UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

ISO-New England Inc.	)	**Docket No. ER17-795-000**

MOTION TO INTERVENE AND PROTEST OF
THE NEW ENGLAND POWER GENERATORS ASSOCIATION, INC.

Pursuant to Rules 211 and 214 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission ("Commission"),[1] the New England Power Generators Association, Inc. ("NEPGA")[2] hereby files this Motion to Intervene and Protest in response to ISO New England Inc.'s ("ISO-NE") proposal to base the net cost of new entry ("Net CONE") for the twelfth Forward Capacity Auction on a greenfield simple-cycle combustion turbine ("Combustion Turbine") as the reference technology.[3]

ISO-NE fails to demonstrate that the Combustion Turbine meets the Commission's criteria to be considered as the reference technology. Further, its Net CONE value would increase resource adequacy and market efficiency risk, especially in import-constrained Capacity Zones, due to its effect on the demand curve parameters. For these reasons ISO-NE's proposed

[1] 18 C.F.R. §§ 385.211, 385.214 (2014). NEPGA's Motion to Intervene and Protest is timely according to the Commission's Combined Notice of Filings #1, dated January 17, 2017.
[2] The comments expressed herein represent those of NEPGA as an organization, but not necessarily those of any particular member.
[3] ISO New England Inc. Filing of CONE and ORTP Updates, Docket No. ER17-795-000 (filed January 13, 2017) ("ISO-NE Filing").

reference technology is unjust and unreasonable. A Combined-Cycle unit meets the Commission's reference technology criteria and would mitigate against the risks created by ISO-NE's proposal, and is therefore a reasonable choice for the Net CONE reference technology. NEPGA respectfully requests that the Commission reject ISO-NE's proposal as unjust and unreasonable and order ISO-NE to adopt a Net CONE value based on the Combined-Cycle as the reference technology for effect beginning in FCA 12.

NEPGA also requests that the Commission direct the ISO-NE and the Internal Market Monitor to remove the Production Tax Credit reduction to the Offer Review Trigger Price for on-shore wind resources proposed by ISO-NE. The on-shore wind Offer Review Trigger Price analysis improperly assumes that all on-shore wind resources will be able to take advantage of the existing Production Tax Credit rate, when in fact the rate declines in a way that makes clear that not all resources will realize the full Production Tax Credit.

In support of this Protest, NEPGA submits as Attachment A the Prepared Direct Testimony of Ms. Tanya Bodell, Executive Director of Energyzt Advisors, LLC. Ms. Bodell concludes that the Combustion Turbine is not a reasonable choice for the reference technology, but instead that a Combined-Cycle unit is a reasonable choice. Ms. Bodell explains that ISO-NE has not shown that the Combustion Turbine is likely to be developed, and that its Net CONE value and Starting Price will cause market efficiency and resource adequacy risks in the Forward Capacity Market. Ms. Bodell further explains that the Combined-Cycle meets the Commission's criteria for consideration, and will mitigate the risks created by the ISO-NE proposal.

I. Motion to Intervene and Communications

NEPGA is the trade association representing competitive power generators in New England. NEPGA's member companies represent approximately 26,000 megawatts, or roughly 80% of the installed capacity in New England. NEPGA's mission is to support competitive wholesale electricity markets in New England. NEPGA believes that open markets guided by stable public policies are the best means to provide reliable and competitively-priced electricity for consumers. A sensible, market-based approach furthers economic development, jobs and balanced environmental policy for the region. As active participants in the ISO-NE capacity and wholesale electricity markets, NEPGA's member companies have substantial and direct interests in the outcome of these proceedings, and those interests cannot be adequately represented by any other party in the proceeding.

All correspondence and communications related to this proceeding should be addressed to the following individual:

Bruce Anderson
Vice President, Market and Regulatory Affairs
New England Power Generators Association, Inc.
33 Broad St., 7th Floor
Boston, MA 02109
Tel: 617-902-2347
Fax: 617-902-2349
Email: banderson@nepga.org

II. Protest

ISO-NE proposes to reduce Net CONE by 32%, from $11.84/kW-month in the eleventh Forward Capacity Auction ("FCA 11") to $8.04/kW-month in the twelfth Forward Capacity Auction ("FCA 12"). ISO-NE also proposes to reduce the Forward Capacity Auction Starting Price, which is equal to 1.6 x Net CONE, by 31%, from $18.62/kW-month in FCA 11 to $12.86/kW-month in FCA 12.[4] These demand curve parameters are unjust and unreasonable for the following reasons:

(1) The Starting Price creates a significant risk that the Forward Capacity Market cannot price the actual cost of new entry, which in turn creates resource adequacy and market efficiency risks;

(2) The demand curve parameters increase the risk that Net CONE underestimates the actual cost of new entry, which in turn increases the risk of the Forward Capacity Auction procuring insufficient capacity to meet New England's resource adequacy needs;

(3) ISO-NE has not shown that a greenfield Combustion Turbine is likely to be developed in New England, a condition the Net CONE reference technology must satisfy;

(4) ISO-NE's proposal is entirely inconsistent with the Net CONE value and clearing price that applied in FCA 11 and the prior four Forward Capacity Auctions, creating market uncertainty and increasing investor perceptions of risk;

(5) It would be unjust and unreasonable to adopt market parameters that carry these significant risks, when ISO-NE has previously adopted a Net CONE value for a Combined-Cycle unit, a reasonable choice that meets the Commission's reference technology criteria but with far fewer risks than the demand curve parameters

[4] ISO-NE Tariff, Market Rule 1, Section III.13.2.4. The Starting Price is equal to the greater of gross CONE or 1.6 x Net CONE, which in this case, and in all prior auctions applying the Starting Price rule, is 1.6 x Net CONE.

proposed by ISO-NE, particularly when ISO-NE has failed to make a compelling case for a change to a Forward Capacity Market characterized by competitive outcomes.

Conversely, the Combined-Cycle is a reasonable choice for the reference technology first because it is a technology likely to be developed in New England for which ISO-NE can calculate a reasonable Net CONE estimate. A Net CONE and Starting Price based on the Combined-Cycle would also mitigate the risks exposed by the ISO-NE proposal and create market parameters relatively consistent with the parameters, and the annual incremental changes to those parameters, applied over the course of the past several Forward Capacity Auctions. The continued use of the Combined-Cycle as the reference technology would result in a Net CONE value of $10.00/kW-month, and associated Starting Price of $16.00/kW-month. As with the Combustion Turbine, a Combined-Cycle Net CONE would cause a decrease in the Net CONE and Starting Price values from FCA 11, but more modestly than the values proposed by ISO-NE which are much less likely to compromise investor confidence in the ability of the market to reflect actual new entry costs.

A. Background and Description of the ISO-NE Filing

The ninth Forward Capacity Auction ("FCA 9") was the first in which the Commission considered and approved a Net CONE value based on a specific reference technology.[5] The Net

[5] For FCA 1, FERC approved a negotiated Net CONE value of $7.50, and in each subsequent FCA through FCA 6, FERC approved Net CONE values that worked in part off of the prior auction's Net CONE value. *See Devon Power LLC, Order Accepting Proposed Settlement Agreement*, 115 FERC ¶ 61,340, at PP 18, 130-132 (basing Net CONE on preceding Net CONE values and Forward Capacity Auction clearing prices). For FCAs 7-8, the Commission approved a $15.00/kW-month Net CONE escalated annually.

CONE value gained new relevancy in FCA 9 because it was the first year a sloped, rather than vertical demand curve priced capacity in the Forward Capacity Auction, with the sloped demand curve positioned so that it intersected the Net Installed Capacity Requirement quantity at a price of 1.19 x Net CONE. [6] The Commission approved a Net CONE value for FCA 9 based on a Combined-Cycle reference technology, which then escalated each subsequent auction according to a Tariff-defined formula through FCA 11.[7]

ISO-NE is required to file a new proposed Net CONE value based on updated information no less than once every three years, and does so here for effect beginning in FCA 12.[8] ISO-NE engaged a consultant, Concentric Energy Advisors ("Concentric"), to develop estimated CONE and Net CONE values, and, to assist the Internal Market Monitor with its proposed Offer Review Trigger Prices.[9] Concentric partnered with Mott MacDonald, an engineering firm, which developed cost estimates for the resources represented by the Net CONE and Offer Review Trigger Price values estimated by ISO-NE.[10]

Concentric developed its Net CONE values by first relying on Mott MacDonald's projected costs to develop gross CONE values, second by applying various cost structures, and

[6] *ISO New England Inc. and New England Power Pool Participants Committee*, 147 FERC ¶ 61,173, at PP 32-33 (2014).
[7] *Id.*; ISO-NE Tariff, Market Rule 1, Section III.13.2.4.
[8] ISO-NE Tariff, Market Rule 1, Sections III.13.2.4 and III.A.21.1.2(e).
[9] Transmittal Letter at p. 1.
[10] *Id.*

third by netting out projected Pay for Performance net payments and energy and ancillary service revenues (together, "EAS Revenues"), represented here:[11]

Reference Technology	Gross CONE	EAS Revenues	Net CONE
Combustion Turbine	$11.35	$3.31	$8.04
Combined-Cycle	$15.62	$5.62	$10.00
Advanced Aeroderivative	$21.03	$3.67	$17.36
Aeroderivative	$25.98	$3.63	$22.35

Concentric developed EAS Revenue offset values using a mix of forward-looking and backward-looking projections. For its projected energy revenues, Concentric developed a 20-year forecast of locational marginal prices by load zone using the AURORAxmp dispatch model ("AURORA"), a "chronological-dispatch simulation model widely used in the industry for price forecasting and market analysis."[12] For its projected Locational Forward Reserve Market and Real-Time Reserve Market revenues, Concentric relied on historical information. Concentric created a $/MWh value for locational forward reserves and real-time reserves, for both ten-minute spinning and thirty-minute operating reserves, based on historical reserves clearing prices, Forward Capacity Market revenues, average on-peak and off-peak hours per month, and unit forced outage rates, during the FCA 2 – FCA 6 Capacity Commitment Periods (June 1, 2011

[11] ISO-NE Filing, Attachment 1, ISO-NE CONE and ORTP Analysis, at p. 7 ("Concentric Report").
[12] *Id.* at p. 49.

