New England States
Committee on Electricity

NESCOE Concludes Gas-Electric Study

September 9, 2013 - The New England States Committee on Electricity (NESCOE) has completed its study of the interactions between the New England natural gas and electricity markets (Gas-Electric Study). Through its consultant, Black & Veatch, NESCOE examined the adequacy of New England's natural gas infrastructure to meet the growing needs of the electric generation sector and analyzed the relative costs and benefits of various solutions that could alleviate natural gas pipeline congestion. This describes the study, and summarizes: 1) Black & Veatch's observations and recommendations; 2) the complexity of the interactions between the natural gas and electric markets; 3) some principles that may inform discussion about the path forward; and 4) NESCOE's observations of the Gas-Electric Study. In the fall of 2013, the states will consider the path forward in light of the results of the Gas-Electric Study.

Background: New England has increasingly relied upon natural gas-fired electric generation. ISO New England, the region's electricity system operator, has identified a growing dependency on natural gas as a risk to reliable electric system operation. The Gas-Electric Study was prompted by natural gas pipelines experiencing increasing levels of constraints during winter months and uncertainty associated with future supplies of imported liquefied natural gas (LNG).

The Study: NESCOE commissioned Black & Veatch to conduct a three-phase study. In Phase I, *Natural Gas Infrastructure & Electric Generation: A review of issues facing New England,* Black & Veatch reviewed existing studies and concluded that New England's natural gas infrastructure will become increasingly stressed as regional demand for natural gas grows, leading to infrastructure inadequacy at key locations. In Phase II, Black & Veatch analyzed the extent and duration of historical and forecasted natural gas congestion. Black & Veatch concluded that with existing natural gas infrastructure, significant portions of New England would experience infrastructure constraints lasting for more than 30 days in the relatively near future. In consultation with states, Black & Veatch designed an economic analysis of the natural gas and electricity market interactions using computer simulation modeling and cost-of-service cost estimation techniques. In Phase III, *Natural Gas Infrastructure and Electric Generation: Proposed Solutions for New England*, Black & Veatch estimated the costs and benefits associated with various gas and electric supply and demand-side solutions under three future scenarios: a Base Case (most likely outcome based on current outlooks), a High Demand Scenario (increased gas use through market and policy drivers), and a Low Demand Scenario (flat or declining gas use across all sectors). The Gas-Electric Study is available at www.nescoe.com.

Study Limitations: The Black & Veatch Gas-Electric Study is not a resource plan. Such studies are based on hypothetical assumptions, any one or more of which history may prove wrong in the near term or at any time during the study period. Indeed, the Gas-Electric Study did not assume the late August 2013 announced shutdown of the Vermont Yankee nuclear reactor by the end of 2014. Further, study results are directional and indicative. They are not predictive or precise. Studies are not predictions of costs that would emerge in a competitive solicitation, as the result of a negotiation, or that could be identified when a project becomes operational. By assessing different hypothetical futures, the study does not pretend to have perfect foresight. Rather, it assumes policymakers will apply their judgment to the assumptions in each of the hypothetical scenarios studied, and their relation to policymakers' beliefs about the future. The Gas-Electric Study should be viewed accordingly, and critically.

Black & Veatch's Gas-Electric Study *Observations*

- In the absence of infrastructure and demand reduction/energy efficiency/non-natural gas powered distributed generation solutions, New England will experience capacity constraints that will result in high natural gas and electric prices. In a Low Demand Scenario, no long-term infrastructure solutions are necessary.
- Gas-supply requirements driven by episodes of extremely cold weather can be very costly and create significant reliability risks – they aggravate infrastructure deficiencies.
- Short-term solutions (2014-2016) provide net benefits to New England customers.
- In the absence of greater demand reduction/energy efficiency/non-natural gas powered distributed generation solutions, a Cross-Regional Natural Gas Pipeline solution presents higher net benefits to New England consumers than do alternative long-term solutions (2017-2029).
- For most or all prospective solutions, the majority of the benefits apply to New England electric customers.

Black & Veatch's Gas-Electric Study *Recommendations*

- Short-term and long-term solutions are needed to relieve the natural gas market constraints in New England under the Base Case and High Demand Scenario.
- No long-term infrastructure solutions are necessary under the Low Demand Scenario.

