2016 Energy Analysis Series

Part I: The Case Against Gas Pipelines, There's Too Much Risk and Not Enough Need

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Acadia Center
Advancing the Clean Energy Future

On March 20th 1886, the world's first alternating current electric grid was powered up in Great Barrington, Massachusetts. The steam generator, power lines and transformers were revolutionary, and in the 130 years since the electric grid transformed society. Remarkably, over the same timeframe the basic model for the grid has remained largely the same. Growing demand has been met with more power plants, more fossil fuel combustion, and more infrastructure to transmit energy to customers across a one-way grid. The accompanying regulations evolved to reward utility monopolies for building and managing this seemingly ever-expanding energy system.

Now the historic model is breaking down. Rooftop solar allows customers to produce and share power at the local level, offering an alternative to additional utility infrastructure. Solar, wind and other renewable energy are increasingly powering the grid without producing carbon pollution responsible for climate change. And, most significantly, smarter and more efficient electricity use is causing demand to decline, benefitting customers who no longer have to pay for an ever-larger system, but threatening utilities whose profits accrue from building and maintaining infrastructure.

In this context, decision-makers face two main challenges related to energy. First, new energy supplies must be carbon-free in order to avert the increasingly apparent impacts of climate change. Second, policies need to account for outdated financial incentives that favor large-scale infrastructure projects over smaller-scale, distributed solutions that can support an efficient, networked grid centered on the consumer.

This three-part series describes these challenges, focusing in Part I on controversial proposals to subsidize large natural gas pipelines through the region. Part II will explore how rooftop solar and smart energy management are transforming the energy system and upending the centralized utility model. Part III will describe the near-term legislative opportunity to bring online large-scale clean energy sources that will facilitate achievement of Massachusetts' climate commitments, stabilize prices, and continue the transition to a clean energy system.

Climate Context

Climate change is no longer a distant threat. By a wide margin, 2015 was the hottest year on record, displacing 2014, which itself shattered global records. Fueled by elevated ocean temperatures linked to climate change, Hurricane Sandy devastated New Jersey, New York, and Connecticut. If Boston were hit by a similar storm, Faneuil Hall, Fenway Park, and much of Boston would be under water.

