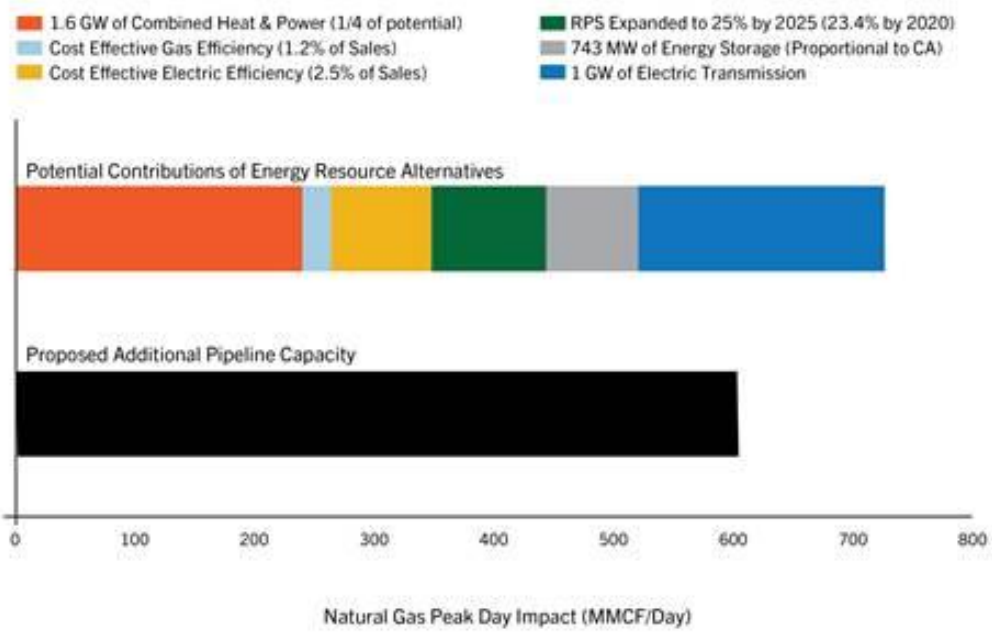
Pipeline Alternatives Assessment:

Energy Resources to Meet New England's Winter Needs

June 2014

In response to increasing reliance on natural gas for heating and electricity, New England states are proposing to publicly finance new, multi-billion-dollar natural gas pipelines in the region, but viable, potentially lower cost, and cleaner alternatives have not yet been sufficiently evaluated.[i] ENE offers this illustrative[ii] assessment to spur more transparent public discussion and debate on considering and utilizing all available options to meet our energy needs.

Specifically, the assessment compares proposed pipeline capacity expansion of 600 million cubic feet (MMcf) per day[iii] to a combination of energy resources capable of reducing peak natural gas demand from electric generation, heating, and other uses. Given the lead time needed to approve, permit, and construct a new pipeline, the assessment compares the potential impact of alternatives in 2020.



Reducing gas demand across the energy system would free up capacity for natural gas generation that is likely to replace retiring oil, coal, and nuclear generation in the near term. Reducing electric demand and increasing clean electric generation would further alleviate the problem of over-reliance on natural gas for electric generation. With lower demand and better utilization of existing pipeline capacity (through coordination of gas and electric trading markets[iv]) peak winter demand could be met using existing liquefied natural gas (LNG) import terminals and additional peak shaving facilities. Analysis commissioned for the states concluded that under a 'low demand' scenario no new large scale energy infrastructure would be necessary or cost-effective.[v]

While more in-depth analysis is needed to determine the potential cost of utilizing an integrated approach, it is worth noting that many of these energy resources would produce consumer benefits regardless of the future price of natural gas, while higher natural gas prices due to exports or other factors would undermine the economic benefits of new pipelines.[vi] Additional resources such as demand-response and renewable heating and cooling[vii] could also reduce peak natural gas demand, but were beyond the scope of this assessment. ENE is not specifically endorsing any of the alternatives described below; it has simply identified candidates for inclusion in a true integrated alternatives analysis.

Sources and Methodology

Combined Heat and Power (CHP) – 1.6 GW of CHP across the region represents one quarter (25%) of the available potential.[viii] The increase in natural gas demand for CHP plants is more than offset by decreased consumption of grid electricity, which in turn decreases demand for natural gas to generate electricity.[ix]

Cost-Effective Natural Gas Efficiency – 1.2% annual reductions in gas demand are used to approximate cost-effective energy efficiency program savings levels based on savings achieved through natural gas efficiency programs in Massachusetts and Rhode Island.[x] Savings depicted are incremental to current savings levels.

Cost-Effective Electric Efficiency – 2.5% annual reductions in electricity demand are used to approximate cost-effective energy efficiency program savings levels based on savings achieved through electric efficiency programs in Massachusetts and Rhode Island[xi]. Savings depicted are incremental to current savings levels.

Renewable Portfolio Standard (RPS) Expansion – Expanding the cumulative regional RPS target to 25% by 2025 would require an increase of 3.7% (4.5 TWh) from the current effective target of 21.3% by 2025.[xii] A 25% by 2025 target translates into 23.4% by 2020 (an increase of 4.2 TWh from current requirements). Added renewable generation is assumed to replace natural gas generation[xiii].

