



New Hampshire's 10 Year State Energy Strategy

APRIL 20, 2018

ESE BOARD PRESENTATION, CONCORD

NEW HAMPSHIRE 10 YEAR STATE ENERGY STRATEGY

- New Hampshire faces myriad energy challenges.
 - New Hampshire has the third highest electricity rates in the contiguous United States. On average, each New Hampshire resident spent \$3,934 on energy in 2015.
 - The purpose of this State Energy Strategy is to inform decisions about these challenges and the state's energy future.
 - The broadest goal of this update document is to provide a platform to improve energy policies and programs to best serve New Hampshire's needs.
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GOALS:

- 1. Prioritize cost-effective energy policies.**
 - 2. Ensure a secure, reliable, and resilient energy system.**
 - 3. Adopt all-resource energy strategies and minimize government barriers to innovation.**
 - 4. Maximize cost-effective energy savings.**
 - 5. Achieve environmental protection that is cost-effective and enables economic growth.**
 - 6. Government intervention in energy markets should be limited, justifiable, and technology-neutral.**
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GOALS CONTINUED:

- 7. Encourage market-selection of cost-effective energy resources.**
 - 8. Generate in-state economic activity without reliance on permanent subsidization of energy.**
 - 9. Maximize the economic lifespan of existing resources while integrating new entrants on a levelized basis.**
 - 10. Protect against neighboring states' policies that socialize costs.**
 - 11. Ensure that appropriate energy infrastructure is able to be sited while incorporating input and guidance from stakeholders.**
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DISCLAIMER

The energy goals listed in this strategy are not numbered by policy preference or priority. The energy goals are intended to work in conjunction with each other. Numbering the goals is solely a means of labelling and not prioritization.



GOAL 1 - PRIORITIZE COST-EFFECTIVE ENERGY POLICIES.

- New Hampshire energy prices are among the highest in the nation. In 2015, New Hampshire spent \$3,934 per resident on energy.
 - The cost of energy has a disproportionate impact on lower wage-earners, who often spend more than a third of their income on purchasing energy.
 - High cost of electricity makes competition more difficult against businesses in lower-cost regions of the country.
 - The primary goal of this Strategy is to pursue cost-effective energy policies.
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GOAL 2: ENSURE A SECURE, RELIABLE, AND RESILIENT ENERGY SYSTEM.

- **Cybersecurity**
 - There is no reason to believe that New Hampshire infrastructure is not being targeted, or will not be targeted in the near future.
 - New Hampshire stakeholders should pursue available synergies with regional and national partners to identify and respond to cyber threats in real time.
 - **Grid Modernization**
 - Grid modernization refers to the utilization of new technologies, equipment, and controls to make energy systems more resilient, efficient, and reliable.
 - Stakeholders should continue the development of grid modernization in New Hampshire in keeping with the 2017 Grid Modernization report and consistent with the broader policy goals outlined in this State Energy Strategy.
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GOAL 3: ADOPT ALL-RESOURCE ENERGY STRATEGIES AND MINIMIZE GOVERNMENT BARRIERS TO INNOVATION.

- No single energy resource will solve all of New Hampshire's energy challenges.
 - Government policies should be technology neutral to enable the cultivation of cost-competitive resources.
 - Public policymakers and regulators should not discriminate on the basis of technology when pursuing cost-effective energy.
 - New Hampshire policymakers should pursue market-based mechanisms for achieving cost-effective energy, while avoiding preferential quotas and mandates.
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GOAL 4: MAXIMIZE COST-EFFECTIVE ENERGY SAVINGS.

- Regional EE efforts are projected to significantly impact both peak demand and gross energy usage.
 - ISO-NE projects that EE measures will shave 1,582 megawatts (MW) off peak demand, with an average annual peak reduction of about 264 MW.
 - This is derived from an estimated \$3.5 billion in EE investments from 2009 to 2014, and anticipated investments across New England of \$1.2 billion annually 2021 through 2026.
 - New Hampshire should continue to coordinate and develop energy efficiency programming to achieve cost-effective savings.
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GOAL 5: ACHIEVE ENVIRONMENTAL PROTECTION THAT IS COST-EFFECTIVE AND ENABLES ECONOMIC GROWTH.