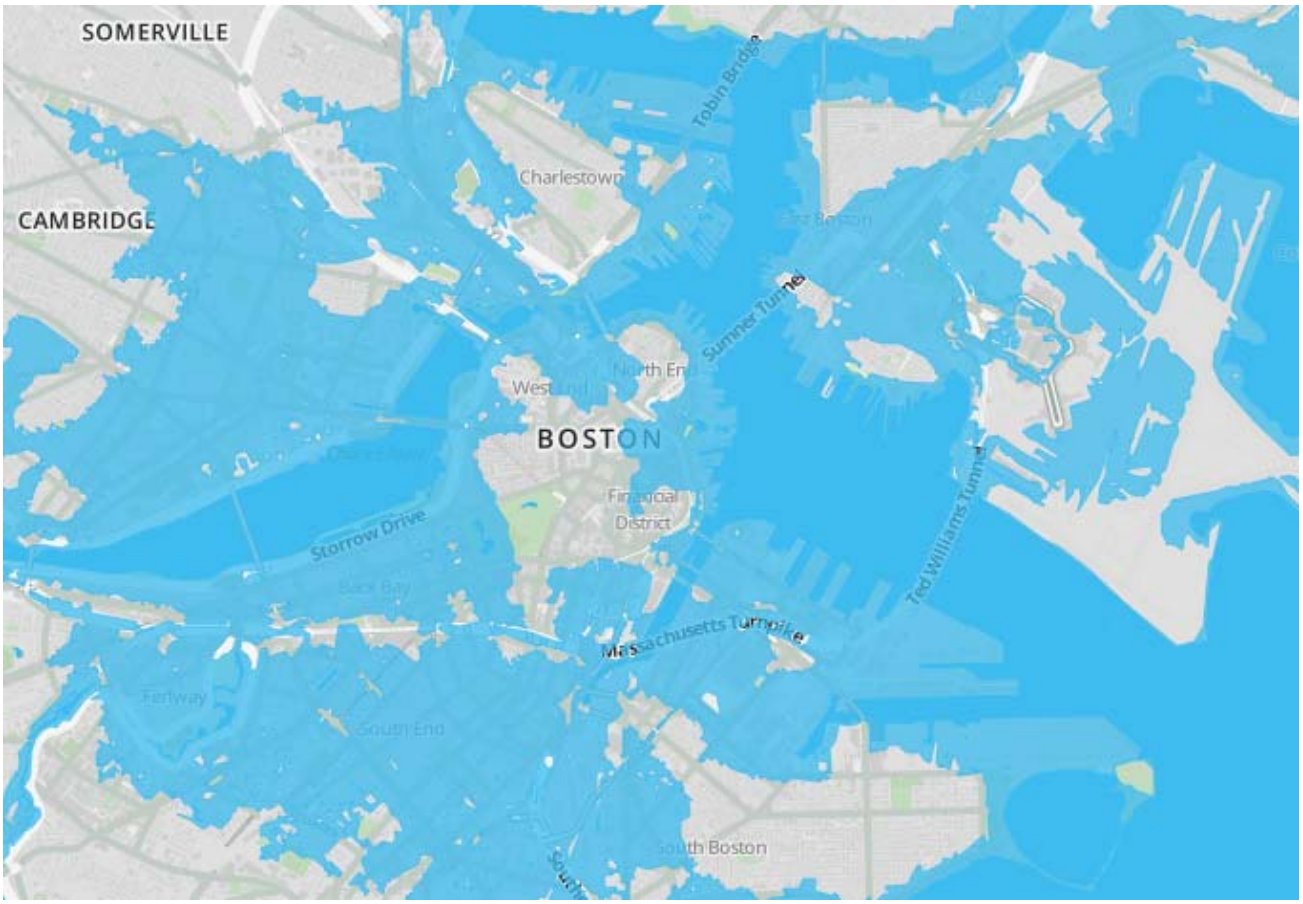


Image from WGBH, based on a Boston Harbor Association report depicting the impacts of 7.5-foot storm surge similar to what parts of New York City experienced during Sandy.

Against this ominous backdrop, some encouraging steps are being taken. Late last year world leaders hashed out shared commitments to contain climate pollution under the Paris Agreement. Closer to home, leaders of new England States and Eastern Canadian Provinces agreed to a 35-45% reduction in greenhouse gas (GHG) pollution by 2030, aligning with Massachusetts' own legal requirement to reduce the Commonwealth's emissions 80% by mid-century.

These commitments must now inform every major decision related to energy, particularly in relation to natural gas.