Energy Storage – 743 MW of energy storage deployed across ISO-New England in 2020 is proportional to the recently established energy storage mandate in California. Because energy storage alternates between periods of charging and discharging, the storage is assumed to replace 372 MW (50% of 743 MW) of natural gas on average during peak periods.[xiv]

Electric Transmission – 1 GW of new electric transmission is below the low end of New England Governor's planned procurement of 1.2 GW to 3.6 GW "clean energy" imports into the region.[xv] Transmission proposals include a mix of onshore and offshore wind and new and existing hydroelectricity from New England, New York, and the Canadian Provinces of Labrador and Quebec.[xvi] Added transmission capacity is assumed to replace natural gas generation.[xvii]

For Further Information:
Peter Shattuck, Director of Market Initiatives, (617) 742-0054 x103, pshattuck@env-ne.org
Jamie Howland, Director, ENE-CLEAN Center, (860) 246-7121 x201, jhowland@env-ne.org

Endnotes

[i] The *New England Gas-Electric Focus Group Final Report* calls for 600MMCF/D of pipeline capacity beyond planned expansions. The report also notes that 'Successfully implementing natural gas and electricity energy efficiency programs, renewable thermal heating applications, and distributed electric generation that cause the demand for natural gas and the net electric load to decline in the long-term could eliminate any need for additional infrastructure. The associated cost of achieving a Low Demand Scenario is not known." Available at: http://www.nescoe.com/uploads/NEGas-ElectricFocusGroup_FinalReport_31Mar2014.pdf

[ii] Without further assessment of alternatives, it is not possible to determine whether the region even needs 600 MMcf/day of additional capacity, and ENE does not endorse this volume but rather uses it to illustrate the magnitude of potential alternatives.

[iii] The *New England Gas-Electric Focus Group Final Report* calls for "600 MMcf/day beyond what has already been announced for the Algonquin Incremental Market Expansion ("AIM") and Tennessee's Connecticut Expansion ("CT") projects." See: http://www.nescoe.com/uploads/NEGas-ElectricFocusGroup_FinalReport_31Mar2014.pdf.

[iv] See: http://www.ferc.gov/CalendarFiles/20130424150622-Lander,%20Skipping%20Stone%2004-24-13.pdf

[v] In analysis for the New England States Committee on Electricity, Black & Veatch finds that under the Low Demand Scenario already planned expansion in gas pipeline capacity and existing capacity to import liquefied natural gas are sufficient to cover winter demand (see: http://www.nescoe.com/uploads/Phase_III_Gas-Elec_Report_Sept._2013.pdf).

[vi] Domestic natural gas prices could rise toward global levels – currently three to five times higher than the U.S. price – (http://www.iea.org/media/files/WEO2013_factsheets.pdf) if we begin to export natural gas for economic and geopolitical reasons. Higher base prices for natural gas would reduce demand for natural gas and the economic benefits of new gas pipelines.

[vii] Massachusetts is considering establishing a target to meet 5% of thermal load through renewable technologies by 2020, increasing to 26% by 2030, and similar opportunities exist in other New England states. Targets proposed during 3/26/14 meeting of the Global Warming Solutions Act Implementation Advisory Committee Thermal Working Group. For additional detail on Massachusetts Renewable Thermal Heating and Cooling policy see: http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/renewable-thermal/

[viii] Analysis commissioned for ISO-New England found 6,433MW of CHP potential in the region. See: http://www.iso-ne.com/committees/comm_wkgrps/prtcpnts_comm/pac/mtrls/2013/nov202013/icf_natural_gas_dsm_in_new_england_white_paper_11-18-2013.pdf.

[ix] The EPA CHP emissions calculator (http://www.epa.gov/chp/basic/calculator.html) is used to evaluate net fuel reduction achieved by deploying a 1.7GW of CHP capacity on existing gas pipelines. Average natural gas power plant efficiency is assumed to be 40% see: http://www.eia.gov/electricity/annual/html/epa_08_01.html.

[x] For information on Massachusetts' energy efficiency programs see: www.ma-eeac.org/Thre%20Year%20Plans.htm, For information on Rhode Island's energy efficiency programs see: www.rieermc.ri.gov.

[xi] For information on Massachusetts' energy efficiency programs see: www.ma-eeac.org/Thre%20Year%20Plans.htm, For information on Rhode Island's energy efficiency programs see: www.rieermc.ri.gov.

[xii] From ISO-NE Renewable Portfolio Standards Spreadsheet, available at: http://www.iso-ne.com/committees/comm_wkgrps/prtcpnts_comm/eag/usr_sprdshts/2012_rps_spreadsheet.xlsx

[xiii] Renewable electricity is assumed to offset generation from natural gas power plants with average efficiency of 40%, see: http://www.eia.gov/electricity/annual/html/epa_08_01.html.

[xiv] Energy storage is assumed to offset generation from natural gas power plants with average efficiency of 40%, see: http://www.eia.gov/electricity/annual/html/epa_08_01.html.

[xv] The *New England Gas-Electric Focus Group Final Report* calls for at least 1200MW and as much as 3600MW of transmission infrastructure. See: http://www.nescoe.com/uploads/NEGas-ElectricFocusGroup_FinalReport_31Mar2014.pdf

[xvi] For additional information on the six transmission proposals under consideration see presentation of Steven Clarke, Assistant Secretary of Energy for Massachusetts, to the April 11th Restructuring Roundtable, available at: http://www.raabassociates.org/main/roundtable.asp?sel=128

[xvii] Electricity imported into the region is assumed to offset generation from natural gas power plants with average efficiency of 40%, see: http://www.eia.gov/electricity/annual/html/epa_08_01.html.