

New England States Committee on Electricity

To: Massachusetts DOER & Synapse Energy Economics, Inc.
From: NESCOE
Date: November 4, 2014
Subject: Comments on October 30 Low Demand Analysis presentation

NESCOE appreciates the opportunity to provide some comments in connection with the Study discussed at the October 30, 2014 stakeholder session. In this context, NESCOE's views do not reflect the views of officials from the Commonwealth of Massachusetts.

The extent and quality of these comments are limited by the three days to review and consider eighty pages of material. The time constraint causes heightened concern because the revised slides had material errors that would fundamentally alter the Study outcome (for example, gas energy efficiency programs that overstated the potential for peak hour reduction by orders of magnitude and calculation errors regarding the peak hour availability of imported hydro). Time to carefully and closely review assumptions, sources and calculations is important so that major errors, or smaller errors that would in the aggregate result in erroneous conclusions, are identified in advance. NESCOE appreciates your attentiveness to feedback and looks forward to reviewing any changes made as a result. Given the expedited schedule for these comments, NESCOE expects to provide additional and potentially wider ranging comments.

These comments focus primarily on two areas: (1) the avoided-cost approach, and (2) certain proposed assumptions and analysis. Regarding the avoided-cost approach, as detailed below, there appears to be a major omission that will affect the Study's outcome. For the comparative resource that is the subject of the study, natural gas pipeline, the proposed analysis considers the costs but not the benefits of this resource. A comparison of cost-effectiveness cannot be achieved without this critical piece of missing information. Further consideration should be given to a number of assumptions: so-called economic hydro from Canada will be 100% available during the winter peak hour without any contractual commitment to do so; less efficient units called upon during the summer peak are an appropriate proxy for avoided gas consumption; and temporary winter emergency programs will continue for the next 15 years. These assumptions do not appear to have a reasonable connection to general experience or expectation. These assumptions should be revisited to ensure that they connect to general experience or expectations or, alternatively, the rationale for taking different paths that influence the study's outcome should be very clearly articulated for the reader.

Avoided Cost Approach and Feasibility Threshold – Considering Benefits as well as Costs

It appears that a Study objective is to enable a reader to understand the relative cost-effectiveness of alternative means to satisfy resource needs. To that end, the Study's Feasibility Threshold should consider the *benefits* – not just the *costs* - of the comparative resource, which the Study has in this case identified as a natural gas pipeline.

Study Description per Synapse: The Study will use a spreadsheet to evaluate the sufficiency of natural gas pipeline under winter peak conditions. Based on this infrastructure sufficiency evaluation, the Study will then “consider various solutions to address Massachusetts’ short and long-term energy needs, taking into account greenhouse gas reductions, economic costs and benefits, and system reliability.”¹ The means by which electric and gas supply- and demand-side resources will be tested for cost effectiveness, relative to a so-called “Feasibility Threshold,” is based on an approach commonly used in the rate-regulated demand-side management realm.

Consistent with the concepts from the 1978 Public Utilities Regulatory Policy Act (PURPA), Synapse will determine which alternatives to pipeline investment are cost-effective by reference to an assumed “Avoided Cost”. In the demand-side management context, the avoided cost is the amount that one would pay if they were to consume electricity. In the Study, Synapse assumes that the avoided cost is the amount that a consumer would save when an alternative resource is implemented. In other words, the Study assumes that avoided cost is a proxy for the benefits of each alternative resource. Combined with cost-of-service-based estimates of the costs of alternative resources, Synapse will compare assumed costs and benefits of each alternative resource (“Avoided Cost Approach”).² This process will, in turn, establish a ranking of relative cost-effectiveness for each alternative resource, a spectrum that will range from highly cost-effective to relatively expensive (“Supply Curves”). Once the Supply Curve for cost-effective pipeline alternatives is developed, Synapse will then apply a Feasibility Threshold to determine the alternative measures and resources that will be incorporated into the Low Demand Scenario.

Comment: As structured, the benefits of the comparative resource identified in the Study, incremental pipeline investments, will not be considered in setting the Feasibility Threshold, only the costs.

