

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

This document represents the product of on-going discussions among interested stakeholders on the necessary and desirable characteristics of a Forward Clean Energy Market (FCEM) that might someday be implemented in New England. These discussions were convened and facilitated by NRG and its consultants. They have relied on market design concepts initially formulated by some of the participating stakeholders who presented them in 2016 NEPOOL stakeholder process known as the Integrated Markets and Public Policy (IMAPP)¹ and who subsequently worked with The Brattle Group and others on their further development.² While the authors have attempted to faithfully capture all viewpoints expressed in these discussions, no stakeholder has necessarily expressed support for or endorsement of this formulation of FCEM, or of the FCEM concept, and some stakeholders may have strong preferences among the options presented here. The organizations participating in these discussions are listed in Appendix 1.

In addition, this document remains a working draft and is subject to further revision as these discussions continue in the coming months. Our goal is not to present a fully defined market design for implementation; rather it is to provide a framework of the major parameters and design considerations that will need to be resolved to successfully implement a FCEM, as a starting point for broader discussions among regional stakeholders.

To achieve their clean energy goals, states are currently relying primarily on individual solicitations offering long-term contracts for certain new resources outside of the wholesale markets and/or the purchase of clean energy attributes from existing resources through short-term markets often reflective of administratively set alternative compliance payments. The goal of a Forward Clean Energy Market is to allow all new and existing clean energy resources to compete in a centralized forward auction, resulting in a more efficient and cost-effective achievement of the region’s clean energy goals.

As discussed among this group of stakeholders, a successful FCEM design will:

- Incentivize investment and production of clean energy and contribute to achievement of state-mandated clean energy and carbon reduction goals through market-based revenues, shifting risk from ratepayers to investors;
- Provide a path for clean energy resources to count as capacity resources without undermining the price signal necessary for resource adequacy;
- Ensure that FCEM revenues are “in-market” from FERC’s perspective, while vesting the states with substantial control over FCEM;
- Avoid allocating FCEM costs to non-participating states; and
- Avoid inefficient price suppression in real-time energy markets.

¹ See, for example, http://www.nepool.com/uploads/IMAPP_Presentation_National_Grid.pdf; and http://www.nepool.com/uploads/IMAPP_Presentation_NextEra.pdf

² See, for example, <https://www.brattle.com/news-and-knowledge/publications/how-states-cities-and-customers-can-harness-competitive-markets-to-meet-ambitious-carbon-goals-through-a-forward-market-for-clean-energy-attributes-expanded-report>; and http://nepool.com/uploads/FGP_NPC_20201001_Spees_Integrated_Clean_Capacity_Market.pdf

I. Demand Participation

1. For an FCEM to be successful, there will need to be a robust and durable demand for clean energy attribute credits (CEACs), denominated and purchased in megawatt hours of electricity that have been produced by eligible clean energy resources.
2. The primary source of that demand will be state governments seeking to achieve their clean energy goals, whether established by state laws, regulations, or other state authority, and each state will need to ensure it has adequately authorized a state agency with the ability to submit demand bids consistent with such clean energy goals.
3. States will communicate their demand bids to the auction administrator for the FCEM auction. The demand bid will be determined by each state pursuant to its goals for carbon emission reductions and/or clean energy supply and its forecasted energy requirements. The auction should include the full volume of state compliance requirements to ensure efficient price formation.
4. The costs of CEACs procured in the auction pursuant to a state's bids will be allocated to the ISO-NE wholesale market participants with Real Time Load Obligations (RTLO) in that participating state in the period that the clean energy is produced, adjusted for any CEACs self-supplied by Load Serving Entities (LSEs).
5. Secondary sources of voluntary demand, in the form of bids to purchase CEACs by, for example, corporations, municipalities and aggregations, can also participate and can contribute to the robustness and durability of total demand. The costs associated with any CEACs procured as a result of such secondary sources of voluntary demand will be allocated to the ISO-NE participant(s) submitting the associated demand bid(s).
6. To provide sellers with confidence that there will be robust demand on an on-going basis, States should make foundational commitments to continue to submit robust demand bids, annually, for a minimum period, e.g. ten years. Ideally, states will publish forecasts of their expected purchase requirements for multiple years even farther into the future.
7. To foster the development and market entry of new carbon-free resources, the FCEM rules will include the option for 'new' generators to elect a price lock for a minimum number of years (e.g. up to 7-12 years) from the date at which they begin to deliver power and create CEACs. The costs associated with those multi-year commitments would be allocated to LSEs in those years through the normal settlement process.
8. State governments and secondary sources will convey price sensitive demand bids to purchase CEACs to the market administrator by a specified date in advance of each annual auction. Subject to accompanying price limits, bids will specify an amount of CEACs sought to be delivered by eligible supply resources during a delivery year (June 1 – May 31) that begins approximately three years following the year in which the auction takes place.
9. The fundamental intent and design of the FCEM is to allow all carbon-free energy resources, whether new or existing, and regardless of their technological characteristics, the opportunity to compete on an equal basis to supply the carbon-free emission attributes participating states may seek to procure to satisfy their clean energy goals. However, if states desire to specify demand bids for CEACs from resources that have specific characteristics (e.g., not only carbon-free, but also renewable), the FCEM could be configured to enable such bids. Under this design

