to a robust, reliable and secure clean energy economy. While a

---

<sup>4</sup> ENE, *Climate Vision 2020*

<sup>5</sup> ENE, *The Regional Greenhouse Gas Initiative: Performance To-Date and the Path Ahead*

<sup>6</sup> The Analysis Group, *The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States*

number of states have global warming GHG reduction targets and are considering other state mechanisms such as a carbon tax, a broad-based regional price on carbon provides a significantly more valuable market signal and opportunity to invest in the most cost-effective emissions reductions measures, as well as encourage a cleaner energy system.

While natural gas has played a major role in reducing carbon emissions from electricity generation, the region risks becoming over dependent on it as a single source of energy. As New England faces the retirement of about 25 percent of its electric grid's current generating capacity<sup>7</sup> (coal, oil, nuclear), it will need to look to new and cleaner sources of energy to power its future. Natural gas will continue to have a role to play but the six New England states should be discussing policies and standards to ensure that all aspects of our energy system, including natural gas, become cleaner for a robust and reliable clean energy future at the end of the "natural gas bridge." The next New England Governors should support the establishment of a roadmap for the retrofitting of fossil fuel plants with carbon capture and sequestration technologies or other technology and/or fuel changes that reduce GHG emissions over time.

## **Conclusion**

The next New England Governors have a unique opportunity to empower their communities and industries to fundamentally shift to a clean energy economy. Individual states can drive this effort by maintaining and introducing state policies to further clean energy innovation, company growth and regional markets for new energy innovations and services, as well as the deployment of renewables throughout the region's electricity system. However, the New England States must also act regionally and collaborate with public officials throughout the region on issues like transmission, procurement from large renewable projects and clean energy imports, 21<sup>st</sup> century electricity system structures, regional support to innovation and entrepreneurship, common financing structures that engage the efficiency of capital markets, and other efforts to drive regional clean energy growth. Further, the next New England Governors must partner with the clean energy companies that have added to the region's economic growth in the last decade, and those new cleantech ventures that bring promise of new solutions, ensuring that the industry is championed, engaged and represented as efforts to clean and modernize our energy system move forward.

There is no doubt that New England is on the path to a clean energy future but there is still much work to be done. The next New England Governors have the opportunity to ensure that the region remains on this path, and that New England leads in clean energy both nationally and globally for decades to come.

## **About NECEC (The New England Clean Energy Council and the NECEC Institute)**

NECEC is a regional non-profit organization representing clean energy companies and entrepreneurs throughout New England and the Northeast through programs and initiatives that help clean energy businesses at all stages of development to access the resources they need to grow.

The New England Clean Energy Council is the lead voice for hundreds of clean energy companies across New England, influencing the energy policy agenda and growing the clean energy economy. The NECEC Institute leads programs that support Innovation & Entrepreneurship, Cluster and Economic Development and Workforce Development.

NECEC's combined mission is to accelerate the region's clean energy economy to global leadership by building an active community of stakeholders and a world-class cluster of clean energy companies.

---

<sup>7</sup> ISO-New England