At the October 30, 2014 stakeholder meeting, Synapse proposed to establish the Feasibility Threshold at a level equivalent to the annual costs of a representative lift-and-replace pipeline project, if those annual costs were recovered only during a portion of the winter season. In other words, the cost of a theoretical pipeline *is* the cost to avoid under the Avoided Cost Approach. This Feasibility Threshold, unlike all of the alternatives to which it would be compared, *only considers the theoretical pipeline’s costs and not its benefits.*

¹ Massachusetts Low Demand Analysis, Second Stakeholder Meeting Slides (Revised) (Oct. 30, 2014), at 3, available at <http://synapse-energy.com/project/massachusetts-low->

² As described further below, Synapse has not yet disclosed the analysis or assumptions associated with converting estimated future costs and benefits to its Annual Net Levelized Cost values for each alternative resource.

It is foreseeable that the Study results will be misinterpreted as suggesting that alternative resources are more cost-effective than the reference resources identified in the Study, a pipeline investment. If the Feasibility Threshold does not consider the benefits of the measure comprising the threshold, then it would not be possible to determine the relative cost-effectiveness of all alternatives. To avoid this foreseeable misperception and misinterpretation, the Study should either 1) clearly explain this limitation, or 2) set the Feasibility Threshold at a level that includes its benefits, consistent with the cost-effective alternatives to which it is compared.

Certain Assumptions Should Have A Closer Connection To General Experience Or Expectations Or The Study Should Articulate Very Clearly Why Alternate Paths To An Outcome Were Chosen

Many important study assumptions are still pending with Synapse, including the potential adjustments to the electric load forecast. NESCOE offers its concerns on some of those released to date below.

Imported Firm Hydro On the Coldest Days With No Associated Contract: The Study includes two electric sector modeling runs to evaluate the sensitivity of power sector gas demand and emissions to an incremental 2400 MW of imported power, predominantly assumed to be hydroelectric. Despite experience to the contrary, the Study assumes that the so-called “Imported Hydro” power will have a winter peak day availability higher than its annual capacity factor.

Further, and of greater concern, is that the Study assumes the Imported Hydro will be 100% available during the coincident design day winter peak hour.³ At the October 30, 2014 stakeholder meeting, Synapse confirmed that the Study will assume no contract to assure hydro delivery during winter peak hours and that high electricity prices during the winter peak would naturally provide economic incentives for the assumed 100% availability. This assumption does not appear supported by experience.⁴ For example, on a particularly cold day last winter, December 14, 2013, Hydro-Quebec “reduced its imports into New England in order to maintain Hydro-Quebec’s own operating reserve requirement.”⁵ Analysis of power system interface flows shows similar trends on January 20-25, 2014.⁶ The Imported Hydro sensitivities should: (i) accurately

