New England States
Committee on Electricity

To: **PAC Matters**
From: **NESCOE**
Date: **October 19, 2016**
Subject: **Base Case Formulation**

NESCOE provides these comments in response to ISO-NE's August 16, 2016 presentation to the Planning Advisory Committee (PAC) on using probabilities in base case formation ("August 16 presentation"). We appreciate the work that ISO-NE has done on this matter to date. ISO-NE's development of the same probability curves for load and MW outage values provides an innovative approach to increasing uniformity between area studies. We encourage the ISO-NE to implement its approach on the timeframe set forth in ISO-NE's 2017 Work Plan. In addition, we offer the following comments and identify some items that we believe ISO-NE should explore next.

ISO-NE's Proposal

The August 16 presentation provides ISO-NE's recommendations regarding how to increase the uniformity of MW out of service and how to treat internal power flow transfers in transmission planning base cases. For generator outages and load levels, ISO-NE proposes to develop a series of "same- probability" curves that allow different combinations of load and unavailable generation in transmission study base cases. ISO-NE recommends a curve with a probability equivalent to the conventional Loss of Load Expectation (LOLE) of .1 day/year and maintaining at least one generator out of service in base cases.

ISO-NE does not recommend changes to the current practice of how power flows (transfers) across interfaces are modeled in the base case. When a transmission study is conducted, the geographic location of generators selected for dispatch, combined with their relation to (fixed) load centers, dictates the flows over the system. The current practice models those flows as close as possible to their maximum or minimum capability. This results in modeling the system with power flows that are rarely, if ever, observed on the system.

ISO-NE's August 16 presentation describes qualitative advantages to this approach to modeling power flows. For example, ISO-NE states that if transfers at a specific level are not explicitly modeled in needs assessments studies, the transfer capability can degrade due to changes in load and changes in supply. This implies that ISO-NE is currently planning the system to maintain the current level of transfer capability without regard to whether that level is appropriate, needed, or economic (e.g., the region might use it in an undefined future). Upgrades will be triggered by this requirement to maintain the current transfer capability even if observed flows do not ever approach the level.

Discussion

- ISO-NE's proposed same-probability curves introduce a greater level of uniformity load level and the MW of generation that can be assumed out of service in the base cases of the numerous sensitivities conducted within a single area study and between base cases of other area studies, *however*:
    - The probability number developed by ISO-NE is not the probability of the base case itself. When ISO-NE analysts choose which generators within a base case should be modeled off line, ISO-NE creates a different situation. So, while the number of MW out will be equivalent from study to study, the study probabilities will still have a great degree of variability.
- ISO-NE proposes to maintain "at least" one generator out in the base case. This is a slight change from the current practice, which is generally to assume at least two generators are out of service, *however*:
    - "At least one" can mean two or more.
    - The probability of more than one out of service is always lower than the probability of only one out of service.
    - ISO-NE's proposal did not address whether there are any changes proposed to the current practice of assuming 20% of fast start resources are unavailable within a study area.
    - New England is the only region that routinely removes generators from service in the base case.[1]
    - NERC and NPCC standards contemplate that generator outages are considered as contingency/planning events.
    - ISO-NE's proposal appears to be out of step with other regions and could influence;
        - The number of "needs" found in area reliability studies.
        - The regional cost of transmission.
        - The date for which these needs create violations.
- ISO-NE has described numerous qualitative reasons for maintaining the current practice of modeling interface flows at their limits. According to ISO-NE, this is designed to "Preserve transfer capability on the system by modeling pre-determined, non-historical, transfer levels."
    - ISO-NE's current design practice is essentially to design a congestion-free transmission system. This does not appear to be the practice in most other regions.[2]
    - Should the transmission system be designed such that existing or future designed transfer capability is maintained?
    - This practice also could influence:
        - The difficulty associated with interconnection studies of remote generation and perhaps the size of the interconnection study queue (each new generator must demonstrate that its interconnection does not degrade transfer capability of all other generators on the system).
        - The costs to generators to interconnect to the system.
        - The cost of solutions to move remote generation to load.

[1] NESCOE commissioned ICF to study of regional planning practices. Other regions develop base cases assuming all generators are available. They then model what happens when one or two generators are taken out of service as a contingency/planning event.

[2] It appears as a sensitivity for key interfaces, or where firm transmission reservations are routinely scheduled.

Additional Matters for Consideration

NESCOE requests that ISO-NE consider the following issues;[3]

1. Rather than assuming "at least one generator out," assume "no more than one generator out."
    a. At least, and in the interim, ISO-NE should explain why assuming more than one generator out is warranted in any case in which it assumes more than one.
2. Explore the use of a lower same probability curve than the .1 day/year curve. Point 1 LOLE has some appeal because it is consistent with the value that has been relied upon for resource adequacy studies, but the base case probability in total is likely very different when stressed transfers are considered.
3. Consider the use of historic transfers within statistical parameters, but use values from multiple years. Alternatively, consider using GE Mars to generate transfer ranges over plausible scenarios (high load growth, low load growth, unit retirements etc.).[4]
4. Consider a quantitative analysis of the cost of maintaining the current stressed transfer practice compared to planning where transfers are generated through economic dispatch of the generating fleet.

[3] Quantitative information for each of the suggestions could be developed by using study files from recently conducted studies and changing the input assumptions accordingly to observe the impact on the needs analysis in terms of the number of violations found and the year of need.

[4] The implication of this is not necessarily that the system will be less reliable, rather it acknowledges uneconomic dispatch/congestion can exist.