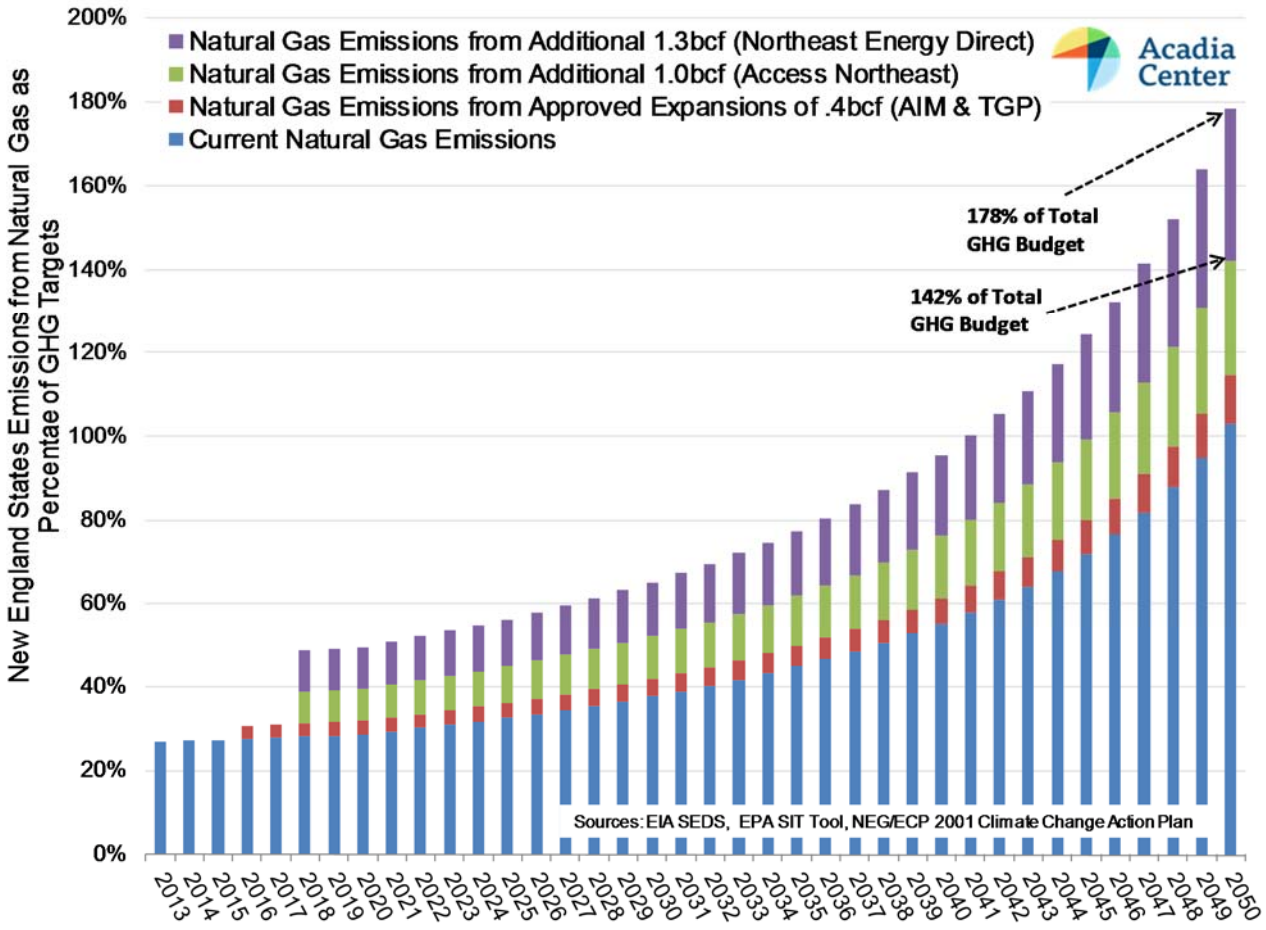
Bursting the Methane Bubble

In a remarkable shift from just a decade ago, natural gas now poses the biggest climate threat in the region. The last of Massachusetts' coal plants will be shuttered by 2017. Generation from oil-fired power plants declined 87% in the ten years leading up to 2014 (latest year of complete data), and oil generation will continue declining as longer-term solutions to meeting peak winter demand come online (more on that below). With coal and oil now effectively out of the regional electricity mix, increased generation from natural gas will start displacing non-emitting sources of energy, undermining efforts to reduce climate pollution.

The natural gas industry is trying to hold on to its once-favored status by portraying the fossil fuel as a complimentary "bridge" to clean energy, but numbers do not support their case. Massachusetts and other New

England states have committed to reducing economy-wide emissions – including emissions from natural gas, petroleum, and other sources – to 75% below 1990 levels by 2050. Using natural gas at current rates (accounting for relatively small pipeline expansions coming online next year), will more than eat up the entire budget by 2050. If we build two large pipelines proposed for the region (Kinder Morgan's *Northeast Energy Direct* and Spectra/Eversource/National Grid's *Access Northeast*), we will be over budget by 78% in 2050.