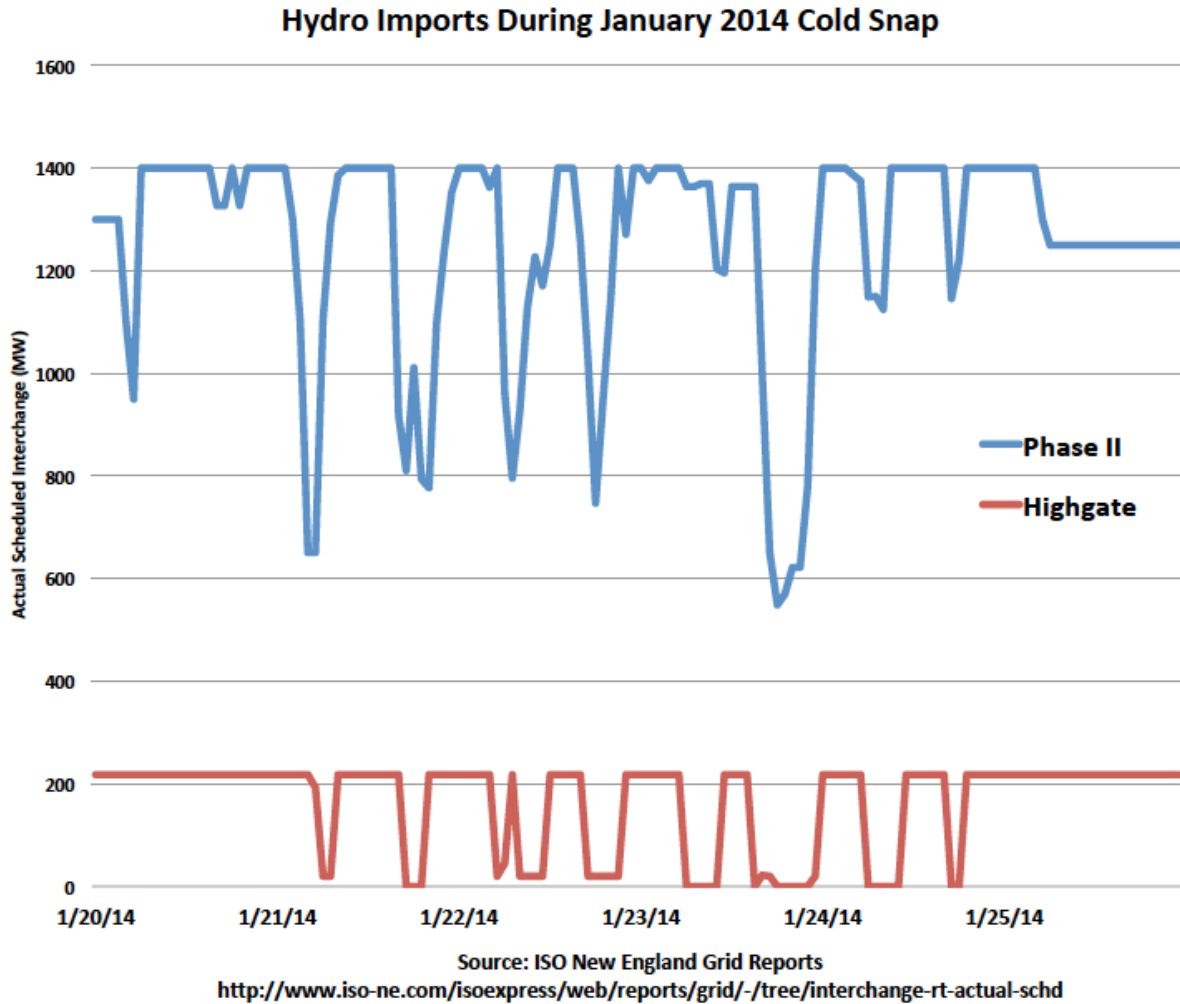
³ Second Stakeholder Meeting Slides, at 21.

⁴ In addition, given legislative proposals in Massachusetts regarding long-term contracting authority by electric distribution companies for large-scale hydropower resources, the assumption could suggest, perhaps erroneously, that long-term contracts for hydropower resources may be unnecessary. Further clarity on this assumption would be helpful to the reader.

⁵ ISO New England, Quarterly Market Report, 4th Quarter 2013, at 8, available at http://www.iso-ne.com/markets/mkt_anlys_rpts/qtrly_mktops_rpts/2013/q4_2013_qmr.pdf.

⁶ ISO New England Grid Reports, Real-Time Actual Scheduled Interchange data, available at <http://www.iso-ne.com/isoexpress/web/reports/grid/-/tree/interchange-rt-actual-schd>.

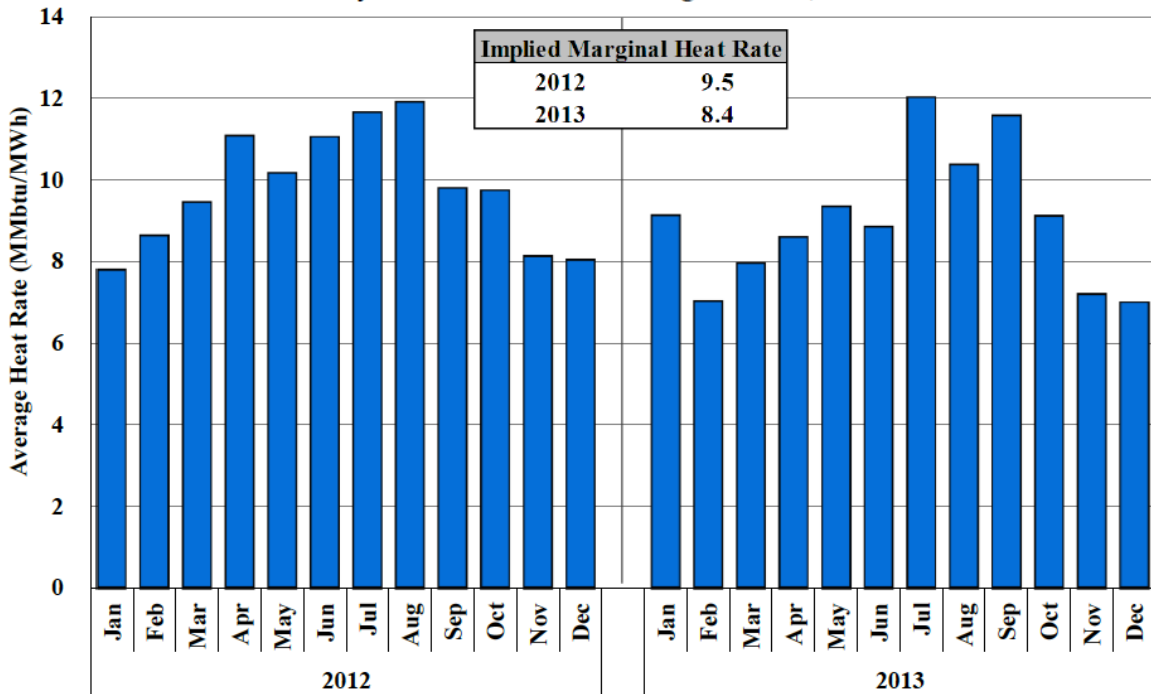
reflect peak day and peak hour availability for economically-based power imports, and/or (ii) accurately reflect the costs associated with firm power delivery during the peak hour. Assuming power will flow on the coldest common winter day by and between Canada and New England with no contractual obligation will likely understate the cost of that power source.



