NESCOE
New England States Committee on Electricity

To: **ISO-NE and NEPOOL Stakeholders**
From: **NESCOE**
Date: **March 5, 2021**
Subject: **Pathways Analysis Initial Thoughts**

NESCOE appreciates stakeholders' time and effort to develop the Forward Clean Energy Market ("FCEM") design specification white paper in late December 2020 ("Whitepaper").[1] It has been helpful to inform our own thinking around an FCEM. We also appreciate ISO-NE's evaluation of the FCEM and Net Carbon Pricing frameworks ("Pathways Analysis"), and ISO-NE's plan to analyze those in the same timeframe.[2]

In this memo, we provide initial thoughts on the Pathway Analysis goals, offer some initial questions on the Pathway Analysis, and give preliminary answers to ISO-NE's February 18, 2021 questions. The suggestions related to the analysis reflect NESCOE's interest in understanding how the market outcomes for both potential market designs compare to current market rules and to achieving state policies using long-term Power Purchase Agreements ("PPAs"). As you know, we are still evaluating an FCEM model and NESCOE's responses to questions or analysis suggestions should be viewed in that context. They do not indicate and should not be interpreted to signal design preferences, or the point of view or position of NESCOE or any NESCOE Manager.

As a threshold matter, we appreciate that the Whitepaper sets out principles against which to assess an FCEM design and generally view those principles as helpful guideposts. We will continue to turn back to those, as well as the NESCOE Vision Statement wholesale market principles as this process moves forward.[3]

Pathways Analysis Goals

The main goal of the Pathways Analysis should be to represent real world dynamics of the interactions between wholesale electricity markets and state energy and environmental requirements.

At minimum, one goal of the Pathways modeling should be, of course, to represent the actual operation of the wholesale markets. In New England's electricity markets, the Forward Capacity Auction ("FCA") outcomes determine the resource mix in the energy market approximately three

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1 A Forward Clean Energy Market for New England – Design Specifications, December 2020.

2 *See* February 18, 2021 NEPOOL Participants Committee Working Session, *Pathways To The Future Grid*, at slide 4.

3 Whitepaper, at page 1.

years later, for a 12-month period (the Capacity Commitment Period, or "CCP").[4] Over time, the relationship between the energy market and FCA influences the resource mix. One year's FCA outcomes become the corresponding CCP's resource portfolio.[5] Moreover, changes to system topology and load forecast updates are implemented on an annual cycle tied to the FCA calendar. How the Pathways modeling will include these relationships over the study horizon may have a significant impact on the model results and any associated lessons for states and stakeholders.

Often, exercises in electricity market modeling include a limited simulation of future time periods. For example, many studies, for practical reasons, only simulate one year or a selection of years within a study horizon (e.g., 2030 in a study horizon of 2021 to 2050). This requires assumptions about the resource mix in a future year. The connection between the assumed future scenario and the actual electricity markets and the current resource mix is based on a plausible narrative. This approach is not necessarily instructive to evaluating wholesale market design concepts where the point is to facilitate a transition, or change in the resource mix, over a long period of time. For this reason, we should not assume a future resource mix but rather ensure the analysis shows whether and to what extent each mechanism is capable of driving change in the future resource mix. For example, one question the analysis has to answer is whether the net carbon pricing mechanism will ensure financing of new clean energy resources?

Compliance with energy and environmental requirements of state laws should also be a foundational objective of the Pathways Analysis. This includes state programs that affect the net load forecast, require the procurement of attributes from eligible resources, authorize agreements to purchase power and/or attributes from certain resources, and may result in updates to system topology over time. It also includes regional and state carbon emission limits on the power sector and the broader economy. One strategy for economy-wide carbon emissions reduction includes electrifying significant portions of the transportation and buildings sectors and anticipates a commensurate increase in the demand for power served by a low-emitting resource mix. Integrating the impacts of these requirements and programs into the Pathways analysis will lead to a better representation of real-world electricity market dynamics and their evolution over time. More importantly, the Pathways analysis must examine the interactions between energy and environmental requirements and programs, the wholesale electricity markets, and any contemplated market designs to achieve compliance with such requirements. In other words, if the mechanism produces such high electric energy rates that it would slow the pace of electrification of the transportation sector, then that demand should be calibrated accordingly. And, vice-versa, if the electric energy pricing is low and therefore incentivizes electrification of the building sector, then that demand increase should be recognized and incorporated in the analysis.