- After several years of falling emissions, the closure of the Vermont Yankee nuclear plant caused carbon dioxide emissions to increase 7% regionally in 2015.
 - While low-carbon renewable resources will undoubtedly increase as a percentage of our fuel mix, the transition to such resources should not inflict unnecessary economic harm on generators and ratepayers. Instead, New Hampshire can continue to safeguard natural resources and achieve emissions improvements without relying on government-mandated market distortions.
 - The most successful way of reducing emissions and protecting our environmental resources from climate change is to achieve a market where low-emission resources are economically competitive without government mandates and subsidies.
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GOAL 6: GOVERNMENT INTERVENTION IN ENERGY MARKETS SHOULD BE LIMITED, JUSTIFIABLE, AND TECHNOLOGY-NEUTRAL.

- Conventional fuels (categorized into coal, natural gas, petroleum, and nuclear) received a total of \$3.25 billion in 2013 in direct federal financial interventions and subsidies. Renewables received \$11.68 billion in subsidies.
 - That means renewables received 72% of all electricity-related subsidies and support in 2013 yet accounted for 13% of total generation.
 - New Hampshire should seek to foster an environment where new and emerging technologies can flourish by virtue of the value they may bring to the market.
 - The exercise of government power to economically advantage one technology over another should be time-limited, narrow, and necessary to achieve a specific policy goal.
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GOAL 7: ENCOURAGE MARKET-SELECTION OF COST-EFFECTIVE ENERGY RESOURCES.

- New England wholesale electric energy prices are primarily determined by the price of natural gas. Public policies that discourage the utilization of natural gas, or restrict adequate supply, will drive up electricity prices.
 - Many New England RPS mandates are approaching a quarter of electricity consumption, and with additional out-of-market contracts, it is not unthinkable to see a competitive wholesale market that serves only a minority of total demand.
 - New Hampshire energy policies should avoid market segmentation while protecting the veracity of competitive wholesale markets to deliver cost-effective energy to meet consumer demand.
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GOAL 8: GENERATE IN-STATE ECONOMIC ACTIVITY WITHOUT RELIANCE ON PERMANENT SUBSIDIZATION OF ENERGY.

- Subsidization to support economically inefficient entities merely for the preservation of their operation ignores reciprocal costs.
 - Subsidization will nearly always help the entity being supported, but the immediate and long-term cost to ratepayers and taxpayers must be included in order to properly weight public policy decisions.
 - Government support for energy industries or sectors should be based on quantifiable data demonstrating consumer benefit.
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GOAL 9: MAXIMIZE THE ECONOMIC LIFESPAN OF EXISTING RESOURCES WHILE INTEGRATING NEW ENTRANTS ON A LEVELIZED BASIS.

- Properly functioning markets should deliver cost-competitive resources while selecting against uneconomic resources.
 - The marginalization of particular energy resources through the subsidization of competitor technologies or mandates imposes costs on ratepayers by raising the price of the last-available resource into the supply chain.
 - New Hampshire stakeholders should seek policies that limit economic waste, maximize the useful competitive lifespan of energy infrastructure, and avoid policy preferences that select for technologies or resources without regard to cost.
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GOAL 10: PROTECT AGAINST NEIGHBORING STATES' POLICIES THAT SOCIALIZE COSTS.

- Every state has the right to pursue its own energy policy agenda.
 - States should be free to impose above-market costs on their citizens for policy reasons. However, one state should not shift above-market costs onto a neighboring state's ratepayers by distorting the wholesale market.
 - New Hampshire should seek regional policies that allocate costs according to each state's preference for higher-cost resources.
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GOAL 11: ENSURE THAT APPROPRIATE ENERGY INFRASTRUCTURE IS ABLE TO BE SITED WHILE INCORPORATING INPUT AND GUIDANCE FROM STAKEHOLDERS.

- Siting energy infrastructure is both challenging and necessary.
 - An affordable energy resource is rendered either expensive or irrelevant if the cost to utilize it is high or it can't be sited.
 - Delivering appropriate energy infrastructure requires predictability, defined processes, good communication, and clear standards for achievement.
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NEW HAMPSHIRE AND REGIONAL ELECTRIC MARKETS

- New Hampshire is a net energy importer, a net electricity exporter, and faces increased costs because of the policy preferences of neighboring states seeking above-market-cost energy resources.
 - New Hampshire ratepayers are increasingly at risk of funding neighboring state public policies.
 - New England state actions to achieve public policy objectives are interfering with regional competitive wholesale markets.
 - Decarbonization efforts are the key drivers of this reality.
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FUEL DIVERSITY



