

NEW ENGLAND COALITION FOR **AFFORDABLE ENERGY**

The Need for Energy Infrastructure in New England

An affordable and reliable supply of energy is needed for New England's businesses to prosper and compete globally and to maintain the region's quality of life. However, New England continues to have some of the highest electricity and natural gas costs in the country. One important factor placing the region's businesses at a competitive disadvantage is the lack of adequate energy infrastructure – electric transmission lines, natural gas pipelines, and power generation, including generation from wind and solar resources.

As of June 2016, New England families pay about 50 percent more for electricity than the national average and, depending on which New England state, over 30 percent more for natural gas. Manufacturers are hit even harder, with industrial electricity rates almost 70 percent above the national average and natural gas rates that are, depending on the state, double and even triple the national average, making it difficult for many companies to compete with those located in lower cost states.¹

New England has always had higher energy costs than the rest of the country because of its lack of indigenous supplies – the region is literally at the “end of the energy pipeline”. More recently, constrained natural gas infrastructure has increased the region's already high electricity and natural gas costs and impacted winter fuel availability. In addition, a substantial amount of electricity generation capacity will soon retire which will need replacement, raising concerns about both affordability and reliability of service. Lastly, state renewable portfolio standards require more renewable generation which, in turn, also requires new electric transmission lines to connect wind and hydro resources to population centers. As a result, energy infrastructure development is needed in New England to:

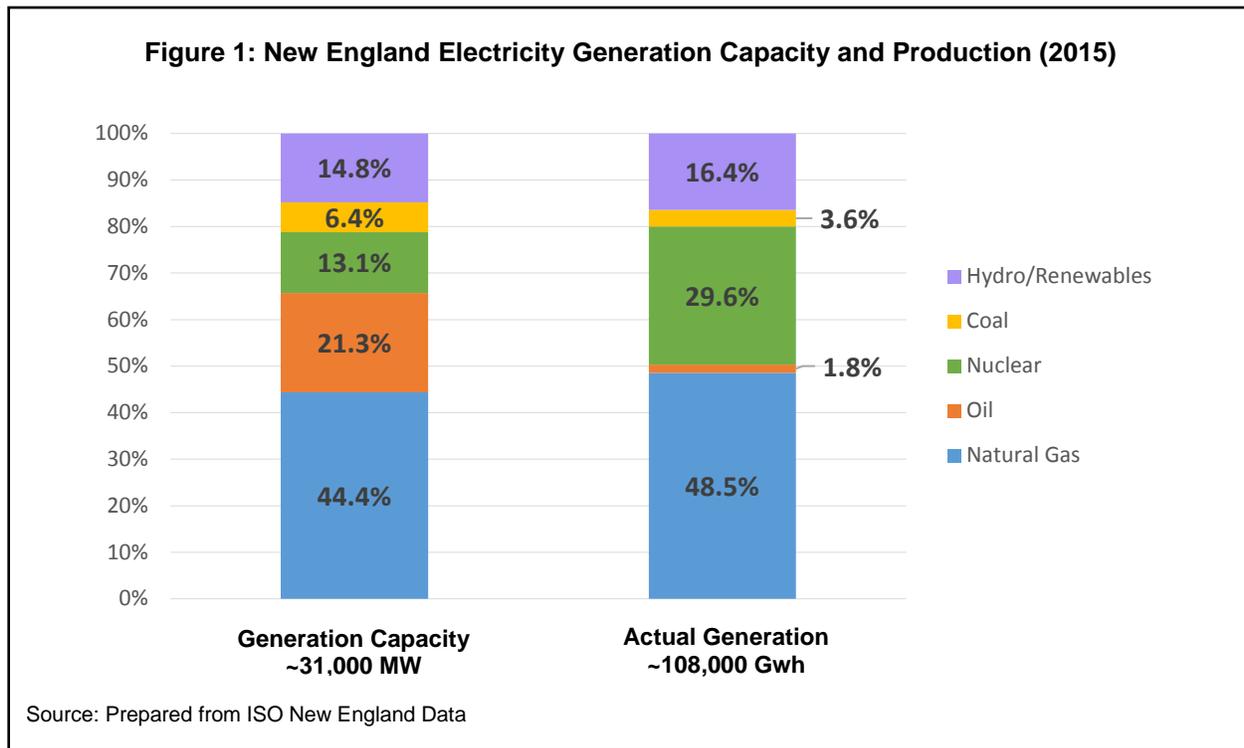
- Make energy more affordable to improve regional competitiveness and economic growth;
- Ensure reliability of electric service; and
- Meet long-term climate goals.

