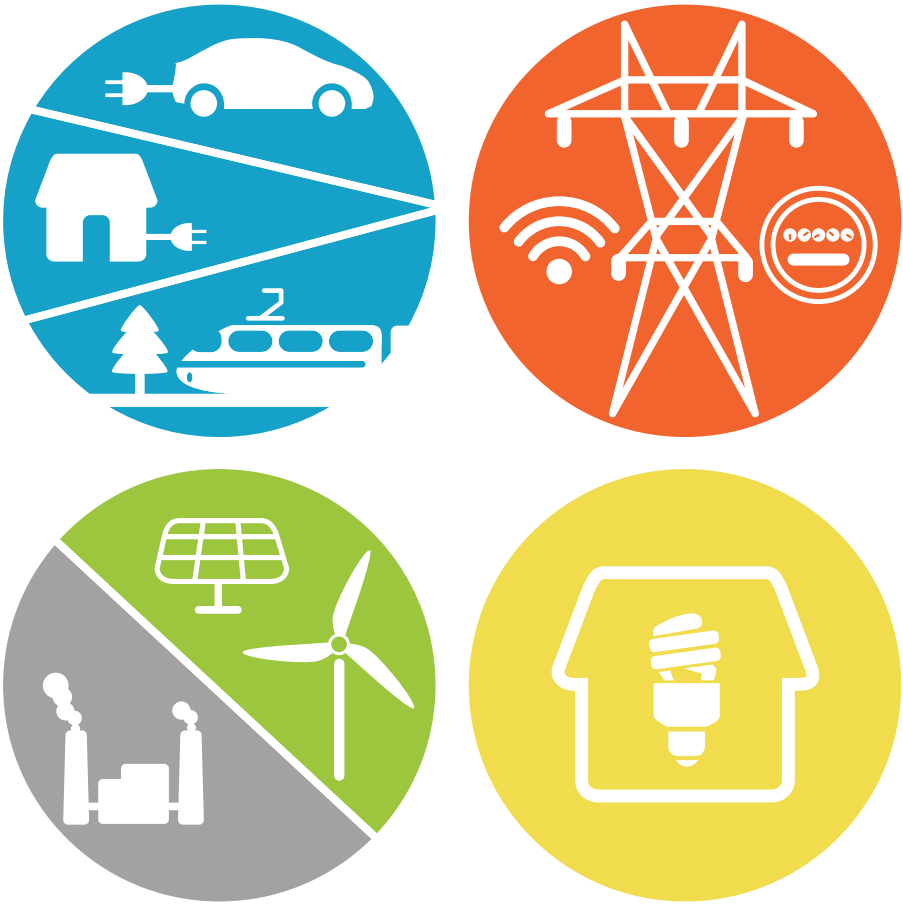

EnergyVision

A Pathway to a Modern, Sustainable, Low Carbon Economic and Environmental Future

ENE

About ENE

ENE is a nonprofit organization that researches and advocates innovative policies that tackle environmental challenges while promoting sustainable economies. EnergyVision is part of a series of ENE reports that focus on how states and regions can address the challenge of climate while improving economic and consumer benefits. EnergyVision was produced by ENE staff, led by Jamie Howland, Director, ENE Climate and Energy Analysis Center with primary contributions from Abigail Anthony, Varun Kumar and Daniel Sosland. Thanks to Eleanor Kung for visualization designs and to Headwaters Writing & Design for layout.

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The country is at a crossroads as it faces decisions over how to upgrade and expand its energy infrastructure. Investing in energy infrastructure is expensive: some estimate that trillions of dollars are needed to upgrade the nation's energy system. The energy investment choices that are made today will determine whether we build a resilient, reliable energy system – one that will maximize economic benefits, provide more consumer control, embrace new and emerging technologies and attain steep reductions in emissions of greenhouse gases.

Our core climate and energy challenge is to **construct a fully integrated, flexible, and low carbon energy network**. A smart and dynamic electric system, managed with the cooperation of utilities, power grid operators, consumers, and communities will be characterized by widespread clean energy supply and distributed generation, deep energy efficiency in increasingly electrified buildings and vehicles and incorporation of new energy resources, business and consumer incentives and community energy systems.

The path that can achieve these goals – an EnergyVision – requires a cultural shift in how we think about our energy system. No longer will our energy dollars be poured only into massive power stations and miles of wire. The **new grid is centered on our homes and businesses**, where users control energy use and improve energy efficiency; install smart appliances; generate electricity from solar and other distributed energy sources; plug in our cars; connect to community wind, solar, and cogeneration; and earn incentives for using power when the grid is most available.

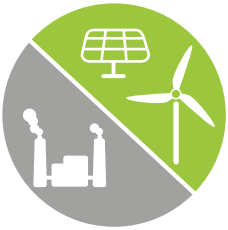
EnergyVision presents a framework for **how reforms in four interdependent areas** can be aligned to replace fossil fuels with clean, low carbon emitting electricity to heat our buildings, power our transportation systems, meet the many demands on our energy system and move us on the path to attain climate, economic and consumer goals.