alternative, States would be able to specify demand bids that “target” resources with specific technologies or characteristics beyond the ‘base’ CEAC eligibility criteria, subject to providing sufficient notice to the market.

II. Supply Eligibility

1. The definition of resources eligible to produce CEACs should be as broad as possible to enable the maximum degree of competition, which can be expected to produce CEACs and achieve the States’ clean energy goals at the lowest cost. FCEM eligibility should be open to all resources that produce energy with no direct carbon emissions. If there is a certain resource type that is eligible for a particular RPS or similar state program that does not meet the ‘no direct carbon emissions’ definition, it may continue to participate in those programs as a state may allow, but it would not be eligible for participation in the FCEM.
2. A fundamental principle of an FCEM is the comparability among sources of carbon-free emission attributes. To the extent they can each produce energy with no associated direct carbon emissions, there should be no eligibility distinction between new and existing resources, or among different technologies.
3. Recognizing that in many respects CEACs and state authorized renewable energy program RPS^{3/} credits both represent clean energy aspirations and that consumers should not pay twice for the same attribute from the same MWh, appropriate rules will be required to ensure that CEAC and RPS product definitions are aligned and that each environmental attribute is only counted once for compliance.
4. Participation by eligible CEAC supply resources in FCEM auctions should be voluntary (subject to market monitor review to deter the exercise of market power). Among other reasons for choosing not to sell in a FCEM auction, a supply resource may find it financially preferable to sell its environmental attributes through other channels.
5. A new resource should have the option to elect a price lock for some number of years (e.g. up to 7 to 12) to enhance the certainty of FCEM revenues and facilitate financing. The structure of this mechanism, and a potential built-in sunset of it over some number of years, need to be considered in light of the FERC order eliminating the price lock from FCM.
6. The output from eligible non-emitting resources being compensated under contracts approved by State regulatory authorities, under which the buyer has rights to the non-carbon and potentially other environmental attributes of the resource, should be eligible to participate and be compensated as CEAC supply, provided the affected State submits CEAC bids for quantities that are no less than the expected energy production associated with such contracts offered into the auction. CEAC market revenues should be allocated to the buyers under such contracts to offset contract payments.
7. A ‘dynamic’ approach, that would create differential value of CEACs based on the marginal carbon intensity of the electric supply at the time the CEAC was created, would

^{3/} In this document we use the term ‘RPS’ to refer generically to state attribute compliance programs, including Clean Energy Standards, Alternative Energy Standards, Renewable Portfolio Standards, Renewable Energy Standard, and similar programs.

align CEAC value with the relative amount of carbon emissions offset by clean energy production, and could provide, for example, a greater value stream to resources incorporating energy storage in its operations.