Almost 30 Percent of the Region's Electricity Generation Capacity is at Risk of Retirement

New England's regional electric power system consists of approximately 350 generating facilities, connected by over 8,600 miles of transmission lines, serving 6.5 million households and businesses. The system is operated as a single control area regardless of state boundaries with interconnections to Canada to the north and New York to the west and south.

As shown in Figure 1, natural gas is the predominant fuel used to generate electricity in New England, comprising over 40 percent of the region's generation capacity of about 31,000 megawatts (MW) (the total capability of all generating units), producing almost 50 percent of the

region’s electricity (up from 15 percent in 2000). Nuclear generation, which represents only about 13 percent of the region’s generating capacity, nevertheless supplies about 30 percent of the region’s electricity. Coal and oil units generate about 5 percent (down from about 40 percent in 2000). Renewable resources – including wood, refuse, wind, solar and hydropower – generate the remaining 16 percent.



According to ISO New England, the operator of the region’s electric grid, several of the region’s oldest and largest generators have retired or will soon retire, totaling over 4,000 MW – equivalent to about 10 percent of the region’s total electricity generating capacity (two of which are highly reliable nuclear units that do not emit carbon emissions). These retirements include:

- Brayton Point Station (1,535 MW, 4-units, oil and coal) (by May 2017)
- Salem Harbor Station (749 MW, 4-units, oil and coal) (May 2014)
- Vermont Yankee (604 MW, 1-unit, nuclear power) (Dec. 2014)
- Pilgrim Nuclear Station (677 MW, 1-unit, nuclear power) (by June 2019)
- Norwalk Harbor Station (342 MW, 3-units, oil) (June 2013)
- Mount Tom Station (143MW, 1-unit, coal) (Dec. 2014)

In addition, about 6,000 MW of New England’s oil and coal capacity will be over 40 years old by 2020, and will be at risk of retirement due to economic and environmental factors (including Yarmouth, Newington, Merrimack, Schiller, Mystic, Canal, Montville, New Haven, Bridgeport (Unit 3), Middletown, West Springfield). If all of these units should retire by 2020, the region’s electricity generation capacity will decrease by about another 20 percent. Furthermore, market

conditions and regulatory requirements also are raising questions about the future viability of the remaining nuclear capacity in New England.

New England's Natural Gas System Has Not Kept Pace with Demand

In addition to generating nearly 50 percent of the region's electricity, natural gas is also used in the region to: ²

- Heat almost 40 percent of all homes (2.3 million residences); and
- Provide space and industrial process heating to over 260,000 businesses and manufacturers.

The region's shift to natural gas away from oil and coal generation occurred due to abundant domestic natural gas supplies combined with new highly efficient, less expensive, lower carbon-emitting natural gas-fired power plant technology.

The environmental benefits have been significant. Since 2000, the nearly thirty natural gas plants built in the region have dramatically reduced the region's emissions from electricity generation – NO_x emissions are down 66 percent, SO₂ emissions have dropped 94 percent and CO₂ emissions that contribute to global warming are down 26 percent.³

Because New England has no native supply of natural gas, it must be transported via pipeline to the region. However, even with the dramatic increase in natural gas demand in recent years, the region's delivery system has largely remained unchanged. As a result, in winter, the pipeline system serving New England is maxed out when natural gas electricity generation competes with space heating. Current gas pipeline capacity into the region is around 3.5 billion cubic feet of daily capacity (Bcf/day). According to ISO New England, the region needs an additional 1.1 to 1.6 Bcf/day to fuel the region's current natural gas generators during periods of peak demand, which occur on about 40 cold winter days per year.⁴

During some of these cold winter days, the cost of natural gas and electricity spikes due to natural gas supply constraints and, at times, ISO New England must dispatch other generating resources to maintain electric system reliability. Over the past several winters alone, natural gas pipeline constraints have cost the region at least \$7.5 billion.⁵