Context: complex interactions between the natural gas and electricity markets contribute to the challenge of addressing New England's increasing dependence on natural gas

- New England's current energy infrastructure was developed primarily under a vertically integrated regulatory regime that has been restructured to rely largely on competitive wholesale markets.
- To date, the electricity markets have not provided incentives that have resulted in investment in new natural gas infrastructure or in alternative solutions to achieve comparable ends. The natural gas pipeline industry generally requires long-term commitments for new infrastructure development, which may not be achievable under the current competitive electricity market rules.
- The benefits of incremental natural gas infrastructure will likely flow to natural gas customers *and* to electricity customers, but the vast majority will flow to electric customers. Since the two customer segments do not necessarily overlap, issues arise in connection with assigning costs proportionate to benefits.
- Rational economic behavior on behalf of power generators would not necessarily lead to their securing firm natural gas supply; firm natural gas supply by *all* generators may be unnecessary and uneconomic. Further, unnecessary and uneconomic investment in firm fuel supply by *all* generators would eventually lead to unnecessarily and unreasonably high consumer costs.

Some *principles* that may provide guidance on the path forward

- Natural gas customers and electricity customers, which customer segments do not always overlap, should bear only those costs reasonably anticipated to deliver benefits to them.

- Any incremental infrastructure investment or investments in demand reduction/energy efficiency/non-natural gas powered distributed generation should provide service to customers at the lowest cost over the long term consistent with environmental objectives. Over time, such investments should provide power system reliability, achieve environmental goals or requirements, and control consumer costs.

- The region's preference for market-based approaches to efficiently allocate society's resources should be incorporated into solution design(s) whenever possible; distortions to the region's competitive wholesale electricity markets should be minimized to the maximum extent possible. Markets are, however, a means to an end, and not the ultimate objective: to the extent markets cannot deliver infrastructure adequacy at a reasonable cost, alternative approaches with minimal market-distorting effects should be considered.

- Adequate infrastructure influences consumer costs, and so timeliness in achieving infrastructure adequacy, whether through decreased demand or increased resources, matters.

NESCOE *observations* on the Gas-Electric Study

- A new natural gas pipeline currently in process toward commercial operation provides significant economic benefits to New England's electricity customers under all future scenarios studied - the Base Case, the Low Demand Case and High Demand Case. The commercial operation of this new planned pipeline reduces gas prices - and therefore electricity prices - in the short term.

- An *additional* hypothetical pipeline, beyond that in process toward commercial operation, provides the most substantial economic net benefits to electricity consumers of all solutions studied under the Base Case and the High Demand Case.

- Using existing LNG import terminals and dual-fuel (e.g., gas and oil) capable electric generation infrastructure is a cost-effective means to address natural gas dependency in the short term, or at least until new longer-term infrastructure, such

as a natural gas pipeline or electric transmission line to increase the level of hydroelectric imports, become operational. Dual-fuel units would, however, need to comply with increasingly stringent emissions standards in order to be permitted. This is likely to influence the extent and duration of at least some dual-fuel units' ability to reduce natural gas dependency.

- The actual cost to consumers for incremental hydroelectric power is currently unknown. The study assumes cost of service based pricing, which may be much lower than its real costs to electricity consumers if the cost of hydroelectric imports are ultimately closer to market prices than to the cost-of-service. The actual costs of incremental hydroelectric imports is unknown absent a competitive process to identify a fixed bid price, a negotiated price in relation to a specific project, or an actual project advancing to operation.

- Reducing consumers' demand for electricity and natural gas to the extent assumed in the Low Demand Case eliminates the need for consumers to invest in infrastructure (beyond the pipeline currently in process toward commercialization). 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 in not known. Further analysis would be required to determine whether policies that would result in a Low Demand Scenario are cost-competitive with infrastructure investments.

- The competitive wholesale market is not designed to help further state public policy objectives, such as emissions reductions and clean energy deployment, and thus states have generally executed those objectives or requirements through programs outside of the regional wholesale competitive market.

- The competitive wholesale electricity markets' economic incentives provided to generators today are unlikely to support long-term infrastructure development. There is no evidence that current proposals to modify the competitive wholesale electricity market would result in incentives to support long-term infrastructure development.