III. Settlement Characteristics

1. The production of clean energy attribute credits (CEACs) from eligible supply resources with FCEM obligations would be tracked and verified through the NEPOOL GIS. As is the case now, this information would include date and time of production, emissions, as well as eligibility for other programs such as state RPSs.
 - a. As an alternative, it may be possible to track and settle the delivery of carbon-free energy entirely through the ISO-NE settlement system, avoiding the complexity of reconciling a new CEAC product with existing REC and similar products. The balance of these documents, though, assume the use of the GIS system.
2. To enable a ‘dynamic’ approach to reducing grid carbon intensity, CEACs could be earned by suppliers in proportion to the grid’s carbon intensity at the date and time of production, and perhaps also as a function of location.
3. The CEAC supply obligation would be for an annual quantity. Under-delivery of a supplier’s CEAC obligation quantity should be subject to a penalty or charge to incentivize the supplier to cover any shortfall. Production of CEACs would be compensated through existing ISO settlement processes as non-emitting energy is produced. The total CEAC obligation of a supplier would be trued up annually. To provide intermediate confirmations that a resource is on track to meet its annual obligation, it may be desirable to settle quantities and deviations more frequently than annually.
4. The ultimate settlement of the market would take place with the close of the CEAC compliance period, likely to be approximately six months following the end of the CEAC delivery year. This timing would allow for confirmation of actual obligation quantities and late-stage trading among participants to balance long or short CEAC positions.
5. Presuming the use of GIS, delivery of CEACs will be accomplished by the seller of said CEACs transferring confirmed GIS certificates to the accounts of the LSEs being allocated FCEM costs, as well as any voluntary buyers. The GIS administrator will identify each CEAC by the physical source of the energy that caused its creation and by the date and time when that energy was produced, to correlate with system emissions intensity data.

IV. Market Integration

Option One: Forward Clean Energy Market with the Forward Capacity Market:

1. Consistent with the objective of the FCEM to support investment in new non-emitting resources as well as to compensate existing resources for their non-emitting attributes, FCEM could parallel the existing Forward Capacity Market (FCM) in a number of respects:

- a. Qualification procedures for FCEM participation would mirror existing procedures for FCM, such as timing and content of ‘show of interest’ and qualification submittals, monitoring of critical path schedules, offer price reviews and financial assurance requirements.
- b. The annual FCEM auction for energy deliveries three-plus years in the future would occur shortly before the associated Forward Capacity Auction which takes place in February.
- c. Offer prices in FCM are assumed to reflect revenues secured through the FCEM auction (and vice versa).
- d. New non-emitting resources should have the option to elect a multi-year price lock (potentially in the range of 7 to 12 years) when first clearing in the market, to enhance revenue certainty and facilitate financing.

Implementation of FCEM would not eliminate the Minimum Offer Price Rule (MOPR) in FCM. However, FCEM revenues associated with ‘base’ CEACs, i.e., the technology-neutral requirement for non-emitting attributes, would be considered ‘in-market’ for purposes of calculating offer floor prices for new resources in FCM. Incremental revenues above the ‘base’ CEAC value (such as associated with a ‘targeted’ demand bid for a specific technology or other characteristic) that are ‘(a) not tradable throughout the New England Control Area or that are restricted to resources within a particular state or other geographic sub-region; or (b) not available to all resources of the same physical type within the New England Control Area, regardless of the resource owner,’⁴ would not be considered as ‘in-market’ revenues.

2. Likewise, for purposes of the MOPR and participation in FCM, a clean energy attribute product (CEAC) procured outside of FCEM would have those attributes valued at the ‘base’ CEAC price

Option Two: Integrated Clean Capacity Market:

1. FCEM and FCM would be combined into a single auction structure that would seek to satisfy both a MW-based resource adequacy constraint and a MWh-based clean energy constraint. ISO would establish the resource adequacy requirements and states (and voluntary buyers of CEACs) would create the requirements for clean energy with their price-sensitive demand bids.
2. Supply offers into the ICCM would comprise a resource’s MW of Qualified Capacity, its MWh of CEAC-eligible energy production, and a price based on its net annual revenue requirement after accounting for energy and ancillary service revenues from the ISO markets. Suppliers should have flexibility to offer quantities less than their theoretical maxima of both capacity and clean energy, as a means of managing delivery risk, weather uncertainty, etc., including offering only capacity or only CEACs, even if eligible to provide both products.
3. The minimum offer price rule (MOPR) would continue to be enforceable, but only to the extent either clean energy or ‘balancing’ resources received revenues from sources outside of the ICCM, ie, FCEM revenues would be explicitly ‘in market’ for FCM purposes, and vice versa.

⁴ ISO-NE Market Rule 1, Appendix A.21.2(b)(i)

4. Many FCM-based mechanisms for qualifying and implementing offers and the auction would be adapted, including the show-of-interest and qualification package processes, financial assurance, critical path schedules, the option of a multi-year price lock for new resources, etc.
5. The co-optimizing auction would clear whole resource offers, i.e. a resource that offered both capacity and CEACs could not receive an obligation for one without also receiving an obligation for the other. The auction would produce separate clearing prices for each product, and delivery performance of each product would be measured independently.