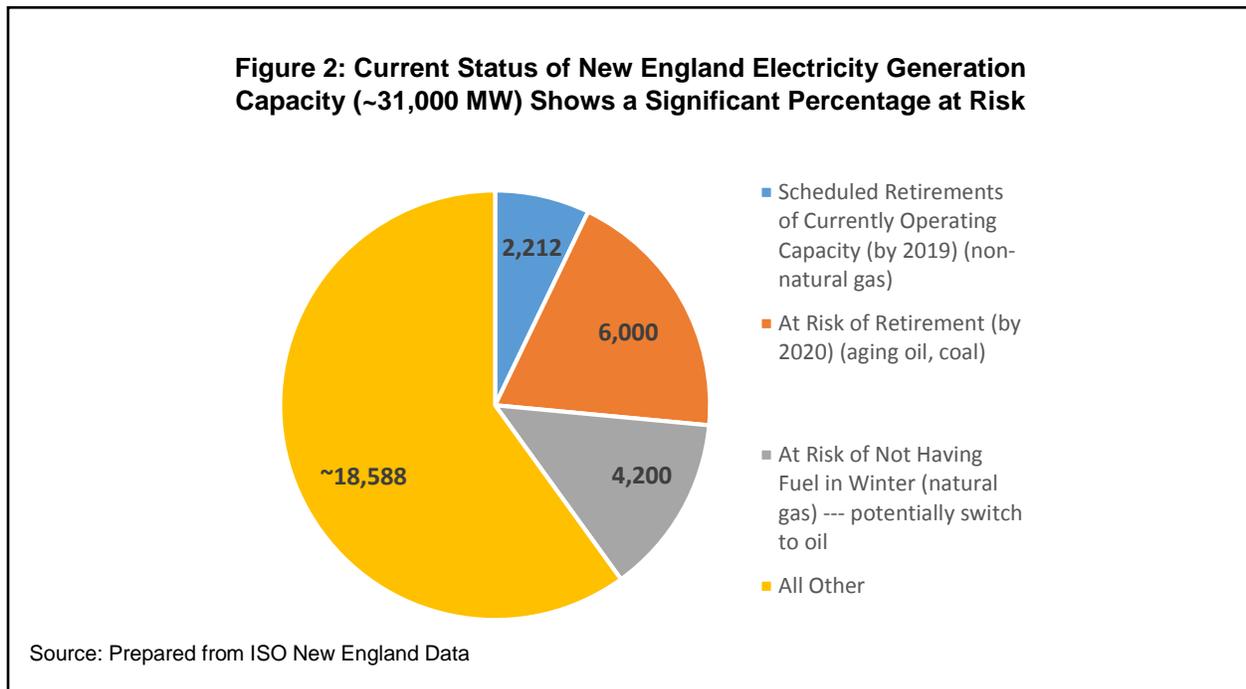
ISO New England has identified up to 4,200 megawatts of natural gas-fired generation that could be at risk of not being able to get fuel during cold winter periods due to pipeline constraints. To maintain reliability, ISO has implemented a Winter Reliability Program to:

- Dispatch older coal- and oil-fired power plants in place of the natural gas plants; and/or
- Ensure that natural gas-fired plants that have dual-fuel capability switch to burning oil or use liquefied natural gas (LNG), which has limited storage capability.

While these measures maintain system reliability, they result in increased power plant emissions (when switching to oil or coal-fired units) and higher energy costs.

Figure 2 highlights the current challenges facing the region's electric system. In summary, almost 40 percent of New England's currently operating electricity generation capacity: will

retire by 2019; is at risk of retirement by 2020; and may not have access to natural gas during winter cold spells (and would most likely be replaced with oil).



Shifting to Cleaner Energy Requires More Renewable Generation and Transmission Lines

The New England states have adopted differing renewable portfolio standards requiring electric utilities to sell a specified percentage or amount of renewable electricity by a certain date.

According to ISO New England, renewables such as biomass, refuse, wind and solar currently generate about 9 percent of the region’s electricity, while hydropower generates about 7 percent.

