

Summary: ISO New England Scenario Analysis Initiative

- ISO-NE's Scenario Analysis Initiative began in January 2007 with input from a stakeholder group. ISO-NE issued draft reports on May 16 and again on June 18. ISO-NE plans to issue its final Scenario Analysis report by August 1, 2007. ISO-NE will present the results of its Scenario Analysis to the CEAB on August 9, 2007.
- ISO-NE's stated goal for the Scenario Analysis is to "*fully educate stakeholders and, in turn, inform energy policy decisions.*" ISO-NE sought to "*generate meaningful data, information and discussion that regional decision makers can use as they develop policies and investments....*" The ISO-NE did not, however, design the Scenario Analysis to result in a resource plan for the region.
- The Scenario Analysis focused on the a year in the 2020 to 2025 timeframe in which the total system demand in New England would reach 35,000 MW. To meet this demand, the Scenario Analysis assumed that 8,000 MW of new resources would need to be added to the existing mix. Seven scenarios representing different fuel and technology-based options are examined and compared for their economic, reliability and environmental performance. Additionally, each scenario is tested against a range of assumptions to understand its sensitivity to different or changing conditions such as fuel prices.
- The results of the Scenario Analysis are interesting, but somewhat limited. For example, the analysis focused on a single future year (rather than, for example examining costs, etc., across a range of years). Moreover, the Scenario Analysis was not designed to select or gain consensus on a particular generation expansion plan for the region. In fact, the Scenario Analysis "*purposefully assumed exaggerated, perhaps unrealistic types of resource additions.*"
- ISO-NE can be applauded for promoting an important discussion. However, given that the Scenario Analysis is conducted at a "macro" level and focuses on substantial resource additions to the region's bulk power grid, it provides limited insight into the incremental resource additions that would best suit individual locales within the New England market. Therefore, it does not provide the kind and quality of information needs to assess projects under the Energy Independence Act, in RFPs for alternatives, or in procurement planning following the development of an Integrated Resource Plan under Public Act 07-242.
- A discussion with ISO-NE of the opportunity to extend this analysis to the local level (e.g., the State of Connecticut) could be interesting. We present questions in the final section toward this end.

MEMORANDUM

July 30, 2007

TO: The Connecticut Energy Advisory Board
FROM: La Capra Associates Project Team
CC: ASWG

SUBJECT: ISO New England Scenario Analysis Initiative

This memorandum provides a summary of ISO New England's Scenario Analysis Initiative, which we have been monitoring on CEAB's behalf.

ISO New England (ISO-NE) will be presenting the results of its Scenario Analysis to the CEAB on August 9, 2007. In this memorandum, we review the objectives of the Scenario Analysis Initiative, and present some observations on the overall process and results. We also offer some questions pertaining to the study for the CEAB members to consider in advance of the August 9 meeting with ISO-NE. This memorandum is intended to address issues related to the Scenario Analysis at a high level. We would be happy to provide additional detail upon request.

The Scenario Analysis Initiative began in January 2007. A stakeholder group provided informal input to ISO-NE as it prepared this analysis. ISO-NE issued an initial draft report on May 16, 2007, and a revised draft report on June 18, 2007. ISO-NE is planning to issue its final Scenario Analysis report on or before August 1, 2007. The results of this study are now being presented to policy forums throughout the region for discussion and input.

We recommend that the CEAB consider issuing a short letter to ISO-NE in the next several weeks, following the August 9 discussion with ISO-NE, that would provide the CEAB's feedback on the Scenario Analysis Initiative and the CEAB's view of the needs for further work in this area.

Briefing Materials on the Scenario Analysis Initiative

Prepared for the Connecticut Energy Advisory Board

By

La Capra Associates

I. Introduction

It is important to understand that the Scenario Analysis Initiative is designed to promote conversation about alternative supply options in New England. By design, it is *not a study or recommendation on a preferred path for the region*. In January of this year, ISO-NE introduced the Scenario Analysis Initiative as follows [*emphasis added*]:

ISO-NE's Scenario Analysis Initiative is an educational stakeholder process to explore long-term resource options for meeting a New England electricity demand of 35,000 MW—a level that will require the addition of 8,000 MW and is expected to occur in the timeframe between 2020 and 2025. It is designed to explore different options and outcomes for the region's electric system, rather than to develop a common plan or even a consensus projection of what is expected to occur in the future.

Seven scenarios representing different fuel and technology-based options will be examined and compared for their economic, reliability and environmental performance. Additionally, each scenario will be tested against a range of assumptions to understand its sensitivity to different or changing conditions such as fuel prices. By purposefully assuming exaggerated, perhaps unrealistic types of resource additions, the different outcomes of each scenario become clear and the results can be used to inform stakeholders of the implications of each.