V. Regulatory Integration

A Forward Clean Energy Market (FCEM) would be a new wholesale market mechanism available for participating states to utilize for the procurement of the clean energy attributes they deem required to achieve their clean energy goals. The ISO-NE would administer the market on behalf of participating states. A revised ISO-NE tariff would specify, among the many rules which would apply to the FCEM, that:

- (1) each state will determine whether it will participate, and, if so, the structure and specifics of its demand bids;
- (2) charges for payments to clean energy resources for CEACs clearing the auction pursuant to a state's demand bids will be allocated to LSEs based on their Real-Time Load Obligations in that state at the time the CEACs are generated and will be adjusted for any CEACs self-supplied by LSEs; and
- (3) FCEM charges will not be allocated to LSEs in non-participating states.

For purposes of this document, we assume the ultimate compliance obligation for any state clean energy regulatory programs (e.g., CES, RPS, RES) would continue to reside with the Load Serving Entities in that state. We further assume the use of the GIS system to track the creation, trading and retirement of the certified clean energy-attribute or attributes transmitted through the FCEM, as is done today for all existing clean energy-associated attributes.

There are at least two ways that the mechanics of an FCEM could be designed to enable integration with state programs. In one, a Clean Energy Attribute Credit (CEAC) would represent only the carbon-free attribute of a MWh. In the other, a CEAC would represent all of the clean energy attributes of a MWh. What follows are descriptions of these two ways.

Option One: A “Carbon-Free Attribute”

In this approach, a CEAC would represent only the carbon-free attribute of a MWh. Other attributes of a MWh that are tracked for RPS compliance (such as the type of producing technology and the location of its production) would be considered separate and distinct. A CEAC would be used, in the first instance, to achieve compliance with the requirements of the

FCEM. In addition, the same CEAC would be eligible to apply towards partial compliance with one or more of a State's clean energy programs.

All of the various attributes of the clean energy production associated with a CEAC would be identified by the NEPOOL Generation Information System (GIS) so the associated GIS certificates could be traded and used to demonstrate compliance with FCEM and, to the extent states allow, with state programs.

The numbered paragraphs that follow provide more detail on what the mechanics of this approach to regulatory integration could be.

1. Load Serving Entities would comply with their FCEM obligations by using a CEAC. States would allow LSEs to also use that same CEAC for partial compliance with their clean energy programs; that is, with the portion of state clean energy programs designed to achieve "carbon-free" energy production.
2. Effectively, each MWh of production that would qualify for compliance with the FCEM would be designated by the GIS system as creating two or more certificates; (1) one representing the carbon-free attribute of the underlying energy production, designated for discussion here as a CEAC, and (2) the other representing other attributes of that energy production (such as technology type, vintage or location), designated generically for discussion here as Residual Credit(s).
3. Residual Credits will reflect the attributes that define eligibility to comply with state programs based on attributes other than carbon-free energy production. For example, that residual value might be related to its production by a particular technology (such as hydro or solar) or by a particular vintage of resource (such as commercial after 2009), or in a particular location (such as within the state in question). These differing attributes and designations will allow these Residual Credits to be bought and sold separately from CEACs and from one another.
4. Suppliers of CEACs that clear in the FCEM auction would be understood to have sold only the carbon-free attribute of their production. They would retain ownership of any residual value that would accrue to their power production for its GIS attributes apart from its carbon-free character. Residual Credits could be sold to compliance entities that will need them (in combination with CEACs) to comply with state RPS programs.
5. Suppliers that do not sell their carbon-free credits (CEACs) in the FCEM auction (either because they did not offer them or they did not clear in that auction) would retain the full value of both the CEACs and the Residual Credits and all of their attributes. They would be free to sell those combined credits to compliance entities who would use them to comply with state energy regulatory programs, as is done today.
6. Compliance with state portfolio and energy standard programs would require both the appropriate number of CEACs, reflecting the carbon-free aspect, and the appropriate number of Residual Credits that address the other non-carbon-free requirements of the state regulations. Residual Credits would demonstrate compliance with all other criteria required by the particular state program, besides being carbon-free.
7. A CEAC could only be used once for FCEM compliance, but could also be used for partial compliance with a state RPS program; i.e., the 'carbon-free' aspect of the program. Likewise, a Residual Credit could only be used once for compliance with a

state regulatory program unless a state has specifically approved of its simultaneous use for more than one state program (such as the MA regulation that allows RECs to count toward compliance with the Clean Energy Standard).