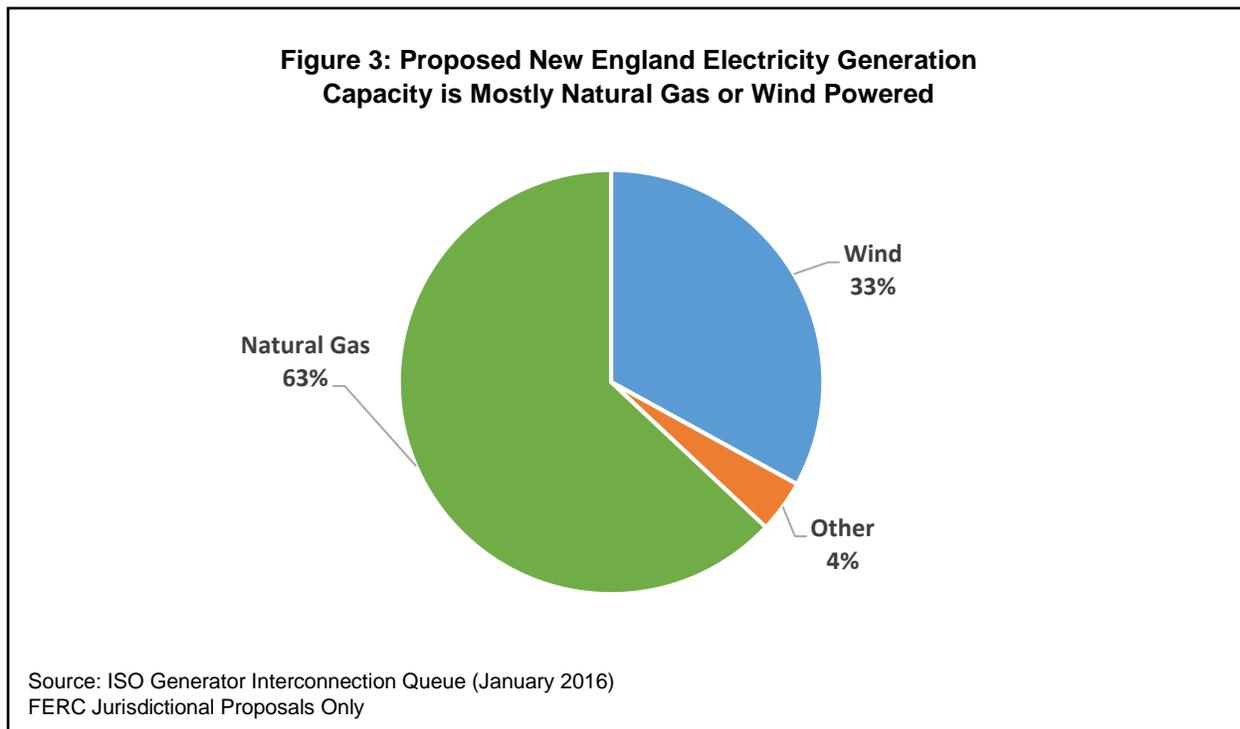
Large-scale renewable sources such as wind and hydro are needed to meet renewable portfolio standards. Renewable resources are typically located in remote, off-shore or mountainous areas and require transmission lines to transport electricity to the region’s population centers (as well as traditional generation, such as natural gas generation, to back-up intermittent renewables).

According to ISO New England, eleven transmission projects have been proposed, totaling more than 7,000 MW of potential transfer capability – primarily large-scale hydro resources from eastern Canada and wind resources from northern New England. If additional renewable facilities and transmission lines are not built, the states may not be able to meet renewable portfolio standards.

While Many Infrastructure Projects Have Been Proposed, Few are Built

Many infrastructure projects have been proposed that would provide households and businesses with more affordable energy. As shown in Figure 3, to replace the retiring coal, oil and nuclear units and meet renewable portfolio standards, private developers are proposing to build 13,000 MW of generation, including nearly 8,200 MW of natural gas-fired generation (63 percent)

(which would further constrain the pipeline system) and more than 4,200 MW of wind (33 percent).



However, not all of these proposed projects will be built. According to ISO New England, there is an attrition rate of about 67 percent of projects proposed. This means that about 4,300 MW of the 13,000 MW of proposed generation will actually get built – substantially less than what may be required.

Contributing to this high attrition rate is the fact that all infrastructure projects must satisfy safety, environmental, cost and operational concerns through a comprehensive regulatory process that allows for meaningful and important public input. But many face opposition that goes well beyond legitimate concerns, seeking only to obstruct and delay, inevitably leading to even higher costs to be borne by consumers and businesses.