Accordingly, the Pathways analysis should include (i) a detailed analysis of how each market mechanism effects changes to the resource mix year after year over time and (ii) a focus on the

[4] The FCA outcomes include resource new resource location, capacity, and technology type; retiring resource location and timing; and capacity contributions from neighboring control areas.

[5] For example, FCA 16 held in 2022 determines the energy market resource portfolio in CCP 2025-2026, FCA 17 held in 2023 determines the portfolio in 2026-2027, and so on.

interactions between markets, legal requirements and associated programs, and contemplated market design concepts.

Initial Questions

NESCOE offers the following general questions related to the overall analysis:

1. How will the analysis determine if the either of the mechanisms will facilitate the financing of new renewable resources and associated infrastructure upgrades?
2. How will it measure how much carbon emission reduction and the consumer cost per ton avoided that are likely under each approach?
3. Is the analysis limited to the power sector? Are the impacts of electricity prices on electric vehicle adoption considered in the scope of the analysis?
4. Is the analysis limited to New England? How will the analysis consider the regional trade impacts of net carbon pricing and any associated border adjustments? Will the analysis measure leakage?
5. What is included in Consumer Costs and how will they be measured? Will Consumer Costs include costs recovered through distribution rates?
6. What and how ancillary services will be modeled? Will this include additional reserve products?
7. Will the analysis assume perfect foresight, or will random volatility be introduced into the analysis of energy market outcomes?
8. Will power sector carbon emissions be explicitly limited with a model constraint, or will they just be monitored and reported?
9. Should a hybrid model be included that uses net carbon pricing set at a level to ensure revenue adequacy for existing[6] clean energy resources with an FCEM mechanism designed to ensure financing and market participation of new clean energy resources.
10. Per prior communications from NESCOE and other stakeholders, could ISO-NE please respond to requests that it evaluate the technical ability of implementing the Integrated Clean Capacity Market("ICCM").[7]

Preliminary Feedback on ISO-NE's February 18, 2021 Questions

In its February 18, 2021 slide deck, ISO-NE posed some questions to inform the analysis. We provide some initial feedback on those questions in red below. Again, we offer the feedback to inform the analysis and this initial feedback does not indicate or reflect support for any particular design or design specification.

[6] Existing being defined as any resource with low- or zero-carbon emissions in commercial operation as of 12/31/2020.

[7] See, for example, http://nescoe.com/wp-content/uploads/2020/11/ISOBoD_MarketAnalysis_2Nov2020.pdf

Questions, Slide 6: "Welcome stakeholder feedback on model assumptions shared across policies"

What study year (or years) should be evaluated?

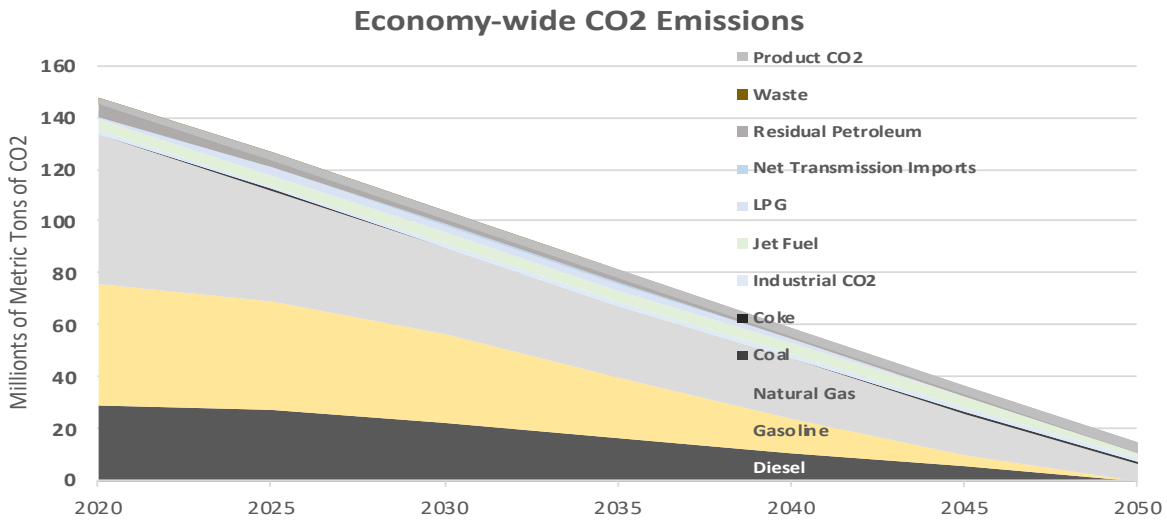
The study should be a period of years from 2026 – 2040. As noted above, the Pathways Analysis should take into account how the mechanisms may affect future electricity demand and impacts on associated regulatory requirements.

–Frameworks are being evaluated as pathways to the future grid, but they should also sustain this future resource mix

Yes, they should also be evaluated as (i) being able to sustain this resource mix and (ii) capable of financing new resources that are consistent with energy and environmental legal requirements.

•What are the regional and state carbon emissions targets for the study year(s)?

The Future Grid Reliability Study assumptions are a reasonable basis for the Pathways analysis.

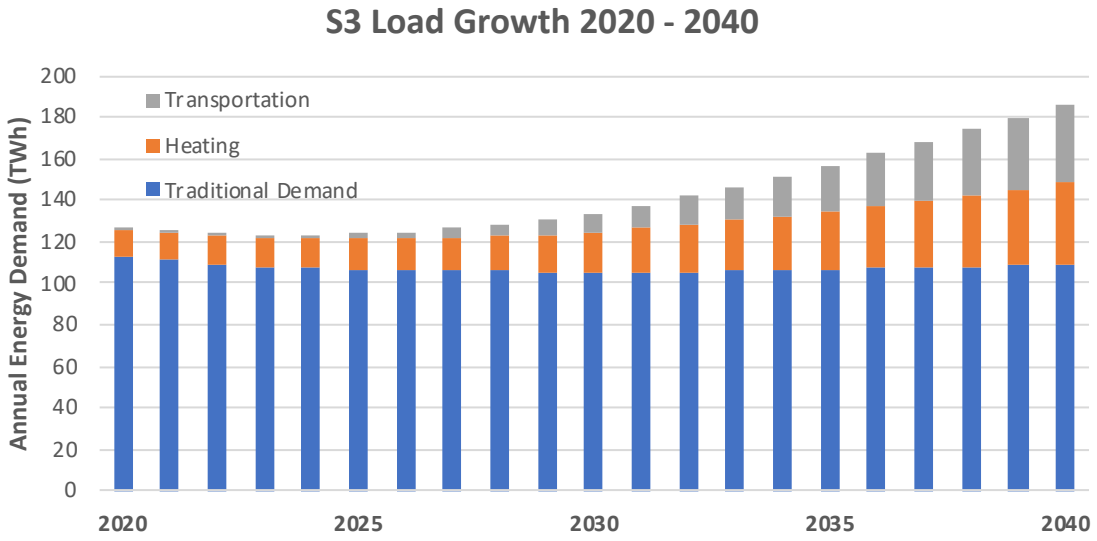


–How does this interact with each of the policies modeled?

We need clarification about what this question seeks.

•What are the assumed load levels and shapes?

The Future Grid Reliability Study assumptions are a reasonable basis for the Pathways Analysis.



•What are the assumptions regarding the MOPR?

The studies should assume that the FCEM revenues count as "in-market." If it would not create material incremental work, understanding the opposite could be useful as well.

Forward clean energy market: product definition – Slide 15

• What resources can sell "clean energy?"

Clean energy attribute credits (CEACs) shall be denominated and purchased in megawatt hours of electricity that have been produced by an eligible clean energy resource that is defined as: (1) Any electrical energy production from a resource delivering electrical energy into the New England power system from a unit that has very low carbon emissions (net lifecycle GHG emissions, over a 20-year life cycle, that yields at least a 75% reduction of greenhouse gas emissions per unit of useful energy relative to the lifecycle greenhouse gas emissions from the aggregate use of the operation of a new combined cycle natural gas electric generating facility using the most efficient commercially available technology as of January 1, 2021)[8] or (2) energy that is discharged from a storage facility[9] or (3) eligible for certain Class I or similar renewable and clean energy standards in any New England state.[10]

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[8] This portion of the eligibility definition, intended to be non-discriminatory in nature, is based on the Massachusetts Clean Energy Standard, with a somewhat more stringent threshold of emissions that is 75% lower than a new combined cycle gas turbine, rather than 50% lower. This provision should be interpreted to mean resources that have very low emissions. Life cycle greenhouse gas emissions, rather than just smokestack emissions, are appropriate for this comparision.

[9] To the extent practicable, storage resources should be considered elgible for FCEM.

[10] Rounding out the broad eligibility definition are resources that are currently eligible for the new, growth tier / class of state renewable portfolio and clean energy standards.

– Does it include imports?
No

– Does this definition apply to resources that do not produce electrical energy, but can store it (e.g., pumped pumped-storage hydro, batteries batteries)?
Yes

– Would credits be "dynamic" (e.g., varying with marginal GHG emission rate)? If yes, how would this work?
At least not initially, but if not too much work it could be phased in later.

• Is there a cap on the quantity of "clean energy" a resource can sell forward?
No

– If yes, how would this cap be determined?
N/A

– Is there a qualification process?
Yes, similar to the FCM.

• Is there a single "clean energy" product, or are there potentially multiple products (and if so, what are they they)?
Single product (see above).

Forward clean energy market: settlement – Slide 16

•What are the settlement implications of producing more or less "clean energy" during the commitment period than was sold forward?
–Is there a "penalty" for the non-delivery of "clean energy"? If so, how is it determined?
While this will be an important design criterion, it seems immaterial for this analysis. Generally, we believe there should be a penalty for non-delivery and no other benefit for over delivery of clean energy. We are also interested in hearing other stakeholder preferences on this question.

–Are there opportunities to buy/sell credits during the commitment period so that a resource can align its forward and spot positions?
We understand the proponents envision "reconfiguration auctions" as part of the overall design. We would benefit from hearing a discussion to understand other all stakeholder preferences and reasoning, as well as the materiality of this issue on the results of the analysis.

–Can a resource without an FCEM obligation buy/sell credits?
We do not envision this occurring; however, we would like to better understand other stakeholder preferences and the materiality of this issue on the results of the analysis.

•Are there any exemptions that would allow resources to avoid covering their forward position during the commitment period?
No, we believe this should be similar to the current FCM rules.

•Can credits be banked across commitment periods?
Currently many state programs with compliance requirements use some form of banking and borrowing to smooth out lumpiness and increase liquidity. Understanding the value of this type of feature in the analysis could be beneficial.

Forward clean energy market: interaction with existing state REC/RPS programs - Slide 18

• Can a resource provide "clean energy" under the FCEM and also qualify for credits/certificates under current state programs?
– If yes, does it receive credits for both programs?
The analysis should assume a resource receives credits for both programs.
– If not, does the resource choose which credit it is awarded, or does one program supersede the other?
• The answer to the above question may have important implications for other design elements, including:
– If/how suppliers price "clean energy" offers
– Whether the FCEM replaces (or reduces) certain state policy requirements
We agree. We continue to analyze and attempt to better understand the implications of these design elements.

Forward clean energy market: pricing and cost allocation – Slide 19
•The design appears to allocate "clean energy" costs to RTLO in the states that buy this product
•If it allows non-rationable "clean energy" MWh offers (or demand bids), there may not be a single price for "clean energy" that is acceptable to all buyers and sellers
–In such cases, the design would require side payments
–This is similar to how minimum offers in the energy market can create uplift
•In such cases, how would the "clean energy" price be determined? How would the costs associated with any side payments be allocated?
Supply offers should be considered non-rationable. Demand bids are rationable.
We would like to better understand other stakeholder preferences on price determination caused by non-rationable offers and the materiality of this issue on the results of the analysis.

Forward clean energy market: integrated clearing with FCM – Slide 19
• Stakeholders have discussed an approach that would jointly optimize forward capacity and "clean energy" positions
– https://nepool.com/uploads/FGP_NPC_20201001_Spees_Integrated_Clean_Capacity_Market.pdf
• Would resources offer capacity and "clean energy" jointly?
– How would such offers be formulated?
– Do participants submit separate offers for each product, or a joint offer for both? If separate offers, could an offer clear for one product but not the other, or would the products be bundled?

• Are offers non non-rationable? If yes, how would prices be determined? Are side payments required?
Similar to above, we would like to better understand other stakeholder preferences, especially views from stakeholders supporting the ICCM design.
• Outstanding question: Is such a joint optimization feasible?
– Requires further assessment of product space and the auction's bid and offer parameters
This is an important question that ISO-NE and other market design experts should address concurrently with this analysis.