8. Any CEACs or Residual Credits retired for compliance with a program in one state could not be used for compliance with a program in another state.

Option Two: “All Clean Energy Attributes”

In this approach, a Clean Energy Attribute Credit (CEAC) from a resource would represent all of the clean energy-associated attributes of a MWh produced by that resource (including absence of carbon, type of producing technology, resource vintage, location, etc.). When a CEAC from a resource is sold in the FCEM auction, it would come with all of the associated GIS certified attributes for which the resource qualifies/is eligible.

For example, a resource which qualifies as a CT Class 1, MA RPS Class 1, MA CES, MA CPS, RI New Renewable, and VT Tier 1 resource, if its offer price is cleared in this market, would be committed to providing to the buyers (LSEs) all corresponding entitlements to the GIS certified attributes for the associated MWhs, once produced. A clean energy resource which might not qualify as any type of the examples provided above would be committed to provide, at a minimum, certification of and entitlement to its Carbon Emission-Free Energy attribute.

Following the real-time production of energy, the various attributes of clean energy production associated with each CEAC would be identified by the NEPOOL GIS and noted on its GIS certificate. The GIS certificate for a CEAC, provided to an LSE based on the ultimate FCEM settlement of charges and CEACs based on applicable Real-Time Load Obligations, could be traded or used by the LSE to demonstrate its compliance with state programs.

The paragraphs that follow provide more detail on what the mechanics of this approach to regulatory integration could be.

1. The sale of a CEAC in the FCEM auction would include the sale of all the clean energy and environmental attributes of a MWh that are produced by a qualifying generating unit. Buying a CEAC would secure ownership of all clean energy associated attributes of each MWh generated by the supplying clean energy resource.
2. Based on the outcome of the FCEM auction, generation offers that cleared in the auction would be allocated to load serving entities (LSEs) in the form of CEACs. Likewise, the costs of purchasing these CEACs would be allocated to LSEs in proportion to their share of Real Time Load Obligations (RTLO). The allocation of CEACs would likewise include a proportional share of all GIS certificates associated with the clean energy that created the CEACs.
3. Voluntary buyers (i.e., any entities submitting demand bids other than the participating states) would be allocated the amount of CEACs they purchased in the auction. That allocation of CEACs would likewise include a proportional share of all GIS certificates associated with the clean energy that created the CEACs themselves.
4. Each *pro rata* share of CEACs awarded to a buyer would reflect ownership of a proportionate share of the various types of state program qualifications on the GIS

certificates attributed to the suppliers of CEACs sold in the auction. As a result of the auction, a LSE might receive a group of CEACs that included more or less of the qualifying characteristics needed to comply with state programs. An LSE would be free to trade CEACs to balance its position.

5. Once a MWh is produced and its attributes confirmed, it will be assigned a GIS certificate. That certificate will specify the attributes for that MWh, including whether it qualifies with various state programs. The ownership of a GIS certificate would be used to demonstrate compliance with state programs.
6. LSEs could buy and sell the GIS certificates that were secured through ownership of CEACs, as needed, to balance positions and meet state compliance obligations.
7. Voluntary buyers who received CEACs from the FCEM auction would also be free to trade CEACs. However, the sale of a CEAC would necessarily include the sale of all its clean energy attributes and the seller could no longer claim to own that MWh or its “clean energy” attributes.
8. A CEAC (and its corresponding GIS certificate) used for compliance with a regulatory program in one state could not be used for compliance in another state.
9. A state might need to clarify, by regulation, which attributes a CEAC would need to represent to accomplish compliance with its clean energy program requirements.

APPENDIX I

Forward Clean Energy Market Design Discussions

Participating Stakeholder Organizations

- Advanced Energy Economy
- Associated Industries of Massachusetts
- Brookfield Renewable Energy
- Connecticut Business and Industry Association
- Conservation Law Foundation
- Direct Energy
- Energy New England
- Eversource
- National Grid
- New England States Committee on Electricity (NESCOE)
- New England Power Generators Association
- NextEra Energy
- Northeast Clean Energy Council
- NRG Energy
- Power Options
- Renewable Energy and Efficiency Business Association (REEBA)
- RENEW Northeast
- Union of Concerned Scientists