Share of Regional GHG Budget Consumed by Natural Gas



New science is additionally undermining the claimed climate benefits of natural gas. A collaborative study by gas producers and the Environmental Defense Fund found that 1.5% of methane (the primary component of natural gas) leaked during production in Texas fracking fields, a figure 90% higher than EPA estimates. These 'upstream' emissions do not account for leaks occurring throughout one of the oldest pipeline systems in the country: in Massachusetts utilities are losing up to 1.8% of the gas in their systems, and in certain places methane has been leaking unabated for over 30 years. Because methane can cause 86 times as much global warming as carbon dioxide over a 20-year period, the new research suggests that the climate benefits of natural gas have been substantially overstated. The climate risks from methane may be one reason why public support for Kinder Morgan's *Northeast Energy Direct* has dropped to 38%, when respondents understand that the pipeline would carry fracked natural gas.

Disappearing Need

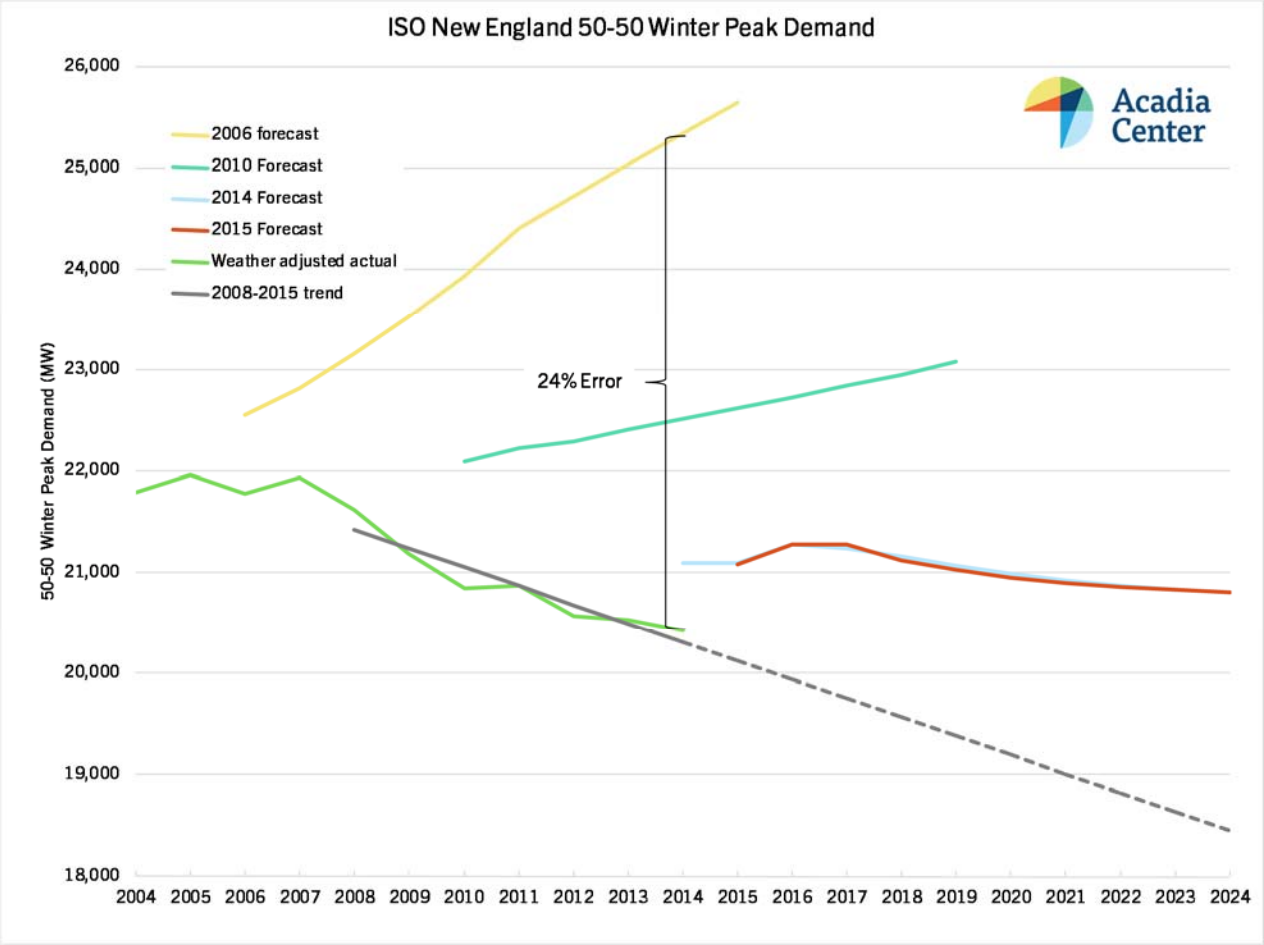
While the climate risks of natural gas are becoming clearer, the need for subsidized pipelines is disappearing in the face of real alternatives that Acadia Center and others have been requesting for years. A recent analysis by Massachusetts Attorney General Maura Healey found that market reforms and better planning remove the need for new pipelines to support electric system reliability. The study additionally describes the consumer and climate benefits of prioritizing investments in energy efficiency, demand reductions, and clean energy imports. The findings are matched by facts on the ground, including:

Declining electricity prices

Eversource's and National Grid's basic service residential winter rates are, respectively, 27 and 25% lower than last year's, *without any new pipeline capacity*. Lower prices are due to a number of factors, including market reforms that align gas and electric markets, and requirements for power generators to ensure adequate fuel supplies.

Declining Demand

Massachusetts' and other New England states' energy efficiency programs are causing energy demand to decline, reducing the need for additional pipeline capacity and other energy infrastructure. Despite using conservative assumptions that overstate the cost and understate the impact of efficiency programs, the regional grid operator ISO-NE predicts that winter peak demand will decline by 0.1% annually over its 10-year planning horizon. The actual impact of energy efficiency is likely far greater. Acadia Center has demonstrated that ISO-NE consistently overestimates energy consumption and peak demand; for instance, actual winter peak demand was 24% lower in 2014 than predicted by ISO-NE in 2006.



These inaccurate projections overstate the need for expensive energy infrastructure of all kinds, including natural gas pipelines.

Clean Energy Alternatives

Massachusetts, Connecticut and Rhode Island are reviewing bids to supply significant quantities (~600MW) of hydroelectric, wind, and solar energy that will displace natural gas generation. Legislative proposals in Massachusetts to purchase additional hydroelectricity and wind power (discussed in greater detail in Part III of this series) could more than triple the quantity of energy in the RFP, offsetting even more natural gas demand.

Backup Generation

New power plants being built in the region can run on natural gas or oil, reducing power sector demand for gas on the few coldest days when natural gas supplies are dedicated to meeting heating needs. This modest, limited use of oil generation during winter peaks in the near term, until more renewable generation comes online, has a far smaller impact on GHG emissions than new pipelines used year-round, and is less expensive to consumers than pipeline expansion.

The Risks

Publicly-subsidized pipelines carry significant risks for consumers and for the climate. The first risk is that pipelines likely cost more than alternatives. Pipelines are being promoted as a year-round "solution" to price

volatility that happens on just a handful of winter days. This peak winter demand could be met through use of targeted, lower cost alternatives, including liquefied natural gas (LNG), backup oil generation or additional energy efficiency, energy storage, and demand reductions (an approach being pursued by Connecticut). Building on the Connecticut approach, Acadia Center and clean energy providers joined in calling for fair competition for resources other than pipelines in a recent solicitation for winter capacity resources. Utilities have thus far declined to pursue such an approach, which could undermine proposed contracts for pipelines that they are partners in developing.

