Scenario Analysis: Update on Modeling Inputs and Assumptions

April 2, 2007

ISO new england

Agenda

9:30 – 10:30	Overview and Update: Feedback on Stakeholder Comments Overview of the Schedule, Next Steps
10:30 – 11:00	Resource Characteristics: Resource Assumptions Load Response Assumptions
11:00 – 11:30	Wind and Photovoltaic Assumptions
11:30 – 12:00	Teeing up Approaches to Presenting Results (Metrics)
12:00 – 12:45	Lunch
12:45 – 3:30	Discussion of Stakeholders Ideas for Presenting Results
3:30	Adjourn

Scenario Analysis Process: Today's Meeting – Overview

- **Process to date – update**
  - Update on discussions after the March meeting
  - Update on the schedule for modeling, presenting the results, preparing/completing the report
- **Final decisions on modeling inputs and assumptions**
  - Feedback on consideration of stakeholder comments
  - Final assumptions on power plant characteristics, cost data
  - Final assumptions on wind characteristics
- **Discussion of ways to present the data**
  - The metrics – format for presentation in charts, tables
  - The "user-friendly" spreadsheet tool

Process for Review of Assumptions Since March Meeting

- **Presentation at March meeting**
  - Summarizing technical assumptions, methods
  - Comments and feedback received during the meeting
- **Subsequent written comments received:**
  - Environmental Advisory Committee
  - Demand-side working groups
  - Individual stakeholders
- **Meetings held with:**
  - Power Supply Planning Committee
- **ISO-NE internal discussions to consider comments**
  - Steering Committee discussions

Scenario Analysis Process: Modeling Inputs and Assumptions

- **Topics on which ISO-NE received technical comments:**
  - Wind and solar energy profiles and capacity values
  - Demand-side energy profiles and cost assumptions
  - Other generation technology performance characteristics and cost assumptions
  - Transmission cost estimates
  - Distribution cost estimates
  - Metrics

Wind, PV, Demand Side: Energy Profiles and Capacity Values

- **Issue: Wind energy profiles – look at other data (NREL, etc.)**
  - Assumptions will be based on results of a Levitan analysis (to be discussed later)
- **Issue: For EE profiles and cost assumptions – get input from the DR Working Group and EE experts –**
  - Ok; done
- **Issue: For Demand Response – what is being modeled: load shedding, or load shifting to DG?**
  - The modeling will assume that DR produces load shedding
  - ISO will provide typical emissions from Diesel DG so that stakeholders will be able to use that information to inform a view of "what happens if diesel DG turns on when DR kicks in"?

Generating Technology Performance Parameters

- **Issue: CO2 estimates – consider higher and lower $'s in the high and low sensitivity cases**
  - PSPC recommends using: $20/ton in the base case; $3/ton in the low price case; $40/ton in the high price case – more discussion later
- **Issue: SO2 and NOx – consider using high and low $ range**
  - Given the expectation that CO2 #'s will show more material differences among the scenarios, the original base case #s will be retained.
- **Issue: Heat rates for CHP and fuel cells – consider the co-benefits**
  - The co-benefits will be addressed in qualitative comments on the scenario
- **Issue: IGCC cost figures seem too low**
  - Agreed: New numbers will be presented later today
- **Issue: Carbon sequestration cost estimates – define the basis**
  - More on this later today

Generating Technology Performance Parameters, cont.

- **Issue: Nuclear cost estimates – too low in light of cost experience elsewhere and comparing costs to those of other technologies**
  - PSPC recommends using a $2,500-$5,000/kW range of costs
  - #'s will be discussed later today
- **Issue: Full fuel cycle cost estimates – will they be used for nuclear fuel?**
  - Fuel cost estimate includes wastes.
- **Issue: Biomass fuel cost estimates – do they include delivery costs?**
  - Yes
- **Issue: Water use for cooling: impacts related to changes in once-through cooling policy?**
  - This will be addressed in qualitative discussion of scenarios with high water impacts
- **Issue: Land acreage and costs to be added for T, D, wind? Yes, but more time is required to get this information**

Transmission Cost Estimates

- **Issue: Consider developing cost for the Canada side of the line to NY (i.e., so that this can be used to estimate imports from the interior of Ontario)**
  - ISO does not know a good proxy for a location within Ontario.
  - Stakeholders will have the ability to add costs for mileage into the interior of Ontario to analyze a project located there.
- **Issue: Provide the underlying spreadsheet showing breakdown of costs for the various transmission investments for the various scenarios - OK**
- **Issue: Provide the charts in the Transmission Presentation (3-5-07) with a new row that indicates the # of line(s) assumed in each case**
  - This information is too much to add to the chart (would require adding new information in each cell, not just a new row).
  - ISO will attempt to introduce that information in the results for each Scenario/Sensitivity case.