Heat Rate Conversion Assumption: To enable comparison between electric and gas supply- and demand-side resource alternatives, it is necessary to establish a conversion ratio between electricity and natural gas. This is typically achieved by reference to a hypothetical gas-fired electric generator with a specific fuel-to-power conversion ratio, a so-called “Heat Rate.” For a study based on the avoided costs of gas-fired electric generation on the Winter Peak Day, the Heat Rate assumption should reflect the resources it is likely to displace. The preliminary assumption for this value is 12 MMBtu/MWh, consistent with the monthly average value of the peak month in 2013. However, the peak month in New England is during the summer and a winter-time marginal heat rate is much lower than the preliminary 12 MMBtu/MWh assumption.

The chart below is from Synapse’s data source, the External Market Monitor’s annual report.⁷

Figure 2: Monthly Average Implied Marginal Heat Rate
Based on Day-Ahead Prices at New England Hub, 2012 – 2013



As shown in the chart, the marginal heat rate during the winter season rarely exceeds the annual average. In order to accurately reflect the hypothetically displaced electric sector gas demand, the Heat Rate assumption should reflect winter conditions rather than the annual maximum value.

This past winter, pipeline network constraints resulted in delivered natural gas prices that were higher than fuel oil. This caused distillate (and sometimes residual) oil-burning units to run in economic merit. Under these circumstances, the marginal heat rate may be more than the monthly average. However, if these are the conditions upon which the Study would base its electric to gas conversion ratio, this assumption should be made very clear and its implications explained.

ISO-NE Winter Program Continuation through 2030: While it is unclear whether this assumption is likely to have a material effect on the Study results, it is unclear why Synapse would assume the ISO New England (ISO-NE) Winter Program will continue through 2030. These programs, in which consumers invest primarily in incremental fuel

⁷ Potomac Economics, *2013 Assessment of the ISO New England Electricity Market* (June 2014), at 44, available at http://www.iso-ne.com/static-assets/documents/markets/mktmonmit/rpts/ind_mkt_advsr/isonne_2013_emm_report_final_6_25_2014.pdf.

oil to ensure reliability, are generally considered to be costly and dirty, and specifically intended by ISO-NE to be temporary, emergency fuel security measures.

In sum, assuming so-called economic hydro from Canada will be 100% available during a design day winter peak hour without any contractual commitment to do so, that less efficient units called upon during the summer peak are an appropriate proxy for avoided gas consumption, and that temporary emergency programs will continue for the next 15 years does not appear to be designed to result in outcomes that have a reasonable connection to experience.

Resource Assessment Assumptions and Analysis Remain Pending

The materials for the October 30, 2014 stakeholder meeting included the results for thirty (30) different resource assessments. However, the assumptions and analytical approach used to develop the Total Potential Capacity, Annual Net Levelized Costs, and associated Peak Hour Gas Savings for the 30 alternative resources were not provided. Rather than a cursory data source description, the Study should make available the assumptions, their associated data sources, and the analysis used to develop the aforementioned metrics. In particular, two aspects of the Study should be further explained and supported.