There Could Be Severe Economic Consequences if New Infrastructure is not Built by 2020

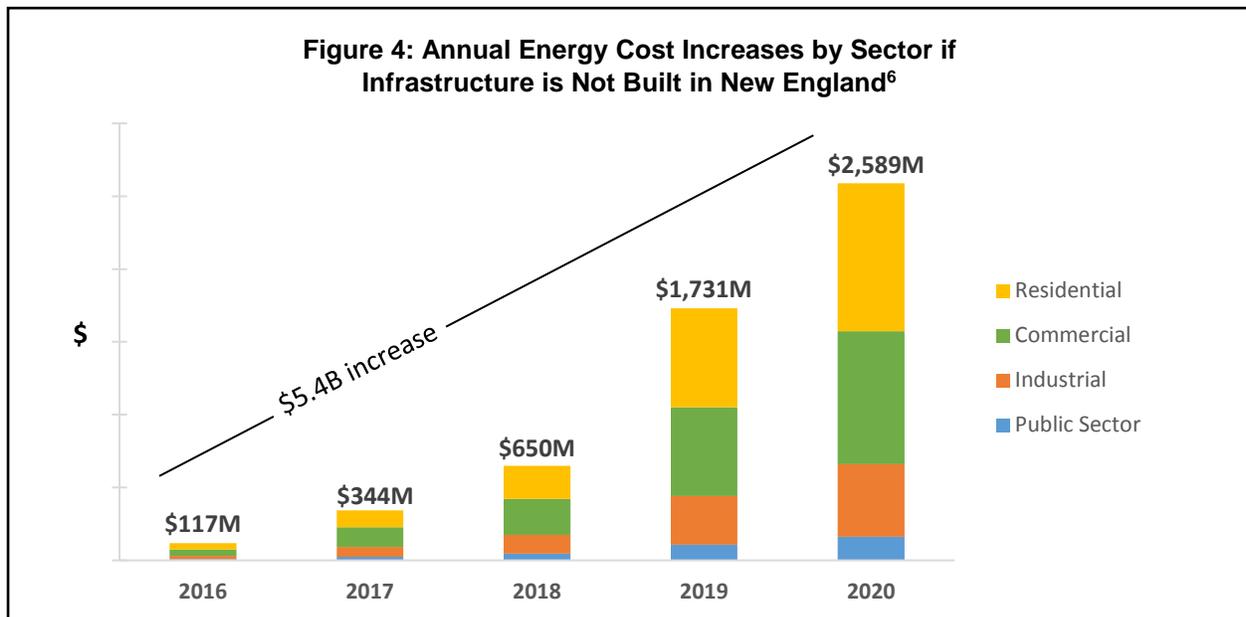
A study commissioned by the Coalition conducted by La Capra Associates (now Daymark Energy Advisors) and Economic Development Research Group shows clear, compelling and immediate economic consequences from failure to build energy infrastructure in New England by 2020.⁶

In conducting the study, two energy infrastructure cases were considered: 1) a constrained case wherein no new investments are made to expand infrastructure beyond existing levels; and 2) an unconstrained case wherein investments are made leading to new and expanded natural gas and electricity infrastructure at levels sufficient to mitigate or avoid higher prices and related impacts.

In the unconstrained case, the study took an all-resource approach. Assuming continued aggressive energy efficiency and solar initiatives, the study found that a combination of at least 500 megawatts of new transmission lines, 1,300 megawatts of on-shore wind, 1.7 bcf/day of new gas pipelines and some 900 megawatts of new natural gas-fired power plants built over the next few years could help the region avoid \$5.4 billion in higher energy costs. (This is a net cost number for electricity and natural gas combined that takes into account the costs consumers save by not building infrastructure – estimated at \$2.6 billion over the study period.)

Figure 4 below portrays the time path of the \$5.4 billion cost escalation by customer segment. The added costs will ramp up from 2016 to 2020, increasing the region’s electricity and natural gas costs by 9 percent in 2020. Similar or larger impacts can be expected beyond 2020 if infrastructure is not added as demands for natural gas and renewable electricity will increase.

These higher energy costs will have a significant impact on the region. The residential sector will experience a decrease in purchasing power; the public sector (comprised of state and local government) will need to off-set the higher cost with reduced public program spending or higher taxes/fees in order to balance budgets; and the commercial and industrial segments will incur higher operating costs.