Transmission Cost Estimates, cont.

- **Issue: Provide a cost estimate for DC line from New Brunswick to Millbury MA**
  - Since the underlying lines in the current system and interconnections with NB are AC lines, ISO and the TOs used AC costs for the expansion as well.
  - If a stakeholder wants to add information about a DC interconnection to the results for an import scenario cases, it would be appropriate to add on the costs of two AC-DC converter terminals (one on each end of the line). The line costs themselves, would be similar based on the estimates used for AC and DC in the overall analysis.
- **Issue: Consider assumption that energy efficiency (EE) is distributed in the same pattern as load, so that in the EE case, there are savings for the underlying RSP transmission costs.**
  - It's not easy to know how to translate this suggestion into actual savings relative to the RSP plan, since the latter addresses both reliability and economic investments. The transmission system (as opposed to distribution) is a grid rather than a radial system which adapts not only to load changes but also to generation pattern changes. As a result, flows even on a balanced load system require varying transmission elements from hour to hour, this necessitating the same or similar grid.
- **Issue: Fix the "2900" to "1900" on the chart on page 11 of the Transmission Presentation (3-5-07) – Ok**

Distribution Cost Issues

- **Issue: Calculation of Savings:**
  - Does the method for calculating distribution cost savings (associated with demand-side resources) reflect line loss savings? Yes
  - Confirm that the calculation methodology (page 18 of the 3-5-07 presentation on Delivery Cost Calculations) are accurate for Distribution Cost Savings associated with Demand-Side sensitivity cases? Yes

Metrics

- **Issue: Addressing some qualitative impacts**
  - Comment: In the "results" section of report, add comments to identify qualitative impacts associated with a scenario's effects on the system
    - E.g., introducing large amount of intermittent resources could add greater wear and tear on traditional generating units
    - E.g., using demand responses that is tied to start-up of diesel generators will have adverse environmental impacts that aren't captured in the simulation.
    - E.g., adding transmission capacity from Eastern Canada through Maine could provide a co-benefit for wind generation in Maine
  - OK – the final report will attempt to add limited comments on qualitative issues
- **Issue: Adding new quantitative metrics**
  - Add system load factor to the metrics - OK
  - Add # of hours that Demand Response would be in effect – OK
  - Add metric(s) on consumer $ impacts – attempting to develop this metric
- **Issue: Depicting results in charts and graphs**
  - Showing results in a way that plots results for multiple metrics on different X and Y axes - OK
  - Showing results in a way to depicts ranges of costs - OK

Tee-ing Up the Results: Process Schedule

- **Modeling the scenarios & sensitivities**
  - Now that assumptions are frozen, modeling is under way
  - Original intention was to have preliminary results by this meeting was not possible due to scheduling changes (to deal with sharpening assumptions)
  - Preliminary results – to be presented to and discussed with stakeholders at meeting on April 30th
    - Results will include both modeling results and "post-processing" analyses (capital costs for generation, demand-side, transmission and distribution)
    - Comments from stakeholders – at and after meeting

Tee-ing Up the Results: Process Schedule, cont.

- **Developing the final report**
  - Now that assumptions are frozen, modeling is now under way
  - Original intention to have preliminary results by this meeting was not possible due to scheduling changes (to deal with sharpening assumptions)
  - Preliminary results will be presented to and discussed with stakeholders at meeting on April 30th
    - Comments from stakeholders – at and after meeting
  - Draft report to be posted publicly on May 7th
  - Draft report to be presented to and discussed with stakeholders at meeting in May
    - Comments from stakeholders on major issues
  - Final report to be issued in June

Tee-ing Up the Results: What and How

- **Results of the Scenario Process**
  - Final report – relatively short, less technical
  - Postings on the ISO-NE website
    - Detailed metrics tables and charts
      - For each metric – all scenarios and sensitivities
      - For each scenario and sensitivity – all metrics
    - Assumptions tables (e.g., performance characteristics, capital costs)
  - Spreadsheet tool
    - "User-friendly" spreadsheet-based tool to enable users to change key assumptions such as the capital costs and recalculate results