Annual Net Levelized Costs: Annual Net Levelized Costs are understood to be costs, net of benefits (avoided costs). For most resource assessments, the values assumed for each resource's capital costs, annual carrying charge rates and values, discount rate(s), and annual performance characteristics are unknown. The benefits (avoided costs) of these measures are referenced to Synapse's 2013 Avoided Energy Supply Cost study and testimony in a current Department of Public Utilities (DPU) proceeding regarding the Global Warming Solutions Act (GWSA), DPU 14-86. The annual net costs are then apportioned to annual resource output to arrive at a unit cost. The values and calculations used in developing the annual net costs per unit of output should be made available for each resource assessment.

Infrastructure Sufficiency - Information Pending: To establish the amount of alternative resources included in the Low Demand Scenario, Synapse will estimate the sufficiency of the New England natural gas infrastructure. The spreadsheet model has not yet been released. Nor have the assumptions associated with the gas demand forecast, available pipeline capacity, peak-shaving and imported liquefied natural gas (LNG) send out rates, and local gas distribution company (LDC) long-term growth rates.

Conclusion

NESCOE appreciates the opportunity to share its views and looks forward to reviewing other forthcoming assumptions including the electric and gas load forecasts, generator retirements and additions, pipeline additions and flows, imported and peak shaving LNG send-out rates, alternative resource technical and economic potential, alternative resource capital and carrying cost assumptions, and fuel prices. NESCOE has previously expressed caution about drawing conclusions about solutions to gas supply constraints from a study that focuses on a single winter peak hour under a single generator retirement scenario. NESCOE similarly urges caution about

drawing conclusions from a study that appears to be highly sensitive to the analytical approach pursued. New England is fortunate to have many relevant studies conducted by a range of entities with diverse interests to help provide context and comparisons on this critically important issue.⁸

⁸ See, generally:
North American Electric Reliability Corporation (NERC),
Phase I (Primer, December 2011): http://www.nerc.com/files/gas_electric_interdependencies_phase_i.pdf.
Phase II (Vulnerability and Scenario Assessment, May 2013):
http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_PhaseII_FINAL.pdf.

ICF International (ICF) for ISO New England,
Phase I (Deterministic Scenarios, June 2012): http://www.iso-ne.com/static-assets/documents/committees/comm_wkgrps/prtcpnts_comm/pac/reports/2012/gas_study_public.pdf.
Phase II (Scenarios with Duration, December 2013): http://www.iso-ne.com/static-assets/documents/committees/comm_wkgrps/prtcpnts_comm/pac/mtrls/2013/dec182013/a3_draft_icf_phase_2_gas_study_report_without_appendices.pdf.
Post Winter Assessment (Benchmarking, April 2014): http://www.iso-ne.com/static-assets/documents/committees/comm_wkgrps/prtcpnts_comm/pac/mtrls/2014/apr292014/a3_icf_benchmarking_study.pdf.

Black & Veatch for NESCOE,
Phase I (Literature Review, December 2012): http://www.nescoe.com/uploads/Phase_I_Report_12-17-2012_Final.pdf.
Phase II (Duration and Scenario Design, April 2013):
http://www.nescoe.com/uploads/Phase_II_Report_FINAL_04-16-2013.pdf.
Phase III (Scenarios and Economic Analysis, September 2013):
http://www.nescoe.com/uploads/Phase_III_Gas-Elec_Report_Sept_2013.pdf.

ICF for GDF Suez NA,
Post-Winter Review (Updated Analysis, May 2014): http://www.nescoe.com/uploads/GDF-SUEZ_CommenstonIGER_30May2014.pdf

ICF for the Eastern Interconnection States Planning Council (EISPC),
Long Term Study (Scenarios, Duration, and Economic Analysis, pending publication), webinar providing results available at
http://naruc.org/Grants/EISPC/2014-09-04_14_01_Webina_Final_EISPC_report-Long-Term_Electric_and_Natural_Gas_Study_by_ICF.wmv

Levitan & Associates for the Eastern Interconnection Planning Collaborative (EIPC),
Multi-Targeted Analysis (Scenarios, Duration, Hydraulics, Dual Fuel Economics, pending publication), drafts available at http://www.eipconline.com/Gas-Electric_Documents.html.