FUEL DIVERSITY

- “Technology is neither good nor bad; nor is it neutral.”
 - New Hampshire will be best served by fostering technologies and solutions that are tailored to our state’s needs.
 - Having a diverse resource mix can help ensure a secure, reliable, and resilient energy system.
 - Investments and policies should prioritize economic efficiency in order to achieve cost-effective energy production and delivery.
 - Resources should compete in the market, not compete for government policy preferences.
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NUCLEAR POWER

- It is essential that New Hampshire's energy strategy account for nuclear power.
- It is likely that New England's carbon emissions would increase significantly if Seabrook Station were to stop generating at capacity.
- Preserving Seabrook Station as a source of zero-carbon energy is the most realistic and cost-effective means of managing emissions in New Hampshire at scale.
- Nuclear generation should be allowed to compete to deliver electricity into competitive wholesale markets, and should also be recognized as a component in New Hampshire's environmental goals and policy frameworks.

NATURAL GAS

- Natural gas produced nearly 42% of all electricity consumed in New England in 2016.
 - “The availability of low-cost natural gas from the nearby Marcellus Shale formation was the main driver of a 44% decrease in the average price of New England’s wholesale electricity between 2004 ... and 2016.”
 - According to EIA data, U.S. carbon dioxide emissions have fallen to the levels of the early 1990’s due to the market driven replacement of coal and oil by natural gas.
 - Electricity reliability is tightly connected to natural gas markets and availability.
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RENEWABLE ENERGY

- Renewable energy is highly likely to continue to grow as a percentage of total electricity generation in New Hampshire.
 - Currently, federal and state energy policies, not competitive markets, are the primary drivers of the construction of renewable resources in New England. Nationally, the growth in renewable energy has been largely driven by preferable tax treatment.
 - If intermittent resources displace other generation sources in the wholesale market, absent cheap storage capacity, on-call resources will still need to be maintained to run when the intermittent resource is not generating.
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ANALYZING THE COST-EFFECTIVENESS OF RENEWABLE ENERGY TECHNOLOGIES

- Intermittent resources have different strengths and weaknesses as opposed to conventional generation sources. Most prominently for renewables, capital demands are high, capacity factors are low, and fuel costs are near or at zero.
 - Lazard's national assessment shows that certain forms of solar and wind are cost competitive with conventional generation technologies in certain situations.
 - The costs for wind and solar are higher in the Northeast, although this relative premium is tempered by the region's high energy costs.
 - Mandates are not necessary in order to achieve renewable market penetration.
 - Renewable technologies will continue to grow in importance and market impact, and market selection should steer those investments.
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OPPORTUNITIES FOR NEW HAMPSHIRE

- It should be an objective to seek an ultimate outcome where production technologies are not subsidized by ratepayers or taxpayers.
 - An undesirable outcome would be for energy developers to pursue uneconomic investments that require ongoing subsidization in order to participate in energy markets.
 - New Hampshire energy policy should not seek to mimic neighboring state renewable energy policies. Instead, New Hampshire should seek the most appropriate investments and goals given our state's geographic location, environmental considerations, land use requirements, and need to deliver cost-effective energy.
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RENEWABLE PORTFOLIO STANDARD

- The RPS was established as a tool to increase the use of renewable energy for producing electricity, protecting fuel diversity, and lowering emissions.
 - The 2018 RPS mandate calls for 18.5% of electricity sold to retail electric customers to be generated by renewable energy sources, with a goal of 25.2% by 2025.
 - If reducing emissions is a primary objective, then in order to have conceptual consistency, the RPS must include other zero-carbon or low-carbon resources.
 - If the goal is to pursue the most cost-effective low-carbon options, then siloing energy technology types thwarts that outcome.
 - RPS should be redefined to include other zero-carbon resources and to pursue the most cost-effective low-carbon options. Segmentation of the RPS to limit competition among energy technology types should be eliminated.
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ENERGY EFFICIENCY AND DEMAND-SIDE RESOURCES



ENERGY EFFICIENCY

- Energy efficiency is the cheapest and cleanest energy resource.
- Reducing energy use saves money for everyone on our energy systems.
- New Hampshire should prioritize capturing cost-effective energy efficiency in all sectors, including buildings, manufacturing, and transportation.
- New Hampshire should continue to coordinate and develop energy efficiency programming to achieve cost-effective savings.

DEMAND RESPONSE

- Demand Response is a method of incentivizing energy users to reduce power use during specific peak periods when energy is most expensive.
- It involves a suite of services that encourage an immediate reduction in peak load.
- The development of new structures and programs that economically integrate demand response resources represents a successful growth of competitive markets, and, as opposed to state action, is likely to be the most cost-effective mechanism to incentivize demand response adoption.

SITING



SITING - FACTORS DRIVING THE NEED TO CONSTRUCT OR REBUILD TRANSMISSION CAPACITY

- Replacement
 - Reliability
 - Interconnection of new load or generation
 - Economics
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SITING - SITING INFRASTRUCTURE TO MEET CURRENT AND FUTURE CAPACITY NEEDS

- It is clear that New Hampshire and the Northeast region have not developed the infrastructure to support the most plentiful and cost-effective energy resource currently available—natural gas.
 - Consumers are hit with higher energy prices when low-cost resources are unable to enter the market. Failure to develop market-demanded infrastructure will only make the Northeast less competitive for businesses, and raise the cost of living for residents.
 - The current need for natural gas infrastructure and future need for renewable and distributed generation integration are complementary.
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SITING – RESOURCE LAND USE

Understanding land use impacts from various electricity generation technologies can help put burdens and benefits on communities in perspective.

Chart 1: Land Use by Electricity Source in Acres/MW Produced

Electricity Source	Acres per Megawatt Produced
Coal	12.21
Natural Gas	12.41
Nuclear	12.71
Solar	43.50
Wind	70.64
Hydro	315.22

SITING – PROCESS CONSIDERATIONS

- Predictability in state policy and review processes allows stakeholders to more accurately gauge the likelihood of outcomes.
 - Clear standards for achievement and defined processes enhance predictability.
 - Communication with all stakeholders is essential to appropriate outcomes, even if those outcomes are not agreeable to all participants in the process.
 - To facilitate infrastructure investments, clear and defined timelines should be established to deter delays.
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TRANSPORTATION



TRANSPORTATION

- It is important to protect consumer-preferred forms of transportation, even where lowering energy intensity of travel is an important goal.
- The most effective near-term energy management strategy for New Hampshire is to efficiently and fully utilize existing infrastructure. Maximizing infrastructure utilization improves efficiency while helping reduce environmental impacts.
- New Hampshire needs to accommodate a market that is rethinking public and private transportation, and the blurring of lines between the two.
- New Hampshire does not require a wholesale rethinking of transportation infrastructure to achieve energy efficiency gains.

TRANSPORTATION - MASS TRANSIT

- There are certain concentrated areas of New Hampshire that can benefit from mass transit, and many more areas where mass transit is not an economically advantageous method of providing transportation.
 - Utilization and cost-effectiveness should determine where and when mass transit modes are merited and necessary.
 - New Hampshire should seek low-cost, flexible, and consumer-focused solutions that recognize our state's population densities. For travelers not utilizing personally-owned vehicles, this will likely be through on-demand, small scale transportation options that leverage existing investments.
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TRANSPORTATION – PASSENGER VEHICLES

- Personal vehicles are by far the dominant transportation mode in New Hampshire and nationally.
 - While EVs and plug-in hybrids are energy-efficient on a per-mile basis and are likely to become an increasing fraction of new vehicle sales, those vehicle types will remain a minority of vehicles on the road for decades, even under optimistic projections.
 - Feedback loop challenge of EV infrastructure: consumers don't want to buy cars if there isn't sufficient charging availability, and investors won't build charging stations unless there is a large enough market to serve.
 - Any government investments should be carefully assessed, and if possible drawn from available non-taxpayer or ratepayer funding sources to avoid cost shifting to benefit a small user base.
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CONCLUSION

This Strategy is designed as a tool for legislators, state agency employees, and other policymakers and stakeholders. It is not a comprehensive listing of every conceivable scenario or policy question. Rather, it is a set of principles and goals from which energy policy can be created. There are any number of factors and circumstances that can arise, and this strategy strives to provide a guiding philosophy to address them.

If we work to achieve the goals outlined in this strategy, the next decade will see lower electricity rates, more secure energy infrastructure, a cleaner environment, and a marketplace that can allow future technologies to thrive.



QUESTIONS?



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