Future Grid Study

Scope, Metrics, and Developing a Straw Proposal

Peter Flynn - September 29, 2020

Future Grid Study

Bubble Chart

Objective

Assess and discuss future state of the regional power system in light of current state energy and environmental policies

Study Process to Define and Assess Future State of Regional Power System

1. Identify Resource Mix in [Year]
2. Identify Resource & Operational/Reliability Needs

**Assumptions, future scenarios, etc. to be developed within stakeholder process*

Gap Analysis

As part of study process, conduct a gap analysis to determine whether, in the future state envisioned, the markets (current design plus ESI) provide resources/ISO-NE what they need to continue to reliably operate the system? If not, what market deficits need to be addressed to assure reliability?

Discuss Potential Market Approach(es) to Address Gap(s)

Based on study results/ gap analysis, explore potential market approaches to address any future gaps identified in the prior step, including evaluation of the pros/ cons of different approaches and discussion of how any such market approach contemplates state energy and environmental laws

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Today‘s Goals:

- Achieve consensus on the scope of study and metrics
- Achieve consensus on the criteria for selecting a straw proposal
- Achieve consensus on what are the key modeling assumptions

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Administrator will consult with NESCOE and NEPOOL to prepare for the November Joint MC/RC meeting

- Analysis comparing past and ongoing studies/proposals based on criteria and key assumptions
- A straw proposal
  - Sensitivities can be performed to the straw proposal to understand the impacts of changing certain assumptions

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November Joint RC/MC Meeting

- Review and respond to a straw proposal
- Discuss what resource or operational/reliability needs might be missed by the straw proposal that different assumptions might illuminate
- Discuss possible additional scenarios or methodologies to illuminate those needs
- Avoid complexity that is unlikely to shed light on resource or operational/reliability needs

Scope of Study and Metrics

Major Areas for Analysis

- Production cost (energy market)
- FCM pricing
- Reliability/resource adequacy
- Ancillary services
- Transmission

Scope of Study and Metrics

Production Cost (Energy Market)

GridView (or similar model)

- Systemwide energy production
- Systemwide production cost
- Load serving entity energy expense + uplift
- Congestion costs by interface
- Average LMPs
- Native New England CO2 emissions
- Spillage by resource

Consensus Point: Do stakeholders agree that these are the energy market metrics we want to study?

Scope of Study and Metrics

FCM Pricing

- FCM clearing prices, revenues and costs
- ISO recommends hiring a consultant for modeling

Consensus Point: Do stakeholders agree that the study should include FCM? If yes, do stakeholders agree to hiring a consultant?

Are there other revenue sufficiency analyses that should be done besides FCM and energy market revenues?

Scope of Study and Metrics

- What about probabilistic reliability/resource adequacy? - GE MARS or similar model
  - Loss of Load Expectation of one day in 10 years
  - What about energy security (Loss of Load Probability, Loss of Load Hours, Expected Unserved Energy during the winter and shoulder seasons)?

Consensus Point: Do stakeholders agree that the study should include a probabilistic reliability/resource adequacy assessment? Which of the above metrics should be studied?

Scope of Study and Metrics

Ancillary services (ramping, regulation and reserves) - EPECS or similar model

- Simulated operating reserves: load following, ramping and curtailment performance
- Simulated interface and tie-line performance
- Simulated regulation performance
- Simulated balancing performance
- Time-series data outputs on a granular time-scale for each type of assessed reserve

Consensus Point: Do stakeholders agree that ancillary services should be studied? Is there anything else about ancillary services that should be studied not covered above?

Scope of Study and Metrics

Transmission Assessment

- What about transmission stability?
  - Example: Evaluate impact of high renewables in the shoulder months
- What about transmission expansion analysis?
  - Costs of transmission upgrades?
  - If yes for costs, ISO recommends hiring a consultant
- What are the effects of non-transmission alternatives?

Consensus Point: Do stakeholders agree that the study should include a transmission assessment? Which of the above should be studied?

Proposed Criteria for Selecting a Straw Proposal

- Start from a past or ongoing study/proposal
- Time to complete study
- ISO modeling preferred to retaining contractors
- Data availability
- Data compatibility with different models (Maintain information policy protections consistent with past practice)
- Economy-wide environmental compliance
- Includes interim and end-state cases
- Data for at least 2 years from 2030 to 2040
- Complete data sets for key assumptions
- Key assumption values within range of other studies/proposals and not outliers
- Feedback?

Key Modeling Assumptions

Load-Related

- Net energy for load
- Peak and off-peak demand
- Traditional load
- Electrification of heating and transportation load
- Energy efficiency
- BTM resources

Consensus Point: Do Stakeholders agree that these are the key load-related modeling assumptions to consider in selecting a straw proposal?

Key Modeling Assumptions

Supply-Related

- System capacity
- Resource Mix
  - Gas
  - Hydro
  - Nuclear
  - Offshore wind
  - Onshore wind
  - PV
  - Storage
- System topology
- Other

Consensus Point: Do Stakeholders agree that these are the key supply-related modeling assumptions to consider in selecting a straw proposal?

Next Steps

By October 9

- Please submit any written feedback on today's discussion
  - study scope and metrics
  - proposed criteria for selecting a straw proposal
  - key assumptions for selecting a straw proposal
- Please submit to: Erin Wasik-Gutierrez, at ewasik-gutierrez@iso-ne.com
  Submissions will be posted.

Next Steps

At the November Joint MC/RC Meeting

- Review and respond to straw proposal
- Discuss what resource or operational/reliability needs might be missed by the straw proposal that different assumptions would illuminate
- Discuss possible additional scenarios to illuminate those needs