The Initiative is not designed to select or gain consensus on the region's future expansion path – rather, the goal is to fully educate stakeholders and, in turn, inform energy policy decisions.

Notably, the revised draft report states:

ISO-NE aimed to generate meaningful data, information and discussion that regional decision makers can use as they develop policies and investments....

Consistent with the... objectives of this initiative, the Scenario Analysis stops short of indicating what steps the region should carry out now. ISO-NE is willing to continue to work with policy makers and stakeholders to define the next stage in this analysis.

In the context of ISO-NE's study design objectives, the Scenario Analysis Initiative results are being offered as a starting point for a discussion about New England's supply options, not an end result.

II. Scenarios Explored

The Scenario Analysis focuses on a single year in the 2020 to 2025 period, where it is anticipated that New England will have a total system demand of 35,000 MW. (In comparison, New England's weather-adjusted peak demand in 2006 was 26,940 MW). To meet this demand, the Scenario Analysis assumed that 8,000 MW of new resources would need to be added to the existing mix.

In each scenario, the first 2,600 MW of new resources reflect the mix currently in ISO-NE's interconnection study queue. In Scenario #1, the remaining 5,400 MW needed to reach the 8,000 MW reflects that same mix. In all other Scenarios, the remaining 5,400 MW are assumed to come from a single type of source. For example, 5,400 MW of coal-fired generation is added in Scenario #4, while 5,400 MW of demand-side resources are added in Scenario #2. This is done without consideration as to whether it would be economically sensible or even feasible to do so.

The scenarios explored were identified by ISO-NE as follows:

- Scenario #1—**The “Queue” Mix**, reflecting a combination of power plant technologies that had applied for interconnection studies in New England (and, thus, are in the “queue” for review by ISO-NE) as of September 30, 2006, notably including gas-fired “peaking” units, combustion turbine (CT) units, and renewable resources.
- Scenario #2—**Demand-Side Resources**, including energy-efficiency technologies that reduce electricity use for a given level of system load or shift usage from on-peak to off-peak hours or reduce it during regionally high peak-demand conditions. Note that it was assumed that 2,700 MW would come from energy efficiency and 2,700 MW, from peak load reduction programs. This has the effect of creating a resource with limited energy-production capability, which affects the results of ISO-NE's analysis.
- Scenario #3—**Expansion of Nuclear Capacity**, assumed to occur at or near existing nuclear stations in New England.
- Scenario #4—**New Coal-Fired Power Plants**, using Integrated Gasification Combined-Cycle (“IGCC”) Technology, which gasifies coal and then runs the gas stream through a combined-cycle power production facility.
- Scenario #5—**New Natural-Gas-Fired Combined-Cycle Power Plants**, reflecting additional new power plants similar to those added in large numbers in the region over the past decade.
- Scenario #6—**New Renewable Projects**, reflecting a combination of new renewable technologies, including offshore wind, inland onshore wind, hydroelectric power,

biomass, fuel cells, landfill gas, combined heat and power (“CHP”) systems, and solar photovoltaic technologies.

- Scenario #7—**Increased Imports of Hydroelectric Power** and Other Low-Emission Resources, reflecting new transmission investment to support imports of a significant amount of new power supply from both Canada and New York.

Each of these scenarios was run through a simulation of the operation of the New England market to see how each Scenario, when operated with the existing system, affected market prices, regional emissions, and energy mix. It is important to note that the analysis focuses only on operating costs and market operations. Consideration was not given to who would develop the resources, or to capital costs required to construct these scenarios. These scenario results should be viewed to address the question: *“If these resources are built, how will the market operate?”*

III. Scenario Analysis Report Findings

In its revised draft report,¹ ISO-NE provides a number of key themes and conclusions, including the following:

- *Under all scenarios, New England will continue to depend on natural gas to supply electricity;*
- *The prices of fossil fuels, particularly natural gas, drive the region’s electric energy mix, costs, electric energy prices, and level of emissions;*
- *However, it is difficult if not impossible to accurately predict today what oil and gas prices will be in the future, and the underlying forces in global energy markets could lead to a wide variability of results for the scenarios and cases analyzed;*
- *Across all the scenarios and sensitivity cases, gas-fired power plants tend to be among the last plants dispatched (the so-called marginal units) to serve typical daily loads in New England to meet demand and the plants that set electric energy clearing prices in the wholesale electricity markets in most hours of the year, approximately 90% of the time;*
- *Investment in most power technologies appear to require more support than can be provided through the electric energy markets alone, so evaluating the technology options must fully consider capital and operating costs as well as variable energy market operating costs;*
- *The scenarios that employ resources that have low variable cost, low emissions, and medium-to-high energy output (e.g., double energy efficiency, nuclear, hydro imports)*

