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Non-Transmission Analysis: A Regional Framework Template

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May 2012

*DRAFT: DETAILS SUBJECT TO MODIFICATION FOLLOWING
DISCUSSION WITH TRANSMISSION OWNERS*

Non-Transmission Alternatives Analysis: A Regional Framework

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- High level framework for discussion
- Identifies elements of Transmission Owners' NTA analysis & process
- A template for common application across New England – assumes adaptation to state-by-state requirements or preferences
- Based on current ISO-NE planning processes & state processes that consider alternatives

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Presentation Overview

I. Background, Strategic Planning Context, Process Observations & Overview

II. ISO-NE Transmission Planning Process Summary:

- Needs Analysis
- Transmission Solution Studies
- Proposed Project Approval
- Proposed MRA process

III. NTA Obligations of the Transmission Owners:

- Implementation Observations
- NTA Assumptions
- Load Forecast Requirements
- Demand Response Potential
- Generation Resources
- Market Analytics Input
- NTA Solution Design
- Hybrid Solutions
- Economic Analysis
- Policy Considerations
- Implementation Issues

Definitions – NTA and MRA

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Non-Transmission Alternative (“NTA”)

- any configuration of generation or demand-side resources other than transmission which, together, can address a need that has been identified for a proposed regulated transmission solution.

Market Resource Alternative (“MRA”)

- Alternative terminology for NTAs recently adopted by ISO-NE in conjunction with its “Aligning Planning and Markets” initiative and the Greater Hartford Pilot study.
- Methodology under development (see slide 17)

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Background

Connection to Strategic Planning, Process Observations & Overview

Background & Objective

In early September 2011, the states expressed their collective intent to obtain from transmission owners (TOs) non-transmission alternative (NTA) analysis *earlier* in the planning process than occurs today, which is typically at the end of the planning process – the siting phase. Earlier analysis will help ensure there is no bias *in timing* between resource type. The states also expressed interest in more uniform analysis from TOs across the region than TOs produce today. See Appendix & http://www.nescoe.com/uploads/NTA_Analysis_9.7.11.pdf

The Objectives of the NTA Framework are:

1. To obtain NTA analysis at a point in time in the regional planning process where such analysis provides more practical value to states & market participants than the alternative analysis TOs produce today does. See Appendix
2. To make state siting processes more efficient by reducing need for states to ask TOs for additional analysis during siting proceedings
3. To obtain more uniform alternative analysis across the region
4. To conduct NTA analyses in an open & transparent process

What the NTA Framework is Not

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- *Not* to disrupt the region's general reliance on markets to select & fund resources to meet needs
- *Not* to elongate the transmission planning & siting process. To the contrary, more information earlier in the process will make the siting processes more efficient (reduce requests for further analysis at that late stage & provide timely information to stakeholders)
- *Not* to create new cost allocation mechanisms
- *Not* to duplicate ISO-NE MRA analysis. Need for & scope of NTA analysis revisited as ISO-NE MRA analysis moves along

Connection to ISO-NE Strategic Planning Initiative

- In October 2011, ISO-NE indicated its intent to conduct market resource analysis (MRA) on a going forward basis in connection with major transmission facility proposals. ISO-NE has also proposed to align markets & planning. The states are very supportive of this effort
- The final form of MRA analysis is unknown – ISO-NE is running “pilots” at this time. Further, the design & implementation of market rules to align planning & markets is down the road
- At some point, the MRA analysis & associated market rule changes may supplant the need for some or most NTA analysis. ISO-NE does not, however, intend to conduct *economic analysis* of MRAs or NTAs; the TOs will continue to produce that to satisfy state siting needs irrespective of when & how ISO-NE’s MRA analysis is fully implemented

Connection to FERC Order 1000

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- New England in process of developing compliance filing for FERC's Order 1000, under which ISO-NE will consider public policies that drive transmission in planning process
- NTA Analysis consistent with & not duplicative of Order 1000's consideration of public policies that drive transmission in planning
- NTA Analysis will provide states, ISO-NE & market participants earlier information about & facilitate evaluation of alternative means, if any, that may to satisfy identified needs consistent with public policy

Process Observations, for context

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NTA Analysis Framework contemplates that:

1. ISO-NE & the TOs conduct coordinated, parallel alternative resource studies to inform regional planning process & state siting proceedings (assuming ISO-NE continues to prepare MRA Analysis)
2. ISO-NE & TOs will coordinate & share alternative analysis early in the planning process to enable evaluation of whether alternatives would satisfy reliability needs*
3. The TOs' NTA Analysis as set forth in this Framework may change over time as ISO-NE's MRA & market mechanisms are developed & implemented; as ISO-NE will not conduct *economic* analysis of alternative resources, the TOs will continue to produce that element of the TO NTA analysis over time

* This framework assumes that the NTA study process will provide stakeholder participation analogous to the ISO-NE stakeholder process for Needs Assessment, MRA, and Solutions Studies (see slide 12). Specifics of such process will be determined by each state.

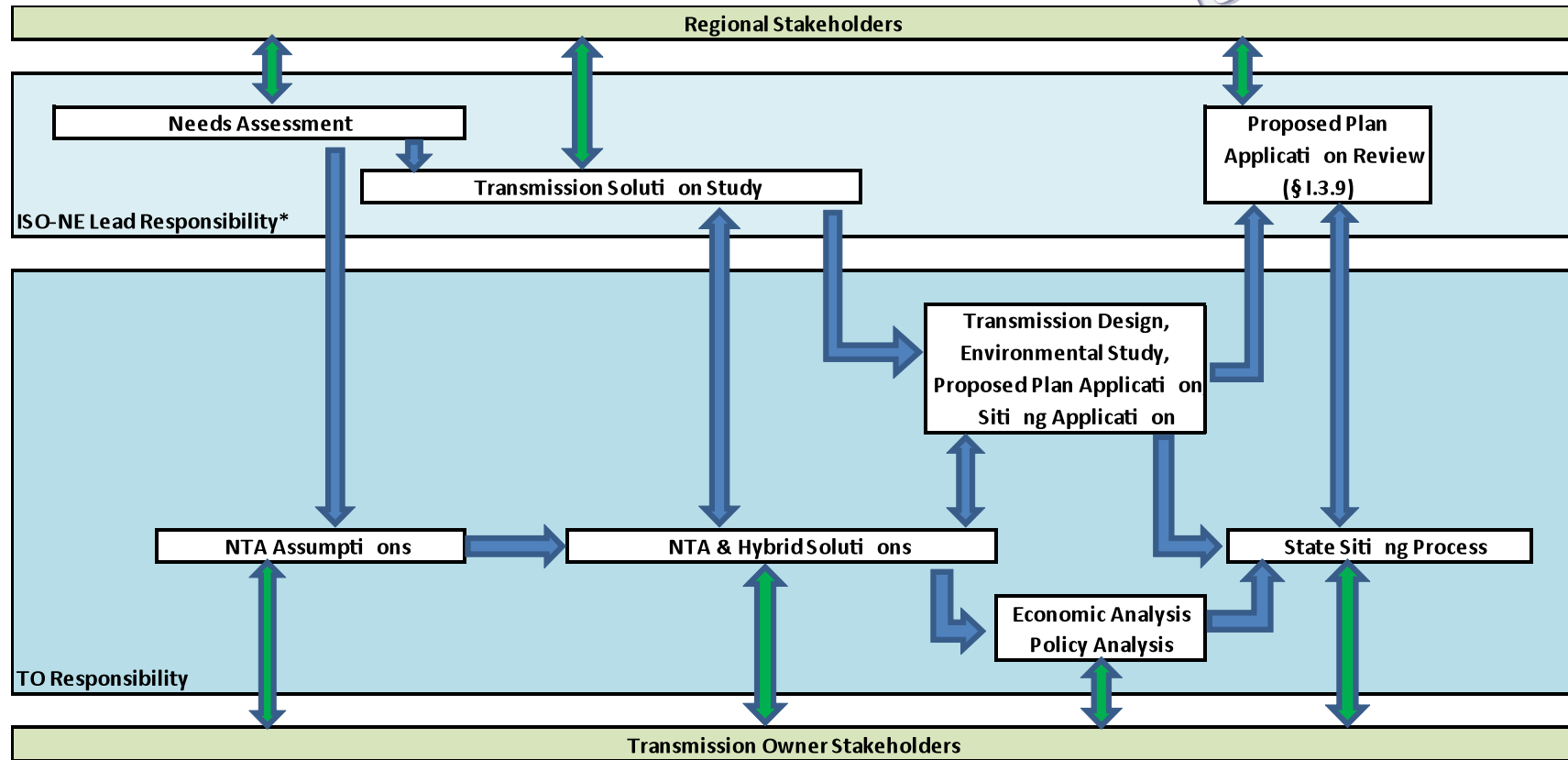
Process Observations, for context con't.