The Western Massachusetts 'Problem'

Vested interests in building pipelines may also be hindering sound utility planning to meet customers' heating needs. In Western Massachusetts, Berkshire Gas and Columbia Gas have imposed moratoria on connecting new gas customers until Kinder Morgan's *Northeast Energy Direct* is constructed. The argument that large new pipelines are needed to meet heating demands is different from claiming that pipelines are needed to supply power plants, but the argument suffers from the same weaknesses: inadequate pursuit of alternatives and misaligned incentives. Improving efficiency is the cheapest and easiest way to free up gas capacity, yet in planning for the next three years, Berkshire Gas proposed 0.73% annual savings, 41% below the average for other Massachusetts utilities, and below the levels that the company itself achieved in 2013 & 2014 (data from the Energy Efficiency Advisory Council). Berkshire Gas has also been challenged to defend its moratorium following revelation of a previously undisclosed stake in the Kinder Morgan pipeline by Berkshire's parent company, UIL Holding Corp (now part of Iberdrola). Northeast Energy Solutions, the organization that unearthed the connection, was blocked from participating in review of Berkshire's proposed gas supply contract with Kinder Morgan, and the organization has requested state and federal inquiries into the UIL investment.

Price Volatility

For the last few years, domestic natural gas prices have been low by historic standards, but price volatility is the norm for all fossil fuels, and natural gas in particular. In addition to underlying price volatility, the cost of carbon pollution associated with gas is likely to increase. In the electric sector, natural gas generators currently a bit more than $5 per ton of CO2 pollution under the Regional Greenhouse Gas Initiative (RGGI), or just over $2.50/MWh. With coal almost gone from the regional power mix and oil only used for brief periods of time, natural gas is the next fuel that will be squeezed by a declining emissions cap and rising carbon prices.

Beyond the power sector, carbon pollution associated with burning natural gas for heating, industry, and other uses will at some point have to be constrained. Legislation proposed by Sen. Michael Barrett to extend carbon pricing beyond power plants (and return revenue to consumers) has received strong public support. California, Quebec, British Columbia, Mexico and a host of other countries have established economy-wide carbon pricing. The question is no longer whether, but when natural gas use in Massachusetts will be subject to additional carbon pricing constraints. This date is likely to be sooner than the 20-30 or more years that customers would be paying for gas pipelines.

Gas Exports

Oversized pipelines running through New England could also carry natural gas to export markets, putting upward pressure on prices for in-region consumers. Pipelines into New England only approach full capacity during the handful of coldest days (when heating demand peaks). The rest of the year, pipes have plenty of underutilized

capacity. This could change under the *Access Northeast* proposal, which consists of both expanding existing pipelines and reversing the flow of the *Maritimes & Northeast* pipeline to carry gas north through Maine.

Fully permitted natural gas exporter terminals are waiting on the pipeline reversal to supply international markets. Once gas exports commence, New England customers will be competing with buyers in Europe, Asia, and other markets currently paying far higher prices. Under this perverse outcome, New England customers would subsidize up to $8 billion in pipeline construction costs to facilitate exports that could drive domestic prices up by as much as 7.5%, according to recent analysis commissioned by the Department of Energy.

Part II of this series will help explain why subsidies for new pipelines are even being considered in light clear conflicts with climate and consumer protection objectives, by looking at another controversial subject: solar energy, and the challenges it poses to the traditional utility model.

*Peter Shattuck is Massachusetts Director and Jamie Howland is Director, Climate and Energy Analysis Center at Acadia Center, a non-profit, research and advocacy organization committed to advancing the clean energy future. Copyrighted material used with the permission of Acadia Center. Installments in this analysis series are available at: http://acadiacenter.org/document/**2016-energy-analysis-series/***