¹ The cover page to ISO-NE’s Revised Draft New England Electricity Scenario Analysis indicates that this draft is not to be cited or quoted. The views presented herein are offered under the assumption (which we believe to be a safe one) that the significant underpinnings of the Scenario Analysis Report will not change in the next several weeks.

will produce electricity more efficiently (i.e., with less overall fossil fuel consumption and lower emissions);

- *New England's CO2 emissions from the power sector vary considerably across the scenarios (and within some scenarios, depending on the assumptions about such variables as fuel prices, emission allowance costs, unit retirements);*
- *Adding significant new demand-side resources provides capacity and electric energy benefits (in the form of capacity and energy savings) to the system; and*
- *Transmission and distribution investment may be needed to support various resource and technology paths, depending on where actual resources are added in the future.*

IV. La Capra Associates' Observations

Based on our experience in monitoring the Scenario Analysis meetings and reviewing related documents (including the two draft reports), we offer the following concerns and observations:

- ISO-NE does not use the Scenario Analysis report as the basis for recommendations for resource additions in the region. The scenarios explored are not (and are not intended to be) realistic expansion plans for New England.
- The scenarios were not created with any consideration of the capital costs required to construct the resources and do not provide a view of the total costs that would need to be incurred to develop each scenario. As such, the resources in some scenarios may not be economically sensible to develop.
- Very limited consideration is given to transmission requirements in these scenarios. The scenarios implicitly assume transmission system build out will occur, as needed, such that there is a reasonably “uncongested” system, where electricity flows freely from generation sources to loads.
- The analysis is conducted at a “macro” level that focuses on substantial resource additions to the region’s bulk power grid. The analysis provides little insight into the incremental resource additions that will best suit individual locales within the New England market. Therefore, the analysis does not really provide the kind or quality of information Connecticut can use to assess projects under the Energy Independence Act, in RFPs for alternatives, or in procurement planning.
- The “key themes” that ISO-NE presents as emerging from the Scenario Analysis Report are not particularly surprising as it is clear that the results are driven by the assumptions. However ISO-NE has offered the disclaimer that its assumptions are not necessarily those that all parties would find satisfactory.
- The analysis that has been performed by ISO-NE is somewhat unusual (e.g., some 52 simulations have been performed focusing on a single, distant year), so the results have limited application.

V. Recommendations

ISO-NE invited comments on its revised draft report in anticipation of releasing a final Scenario Analysis report by August 1. Because we would not anticipate providing comments on the substance of the report, we do not see it as critical for the CEAB to provide comments to ISO-NE in advance of its publication.

However, we believe the CEAB should consider going “on the record” regarding its overall position with respect to the report. That is, it may be important to reinforce some of the qualifications and caveats that ISO-NE has itself emphasized throughout the process and to articulate the CEAB’s view of additional work that should be done. In short, the CEAB could state its understanding that the Scenario Analysis Initiative is intended to generate data, information, and discussion that decision makers can use in developing policies and resource investments, but that the Scenario Analysis does not describe potential resource plans for individual states and therefore provides little assistance to Connecticut policy makers struggling with multiple local system issues. Given that the ISO-NE purposefully assumed exaggerated and perhaps unrealistic types of resource additions at a far away point in time, the analysis does little to provide guidance toward solving existing system deficiencies that weigh heavily on Connecticut ratepayers today.

As such, the CEAB may seek to go on the record indicating that, while the Board understands that ISO-NE did not intend to make specific recommendations regarding the resource additions that should be implemented for New England or Connecticut, the Board would like more relevant guidance in addressing existing system challenges.

Any comments the Board chooses to make could be provided at any time prior to, or even just after, release of the final report.

Workshop – Talking Points and Questions for ISO-NE

1. What feedback have you received from other forums, in particular the New England Governors and Eastern Premiers meetings and the NECPUC meeting?
2. Are there inherent limitations on the regional supply planning work that ISO-NE can do in its role as the market administrator? How does a regional planning study that does result in realistic plans for policy makers to consider get done? By whom?
3. What are the transmission requirements through the system for Connecticut to realistically consider significant resources from Canada in its planning?
4. What kinds of response are you seeing in the Forward Capacity Market process, and how does it relate to the scenarios you analyzed? Note that the Forward Capacity Market was recently implemented by ISO-NE to provide advance commitments to purchase generating capacity (i.e., MW) in order to stimulate investment in new generating resources.
5. What do you see as the logical next steps in furthering the discussion? For example, what should the states do to ensure that resource options are developed in a timely manner? Is ISO-NE planning to make any changes based on what the Scenario Analysis demonstrated?
6. The Scenario Analysis report advises policy makers that steps might need to be taken to add or remove existing incentives and disincentives that may lead us down a less desirable path. Will ISO-NE look at aspects of its process that might create barriers to non-transmission solutions to reliability problems?