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NTA Framework assumes each state will:

1. Identify when TOs will conduct NTA Studies pursuant to this Framework & communicate that to its jurisdictional TO (e.g., all projects, projects over a certain size, etc.)
2. Provide details to the NTA Analysis framework template consistent with its requirements & preferences & communicate to the jurisdictional TO the specific NTA analysis the state expects to see in advance of siting petitions
3. Discuss with its jurisdictional TO what type & level of stakeholder process the TO should conduct in the service area during the NTA study process (CMP, VELCO may provide examples to consider)
4. Receive the TO NTA analysis earlier in the planning process so that there is no bias *in timing* in resource analysis

Planning Process Overview



* ISO-NE Lead Responsibility - analysis may be conducted by the TO or other members of the Study Group

* Analysis Steps are depicted by the boxes and blue information arrows; stakeholder involvement is depicted in green information arrows

NOTE: This diagram does not include any of the ISO's proposed MRA processes

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ISO-NE Transmission Planning

process & study summary, for regional context

ISO-NE Needs Analysis Summary

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Outputs of ISO-NE Needs Analysis



- Needs Assessment Study = Transmission Project Concept
- Identifies Year of Need
- Lists criteria violations if need is not met

Methodology Considerations



- 10 year Horizon Forecast - Peak Load Focus
- Assumes existing generation availability & dispatch
- Applies reliability criteria (*i.e.*, N-2, N-1-1, etc.)

Timing of ISO-NE Needs Analysis

- Prepared in advance of a Transmission Solutions Study



Process

- ISO-NE has lead responsibility & convenes a Study Group comprised primarily of the TO & “affected” stakeholders as defined by ISO
- Stakeholders review Needs Analysis at ISO-NE Planning Advisory Committee (no vote)

ISO-NE Transmission Solution Study Summary

Outputs of ISO-NE Solution Study



- Transmission Solutions Study = Proposed Transmission Solution
- Provides description & cost of potential transmission solution(s)
- Identifies longevity of transmission solution(s)

Methodology Considerations



- Identifies potential environmental or other siting limitations
- Includes load growth assumptions (for longevity analysis)
- Reflects cost escalation assumptions

Process

- ISO-NE has lead responsibility & convenes a Study Group including TO & “interested & affected” stakeholders as defined by ISO-NE
- Stakeholders review at ISO-NE’s Planning Advisory Committee (no vote)



Timing

- ISO-NE initiates Solutions Study after it completes the draft Needs Analysis
- ISO-NE prepares Solution Study in advance of route selection/environmental studies (TO assists)

Proposed Plan Application Review Summary

Outputs



- Plan Approval requires ISO-NE to find project will cause “no significant adverse system impact” & will meet identified need
- Results in planned transmission solution & associated reliability assessments

Methodology Considerations



- Steady state, stability, & other reliability testing, as needed based on potential scope of impact on the system
- Determinations can affect the transmission solution design

Process

- Application is prepared by the constructing Transmission Owner. It is then submitted to NEPOOL's Reliability Committee for review. The Reliability Committee recommends approval or not to ISO-NE. ISO-NE makes the final decision.



Timing

- Proposed plan prepared by Transmission Owner(s) after Solutions Study is complete
- Proposed plan to be submitted before detailed engineering is undertaken

ISO-NE Proposed MRA Process

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ISO-NE Aligning Planning & Markets Whitepaper, October 2011

- Concept proposed in context of Strategic Planning Initiative:
 - ISO-NE to conduct “Market Resource Alternatives” (MRA) Planning for major transmission projects
 - Will broaden Needs Assessment to identify NTA & will rely on market mechanism(s) to solve NTA
Specifics, timing, effectiveness to be determined

Methodology Considerations

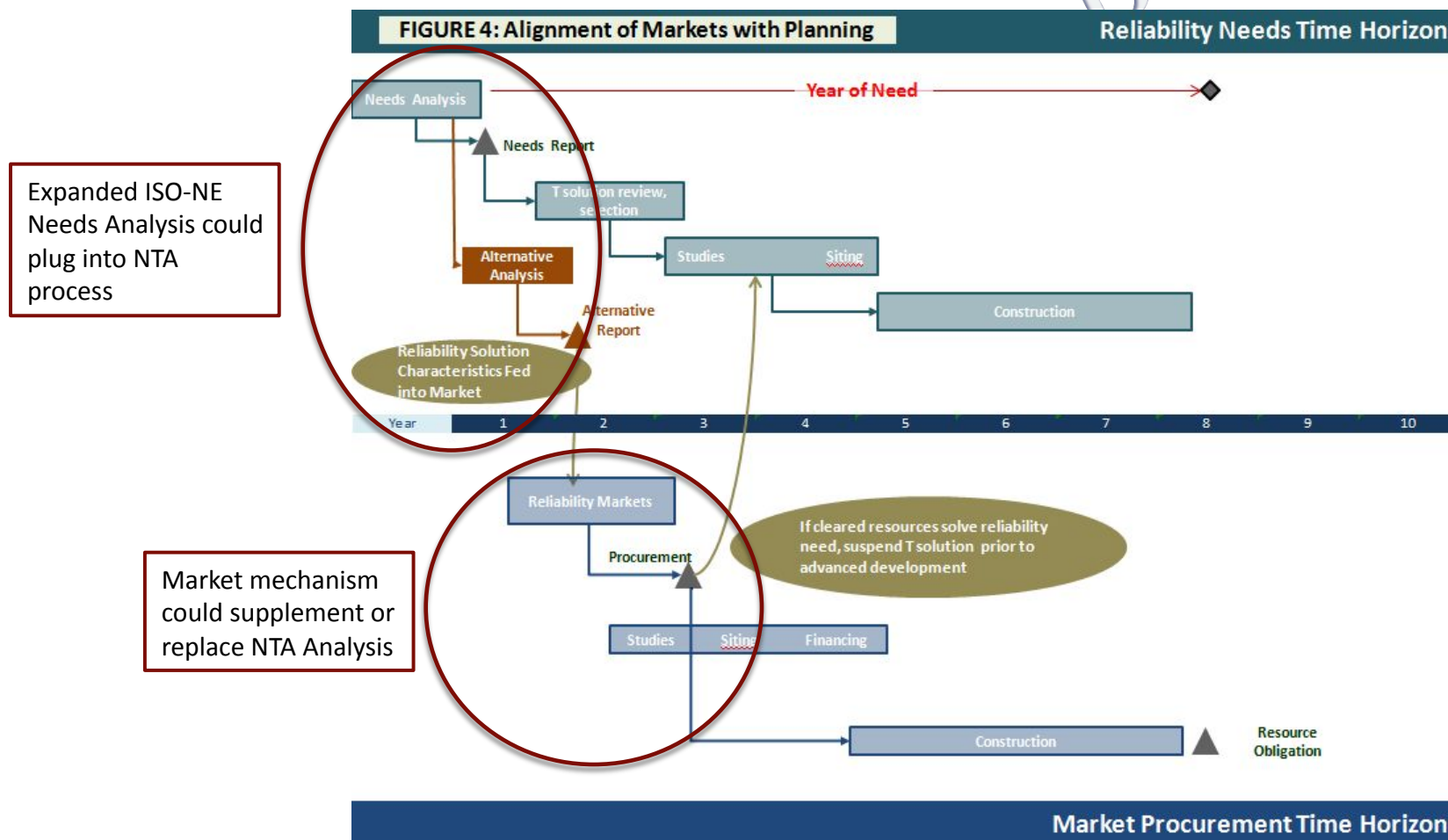
- Expanded Needs Assessment process to test proxy units’ ability to address need
- Economics of other solutions *not* analyzed – economics to be derived from a market mechanism
- As proposed, ISO-NE MRA will run in parallel
- MRA has potential to enhance TO NTA assessment or supplant TO NTA process
- ISO-NE does not, however, intend to conduct *economic analysis* of MRAs; TOs will produce that to satisfy state siting needs irrespective of when & how ISO-NE’s MRA analysis is fully implemented

Timing

- ISO-NE conducting 2nd MRA Pilot in 2012 in context of Greater Hartford
- Further development of analysis and market mechanism(s)-needed prior to implementation

ISO-NE Proposed MRA Process

FIGURE 4: Alignment of Markets with Planning



Source: ISO-NE October 2011 "Aligning Planning & Markets" Whitepaper

NTA Obligations of Transmission Owners

Template Framework

NTA Implementation Observations, for context

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Use of NTA Study in Developing Solutions

- NTA Study focus is on *conceptual* solutions - analogous to transmission solutions in transmission solution study
- Study results will:
 - Be made available to ISO-NE & market participants & inform transmission planning – potential to modify transmission solution
 - Feed into NTA solutions development
 - Be made available to state siting authorities & provide foundation for determining “best solution” in project(s) permit proceedings

NTA Solutions Development

- NTA Study Is not limited to solutions TOs can implement
- Some NTAs may require market solutions (e.g., ISO market mechanism, potential direction of EE funding, etc.)
- DSM elements may require state to consider energy efficiency program funding & redesign
- Solution development will vary by state, TO, & viable option

TO NTA Analysis Assumptions: Overview

Requirements



- Forecast of energy (24/7 or 8760 hours) & demand for all years of the planning horizon
- Demand Side Resource Options – Achievable Potential Study
- Generation Options - cost & performance data
- Market Price - forecasting assumptions for Energy, Capacity, & Ancillary Services

Methodology Considerations



- Locational detail needed in Load Forecast & Demand Resources potential
- Size/scale comparability of the transmission & NTA solutions
- Economic & policy metrics needed for state & regional benefits assessments
- Stakeholder involvement (PAC & TO-led stakeholder options)

Timing



- Can be initiated in parallel with ISO-NE Needs Assessment Study
- Assumptions should be completed to coincide with the timing of needed inputs from the Needs Assessment & Transmission Solution Studies

TO NTA Analysis: Load Forecast Requirements

Peak Demand Forecast Information Requirements*

- 10 year ahead “90/10” extreme weather (Need Assessment)
- Historical & Near Term “90/10” extreme weather (Year of Need)
- Longer term “90/10” extreme weather (Transmission & NTA sizing)
- Longer term weather normal (resource adequacy, DSM evaluation)

Energy Forecast Information Requirements*

- Long term weather normal (market price analysis, economics of solutions)

Time & Location Considerations*

- Load flow modeling – “90/10” loads at each bus in the system
- Market modeling - zonal or nodal net energy for load & losses
- End use information in each “load pocket” for EE contribution to NTA Solutions (locational information from DSM potential study)
- Representation of 24/7 (8760) loads for market prices, EE planning, economic analysis

* NTA load forecast information should be consistent with the forecast used in the Needs Assessment

TO NTA Analysis: Demand-Side Resources Potential

Demand-Side Resource Potential Information Requirements

- Achievable Cost – Effective Potential* for Demand Response & Energy Efficiency
- Expected peak load reduction/response during system events**
- Expected energy saving & total costs of implementation**

Reliability Planning Considerations

- Focus on reliability performance (ability to reduce peak demand or otherwise address the reliability problem) as alternative to a transmission solution
 - Performance of the measure (assured savings of the measure) & the ability to meet market penetration goals (achievable participation levels for assured total savings of the program)
- Responsive demand performance requirement may differ from ICAP resources

Location Considerations

- The resource potential may need to be specific to a specific node or zone
 - Analysis will require customer & end use information in targeted areas.
- Location-targeted marketing may be required for implementation

* Cost-effectiveness definition should include consideration of potential to avoid T&D costs

** Potential estimates should be consistent with load forecast assumptions regarding existing demand resources.

TO NTA Analysis: Generation Resources

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Generation Resources Information

- Identify the generation options that could contribute to a solution – technologies & fuel source
- Identify planning assumptions for all fixed & variable costs & operating characteristics (installed costs, ownership costs, fuel, O&M, consumables)

Reliability Planning Considerations

- Generation options must fit with the reliability need - consider size, reliability & dispatch characteristics

Location Considerations

- Customer sited generation could be included as generation or part of demand response
- Siting feasibility in key locations, available location within identified needs areas
- Connecting voltage level may affect the ability to provide effective solutions

TO NTA Analysis: Market Analytics Inputs

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Market Forecast Information Requirements

- Economic evaluation of alternatives - cost of resources net of revenues
- Information needed includes production costs, LMPs, emissions metrics, market revenues
- Capacity market forecasting & out of market capacity treatment
- Reserves & other ancillary revenue opportunities
- Used to calculate economic value of alternatives

Market Simulation Model Considerations

- Produces LMPs, production costs, emissions & other energy market metrics
- Can be zonal or nodal (options: *IREMM, GridView, ProSym, Aurora, etc.*)
- Long term view (often 20 years+), consistent with the economic life of options
- May need to capture changes in expected losses, congestion changes & re-dispatch under scenarios

TO NTA Analysis: Solutions Design

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Define Alternative NTA Scenarios for Economic Analysis

- Define NTA options that are feasible to address the identified need
- NTA solutions should consider *combinations* of generation & demand side options

Reliability Planning Considerations

- Reliability of each NTA solution to be tested consistent with transmission solutions
- The scale *and* life span of the NTA solution should be considered relative to transmission solutions*

Other Considerations in Defining NTA Solution Scenarios

- States must determine when NTA Analysis is warranted (e.g., project size, other criteria)
- Whether an NTA scenario may meet state or regional economic & policy objectives (e.g., RPS)
- Feasible implementation mechanisms (e.g., TO, merchant)

* Transmission solutions will be evaluated for “longevity” tied to the loads that can be carried if the solution is implemented

TO NTA Analysis: Include “Hybrid” Solutions

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**“Hybrid Solutions” combine Transmission & NTA elements –
A practical extension of
Transmission-*Only* or NTA-*Only* Solutions**

- Reliability Considerations for Hybrid Solutions are the same as Transmission & NTA Solutions
- Other Considerations in Defining Hybrid Solutions
 - Potential to defer of Transmission year of need by implementing NTAs
 - Combine NTAs with smaller scale transmission solutions
 - Combine NTAs with transmission or distribution elements at lower voltage levels
 - Identify Voltage Support Solutions
 - Process for selecting hybrid combinations will manage scope of the analysis

TO NTA Analysis: Economic Analysis Overview

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Objectives of NTA Study

- **Evaluate:**
 - Transmission Solution economic performance
 - NTA & Hybrid Solutions economic performance
 - Policy & other benefits for each option
- **Provide overall comparative assessment of Transmission, NTA & Hybrid Solutions**
 - Reliability, economics, & policy perspectives
 - State & regional perspectives, as appropriate

Timing

- Initiated when the Transmission, NTA & Hybrid Solution Options are defined

TO NTA Analysis: Economic Analysis Structure, cont.

Economic Analysis Elements for *Each* Transmission, NTA & Hybrid Option

- **Regional Cost Benefit Analysis**
 - Identify total cost of the solution without consideration of cost allocation
 - Identify total benefit of the solution (e.g., production cost savings, reduced cost of energy to load)
- **State-Specific Cost Benefit Analysis**
 - Identify total cost allocated to state's ratepayers considering cost allocation
 - Identify total economic benefit of the solution to state's ratepayers
 - Each state to defines the specific decision criteria to be applied to proposed projects
- **State or Regional Policy Cost Benefit**
 - Consideration of the solution's contribution to other policy objectives, as appropriate

TO NTA Analysis: Economic Analysis Methods

Economic Analysis Metrics for Each Solution Include:

- **Annual cost to consumers over the life of the solution**
 - Annual revenue requirements for Cost of Service elements
 - Market costs for merchant elements
- **Annual economic benefits over the life of the solution**
 - Avoided cost savings, net market revenues, reductions in market costs to consumers
- **Comparison of solutions on costs & benefits**
 - Net Present Value of annual costs & benefits
 - Rate impacts
 - Societal Benefits Test

TO NTA Analysis: Policy Analysis Considerations

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Potential Policy Issues & Metrics Each State Could Consider Identifying & Communicating to TO for purpose of NTA Analysis:

- Local & regional emissions reductions requirements (greenhouse gases, SO_x , NO_x)
- State energy efficiency objectives
- Renewable energy development objectives (generation & transmission as needed)
- Economic development implications, as appropriate (investment, etc.)

Analytic methods will vary based on the policy issues of interest & solution characteristics

Policy assumptions influence analysis. Each state may consider communicating with TO's about policy assumptions

Next Steps

1. States communicate to TOs pursuit of this approach; further communicate approach to NEPOOL Chairs & ISO-NE on May 23, 2012 in Maine
2. In June, La Capra, NESCOE & states as they wish provide draft Framework to TOs, meet with TOs together to discuss Framework & get feedback. Modify as appropriate.
3. Discuss any changes with ISO-NE
4. NESCOE convert power point into outline of NTA Template Framework & provide to states
5. Each state: a.) modify NTA Template Framework as needed to comply with specific state requirements/preferences & b.) consider & implement appropriate process to execute NTA Framework. *NESCOE may as states wish help facilitate sharing of information about state modifications &/or implementation mechanisms*

Ongoing: Monitor implementation of ISO-NE MRA Analysis & development & implementation of market mechanisms to determine whether modifications to the NTA Analysis is warranted

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Appendix

State Requirements Associated with Alternative Analysis

In **Connecticut**, the Connecticut Energy Advisory Board (CEAB) may issue a Request for Proposals (“RFP”) for alternative solutions to the need that will be addressed by a proposed transmission facility not later than fifteen (15) days after an applicant files a project for approval with the Connecticut Siting Council. The RFP is to solicit proposals that include distributed generation or energy efficiency measures. The CEAB, by a vote of 2/3 of the members present and voting, may determine that an RFP is unnecessary for a specific application because the process is not likely to result in a reasonable alternative to the proposed facility. Conn. Gen. Stat. §16a-7c.

Maine requires that petitioners seeking siting approval to state whether alternatives, including conservation, distributed generation or load management to the proposed transmission line project were investigated. If the petitioner has investigated alternatives, the petition has to include all studies, reports, or other data relied upon in the investigation of such alternatives and state the process by which petitioner decided upon the proposed construction, rebuilding, or relocation project. The petitioner also has to state the purposes and benefits of the proposed project, such as the promotion of reliability and line loss reduction, and whether cost-benefit analyses have been performed. Chapter 330.

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In **Massachusetts**, a non-transmission alternative analysis is generally presented as part of an applicant's petition. The application has to include, among other items, a description of the alternatives to the facility, such as other methods of transmitting or storing energy, other site locations, other sources of electrical power, or a reduction of requirements through load management. M.G.L. c. 164, § 69J. In addition, project proponents generally submit a "No Build Alternative" pursuant to practice that has developed as a result of case law, although it is not necessarily a filing requirement.

In **New Hampshire**, as a general matter, the Siting Authority must consider "available alternatives" before it makes its findings. RSA 162-H:16, IV. The Siting Authority statute and rules do not, however, set out express guidance with respect to types or number alternatives that must be considered; nor do they require a transmission developer to provide analyses or studies of alternatives with its application for certification. In practice, "alternatives" has been interpreted to encompass alternative sites or alternative facility size, for example, not alternative technologies. To date the Siting Authority has not required TOs to provide information on non-transmission alternatives

Rhode Island requires siting applications to include a study of alternatives to the proposed facility, including alternatives as to energy sources, methods of energy production, and sites for the facility, together with reasons for the applicant's rejection of these alternatives. The study has to include estimates of facility cost and unit energy costs of alternatives considered. Section 42-98-8.

Vermont's statutory scheme includes least cost integrated planning, a component of which requires owners of transmission facilities to file transmission system plans at least every three years, and more often if requested by the state, that looks forward for a period of at least ten (10) years. The objective of the plan is to identify the potential need for transmission system improvements as early as possible, in order to allow sufficient time to plan and implement more cost-effective non-transmission alternatives to meet reliability needs wherever feasible. Section 218c. "Before a transmission project is approved in Vermont, the petitioner must demonstrate that the need for the project cannot be met more cost effectively through alternative means, including the implementation of energy efficiency, load management, or generation." 30 V.S.A. § 248(b)(2).

End of Presentation

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Thanks

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