– May 31, 2016).[13] For each reference technology, Concentric projects the following annual levelized energy and ancillary reserves revenues (all values in $/kW-month):[14]

Reference Technology	Energy Revenues	Ancillary Services Revenues	Pay for Performance Net Revenues	Total Energy and Ancillary Services Offset
Combustion Turbine	0.25	2.58	0.48	3.31
Combined Cycle	5.31	0.05	0.26	5.62
Aeroderivative	0.22	2.93	0.48	3.63
Advanced Aeroderivative	0.26	2.93	0.48	3.67

As shown, Concentric projects that the Combustion Turbine will derive its economic value primarily as a peaking and reserve resource, with it earning over 90 % of its EAS revenues from forward and real-time reserves (shown as ancillary serve revenues, above) and only approximately 8% from energy revenues. Conversely, Concentric projects that a Combined-Cycle's economic value comes primarily from its delivery of energy, with nearly 95% of EAS revenues coming from energy and less than 1% from reserves.

ISO-NE has adopted Concentric's proposed Net CONE value for the Combustion Turbine reference technology without modification.

[13] *Id.* at p. 61.
[14] *Id.* at p. 62.

III. The Combustion Turbine is an Unjust and Unreasonable Choice for the Net CONE Reference Technology

The reference technology must satisfy certain baseline criteria and create just and reasonable market design parameters in order to be an appropriate choice for the Net CONE reference technology. As explained by the Commission, the reference technology must: (1) create a Starting Price "high enough to accommodate projects that use a variety of combustion turbine technologies" but "not so high as to add unnecessary costs"; (2) create demand curve parameters that meet New England's reliability objective; (3) "be likely to be developed in New England;" and (4) ISO-NE must be able to develop cost and revenue estimates for the reference technology "with confidence."[15] The Commission further explained that "[m]ore important, the significance of the choice of reference unit is that its Net CONE value affects the position of the demand curve,"[16] adding that the position of the demand curve must "accommodate projects that use a variety of combustion turbine technologies."[17] The Commission also agreed with ISO-NE's position that "there should be consistency in the use of reference technology to provide certainty to the market."[18]

ISO-NE asserts that the Net CONE value should be based on the technology that is "the most economically efficient and that is commercially available to new capacity suppliers."[19] But

[15] *ISO New England Inc. and New England Power Pool Participants Committee*, 147 FERC ¶ 61,173, at PP 32-33 (2014).
[16] *Id* at P 33.
[17] *Id*. at P 32.
[18] *Id*. at P 34.
[19] ISO-NE Filing, Transmittal Letter at p. 9.

this misstates the Commission's standard. First, the most important consideration is how the Net CONE value effects the demand curve parameters, and in turn how it effects the ability of the Forward Capacity Market to meet its purposes. Second, the Commission has not established a litmus test of which resource is "most economically efficient," but instead requires that technology types that are not "likely to developed in New England," or for which a cost estimate cannot be made with reasonable certainty, cannot be considered for the reference technology.

ISO-NE has presented no evidence that the Forward Capacity Auction is in need of the significant change it proposes. The capacity market has cleared several new resources in each of the last four Forward Capacity Auctions, including several large generators employing combined-cycle technologies. The demand curve parameters and relatively stability in the last four auctions have significantly contributed to these competitive and efficient the Forward Capacity Auction outcomes. ISO-NE should maintain this consistency as the Forward Capacity Market enters a critical phase of providing the incentives for new resources to replace retiring units.

A. The Net CONE Value Proposed by ISO-NE is Unjust and Unreasonable

ISO-NE has not demonstrated that its proposal is just and reasonable as measured against the factors the Commission has deemed relevant to the evaluation of the Net CONE reference technology. The Net CONE value proposed by ISO-NE will unnecessarily position the demand curve in a way that creates a significant risk to resource adequacy, fails to accommodate other gas turbine technologies that have cleared in recent Forward Capacity Auctions and are

likely to seek to enter the market in future auctions, and is based on a project type that neither historically nor in Concentric's modelling results is shown to be likely to be developed in New England. The Net CONE and Starting Price values proposed by ISO-NE are entirely inconsistent with those used in the last five Forward Capacity Auctions, creating the risk of investor uncertainty and incentives to include inefficient risk premiums in capacity market offers. Together, these factors demonstrate that ISO-NE's proposal is unjust and unreasonable.

1. ISO-NE Proposes a Starting Price That Does Not Accommodate Gas Turbine Technology Types and Creates Resource Adequacy Risk

A reasonable Starting Price for the Forward Capacity Auction must be "higher than the actual cost of an efficient resource to enter the market, so that the auction can attract new entry when it is needed."[20] "Too low a starting price runs the risk of short supply and a failed auction."[21] The Starting Price runs little risk of being set too high, as it is "only a starting point for the auction" and "will not change the actual cost of new entry."[22] ISO-NE endorsed these concepts just three years ago in 2014, in the testimony it filed in support of its proposal to base Net CONE on a Combined-Cycle reference technology for effect beginning in FCA 9. According to ISO-NE:

[20] *ISO New England Inc. and New England Power Pool Participants Committee*, 131 FERC 61,065, at P 140 (2010).
[21] ISO New England Inc. and New England Power Pool Filing Re: Various Revisions to FCM Rules Related to FCM Redesign, Transmittal Letter at p. 22, Docket No. ER10-787-000 (filed Feb. 22, 2010).
[22] *Devon Power LLC*, 115 FERC ¶ 61,340 (2006) at P 132.

> [T]he dangers of understating Net CONE are far greater than the dangers of overstating it, making the choice of the Frame unit (with an estimated Net CONE of $8.47/kW-month) much riskier than the choice of a combined cycle unit (with an estimated Net CONE of $11.08/kW-month). If we choose the combined cycle unit as the reference technology and the less expensive Frame unit turns out to be a viable technology (and so Net CONE is set too high), the region will overbuy capacity by some amount, increasing costs. But, for reasons I discuss below, these increased costs would be modest in the context of the entire capacity market. On the other hand, if the lower priced Frame unit is selected as the reference technology and the Frame unit turns out *not* to be a viable technology in New England (and so Net CONE is set too low), the region will procure insufficient capacity, which has a large reliability impact, and the region will likely end up with a reliability problem that will be very challenging to solve in a timely manner.[23]

The Starting Price proposed by ISO-NE in the present docket, both system-wide and for the import-constrained Capacity Zones, fails to properly balance these considerations and unnecessarily increases resource adequacy and market efficiency risk, with little to no benefit.

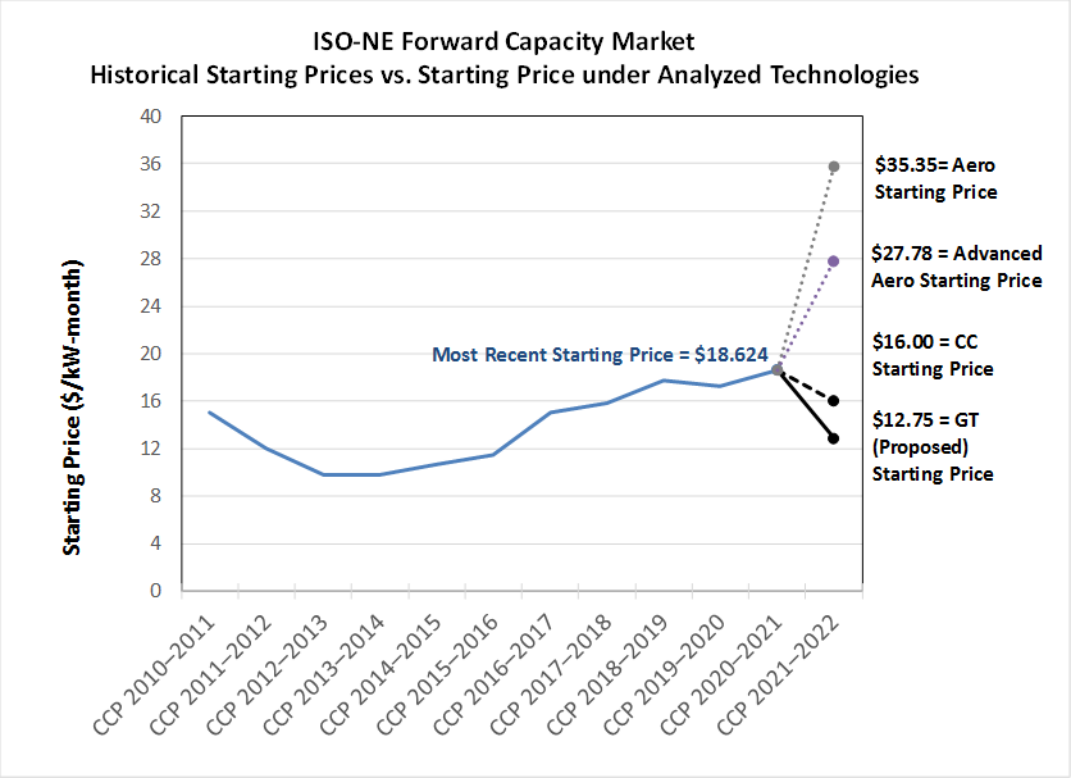
Beginning in FCA 11, the zonal curves will price capacity based on a premium (for import-constrained zones) or a discount (for export-constrained zones) off of the rest-of-pool clearing price.[24] The clearing price for any import-constrained zone, however, cannot exceed the Starting Price. The price cap for capacity zones thus is the same as for the system-wide curve.

[23] Prepared Direct Testimony of Robert G. Ethier on Behalf of ISO New England Inc., *ISO New England Inc. and New England Power Pool*, Docket No. ER14-1639-000, at pp. 11:13 -12:2 (filed Apr. 1, 2014) ("Ethier Testimony"); *see Id.* at 13:2 – 14:13 (providing further detail on same, including explaining that: "The Newell/Ungate Testiony shows that if Net CONE were underestimated by 33%, the market would clear about 2% less capacity yon average, but shortages would be expected 50% more often." *Id*. at 13:6-9).

[24] *ISO New England Inc. and New England Power Pool Participants Committee*, 155 FERC ¶ 61,319, at P 10 (2016).

The $8.04/kW-month Net CONE value proposed by ISO-NE would result in a price cap of approximately $12.86/kW-month, both system-wide and in import-constrained Capacity Zones.[25]

The Starting Price proposed by ISO-NE would significantly and suddenly drop the Starting Price well below those that have applied in recent Forward Capacity Auctions, and mark a sudden shift in the relative consistency in Starting Price changes over those auctions, as shown here:



[25] ISO-NE Tariff, Market Rule 1, Section III.13.2.4 (setting the Starting Price at the greater of gross CONE or 1.6 x Net CONE).

ISO-NE proposes to reduce the Starting Price by $5.87/kW-month (31%), an unprecedented reduction from one auction to the next. ISO-NE proposes this change during a time of significant competition in the Forward Capacity Market, where investors have responded to Forward Capacity Market (and other market) design changes by competitively clearing new resources to replace less efficient units in four consecutive auctions. The Forward Capacity Market design has been marked, in part, by relative stability in the demand curve parameters, including a Starting Price that has remained at or above $15.00/kW-month throughout those four auctions. The ISO-NE proposal will upset this consistency at a time when the ability of the Forward Capacity Market to attract investment is critical. ISO-NE has repeatedly emphasized that now is a critical time in a changing resource fleet, reporting that several thousand MWs of non-gas units have retired over the past several years, with thousands more "at risk" of retirement in the near future.[26] ISO-NE has further emphasized that it is the Forward Capacity Market that must drive investment in replacement capacity.[27] Market certainty and consistency promote efficient market outcomes, whereas a significant and sudden reduction to the Starting Price may cause market participants to mitigate the risk of other significant changes, or the risk that the market will not price the actual cost of new entry, in their capacity market offers.

[26] *See, e.g.*, ISO-NE State of Grid:2017, at pp. 13-14 (January 30, 2017) (explaining that 4,000 MW of non-gas capacity retired over the last three years, with another 6,000 MWs of remaining coal and oil plants "at risk for retirement."), *available at*: https://www.iso-ne.com/static-assets/documents/2017/01/20170130_stateofgrid2017_remarks_pr.pdf.

[27] *Id.*

In FCA 9 – FCA 11, Net CONE was based on a Combined-Cycle reference technology, providing for a relatively consistent Starting Price and for relatively smooth changes from auction to auction. ISO-NE attempts to justify disrupting these consistent demand curve parameters, in part, by asserting that changes to the wholesale markets "are likely to favor the development of more flexible resources."[28] If flexibility is a value proposition that ISO-NE requires, however, market-based means specifically designed to procure that flexibility are the more appropriate measures, not pricing capacity based on a flexible resource.[29] The Commission has initiated administrative dockets, technical conferences and issued NOPRs exploring the development or modification of markets to price fast-start resources, regulation, frequency response, and other ancillary services. For example, the Commission issued Order No. 755 requiring faster response services to be compensated with higher prices, and in other regions such as the Pacific Northwest are discussing the potential design of markets for frequency response. Further, ISO-NE's wholesale markets currently signal the need for fast-start, flexible resources, such as those that provide 10-minute and 30-minute reserves and regulation service. These existing and future market designs should continue to be used to procure whatever services are necessary to reliably operate the system. It is neither necessary nor appropriate to instead price the Forward Capacity Market based on a need for those services.

[28] ISO-NE Filing, Transmittal Letter, at p. 11.
[29] New England Power Generators Association Motion to Intervene and Protest, Attachment A, Prepared Testimony of Tanya Bodell, at p. 29 (filed February 3, 2017) ("Bodell Testimony").

ISO-NE's proposal also increases resource adequacy risk, especially in import-constrained Capacity Zones. ISO-NE's Stating Price is well below the actual cost of new entry cleared in recent Forward Capacity Auctions, including in the import-constrained Capacity Zones Northeastern Massachusetts/Boston and Southeastern Massachusetts/Rhode Island. In FCA 7 – FCA 9, the import-constrained Capacity Zones cleared new resources at prices much higher than $12.84/kW-month, ranging from $14.99/kW-month in FCA 7 to $17.73/kW-month in FCA 9.[30] FCA 10 cleared system-wide at $7.03/kW-month, indicative of a competitive market and, for a single new entrant, a project that may have enjoyed cost advantages or other incentives to offer at that price.[31] The $7.03/kW-month clearing price also confirms that the FCA 10 Starting Price of $17.84/kW-month was *not* set "too high." What these auction results show is that the Starting Price allowed new entry to compete, particularly in the import-constrained Capacity Zones that signaled a locational need for new investment. The market has responded with new resources competing with existing resources to assume Capacity Supply Obligations when and where needed.

The ISO-NE proposal would create the significant risk that import-constrained Capacity Zones will fail to attract new investment and fail to price capacity in the zone based on actual new entry costs. This risk is real and immediate, given the recent actual new entry costs for units

[30] *See ISO-NE Key Grid and Market Stats, Results of the Annual Forward Capacity Auctions*, available at: https://www.iso-ne.com/about/key-stats/markets#fcaresults.

[31] ISO-NE's External Market Monitor found that the FCA 10 clearing price "may indicate that the new capacity had cost advantages over a typical green-field project, or that the new developers had incurred substantial costs and were largely committed to entering prior to the auction." ISO-NE External Market Monitor Comments on FCA 10 Results Filing, Docket No. 16-1041-000 (filed June 13, 2016).

clearing in import-constrained Capacity Zones, and, as noted above, the potential need for ISO-NE to replace retiring resources with new resources in large quantities of retirements in the coming years.[32] The AURORA model results are consistent with the need for new resources, for example by building out five Combined-Cycle units in the NEMA/Boston import-constrained Capacity Zone over the forecast horizon.[33] To limit competition by setting a Starting Price below competitive entry prices would prohibit certain gas turbine technology types from participating in the Forward Capacity Market, thus violating the Commission's directive that the reference technology should lead to a market design that "accommodate[s] projects that use a variety of combustion turbine technologies."[34]

Several different technology types have cleared in recent Forward Capacity Auctions, demonstrating a healthy competition among technologies to meet New England's locational and system-wide resource adequacy needs. What has been critical to this competition has been that the Starting Price did not cap offers below the actual costs of new entry. The gas turbine technology types that have cleared in recent auctions include all for which Concentric estimated

[32] *See, e.g.*, ISO-NE State of Grid:2017, at pp. 13-14 (January 30, 2017) (explaining that 4,000 MW of non-gas capacity retired over the last three years, with another 6,000 MWs of remaining coal and oil plants "at risk for retirement."), *available at*: https://www.iso-ne.com/static-assets/documents/2017/01/20170130_stateofgrid2017_remarks_pr.pdf.
[33] *See* Bodell Testimony at p. 22.
[34] *ISO New England Inc. and New England Power Pool Participants Committee*, 147 FERC ¶ 61,173, at P 33 (2014).

Net CONE values, including aeroderivatives, simple-cycle combustion turbines, and combined-cycle units:[35]

Auction	Project	Technology	Turbine Type	Capacity (MW)
FCA 7	Salem Harbor	Combined-Cycle	GE 7F 5-Series	674
FCA 9	West Medway	CT Aeroderivative	GE LMS100PA+	200
FCA 9	Towantic Energy Center	Combined-Cycle	7HA.01	785
FCA 9	Wallingford Energy	CT Aeroderivative	LM6000	90
FCA 10	Bridgeport Harbor	Combined-Cycle	TBD	485
FCA 10	Canal 3	Combustion Turbine	7HA.02	333
FCA 10	Clear River Energy Center	Combined-Cycle	TBD	485

What is apparent is that a diverse set of resources can economically meet the performance demands under the two-settlement Forward Capacity Market design. There is no single turbine type, configuration or nameplate capacity that has emerged as the sole solution. Indeed, the two-settlement design is intended to create competition among diverse resource types to meet the resource adequacy and reliability needs of an evolving resource mix in New England.[36] Recent Forward Capacity Auctions have been extremely competitive and signaled the need for investment in import-constrained Capacity Zones where and when needed.[37] The Forward Capacity Market will continue to do so as long as the demand curve parameters allow for

[35] Concentric Report at p. 18, Table 8.

[36] *See ISO New England Inc., and New England Power Pool, Filings of Market Rule Changes to Implement Pay for Performance in the Forward Capacity Market*, Transmittal Letter at p. 6. Docket No. ER14-1050 (filed January 17, 2014) (explaining that "Pay For Performance will enable individual suppliers to select the solutions that work best for the technologies and features of their resources. This market-based approach rewards suppliers that pursue the most cost-effective means to improve performance and reliability.").

[37] Bodell Testimony at p. 26 (explaining that import-constrained capacity zone pricing has encouraged new entry where it is needed most at the price required, and that merchant plants are being built with attractive characteristics such as dual-fuel capability that provides added optionality for meeting the region's energy requirements).

competition. Over 5,000 MW of new resources are qualified to participate in FCA 11, with over 13,000 MW in the interconnection queue.[38] The Forward Capacity Market design is working as intended, allowing for substantial competition between new and existing resources driving the lowest prices to bear to meet New England's resource adequacy needs in each auction.

Over the past several years, ISO-NE, NEPOOL stakeholders, and the Commission have spent considerable effort in developing, considering, and approving several market reforms intended to improve competition, increase efficiency, and protect against undue market power in the Forward Capacity Market. Pay for Performance, priced retirements, the timing of retirement decisions, and sloped demand curves are some of the many significant changes to the Forward Capacity Market intended to improve upon competition and efficient outcomes. The Starting Price proposed by ISO-NE would compromise the ability of these market reforms to have their intended effect by limiting competition in the Forward Capacity Market.

2. ISO-NE's Proposal Fails to Mitigate Against the Risk of Underestimating Actual New Entry Costs

The only thing certain about the Net CONE value is that it will not precisely equal the actual cost of new entry. Net CONE will either overestimate or underestimate actual new entry costs. The potential consequence of underestimating Net CONE, however, is far greater than that of overestimating it. Underestimating Net CONE (as may be the case with the Combustion

[38] *See, e.g.*, ISO-NE Interconnection Request Queue as of Feb. 2, 2017, available at: https://www.iso-ne.com/system-planning/transmission-planning/interconnection-request-queue.

Turbine) may cause the market to procure insufficient resources to meet ISO-NE's system-wide or import-constrained Capacity Zone resource adequacy needs, whereas overestimating Net CONE (as may be the case with another technology type) may cause the market to buy more capacity but at a lower price and with the marginal benefit of greater system reliability. Given that the Net CONE value proposed by ISO-NE is less than half recent actual new entry costs in an import-constrained Capacity Zone, and a 33% reduction from the FCA 11 Net CONE value, it creates a much greater risk of underestimating actual new entry costs than of overestimating them. It would be unjust and unreasonable to incur this risk when the potential consequence of underestimating Net CONE is much greater than that of overestimating it.

This is particularly true given the significant and efficient turnover in resources that has occurred and will continue to occur so long as the Forward Capacity Market is designed to allow for that competition. Over the past three years, 4,000 MW of retiring resources have been replaced through the Forward Capacity Market with another 6,000 MW identified by ISO-NE as being "at risk" or retirement in the near future.[39] Protecting against the risk that Net CONE is set too low is therefore particularly critical at this time. As discussed, the existing Forward Capacity Market design and relative consistency in Net CONE values over the past several Forward Capacity Auctions has driven a highly competitive marketplace. That should not be taken for

[39] *See*, ISO-NE State of Grid:2017, note 26, *supra*.

granted nor should it be undermined by taking on a greater risk that the Net CONE value underestimates the actual cost of new entry.

Though ISO-NE asserts that recent changes to the demand curves (creating the "Marginal Reliability Impact" or "MRI Curves") "address" the risk of underestimating Net CONE, the MRI Curves are not designed to eliminate this risk. Together with the adoption of a system-wide sloped demand curve in 2014, ISO-NE recommend positioning the system-wide demand curve to intersect with the Net Installed Capacity Requirement quantity at 1.19 x Net CONE in order to "safeguard against underestimating net CONE."[40] This market design element was removed from the market design beginning in FCA 10, concurrent with the adoption of the MRI Curves. But whether under the prior straight-line sloped demand curve or the MRI Curves, underestimating the actual cost of new entry will cause the market to fail to efficiently meet New England's resource adequacy needs. ISO-NE's proposal would necessarily increase these risks by reducing Net CONE by 33% in a single auction when actual new entry costs have far exceeded the Net CONE value proposed by ISO-NE.

When ISO-NE sought approval of the MRI Curves, it explained at great length that the harm of setting Net CONE lower than the actual cost of new entry is far greater than the harm of setting it higher.[41] According to ISO-NE, when Net CONE is set higher than the eventual cost of

[40] *ISO New England Inc. and New England Power Pool Participants Committee*, 147 FERC ¶ 61,173, at P 140 (2014), *citing* Ethier Testimony at pp. 6-7.
[41] Ethier Testimony at p. 11.

new entry, the market may buy more capacity than is necessary to meet its resource adequacy needs. The increase in cost, however, is mitigated by the lower price for each kW-month of capacity procured, lower energy prices due to surplus capacity, and improved reliability.[42] Setting Net CONE below the actual cost of new entry has the far greater potential consequence of significantly compromising system reliability by under-procuring capacity relative to system and zonal capacity needs.[43] ISO-NE illustrated the relative harms of under or over-procuring capacity, explaining that (under the straight-line demand curve) though being 500 MW short of the Net Installed Capacity Requirement may decrease total capacity costs by only 3%, it may increase the frequency of load shedding events by 46%.[44]

When the Forward Capacity Market transitioned from a vertical system-wide curve to a sloped, straight-line demand curve, the design required that the demand curve price capacity at 1.19 x Net CONE at the Installed Capacity Requirement quantity.[45] The 1.19 x Net CONE rule allowed a Forward Capacity Market in equilibrium to procure the Net Installed Capacity

[42] Ethier Testimony at p. 12.
[43] *Id.* at p. 13.
[44] *Id.* at p. 14. As Dr. Ethier explained:

> "The fundamental reason for the asymmetry in the risks of over and underestimating Net CONE is, as noted above, that reliability is a highly non-linear function of capacity, while costs rise linearly with the quantity of capacity. The non-linear nature of reliability can be seen by looking at the impact of capacity deficits or surpluses on reliability: being 500 MW short may increase the frequency of load shedding events by 46%, while being 500 MW long may only decrease the probability by 29%. However, as noted above, costs for a market in equilibrium rise (or fall) at a constant rate: true Net CONE x the quantity of additional (or reduced) capacity. Because of this, reducing the amount purchased may have a large reliability effect (e.g. a doubling of load shedding events) but decrease costs by less than three percent (900 MW out of 34,000 MW)."

[45] *ISO New England Inc. and New England Power Pool Participants Committee*, 155 FERC ¶ 61,319, at P 21 (2016) ("MRI Curves Order").

Requirement over time even if the actual cost of new entry was up to 20% higher than the Net CONE value. When the Commission approved the MRI Curves, it considered ISO-NE's associated proposal to change the position of the demand curve to intersect with the Net Installed Capacity Requirement at 1.0 x Net CONE.[46] Though the Commission found that the removal of the 0.2 x Net CONE buffer was reasonable because, in situations where Net CONE is underestimated, the amount of underprocurement will be smaller under the MRI Curves than under the linear demand curve, the risk of underprocurement remains.[47] "Under either curve, ISO-NE will procure less capacity if net CONE is underestimated than if net CONE were accurately estimated."[48]

ISO-NE asserts that the risk of systemic under-procurement has "been addressed" by the MRI Curve.[49] Concentric takes it one step further, opining that the MRI Curves and elimination of administrative pricing rules have "eliminated" the concern that underestimating Net CONE could result in system under-procurement."[50] ISO-NE asserts that because the MRI Curve is steeper than the previous straight-line curve at quantities below the Net Installed Capacity Requirement, the incremental price paid for capacity at those quantities will send a stronger price signal at smaller capacity deficits than under the straight-line curve.[51] This market design

[46] MRI Curves Order at P 38.
[47] *Id.*
[48] *Id.*
[49] ISO-NE Filing, Transmittal Letter at p. 11. ISO-NE also mentions that the concurrent elimination of administrative pricing rules as material, but offers no further explanation with respect to these former pricing rules.
[50] Concentric Report at p. 66.
[51] ISO-NE Filing, Transmittal Letter at p. 11.

feature, however, is intended to send a stronger price signal per increment of capacity when capacity is short, not eliminate the risk that the market may not procure sufficient resources to meet system-wide and zonal capacity needs.[52] Indeed, ISO-NE reports that if the Net CONE value underestimates the true cost of new entry, then the MRI Curve will not meet the 1-in-10 loss of load-expectancy ("LOLE") criterion over the long-term.[53] According to its modeling in support of the MRI Curves, in cases where the marginal clearing price (*i.e,* the actual cost of new entry) is 11% above the Net CONE value, the system meets a 1 in 9.1 years LOLE reliability objective.[54] The LOLE for a Net CONE that underestimates actual new entry costs by 33%, ISO-NE's proposed Net CONE reduction, would presumably be much larger, and in import-constrained Capacity Zones much larger still.

The risk of underprocurement continues to exist under the MRI Curve, a risk that ISO-NE and the Commission have explained should be accounted for and mitigated in the Forward Capacity Market design and demand curve parameters. It would be unjust and unreasonable to adopt demand curve parameters that create additional risk that the Net CONE value underestimates the actual cost of new entry by applying a Net CONE value 33% below the prior auction Net CONE value and well below recent actual new entry costs.

[52] ISO-NE and NEPOOL Filing of Demand Curve Improvements, Prepared Testimony of Christopher Geissler and Matthew White, Docket No. ER14-1434-000 (filed April 15, 2016) ("Geissler/White Testimony")
[53] Geissler/White Testimony at p. 137.
[54] Geisler/White Testimony, Attachment 1, p. 1 (showing that a marginal offer at $12.00/kW-month results in a system LOLE of 0.110).

3. ISO-NE Has Not Shown That a Combustion Turbine at a Greenfield Site is Likely to be Developed in New England

ISO-NE proposes a reference technology that does not satisfy the Commission's criteria that "project developers will likely build a resource using the reference technology."[55] ISO-NE has not shown, whether based on new resources that have cleared the Forward Capacity Auction in recent years or on Concentric's energy modelling results, that Combustion Turbines are likely to be developed. Concentric estimates that the Combustion Turbine will derive virtually all of its non-capacity revenues from forward and real-time reserves, but its reserve price projections are unreasonable because they do not account for other market conditions that effect reserve pricing. Several inconsistencies between Concentric's energy revenue projections and the remainder of its Net CONE analysis also undercut the asserted economics of the Combustion Turbine. ISO-NE therefore has not shown that the Combustion Turbine is a reasonable choice for the reference technology.

a. Recently Cleared Capacity Resources and Energy Market Modelling Do Not Indicate That the Combustions Turbine is Likely to be Developed

ISO-NE has failed to show that the Combustion Turbine at a greenfield site is likely to be developed in New England, whether based on historical information or in its AURORA market modelling. To date, no Combustion Turbine developed at a greenfield site has cleared the Forward Capacity Auction. Though three new Combustion Turbines developed at

[55] *ISO New England Inc. and New England Power Pool Participants Committee*, 147 FERC ¶ 61,173, at P 33 (2014).

brownfield sites have cleared the market, with two of the three using aeroderivative turbines, four new Combined-Cycles are being developed in New England. The AURORA model, which Concentric used to develop energy revenue offsets to Gross CONE, builds out 13 new Combined-Cycle units, 4 new wind units and *zero* new CombustionTturbine units over the forecast period through 2040. The AURORA model therefore provides no support for choosing a greenfield Combustion Turbine project as the reference technology, and indeed indicates that the Combined-Cycle is likely to be developed.

As explained in Ms. Bodell's affidavit, there are no market indicators supporting the conclusion that a greenfield Combustion Turbine project is economically competitive in New England.[56] Indeed, both the historical evidence and modelling results ISO-NE relies on fail to support its conclusion, but instead show only that Combined-Cycle resources are likely to be developed. Concentric cites to the following three Combustion Turbine projects that have cleared the market as historical indicators:[57]

Project	Auction Cleared	Technology	Site
West Medway II	FCA 9	Aeroderivative	Brownfield
Wallingford Energy	FCA 9	Aeroderivative	Brownfield (Uprate)
Canal 3	FCA 10	Frame 7HA	Brownfield

[56] Bodell Testimony at pp. 10-20.
[57] *Id.* at pp. 11-12.

The projects ISO-NE cites to, however, do not support a conclusion that its proposed reference technology is likely to be built. All three projects are brownfield developments and two will use aeroderivative gas turbines. The Wallingford Energy uprate project adds two simple cycle aeroderivative combustion turbine generating units to five existing simple cycle turbines.[58] The West Medway II project interconnects two aeroderivative turbines to an adjacent substation.[59] Notably, Concentric developed Net CONE values for two types of aeroderivative configurations equal to $22.35/kW-month for the 2x0 configuration and $17.36/kW-month for the 1x0 configuration.[60] None of the new Combustion Turbine projects being developed in New England meet the specifications of ISO-NE's proposed reference technology, a greenfield simple-cycle configuration using the GE Frame 7HA. ISO-NE did not develop a Net CONE value for a brownfield Combustion Turbine unit – the only Combustion Turbine project type that has cleared the Forward Capacity Auction in recent years. Concentric explained that brownfield sites "are highly variable in terms of characteristics and the extent of the re-use of existing facilities" and that "to reasonably estimate the development costs for brownfield sites was challenging and uncertain,"[61] perhaps conceding that if it had developed a brownfield Combustion Turbine Net CONE calculation it would not have met the Commission's requirement that it could estimate Net CONE with reasonable certainty.

[58] *Id.*
[59] *Id.*
[60] Concentric Report at p. 7.
[61] *Id.* at p. 17.

NYISO recently considered, but declined to base its Net CONE value on the reference technology ISO-NE proposes, finding that the GE Frame 7HA in a simple-cycle configuration "is not economically viable" and that the Frame 7HA "has no actual commercial operating experience in a simple-cycle configuration."[62] ISO-NE attempts to distinguish NYISO's findings, asserting that its choice of the Frame 7HA is more consistent with the capacity market's "forward looking nature." However, as Ms. Bodell explains, if the reference technology is to be determined based on projections about technologies that may become economic three years forward, ISO-NE would necessarily need to consider other technology types and develop Net CONE values for comparison that can meet the peaking needs ISO-NE projects its proposed reference technology will meet.[63] Concentric projects that the Frame 7HA Combustion Turbine will receive virtually all of its non-capacity revenues from peaking energy and reserves, services one or more of several other technologies could potentially meet.[64] For example, Concentric projects Offer Review Trigger Prices of $1.01/kW-month for industrial demand resources and $7.56/kW-month for residential demand resources, suggesting that these resources are as, or more competitive than ISO-NE's reference technology in meeting ISO-NE's peak energy and reserves needs.[65]

[62] Bodell Testimony at 13, *citing* Letter transmitting NYISO ICAP Demand Curves, November 18, 2016, New York Independent System Operator, Inc., Docket No. ER17-___-000; Proposed ICAP Demand Curves for the 2017/2018 Capability Year and Parameters for Annual Updates for Capability Years 2018/2019, 2019/2020 and 2020/2021, referencing staff and independent consultant reports.
[63] Bodell Testimony at 14-15.
[64] *Id.*
[65] Concentric Report at p. 7, Table 3.

As further explained by Ms. Bodell, the AURORA results likewise fail to demonstrate that Combustion Turbines are likely to developed in New England, and in fact supports the conclusion that Combustion Turbines will not be economic. The AURORA model dispatches generation economically, and projects capacity additions and retirements in order to balance the model.[66] AURORA balances supply and demand in the model by performing a capacity build-out based on the relative economics of several modelled technologies. The AURORA model included actual announced retirements in New England and predicted the retirement of old Combustion Turbines. Concentric further reports that it added new resources that have cleared in recent FCAs and scheduled to come on-line from 2017-2020. Yet, the AURORA model run Concentric used to develop its project energy revenues does not build any new Combustion Turbines, but instead built only Combined-Cycle and wind turbine resources for new entry, as shown here:[67]

[66] Bodell Testimony at pp. 15-16.
[67] *Id.* at p. 16, Figure 1.

ISO-NE PUBLIC					
Zone	Fuel	Type	Year	Capacity	Heat rate
isoNE-Boston	Natural Gas	CCCT	2021	386	6752
isoNE-Boston	Natural Gas	CCCT	2021	386	6752
isoNE_SEMA	Natural Gas	CCCT	2023	386	6752
isoNE-Boston	Natural Gas	CCCT	2025	386	6752
isoNE_VT	Natural Gas	CCCT	2026	386	6752
isoNE_NH	Wind	Wind	2026	50	0
isoNE_SEMA	Wind	Wind	2027	326	0
isoNE-Maine	Wind	Wind	2029	50	0
isoNE_VT	Natural Gas	CCCT	2030	386	6752
isoNE_NH	Natural Gas	CCCT	2031	386	6752
isoNE-Boston	Natural Gas	CCCT	2033	386	6752
isoNE_NH	Natural Gas	CCCT	2033	386	6752
isoNE-CT	Natural Gas	CCCT	2036	386	6752
isoNE-Boston	Natural Gas	CCCT	2037	386	6752
isoNE_NH	Wind	Wind	2037	50	0

The Combined-Cycle dominates the AURORA capacity buildout, contrary to ISO-NE's conclusion that the Combustion Turbine is more economic. Other than economics, the only explanations for the Combined-Cycle built out is that Concentric modeled the Combustion Turbine and Combined-Cycle based on different unit specifications than it used elsewhere in its Net CONE calculations, or that it did not allow AURORA to build out Combustion Turbines. But AURORA allows for the specification of several generation technologies, which should include Combustion Turbines especially given Concentric's conclusion that Combustion Turbine resources are more economic than Combined-Cycles. If Concentric did not allow for the build-out of Combustion Turbines in AURORA by not including Combustion Turbine specifications as eligible resources, the AURORA model would not reflect a reasonable long-term equilibrium

and therefore cannot be relied on for purposes of projecting energy revenues.[68] If Concentric input different Combustion Turbine specifications in the AURORA model than those it used elsewhere in its Net CONE analysis, then the projected energy revenues are based on a different set of assumptions and the Net CONE analysis is internally inconsistent.

Neither historical information nor the AURORA modeling results support the conclusion that the Combustion Turbine is the most economic technology or likely to be developed. ISO-NE has not satisfied the Commission's requirement that it demonstrate that the Combustion Turbine reference technology is likely to be built in New England.

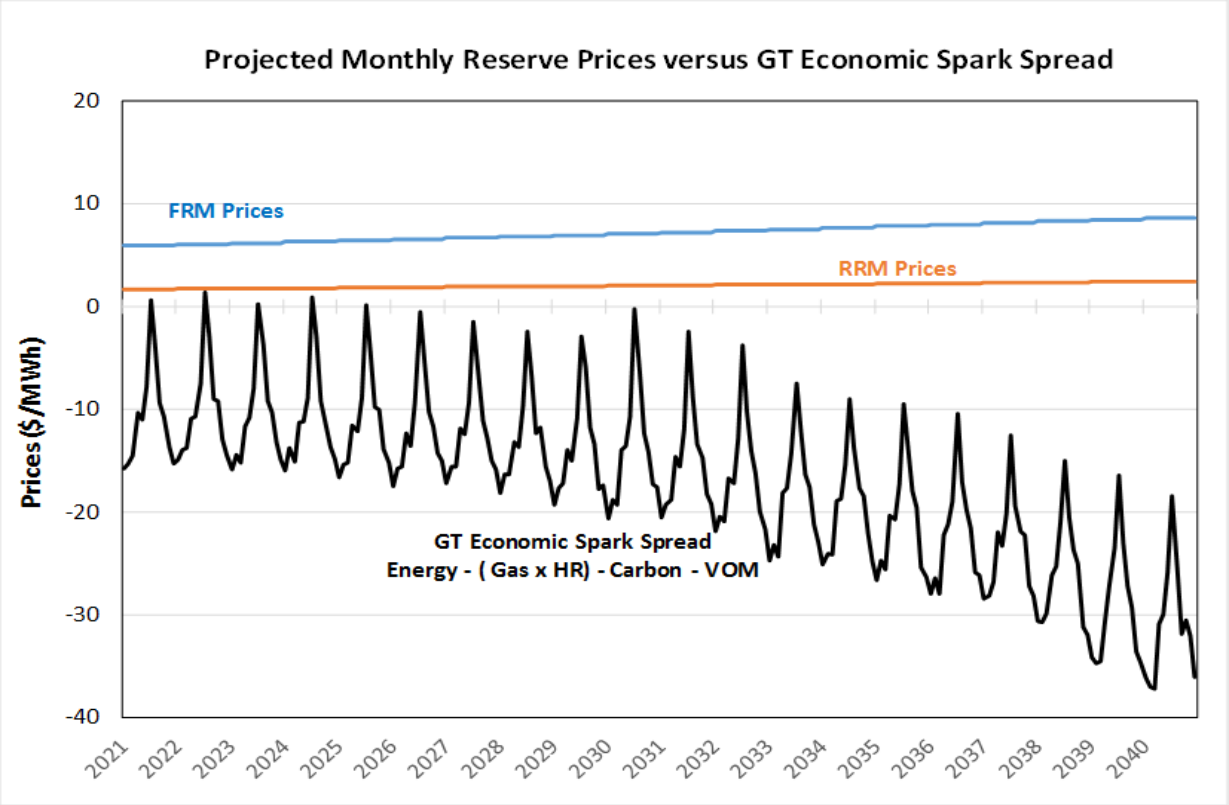
b. Concentric's Projected Reserve Revenues Are Unrealistic and Do Not Show That the Combustion Turbine is Economic

Forward and real-time operating reserves prices and revenues depend on several factors, including supply, demand, energy prices, and marginal fuel prices (for the foreseeable future, natural gas).[69] Concentric failed to account for these factors by estimating forward and real-time reserve revenues based on historical clearing prices. Concentric projects reserve prices by applying a static inflation factor to an historic average rate which is inconsistent with actual trends in futures for energy and natural gas prices and the AURORA energy modeling Concentric relies on to develop its estimated energy revenues. This analysis design bias is particularly relevant to the Combustion Turbine Net CONE value, as Concentric estimates that more than 90% of a Combustion Turbine's EAS revenue offsets will come from forward and

[68] Bodell Testimony at p 17.
[69] *Id.* at p. 35.

real-time reserves. Because the reserve price projections are unreasonable, they do not support the conclusion that the Combustion Turbine is likely to be developed.[70]

Natural gas and energy prices strongly influence reserve pricing due to the fuel and opportunity costs resources must incur to provide reserves.[71] An estimate that fails to take into account this relationship is significantly flawed. As shown here, Concentric's reserve pricing projections do not follow energy market conditions:[72]



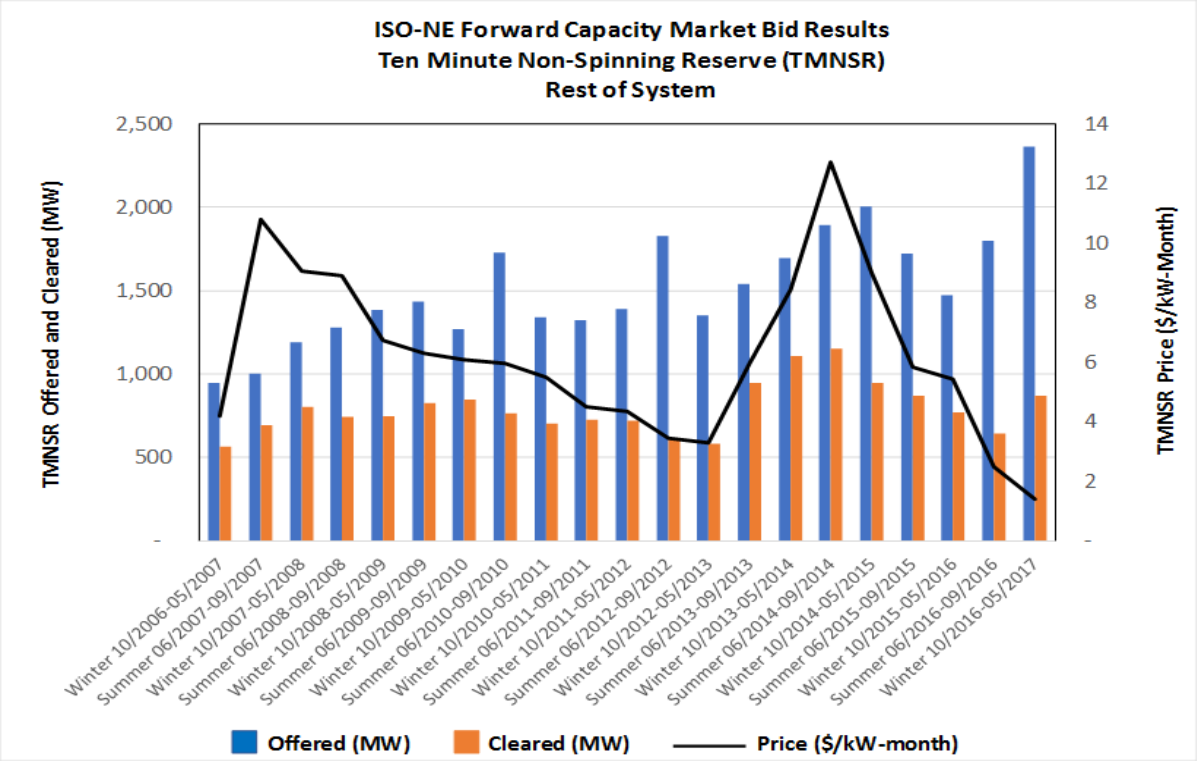
[70] *Id.* at pp. 35-41.
[71] *Id.* at pp. 35-36.
[72] *Id.* at p. 35, Figure 7.

As this figure shows, Concentric projects reserve revenues to increase over time, even though potential margins for energy sales are declining. As a result, the projected revenues for a Combustion Turbine are fairly independent of market conditions. Even though the Combustion Turbine capacity factors[73] and energy margins decline over time, its reserve revenues rise constantly pursuant to Concentric's inflation adjustment to historic average reserve prices. In contrast, profitability to a Combined-Cycle generally stays within a narrow band because the AURORA market model balances the system around the economic build-out of new Combined-Cycle units based on market fundamentals.[74] This biases the projection of revenues that would be earned by a new Combustion Turbine upwards (and Net CONE lower), compared to the Combined-Cycle which is prevented from earning additional revenues because of the build-out of new Combined-Cycle units in the AURORA model.[75] These relative outcomes are the result of a disconnect between a static, backward-looking reserve price projection and a forward-looking projection grounded in market-based energy and natural gas prices.

Concentric also failed to take into account future changes in forward and real-time operating reserve supply and demand that will likely decrease forward reserve revenues in the future. Demand for reserves is fairly limited, and supply in Thirty Minute Operating Reserves ("TMOR") and Ten-Minute Non-Spinning Operating Reserves ("TMNSR") is increasing.[76] For

[73] Bodell Testimony at pp. 18-19, Figure 3
[74] *Id.* at p. 36.
[75] *Id.* at pp. 35-40.
[76] *Id.* at p. 39.

example, supply and demand in the Forward Reserve Market for TMNSR has changed significantly since 2006, as shown here:[77]

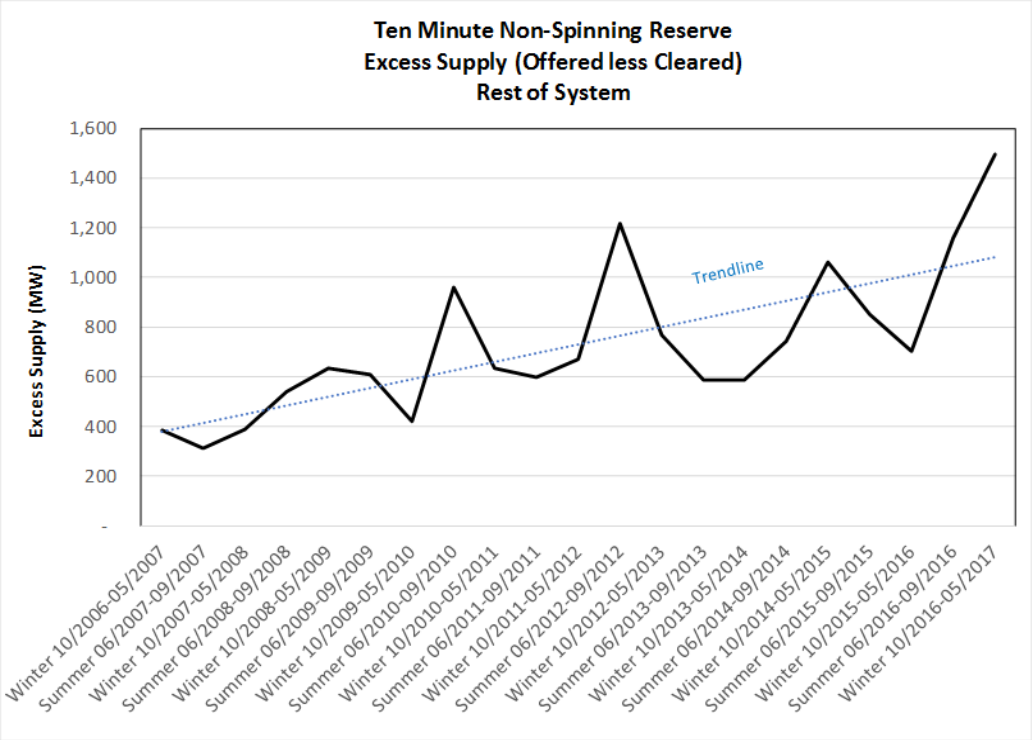


Forward Reserve Market supply has increased over time, rising by more than 100% from approximately 1,000 MW in winter 2006-2007 to 2,365 MW in winter 2015-2016.[78] Together with relatively low and consistent demand, averaging only 793 MW per Forward Reserve Market auction since 2006-2007, the growing difference between supply and demand suggests a declining price for forward reserves over the forecast period.[79] The market for TMNSR has

[77] *See id.* at p. 37, Figure 8.
[78] Bodell Testimony at pp. 37-38.
[79] *Id.*

shown to be price sensitive, indicating that as supply growth outpaces demand, prices will drop.[80]

The historical trend and types of new resources coming onto the ISO-NE system also suggest that excess supply conditions will continue to grow. Since 2006, there has been a systematic increase in the oversupply of reserves, for example with respect to TMNSR:[81]



In addition, several new resources that have cleared the Forward Capacity Auction but have yet to commence commercial operation will significantly increase the supply of reserves,

[80] *Id.*
[81] Bodell Testimony at pp. 38-39, Figure 9.

including 623 MW of capacity combined from Canal 3, Wallingford, and West Medway.[82] Two of those projects alone, totaling 533 MW, meet the entire demand for forward TMNSR for rest of system, and will increase excess supply by more than a third.[83] Other technologies encouraged by the New England states are also likely to contribute to excess reserve supply conditions, including distributed energy resources, demand response and energy storage.[84]

Concentric's reserve price projections are unreasonable and do not support a finding that the Combustion Turbine is likely to be developed in New England. Projected energy margins, recent oversupply conditions, and new generation resources are likely to contribute to declining reserves prices, rather than the steady growth in reserve prices projected by Concentric. Together with Concentric's projection that Combustion Turbines will realize little to no energy revenues, declining reserves prices leads to the conclusion that the Combustion Turbine will not be needed to provide reserves or energy, and therefore is unlikely to be developed.

4. Concentric Bases its Estimated Energy Revenues on an Unbalanced System Model

The AURORA model based its energy price projections on an unbalanced system, inconsistent with the purpose of Net CONE. Net CONE is intended to position the demand curve in a way that will, on average and over time, price ISO-NE's resource adequacy needs according to the actual cost of new entry, assuming a system in equilibrium. Inputs to the Net

[82] Bodell Testimony at p. 39-40.
[83] *Id.*
[84] *Id.* at p. 40.

CONE calculation, such as projected energy prices, that are not based on equilibrium conditions are inconsistent with Net CONE and do not support a finding that the Combustion Turbine Net CONE value is just and reasonable. Though Concentric reports that its Net CONE values reflect the economics of a merchant plant under "long-term equilibrium conditions,"[85] it is apparent that the AURORA model did not model a system in equilibrium for several reasons.

First, Concentric did not build out off-shore wind resources that are expected to be developed pursuant to recently enacted Massachusetts legislation, instead discounting the 1,600 MW solicitation by 75% in assuming that only 400 MW of off-shore wind will come onto the system through 2040.[86] Concentric explains that its assumption is reasonable because the law requires that the resource be "cost-effective" and Concentric apparently believes that only 25% of the off-shore wind will be found to be cost-effective.[87] But Concentric offers no independent basis for the magnitude of the discount, offering only a belief that Massachusetts regulators will find 75% of the wind resources solicited under the legislation to be not "cost-effective." Concentric attempts to justify its discount based on "previous experience in Massachusetts and experience in other states," but the previous experience in Massachusetts suggests that the off-shore wind contracts will be found to be cost-effective.[88] The Massachusetts Supreme Judicial Court held, in its review of the Cape Wind contracts, that "cost-effective" includes the

[85] Concentric Report at p. 64; *see also* Bodell Testimony at p. 29.
[86] Bodell Testimony at pp. 29-30.
[87] Concentric Report at p. 55, note 37 ("Because of the requirement for cost effectiveness, it has been assumed that procurement of the full 1,600 MW would not be achieved. Instead, we have chosen to add a resource to the generation mix of roughly 25%.").
[88] *Alliance to Protect Nantucket Sound, Inc. v. Dep't of Pub. Utils.*, 461 Mass. 166, 176-181 (2011).

environmental benefits of off-shore wind, and therefore found that the Cape Wind contracts were cost-effective. Recent experience in the Forward Capacity Auction also supports the belief that Massachusetts will find the contracted resources to be cost-effective, with the first off-shore wind resource in the United States having cleared in FCA 10.[89] In addition, the off-shore wind resources are expected to come on-line because Massachusetts has adopted a policy that it will facilitate the development of otherwise uneconomic resources through electric distribution company contracting with substantial support across the political spectrum. Passage of the Massachusetts off-shore wind legislation was a top priority for the executive administration and Legislature, and Massachusetts has moved quickly to put this new legal authority into practice. It is unreasonable to assume that Massachusetts will fail to fulfill nearly 75% of the Commonwealth's policy given these considerations.

Second, the AURORA model at times appears to delay the addition of new capacity needed to offset modelled retirements. As explained in Ms. Bodell's affidavit, in certain years when the AURORA model retires resources it does not add sufficient resources to meet the demand and balance the system until more than one year later.[90] This lack of balance and timely new entry can result in more volatile energy and reserves revenues than would be expected under a system in equilibrium.[91]

[89] The Deepwater Wind Block Island off-shore wind resource cleared in FCA 10. *See* FCM Auction Results, *available at*: https://www.iso-ne.com/isoexpress/web/reports/auctions/-/tree/fcm-auction-results.
[90] Bodell Testimony at pp. 32-33.
[91] *Id.*

Third, the AURORA model is inconsistent with the remainder of Concentric's Net CONE analysis in certain respects, again calling into question whether the Net CONE analysis reflects a system in equilibrium. For example, the AURORA model builds out Combined-Cycle units with an average heat rate higher than the heat rate specified by Concentric for its Combined-Cycle reference technology, creating higher energy prices.[92] The AURORA model capacity factors are also inconsistent with the Net CONE analysis, with AURORA projecting Combined Cycle units running at a 38% capacity factor and Concentric estimating an 80% capacity factor for purposes of its Net CONE analysis. Likewise, the Combustion Turbine capacity factors do not align, with AURORA projecting a 5% capacity factor and Concentric estimating a 2.5% capacity factor. These inconsistencies suggest that the AURORA energy revenues are based on an unbalanced market.[93]

An energy revenue model based on an unbalanced system is inconsistent with the use and purposes of Net CONE. ISO-NE has not demonstrated, as it asserts, that the Net CONE values assume a system in equilibrium. The AURORA energy revenue model, therefore, does not support a finding that Combustion Turbines are likely to be developed.

5. The ISO-NE Proposal Creates Inefficient Risk in the Forward Capacity Market

As discussed throughout this Protest, the ISO-NE Net CONE proposal creates the risk of causing higher, inefficient clearing prices by creating the economic incentive to price

[92] *Id.* at pp. 29-30.
[93] *Id.* at pp. 29-33.

incremental risk in capacity supply offers. The significant and sudden reduction to the Starting Price and demand curve pricing called for under ISO-NE's proposal unnecessarily creates this risk of inefficient clearing prices.

To attract new entry when needed, market participants must expect that on average the clearing price reflects the actual cost of new entry.[94] In order to have this expectation, market participants must believe that the market will allow prices to reflect the actual cost of new entry in years where supply is tight at a price sufficient to offset those years when capacity surpluses cause lower clearing prices. As the Commission has explained, if a new resource needs the first year clearing price to exceed a certain level to offset future year reductions in capacity prices, but the market design does not allow prices to reach those levels, the market will not attract that new entrant.[95]

Existing resources as well depend on a market design that allows for competition from economic resources and for the clearing price to reflect actual new entry costs. Existing resources that believe that capacity clearing prices will be suppressed by market design elements may retire sooner than they would with a more competitive market design.[96] ISO-NE endorsed these principles in seeking approval of the MRI Curves, explaining that when market participants believe that they cannot earn the actual cost of new entry due to a market design that

[94] *Cf. PJM Interconnection*, 119 FERC 61,318 at P 130 (2007) (discussing the market inefficiency of capacity market rules that cap the price below competitive new entry price levels).
[95] *Id.*
[96] EMM Memorandum Re: EMM Comments on ISO-NE's Zonal Demand Curve Proposal, Docket No. ER16-1434 (filed January 11, 2016).

underestimates the actual cost of new entry, they will include risk premiums in their offers to reflect this market design risk.[97]

Beginning in FCA 4, the Starting Price has increased every year with a high of $18.24/kW-month in FCA 11.[98] The Starting Price has also exceeded ISO-NE's proposed Starting Price in every auction since FCA 7, when the auction Starting Price was $15.00/kW-month. A significant reduction in the Starting Price, and associated risk to investor confidence, is not justified given that the market has successfully attracted new entry at competitive clearing prices when and where needed since market scarcity signaled the need for new local investment in FCA 7. Since then, the Forward Capacity Market has cleared combined-cycle units and brownfield combustion turbines, and priced capacity higher in import-constrained capacity zones when zonal prices signaled the need for new investment.[99]

The Commission has cautioned against volatility in the design curve parameters.[100] According to the Commission, "there should be consistency in the use of reference technology to provide certainty to the market."[101] Though the Commission suggested that changes in "market activity and technology"[102] may render a previous reference technology unjust and unreasonable,

[97] Ethier Testimony at p. 11-14.
[98] *See ISO-NE Key Grid and Market Stats, Results of the Annual Forward Capacity Auctions*, available at: https://www.iso-ne.com/about/key-stats/markets#fcaresults.
[99] Bodell Testimony at pp. 26-27.
[100] *ISO New England Inc. and New England Power Pool Participants Committee*, 147 FERC ¶ 61,173, at P 34 (2014).
[101] *Id.*
[102] *Id.*

ISO-NE has made no showing that such changes have occurred since 2014, nor that any such changes compel a change in the reference technology. Indeed, as discussed, the Forward Capacity Market and the cleared resources have been remarkably consistent over the last several auctions, clearing a variety of gas turbine technologies (though most often, combined-cycles) at competitive prices to meet New England's resource adequacy needs when and, critically for the import-constrained Capacity Zones, where needed.

The ISO-NE Net CONE proposal will create a Starting Price well below the actual new entry costs of several new gas turbine resources that have cleared the Forward Capacity Auction. The Starting Price proposed by ISO-NE would effectively serve as a mitigation threshold, with offers above the threshold prohibited from participating in the market. Not only would the ISO-NE Starting Price therefore limit competition, it would also create the risk that actual new entry costs will not price capacity, decreasing investor confidence in the market and creating economic incentives to include inefficient risk premiums. A just and reasonable market design should mitigate rather than create incentives to offer additional risk into the market.

NEPGA respectfully requests that the Commission reject ISO-NE's Net CONE and Starting Price proposal as unjust and unreasonable.

B. A Net CONE Value Based on a Combined-Cycle Unit is Just and Reasonable

1. Combined-Cycle Units Are Economic and Likely to be Developed

Several combined-cycle resources with specifications similar to the Combined-Cycle reference technology considered by Concentric have cleared in recent Forward Capacity Auctions, three since the two-settlement Forward Capacity Market design took effect. Salem Harbor, Towantic Energy Center, Bridgeport Harbor Station, and Clear River Energy Center, all combined-cycle units, cleared new in FCA 7, FCA 9 and FCA 10. More new combined-cycle resources have cleared in recent Forward Capacity Auctions than any other reference technology considered by Concentric, including combustion turbines.[103] Significantly, three of the four combined-cycles cleared in FCA 9 or FCA 10, the first two auctions under the two-settlement Pay for Performance capacity market design.

The AURORA modeling results likewise support the likelihood that combined-cycle resources will continue to be developed in New England. As explained above, the AURORA model added 13 new combined-cycle units over the forecast period, displacing less economic, largely combustion turbine retiring resources. Only four other resources were added to the system in the AURORA model, each a wind resource. Though not necessarily predictive, the AURORA model results strongly support a finding that combined-cycle resources are likely to be developed in New England.

[103] *See* Concentric Report at p. 6, Table 1.

That three different market participants have found a way to make the combined-cycle unit economic under the two-settlement design indicates that market participants will continue to develop combined-cycle units as an economic means to meet the two-settlement design performance obligations. The AURORA model results strongly support that conclusion. The Combined-Cycle reference technology therefore meets the Commission's criteria for consideration as the Net CONE reference technology.

2. A Starting Price Based on a Combined-Cycle Unit Accommodates Competition Among Gas Turbine Technologies and Mitigates Against Inefficient Clearing Prices

A Combined-Cycle reference technology also satisfies the Commission's requirement that the reference technology Net CONE value create just and reasonable demand curve parameters, including a Starting Price that accommodates competition among different gas turbine technology types.

The Forward Capacity Market Starting Price must be set high enough to allow different gas turbine technologies to compete in the market. At the same time, the Starting Price must mitigate against the risk of inefficient pricing due to the undue exercise of market power. Though, as discussed earlier, the risk of setting the Starting Price "too high" is *de minimis*, a Starting Price based on the Combined-Cycle reference technology achieves an appropriate balance between these principles. It would allow for competition among the diverse types of technologies that have cleared recent Forward Capacity Auctions, yet would be lower than the FCA 9, FCA 10 and FCA 11 Starting Prices and would therefore mitigate against the exercise of

undue market power. This is particularly so given the robust competition seen in recent auctions, and expected in upcoming auctions given the high shows of interest from new resources, and the several recent Forward Capacity Market design changes intended to mitigate against the opportunity to exercise undue market power (*e.g.*, sloped zonal demand curves). As shown above, a Net CONE value based on a Combined-Cycle reference technology would create a Starting Price consistent with, but lower than recent Forward Capacity Auction Starting Prices, and therefore would be set high enough to accommodate competition among technologies yet no so high as to add inefficient costs to the market. A Combined-Cycle Net CONE value would therefore mitigate against market inefficiency and resource adequacy risk, and is a just and reasonable choice for the reference technology.

C. The Concentric Offer Review Trigger Price Analysis Improperly Includes Tax Credits Offsetting Onshore Wind Gross Costs

The Concentric ORTP analysis improperly includes a Production Tax Credit ("PTC") for onshore wind. As Concentric explains:

> Tax credits are currently available for eligible renewable resources in the form of a [PTC] and the Investment Tax Credit ("ITC"). In our ORTP calculations, we have included the value of the PTC for wind. *We assumed that the tax credits will continue to be available at their current respective rates through 2021*. For the onshore wind ORTP calculation, the PTC is estimated to be $0.15/kWh in 2021 dollars, based on current rules and our assumed inflation rate.[104]

This assumption is flawed and should be rejected on the similar grounds as the Commission did in *ISO New England Inc.*, 146 FERC ¶ 61,084 at P 33 (2014) (the "2014 ORTP Order").

[104] Concentric Report at p. 78 (emphasis added).

The FY16 Omnibus Appropriations Bill, passed on December 18, 2015, included a five-year extension and phase-down of the PTC. For the PTC, wind facilities that commenced construction in 2015 and 2016 receive a full value PTC, which the IRS calculated to be $0.023/kWh on an inflation adjusted basis. For wind projects that commence construction in 2017, the PTC is 80 percent of full value; in 2018, 60 percent of the full value; and in 2019, 40 percent of the full value.[105] Thereafter, the PTC is reduced to zero unless Congress acts.

Concentric's assumption that the PTC "will continue to be available at their current respective rates through 2021" is unreasonable under the phase-down in the law. Further, its estimate of the PTC to be $0.15/kWh in 2021 dollars makes little sense. As an initial matter, NEPGA assumes the report erred in assuming a PTC value of $0.15/kWh (or $150/MWh) rather than $0.015/kWh (or $15/MWh). That said, the use of a $0.015/kWh PTC assumes that *all* onshore wind facilities that become commercial in 2021 will have commenced construction no later than December 31, 2018 – at least 2.5 years before the 2021 Capacity Commitment Period – when the PTC is set at 60% of the full value.[106] Were a project to commence construction in 2019, it would receive only about $0.010/kWh, and thereafter zero. Because there is no probabilistic certainty that all wind resources will meet the December 31, 2018 deadline, as

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[105] *See, e.g.*, https://energy.gov/savings/renewable-electricity-production-tax-credit-ptc (the exact amount of the production tax credit for the tax years 2017-2019 will depend on the inflation-adjustment factor used by the IRS in the respective tax years. *Id.*).

[106] $0.015/kWh is approximately 65% of the $0.023/kWh PTC full value in 2016; NEPGA thus assumes the value includes Concentric's assumed inflation rate.

Concentric assumes, under the Tariff the IMM properly should treat such revenues as being out-of-market.[107]

The Commission should apply the 2014 ORTP Order's rationale and direct ISO-NE to remove the PTC value from the calculation of the ORTP for onshore wind. As the Commission reasoned:

> [W]e find the assumption that a resource participating in FCA 9 for the 2018-2019 Capacity Commitment Period will receive Production Tax Credit revenues to be inappropriate. The Tariff states that the calculation of ORTPs for generation resources will account for "expected non-capacity revenues."[30] At this time, the Production Tax Credit has expired, and thus, it is not a source of expected non-capacity revenue for new wind resources participating in FCA 9. While Congress has previously renewed the Production Tax Credit, it is currently unavailable to wind projects that did not begin construction by December 31, 2013. *We agree with protesters that given the relatively short construction period for onshore wind resources, it is unlikely that a wind resource participating as a new resource in FCA 9 will have begun construction by the December 2013 deadline*. For this reason, we reject ISO-NE's proposed ORTP for onshore wind resources.[108]

The PTC will expire entirely on December 31, 2019 – well in advance of when a wind resource needs to commence construction to meet commercial operations in 2021 (not to mention 2022

[107] Under the ISO-NE Tariff, if *all* on-shore wind resources in 2021cannot meet the requirements of the law expiring in 2019 – not to mention the full value PTC expiring December 31, 2018 – the inclusion of such revenues in the ORTP calculation is prohibited. As set forth in Section III.A.21.2(b) of the Tariff:

> The [IMM] will exclude any out-of-market revenues from the cash flows used to evaluate the requested offer price. Out-of-market revenues are any revenues that are . . . (b) not available to *all* resources of the same physical type within the New England Control Area, regardless of resource owner. [Emphasis added].

[108] 2014 ORTP Order at P 33 (emphasis added) (citing ISO-NE Tariff, Section III.A.21.1.2(b)).

and 2023) – and this error is compounded by Concentric's assumption that all wind resources will have commenced construction one year earlier, by December 31, 2018, when the PTC is set at 60 percent of its full value. Given the flawed and unsupported assumptions, the Commission should direct ISO-NE to remove the PTC value from the ORTP for onshore wind.

IV. Conclusion

Wherefore, NEPGA respectfully asks the Commission reject ISO-NE's proposal to base the net cost of new entry value for FCA 12 based on a simple-cycle frame combustion turbine and instead base it on a combined-cycle reference technology. NEPGA also respectfully requests that the Commission order ISO-NE to remove the Production Tax Credit value from the analysis underlying the Offer Review Trigger Price for on-shore wind.

Respectfully Submitted,

/s/ Bruce Anderson

Bruce Anderson
Vice President, Market and Regulatory Affairs
New England Power Generators Association, Inc.
33 Broad St., 7th Floor
Boston, MA 02109
Tel: 617-902-2347
Email: banderson@nepga.org

CERTIFICATE OF SERVICE

I hereby certify that I have served a copy of the comments by via email upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Boston, Massachusetts, February 3, 2017.

/s/ Bruce Anderson

Bruce Anderson
Vice President, Market and Regulatory Affairs
New England Power Generators Association, Inc.
33 Broad St., 7th Floor
Boston, MA 02109
Tel: 617-902-2347
Fax: 617-902-2349
Email: banderson@nepga.org