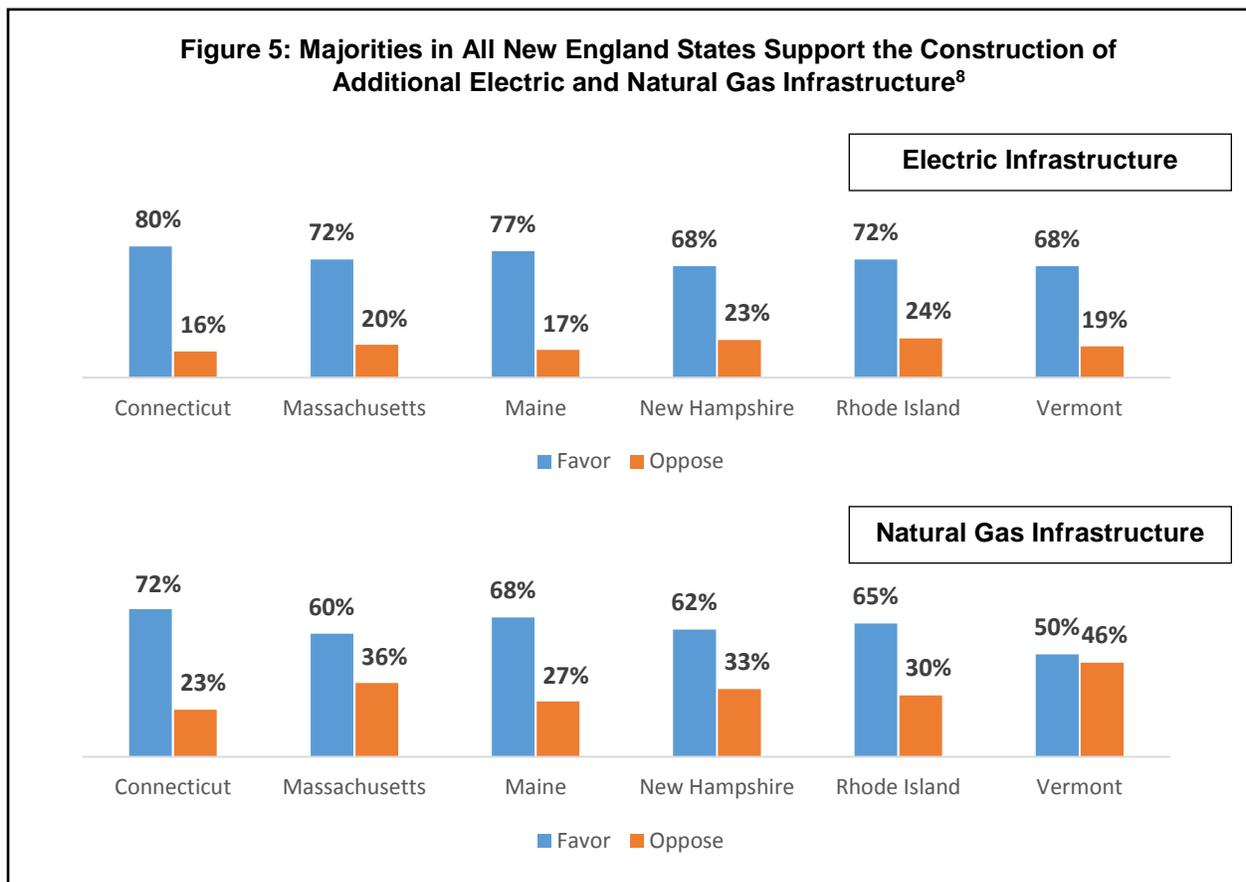
The Coalition’s study also found that lack of infrastructure development assumed under the unconstrained scenario would result in:

- The loss of 167,600 jobs between 2016 and 2020 (temporary or permanent private-sector jobs) due to foregone construction activity and higher energy costs; and
- Lost personal income of \$12.5 billion from a total cumulative loss in gross regional product (GRP) of \$16.1 billion between 2016 and 2020, including \$10.5 billion from infrastructure disinvestment and \$5.6 billion from higher energy costs.

Since the study was conducted a year ago, the region’s energy landscape has changed significantly including: the announcement of Pilgrim Nuclear Power Station’s retirement; cancellation of a major natural gas pipeline project; and delay in schedule of a major electric transmission line to bring hydroelectric power from Canada to New England. As a result, the economic consequences of not building additional energy infrastructure may now be greater.⁷

Surveys Show Strong Support for Energy Infrastructure Development in New England

To avoid these economic consequences, the region needs to invest in energy infrastructure which is supported by both consumers and businesses in the region. According to a survey sponsored by the Coalition earlier this year, 73 percent of New Englanders favor the construction of additional electric infrastructure in New England while 64 percent favor the construction of additional natural gas infrastructure to fuel electricity generating plants and homes and businesses in New England.⁸ Figure 5 below includes the results by state.



In a separate Coalition survey of New England businesses (Survey Monkey, May 2016),⁹ almost 80 percent of respondents said they were concerned about the reliability of energy in New England. This is not surprising given that virtually every company and institution depends on reliable and affordable energy 24 hours a day, 365 days a year. At least two-thirds of the businesses responding said they would support an all-resource strategy to building new

infrastructure in New England including natural gas, increased energy efficiency and renewable resources.

Comments from New England Businesses on Need for Infrastructure⁹

“As a region, we need to enable long-term investment in energy infrastructure through legislation that will encompass generation capacity, distribution, siting, fuel diversity, renewables and energy storage – all with environmental and economic balance – a tall order for sure” – Massachusetts

“We need to build out an infrastructure that allows for cost effective energy delivery” – Rhode Island

“We need the energy infrastructure that will allow us access to diverse/competitive energy supplies” – New Hampshire

“Lack of investment in infrastructure (NG pipelines, electricity transmission lines to hydro, etc.) has made eastern MA electricity and natural gas some of the most expensive in the country. IF we want to keep our production and jobs in eastern Mass, we need to invest in the infrastructure” – Massachusetts

Energy Infrastructure in New England will Improve Energy Affordability and Reliability

Underinvestment in infrastructure ensures persistently high and steadily increasing energy prices for the region. An all-resource strategy is needed including new and expanded pipelines to bring lower cost natural gas from the west, the construction of large-scale wind projects, additional natural gas-fired power plants, and new transmission lines to bring hydropower and large amounts of wind energy to population centers. This is in addition to continuing the region’s aggressive pursuit of energy efficiency and solar. All of these resources are needed if the region’s energy prices are to become more affordable and energy supplies more reliable.

Endnotes

1. U.S. Energy Information Administration (EIA) electricity and natural gas cost data is the latest annual data available at time of printing. www.eia.gov
2. Northeast Gas Association, 2015 Statistical Guide to the Northeast U.S. Natural Gas Industry, November 2015, www.northeastgas.org
3. “Regional air emissions 2014: significant long-term reductions”, ISO New England, February 2016 (www.iso-newswire.com).
4. “Region needs energy upgrades, including more natural gas pipeline capacity, says grid operator ISO New England,” *The Republican*, January 26, 2015.
5. “New England governors vow to boost natural gas capacity,” *Commonwealth Magazine*, April 23, 2015.
6. The Economic Impacts of Failing to Build Energy Infrastructure in New England, LaCapra Associates, Inc. (now Daymark Energy Advisors) and Economic Development Research Group, August 25, 2015, available at www.NEaffordableenergy.org
7. Daymark Energy Advisors is conducting a review of the major issues and developments in the New England energy landscape since the report was completed in August of 2015 – including policy implications and cost impacts – scheduled for completion in October.
8. A telephone survey of 1,650 registered voters in CT, ME, MA, NH, RI and VT (including 660 cell phone-only interviews) was conducted May 1-5, 2016, by Public Opinion Strategies for the New England Coalition for Affordable Energy. Margin of error is +/- 2.4%. The results are available at www.NEaffordableenergy.org
9. A web-based research survey (Survey Monkey) developed by the Coalition was distributed by its business members during the month of May 2016. A total of 175 businesses/manufacturers throughout the region responded. The quotes included are verbatim responses given in response to an open-ended question about energy policy concerns. The results are available at www.NEaffordableenergy.org

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The New England Coalition for Affordable Energy was formed to advocate for the expansion of all types of energy infrastructure in New England to facilitate lower energy costs, protect jobs and grow the economy. Members from all six New England states include prominent business and labor groups, representing tens of thousands of employers in the region.

For more information, visit: www.NEaffordableenergy.org

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