UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION


New England Power Generators Association, Inc. )

v. ) Docket No. EL10-50-___

ISO New England Inc. )

PSEG Energy Resources & Trade LLC, et al. )

v. ) Docket No. EL10-57-___

ISO New England Inc. )

TESTIMONY OF DAVID L. MCADAMS PH. D.
ON BEHALF OF NEW ENGLAND POWER GENERATORS ASSOCIATION

JULY 1, 2010
PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.

My name is David McAdams. I am Associate Professor of Business Administration and Economics at Duke University. My business address is Fuqua School of Business, Duke University, Durham, NC 27708.

PLEASE DESCRIBE, BRIEFLY, YOUR EDUCATIONAL AND EMPLOYMENT BACKGROUND.

I have a Bachelor of Science degree in Applied Mathematics from Harvard University in 1996, a Masters in Statistics from Stanford University in 2001, and a Ph.D. in Business from Stanford University in 2001. In 1999, I was Special Assistant to the Director, Bureau of Economics, Federal Trade Commission. From 2001-2008, I served on the faculty at the Massachusetts Institute of Technology Sloan School of Management. In 2008, I joined the Duke faculty in the Fuqua School of Business and in the Economics Department. My theoretical and empirical research on multi-unit auctions¹ (of which capacity auctions are an example) has been supported by the National Science Foundation and published in the leading journals of economics. My curriculum vitae is attached hereto as NEPGA Exhibit 4-A. This is my first prepared testimony before the Commission.

WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

I am an economic theorist and auctions expert. The purpose of this testimony is to evaluate the ISO New England (“ISO-NE”) Forward Capacity Market (“FCM”) auction process, especially the proposed modifications to the Alternative Price Rule (“APR”).

¹ Multi-unit auctions are auctions of multiple identical objects (e.g., electricity, Treasury bonds, stocks), as opposed to so-called multi-object auctions of dissimilar objects (e.g., FCC spectrum, task assignment). My dissertation was titled “Essays in Multi-Unit Auction Theory,” and a project funded by the National Science Foundation (“NSF”) from 2003-2006 was titled “Ordinal Structure in Multi-Unit Auctions.”
outlined by ISO-NE staff in a June, 15 2010 presentation. In brief, my main conclusions are as follows. *First*, the February APR proposed by ISO-NE in a February 22, 2010 filing is flawed for several reasons, and needs to be improved. *Second*, the June APR outlined by ISO-NE staff resolves several of my concerns with the February APR, and represents a substantial step forward. *Third*, I find one of the most novel aspects of the June APR—its two-tiered pricing structure whereby new resources are paid a different price than existing resources—to be sensible and economically sound.

Q AS AN ECONOMIST WITH AUCTION EXPERTISE, CAN YOU PLEASE PROVIDE AN OVERVIEW OF AUCTION ECONOMICS, AND WHY AUCTION THEORY IS RELEVANT FOR PRACTICAL AUCTION DESIGN?

A Auctions have been a very active area of research in economics—indeed, one of the most active areas of research—for over two decades. To an outsider, this may seem rather odd. Auctions are certainly interesting and important mechanisms for the facilitation of trade in many important markets—such as stock exchanges, bonds sales, business-to-business procurement, and so on—but there are many other sorts of transactions as well.

Why such focus on auctions? In my mind, there are four main reasons.

*First*, auctions shed light on the role of *private information* in markets. The canonical neo-classical model describes the good properties of markets when there are many buyers and sellers, firms cannot abuse market power and there is no hidden information about

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3 This summary of auction economics builds upon a private correspondence that I received from Professor Patrick Bajari. Another excellent discussion is contained in “Empirical Models of Auctions” by Susan Athey and Phil Haile, an invited lecture prepared for the Ninth World Congress of the Econometric Society.
the goods being bought and sold. The celebrated welfare theorems in some sense formalize the intuition of Adam Smith: despite the fact that market participants are self interested, their very self interest may generate socially beneficial outcomes since it generates an efficient use of resources. However, it is well known that if agents possess private information about the objects being sold, markets may break down or fail to function properly. The Nobel prizes awarded to Akerlof, Spence, Stiglitz, Hurwicz, Maskin and Myerson were in large part for their analysis of private information. The Nobel Prize awarded to Vickrey was specifically for the analysis of private information in auctions.

A large volume of literature has demonstrated that private information is important in both economic theory and in real markets. Much of this research has a pessimistic tone about the ability of markets to generate socially desirable outcomes. Auctions are a laboratory for studying private information because the fundamental motivation for holding an auction is to get bidders to compete against each other in order to reveal their private information. One of the key positive messages of auction theory is that competition can achieve efficient outcomes even in the presence of private information. Therefore, if there is private information, you can sometimes restore the “good” properties of the welfare theorems by holding an auction. However, the rules of the auction and the form of private information are central to whether or not efficiency will be obtained through decentralized competition via bidding.

Second, auctions have very high-quality data. Academic researchers typically have access to precise descriptions of what is being sold. In the best case, they have approximately the same public information that is available to bidders. Also, prices in
auctions typically have no measurement error. In other markets, the researcher may have only
error-prone measures of prices, quantities and product characteristics.

Third, auctions have highly structured formal rules that provide a close link between
game theory and actual market institutions. In many other settings, the “rules” of
competition are unclear. By contrast, in an auction, the strategies that bidders may use and
how markets clear are precisely specified. As a result, it is much easier and more compelling
to bring the theory to the data. This makes auctions a highly attractive testing ground for
game theory and economic theory more generally.

Finally, since the “auction game” is clearly specified and known to all players,
auction theory may do a relatively good job of describing real-world behavior—including
by anticipating strategic behaviors that may undermine the performance of the auction.\footnote{In many high-stakes auctions, such as those used in recent FCC spectrum auctions, many bidders have hired auction theorists to help them decide what to bid. In such cases, one may expect an even closer correspondence between the predictions of auction theory and actual bidding behavior.}

Because of this, auction theory and academic auction theorists have played an important
role in the design of many important real-world auctions, including everything from the
sale of FCC spectrum and Treasury bonds to the assignment of environmental permits.

\textit{PART ONE: CONCEPTS AND TERMS USED IN THIS TESTIMONY}

\textbf{Q} ARE THERE ANY SPECIALIZED ECONOMIC TERMS OR CONCEPTS THAT YOU
\textbf{WILL USE IN YOUR TESTIMONY?}

\textbf{A} Yes, I will refer to some economic and game-theory concepts that may not be familiar to
some readers, and utilize certain terms commonly used in this proceeding. Accordingly, I
will begin by defining and discussing the following concepts and terms:

\begin{itemize}
\item a. economic cost;
\end{itemize}
b. stand-alone economic cost;

c. economic CONE (vs. annualized CONE vs. administrative CONE);

d. single-price auction;

e. uniform-price auction;

f. truthful bidding;

g. lowest-cost allocation;

h. marginal economic resource;

i. economic price;

j. OOM;

k. Nash equilibrium; and

l. weakly dominant strategy.

This is not a complete list of all significant terms used in this testimony. When other significant new terms are introduced in later parts of the testimony, I will indicate that by underlining and italicizing the term in question.

Q THE FIRST TERM ON YOUR LIST IS “ECONOMIC COST.” WHAT DO YOU MEAN BY THIS?

The “economic cost” of an economic decision—such as the decision to enter with a new resource or continue operation with an existing resource—is, quite simply, the unprofitability of that decision. After all future benefits and costs of this decision are accounted for, including any out-of-market subsidies from third-parties, how much money is lost by making this decision? That amount is the economic cost of the decision.
Q WHAT IS “STAND-ALONE ECONOMIC COST”?

A When a resource is deciding whether to enter or continue operating in the FCM, there are all sorts of future benefits and costs associated with this decision that have nothing to do with the economic operation of that particular resource. For example, if the owner of the resource in question has buyer-side market power and entry will decrease current and/or future FCA prices, then such exercise of market power constitutes a benefit. Similarly, if the resource has been subsidized or guaranteed a positive return by some third-party, then prospective subsidy payments from this third-party constitute a benefit. Finally, the prospect of future FCA auction payments constitutes a benefit.

The “stand-alone economic cost” of a decision to enter or continue operation is the unprofitability of that decision, when accounting only for the revenues and costs associated with the economic operation of that resource plus FCA auction payments. Namely, this includes all revenues earned in energy markets, all costs of operation and (if the decision in question is whether to enter the auction before investment costs have been sunk) all costs of investment. Stand-alone economic cost does not account for any benefits from the exercise of market power nor for any subsidies received from third-parties—other than FCA payments.

Q WHAT IS “ECONOMIC COST OF NEW ENTRY (CONE)”?

A I will use the term “economic CONE” to refer to the stand-alone economic cost of new entry. To re-iterate an earlier definition, then, a resource’s economic CONE is the unprofitability of that resource, after accounting for all investment costs, the present value of profitability after entry\(^5\) and all future FCA auction payments. In other words, a

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\(^5\) Profitability after entry includes not just expected revenues and costs of operation, but also the option value associated with being able to temporarily or permanently cease operations.
resource’s economic CONE is the FCA auction payment that it needs now, in order to make new entry of that resource profitable on a stand-alone basis, i.e., not including any prospective subsidies or benefits related to the exercise of market power.

Q

PLEASE EXPLAIN WHAT YOU MEAN BY “ANNUALIZED CONE” AND “ADMINISTRATIVE CONE.”

A

In my reading of the record of this proceeding, I have noticed two common uses of the term “CONE” that are different from economic CONE. (By contrast, I have rarely seen the term “CONE” used to refer to the stand-alone economic cost of new entry.) First, this term is used to refer to what one might call “annualized CONE,” corresponding to the annualized stand-alone unprofitability of a resource. In other words, if the FCA were to provide the same auction payment every year over a resource’s lifetime, annualized CONE is the annual payment that that resource needs to make new entry profitable on a stand-alone basis. Second, “CONE” is used to refer to an administratively-determined cost of new entry (“administrative CONE”) that plays a role in the rules of the FCA.

Q

WHAT IS A “SINGLE-PRICE AUCTION”?\(^6\)

A

In a “single-price auction” of reserve capacity obligations, each bidder announces a price at which it is willing to supply different quantities of reserves. (Each bidder may be viewed as submitting a supply curve listing the price that it demands for every quantity that it might be asked to supply.) Obligations are awarded to all those who submit bids less than the “market-clearing price,” i.e., the lowest price at which more quantity is

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\(^6\) The term “single-price auction” is not standard in the auction theory literature. However, for this testimony, it will be useful to distinguish auctions in which all winners receive the same price (“single-price auctions”) from those in which all winners receive the same price and this price equals the market-clearing price (“uniform-price auctions”).
offered than needed to meet the Net Installed Capacity Requirement (“Net ICR”), and all
winners are paid the “auction price” for all quantity supplied.

Q WHAT IS A “UNIFORM-PRICE AUCTION”?
A A “uniform-price auction” is a single-price auction in which the auction price is equal to
the market-clearing price. As I will explain in more detail in Part Three, the FCA under
the February APR is a single-price auction but not a uniform-price auction, because its
auction price is not always equal to the market-clearing price.

Uniform-price auctions are most commonly implemented via sealed bids or via a
“descending clock” process. In the descending clock variety, announced prices decrease
over time until the quantity supplied no longer exceeds the Net ICR, and the “bid” on a
given unit of supply corresponds to the price at which that unit is withdrawn from the
auction.

Usually, we expect uniform-price auctions to perform well as a means to generate
meaningful price signals and efficient allocations. For instance, uniform-price auctions
are routinely used around the world in electricity procurement auctions, Treasury bond
sales auctions, and to open trading each day on stock exchanges. The reason is that, as
long as all bidders are “small enough” relative to the overall market to view themselves
as unable to influence the price, each bidder has an incentive—technically, a “weakly
dominant strategy” (defined below)—to bid the maximal price at which it is willing to
buy (if a buyer) or the minimal price at which it is willing to sell (if a seller).

Q WHAT DO YOU MEAN BY “TRUTHFUL BIDDING”?
A A resource is “bid truthfully” if its bid is equal to its stand-alone economic cost.
Q WHAT IS A “NASH EQUILIBRIUM”?  
A In any Nash equilibrium of a game, each player’s strategy is a best response to the strategies of the other players. In the context of the FCA, this means that each bidder would not gain from changing its bid, were it to learn the bidding strategies of all others in the auction.

Q WHAT IS A “WEAKLY DOMINANT STRATEGY”?  
A A strategy is weakly dominant if it is a best response to others’ strategies, no matter what those strategies may be. The adjective “weakly” in weakly dominant strategy captures the possibility that there may be some circumstances in which a player is indifferent between various strategies. For example, in the context of the FCA, a resource whose cost is so high that it has no chance of clearing in the auction finds every bid that doesn’t clear to be a best response. Such a bidder is indifferent between all such losing bids because all of them are payoff-equivalent: the bidder gets nothing, regardless of which losing bid it makes.

Q WHAT IS A “LOWEST-COST ALLOCATION”?  
A A lowest-cost allocation of reserve obligations is one in which obligations are assigned to those resources having the lowest stand-alone economic costs. Any allocation of obligations that fails to meet this standard—_i.e._, in which the stand-alone economic costs of some resources that receive an obligation are greater than the stand-alone economic costs of some resources that do not receive an obligation—is manifestly inefficient. Namely, efficiency could be increased (while holding fixed the supply of reserve capacity) by displacing high-cost resources that received an obligation with lower-cost alternatives that did not.
Any single-price auction results in a lowest-cost allocation if all bidders bid truthfully.

The uniform-price auction has the extra advantage of incentivizing every resource to submit a bid equal to its economic cost. In particular, all “stand-alone resources” whose economic cost is equal to their stand-alone economic cost have an incentive—technically, a weakly dominant strategy—to bid truthfully. (By contrast, bidders with market power will shade their bids away from stand-alone economic cost in order to distort market outcomes to their advantage. Similarly, bidders with access to subsidies will bid less than stand-alone economic cost in order not to forego those outside payments.)

Q WHAT IS THE “MARGINAL ECONOMIC RESOURCE”?
A Suppose that the FCA achieves a lowest-cost allocation. The “marginal economic resource” is the lowest-cost resource that fails to receive an obligation under this allocation.

Q WHAT IS THE “ECONOMIC PRICE”?
A The “economic price” of reserve capacity is the stand-alone economic cost of the marginal economic resource. The economic price of reserve capacity can be interpreted as the marginal social value provided by each unit of reserve capacity in the FCM, should the lowest-cost resources be those that satisfy the Net ICR. To see why, suppose that the lowest-cost resources satisfy the Net ICR, but that one of these resources were forced to exit. The most economical way to replace this lost resource would be with the marginal economic resource, at a marginal social cost equal to the stand-alone economic cost of the marginal economic resource.
Q WHAT IS “OOM”?

A Broadly construed, “out-of-market (OOM)” is a phrase used to describe resources whose economic costs are less than their stand-alone economic cost. Thus, resources may be OOM for a wide variety of reasons, including buyer-side market power and subsidies for entry and/or operation received from a third-party.7

The term “OOM” is also commonly used to refer to a category of resources that are administratively labeled as OOM. For instance, under the February APR, a new resource is designated as OOM when (a) its bid is less than a pre-designated threshold and (b) this bid is not appropriately justified with the market monitor ahead of the auction, or when its de-list bid is rejected for reliability reasons.

Following the convention established in the record of this proceeding, I will use the term “OOM” in my testimony to refer both to resources that have stand-alone economic costs less than their economic costs, as well as to resources that are administratively labeled as being “out-of-market” in the FCA.

PART TWO: STATEMENT OF THE PROBLEM

Q WHAT IS THE PURPOSE OF THIS PART OF YOUR TESTIMONY?

A In this part of my testimony, I will discuss why an Alternative Price Rule (“APR”) is needed in the Forward Capacity Auction (“FCA”).

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7 Another category of OOM resources are those that have sunk investment costs prior to the FCA. Such resources would bid in the FCA without regard to these sunk costs, bidding less than the FCA payment that they would need to make entry profitable prior to their investment decision to sink these costs. However, as Mr. Stoddard notes in his testimony, gas-fired resources, unit up-rates, and demand-side resources can all move from advanced development to commercial operation in the three years between the FCA and the beginning of the commitment year. