MEMORANDUM

April 5, 2021

To: ISO New England, NEPOOL

From: Pete Fuller & David O'Connor, on behalf of NRG Energy and other stakeholders

Re: Future Grid Pathways Study – Further Input

In response to the ISO-NE presentation at the March 18 Pathways meeting, we offer this memo to provide additional input and feedback regarding the structure and assumptions for the Pathways study of the Forward Clean Energy Market (FCEM) and Net Carbon Pricing. The content here was drafted by consultants for NRG Energy, Inc. based on discussions and collaboration with a number of other NEPOOL market participants. We appreciate the opportunity to continue to engage with the ISO, NESCOE and other stakeholders and provide our perspectives on the important design parameters for incorporating the New England States' clean energy and decarbonization objectives into the ISO competitive markets, and we look forward to continued collaboration on these issues.

Modeling structure – Business as Usual

We are supportive of the ISO's stated intent to evaluate the Integrated Clean Capacity Market (ICCM)[1] and Net Carbon Pricing (Net-C) market designs. In order to provide context, however, those designs need to be compared to a business as usual (BAU) case. While there have been several passing mentions of a BAU comparison case, we believe more attention needs to be placed on developing the assumptions and parameters of the BAU scenario. Some particular comments and questions include:

- We start with the assumption that all of the cases being evaluated should be designed to meet the same overall level of emissions and reliability standards, such as 'net zero by 2050,' and that each scenario needs to be measured against the same level of clean energy or decarbonization achievement. Our hypothesis is that a market-based approach such as ICCM could achieve more emission reductions more quickly and at lower cost than the contract-based approach that States have traditionally relied on to procure clean energy resources. Both the BAU and the market-based cases need to be constructed in a way that enables us to test that hypothesis.
- How will the model capture the dynamics and the comparative costs and risks of an episodic RFP structure driven by legislative cycles compared to a regular annual procurement of a common product through a competitive wholesale market for clean energy?

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[1] We understand that although evaluation of the two approaches is still on-going, ISO has preliminarily determined that "the joint clearing of capacity and clean energy in a single auction [i.e., ICCM] is theoretically feasible ..." (ISO-NE, Developing a Straw FCEM Framework, March 11, 2021, p. 9 (p. 56 at https://www.iso-ne.com/static-assets/documents/2021/03/npc-fg-20210318-composite.pdf). Consistent with the majority of stakeholder feedback that appears to favor the ICCM approach, we use 'ICCM' throughout this memo with the understanding that the term also includes FCEM to the extent the integrated, co-optimized approach is found to be unworkable for some reason.

- Presumably the BAU case should be constructed assuming completion of the technology-specific contracts contained in current statutes, but what should be assumed for procurements in the longer term? Would State procurements continue to target specific technologies or shift to a more technology-neutral and vintage neutral approach? What other State interventions should be assumed? How should 20-year contracts and their costs and cash-flows be modeled? What role should the Alternate Compliance Payment (ACP) mechanisms play in the model?
- Should the model assume FCM product definition and obligations remain unchanged? Should it take into account ELCC or other likely market changes?
- How should the model account for requirements for balancing resources and additional ancillary services?
- How will the BAU scenario treat existing renewable energy resources and other non-emitting sources? In particular, how will the BAU scenario treat expiring contracts? Should we assume States authorize future procurements for which existing resources are eligible? What should be assumed about continued operation of existing non-emitting resources that do not have or do not receive contracts? What technologies should be assumed to replace retiring non-emitting resources, and under what business model?

Participation in FCEM by Resources with State-backed Contracts

One of the 'facts on the ground' that would have to be incorporated into the implementation of an ICCM is the existence of the substantial contracts for clean energy that exist today, or that will exist by the time the region can proceed with ICCM implementation. As in our previous materials[2] we continue to recommend that the model consider three scenarios.

- Scenario 1 – assume contracted resources are external and do not participate in ICCM. This scenario has the downside of bifurcating the clean energy 'market' and understating the region's full clean energy needs in the ICCM, though that effect would presumably decrease as existing contracts reach their terminations and the demand would shift into the ICCM.
- Scenario 2 – assume the supply and demand associated with contracted resources participate in ICCM with non-FCEM contract revenues subject to MOPR. This scenario assumes the continued existence of a MOPR and would estimate the ICCM offer prices for contracted resources based on their total estimated costs less the estimated market value of energy and ancillary services provided by the resources. Any modeled clean energy credit revenues received by these resources under FCEM or ICCM as well as energy and ancillary service earned in the ISO markets would be assumed to be passed through to the utility customers responsible for the existing contract payments. Modeled capacity revenues would be assumed to flow to the project owner, based on our understanding that existing clean energy contracts rarely, if ever, include capacity.
- Scenario 3 - assume contracted resource supply and demand participate in ICCM with no MOPR applied, and with all non-FCM market revenues flowed through to the customers responsible for the contract payments. This scenario would provide a comparison to Scenario

[2] Fuller & O'Connor on behalf of NRG Energy and Others, FCEM in New England: Feedback on ISO-NE Questions, March 18, 2021 (pp. 79-101 at https://www.iso-ne.com/static-assets/documents/2021/03/npc-fg-20210318-composite.pdf).

2 and an indication of the importance (or not) of applying MOPR to clean energy resources entering the capacity market and also supported by contracts.

Establishing State Clean Energy Demand in ICCM

The process for establishing clean energy demand for modeling purposes will vary by State, just as it will for actual implementation. The primary reason for this is the variation in how each State has defined its own emission reduction or clean energy goals. For example, Massachusetts' new climate law has set a goal of economy-wide net-zero emissions by 2050, with interim targets for sub-sectors of the economy. Connecticut's latest statutory goal is to reduce greenhouse emissions by 45% from 2001 levels by 2030 and 80% by 2050, while Rhode Island has set a goal of using 100% renewable energy by 2030.

In each case, some or all of the following steps may be required to 'translate' from the State's goal to a quantity of clean energy requirement that can be modeled in the ICCM. Starting with the State goals as contained in statute, Executive Order, etc., first translate as needed to the percent emission reductions needed from the energy sector. Apply that percentage to the relevant baseline year emissions to estimate total allowable tons in the target year. Create a straight-line path[3] for intervening years if necessary. Estimate total electricity demand in the study year, which should take into account forecasts of electrification of heating and transportation as well as other load growth dynamics.[4] Assuming natural gas as the supply source for all non-emitting MWh, calculate the amount of MWh that must come from non-emitting sources in the study year to meet the allowable emissions limit.

One important assumption regarding State clean energy demand relates to the level of supply in the market. Both for modeling and implementation purposes, it will be critically important for the demand quantity to be sufficiently large so that it exceeds the quantity of supply assumed to offer as price-takers. Existing clean energy resources subject to long-term contracts and other existing, uncontracted clean energy resources can be expected to offer into ICCM at low, or even zero, prices due to either the sunk nature of their investments or their contract revenue. If the aggregate demand for clean energy does not exceed the quantity of price-taking supply, the market (or the model) will not reveal a meaningful marginal cost of meeting the States' clean energy goals and clean energy market signals will fail to attract new investment in non-emitting resources.

Rationable Offers

In the original formulation of ICCM, we had posited a need to have offers be non-rationable as a means to ensure that resources offering both clean energy and capacity would not be at risk of clearing for one product but not the other. ISO's ICCM Scoping Memo[5] suggests an offer structure that would keep the clean energy and capacity offers linked, avoiding the problem of taking on an obligation for one product but not the other. We support continued investigation and development of ISO's proposal to model rationable offers based on MW and MWh/MW offered, the key being that a resource offering both products will not clear one without clearing the other. In evaluating the model results, it will be necessary to examine, and possibly reject, cases in which either the $/MW or $/MWh

[3] We assume a straight-line approach would be most appropriate unless the relevant State requirement specifies some other trajectory.

[4] As noted in our March 18 materials, the demand assumptions being used for the Future Grid Reliability Study appear to be a good starting point for this modeling effort.

[5] Pp. 57-61 at https://www.iso-ne.com/static-assets/documents/2021/03/npc-fg-20210318-composite.pdf

price is zero/very low, or in which only a *de minimis* portion of one or more resources clears the market. Even if the total revenue to be earned by an ICCM resource from the base capacity and clean energy credit prices would satisfy the total offer cost requirements of the resource, it may be unattractive to hold an obligation if there is a high risk of net losses based on the performance requirements associated with the two products. Likewise, participants will need some means to ensure that they clear a sufficient share of their resource to justify operating the full resource.

Dynamic Credits and Storage

As described in our earlier feedback and out of expedience to get the modeling started, we continue to recommend approaching the initial modeling effort with static (i.e., non-time-varying) clean energy credits. That said, we strongly support parallel efforts to better understand how dynamic credits could work, for example, understanding hourly dynamics, patterns and relationships of emission rates, and correlations to demand, price or other observable factors. We would then expect to develop one or more frameworks for implementing dynamic credits as part of ICCM based on this new understanding.

We had previously suggested making energy storage resources eligible for ICCM clean energy credits as long as they could demonstrate that they used charging energy from eligible clean energy resources. ISO-NE indicated at the March 18 meeting a continued openness to exploring avenues for compensating storage resources for their ability to facilitate and enhance the integration of renewable energy into the system, suggesting that energy price volatility and possibly dynamic credits as the most 'sensible' mechanisms through which storage could monetize its value. We acknowledge that making energy storage eligible for clean energy credits requires careful avoidance of double-counting issues and we are likewise open to exploring how the markets can reveal and compensate the operational and emission reduction value of energy storage, recognizing that some of that value may be identified in studies beyond the scope of this Pathways effort, such as the Future Grid Reliability Study.

ICCM Credits vs. RECs

ISO's memo on a Straw FCEM Framework suggested three approaches for how the new clean energy credits would interact with existing State programs. Our observation is that all of these approaches appear to put a lot of emphasis on modeling existing REC programs, which is likely to be complex and appears to be somewhat outside the scope of the Pathways modeling effort. As an alternative we continue to recommend a simpler approach that only assesses the impact of revenues from REC markets on ICCM modeled results. One scenario would assume that resources producing FCEM/ICCM credits do not receive any revenues from REC trading (this is potentially equivalent to Approaches 2 and 3 as suggested by ISO). In the other scenario, assume a market price (eg, $40/MWh for Class I and perhaps $300/MWh for Solar RECs) which would act to reduce the offered prices of eligible resources in FCEM/ICCM.