Electrify Buildings and Transportation

Reliance on gasoline, diesel and heating oil is harmful to our environment and economy. Improvements in building heating and cooling equipment, appliances, and cars offer viable alternatives: high efficiency heat pumps can cut total energy needed to heat a home by 60% at competitive costs while emitting far less CO2 than natural gas. Electric vehicles produce only 40% of the emissions of a gasoline vehicle at 2/3rd less cost to operate per mile, while potentially providing energy storage and grid stability. Updated town planning that incorporates electrification of buildings and vehicles can advance more livable and cleaner communities.

Modernize our Electric Power Grid and Adopt a New Utility Business Model

The decades-old way we plan and manage the electric power grid and the regulations, rates and incentives governing utility and grid investments policies are outdated. They also fail to incorporate climate and consumer friendly innovations in technology. These policies and financial rules must be aligned with the region's clean energy, carbon reduction and economic goals. A decentralized, community-oriented energy system is more resilient and less prone to widespread storm damage that downs power lines, and is less vulnerable to international energy prices that are out of our control. Electric utilities, which would face substantial reforms, can be partners in advancing new electric markets.



Clean Electric Supply

Energy production is a leading contributor to climate change, but it doesn't have to be. Energy generation can be cleaner. In the six-state New England electric power grid, the two most polluting fuels – oil and coal – have fallen from 27% of our power mix to only 3% in the past 10 years. Policies that incentivize increased deployment of renewable, clean energy and put a fair price on pollution will keep moving us toward a clean electric supply.

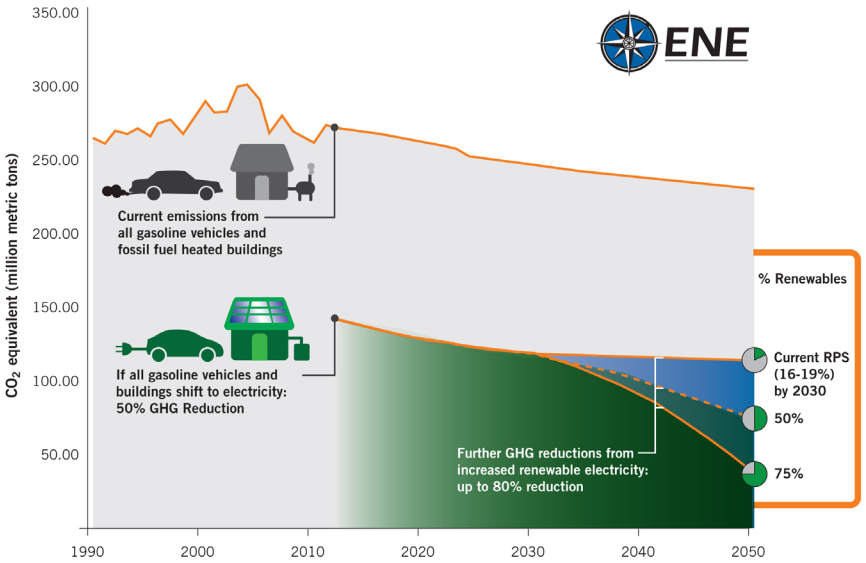
Maximize Energy Efficiency

Energy efficiency is the cheapest and cleanest "fuel." It creates huge savings for consumers and is the keystone to a sustainable, low carbon energy future. Massachusetts's current 3-year efficiency plan will save enough energy to power 500,000 households while producing over $6 billion in net economic and consumer benefits. By reducing demand on the power grid, efficiency lessens the burden of shared infrastructure costs; efficiency resources contributed to the recent cancellation of over $400 million in proposed power infrastructure additions. Efficiency programs need to expand and evolve to align with the needs of a modernized grid and increased renewable generation. Programs can target locations where reliability and system needs are greatest.

Deep Carbon Reductions

The implications of this new system on reducing carbon emissions are potentially dramatic. Assume, hypothetically, that with the flick of a switch, all gasoline powered cars on the road now and all buildings using fossil fuels immediately switched to modern electric technologies like electric vehicles and high efficiency air to air cold weather heat pumps. In that scenario, greenhouse gas emissions from these sources in the Northeast region – New England, New York and New Jersey – would be cut in half. With further efforts to transition electricity generation to renewable, in-region resources, emissions would continue to fall. This scenario illuminates the path towards meeting the 80% deep reduction target by 2050 that many states and intergovernmental accords like the New England Governors and Eastern Canadian Premiers have set:

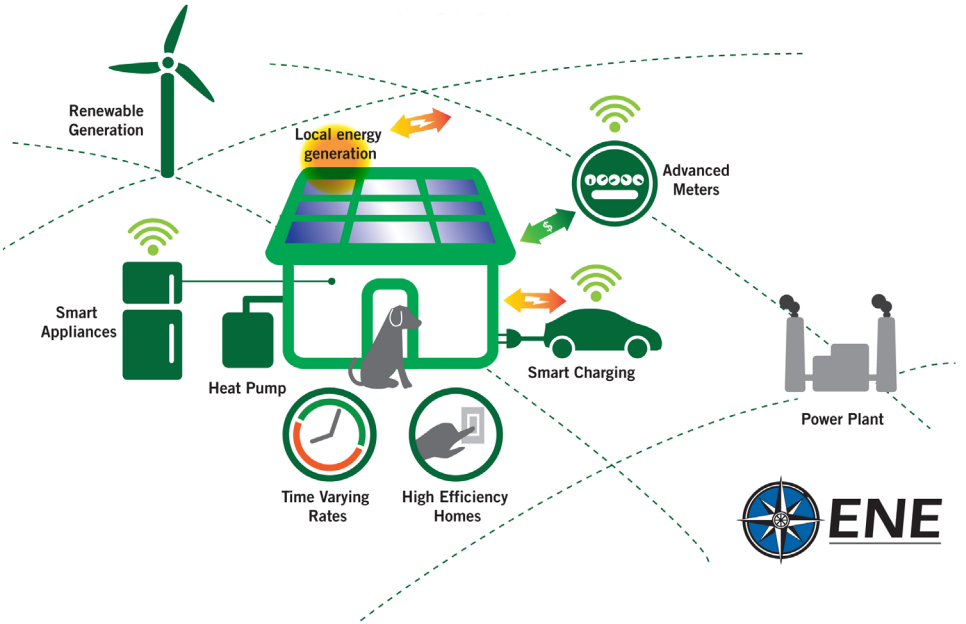
Full Electrification Illustration



Power Grid Reform is Key to the New Energy Future

The electric power grid – the connection between a clean, low carbon electricity generation and new electric technologies to heat buildings and power vehicles – needs to be modernized. To maximize consumer, climate and economic benefits and improve energy system resiliency in the face of storms and other disruptions, we need to **transform the "Old System" – a one-way route from power plants to homes and businesses – to the "New System" – a multi-directional path using many technologies to meet energy needs:**

Modern Grid System



The Need for Change

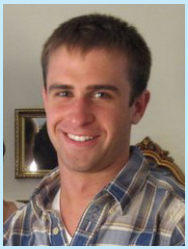
We operate our energy system in increasingly outdated ways that demand more: more power lines, more fuel, and higher costs; yet offer less – continued vulnerability to international energy markets, fewer local investments, less local control and inadequate protection from the risks of climate change. **In the Northeast alone, states are poised to spend billions of dollars on traditional infrastructure** – electric transmission lines, natural gas pipelines, distribution network expansions, and other large projects in the coming years – **and ratepayers will be paying the bill for decades**. But our energy future can start down a different path today – one that is consumer friendly, lower cost and cleaner. A **"Renewable-Ready" energy system can meet our needs today and build the clean, electrified energy system of tomorrow.** Many of these investments will have immediate economic and environmental benefits that will increase in the future. Starting now will put states on the cutting edge to reap the benefits of future breakthroughs in clean generation technology. State and regional leadership will be a national model for bold steps toward a strong economy and a secure energy future.

ENE's EnergyVision charts the four interrelated areas that will put us on the path to the energy future we want. Starting now puts states on the cutting edge to reap the benefits of a modernized system.

The re-visioning of our energy system gives greater control to customers; keeps consumer dollars in our communities and states; improves system reliability from storm and other threats that interrupt the current power grid; lowers energy costs; offers new markets for job creation; and, dramatically reduces greenhouse gases and other air and water pollutants. Technology has fundamentally changed telecommunications by giving greater tools and control to consumers. Technology can now change our energy system – if we make the right investment and regulatory decisions. ENE's EnergyVision charts the four interconnected areas that, together, will put us on the path to the energy future we want.

Look for the
Implementation RoadMap
in 2014

Learn about the
EnergyVision Framework at
www.env-ne.org/resources/detail/energyvision



Dedication to David LeClair

ENE dedicates EnergyVision to David LeClair, who tragically lost his life on June 14, 2013 in a bicycle accident during the Trek Across Maine, a normally joyful 3-day, 180-mile trip that attracts thousands of bicyclists in a fundraiser for the American Lung Association. David was riding with his employer group from athenahealth, a company that provides cloud based services in the health profession. David was known for his energy, enthusiasm and genuine kindness. As his friends and colleagues at athenahealth note, "David has shown us that caring is the greatest thing you can do in life – and he demonstrated what caring means in ways large and small." ENE was deeply moved when David's team at athenahealth selected ENE to receive a generous donation in his memory. We hope that EnergyVision, which sets forth an ambitious, positive pathway to a sustainable future, is a fitting tribute to David's enthusiasm and optimism and his passion for the environment. We are honored to dedicate EnergyVision to David.

Notes

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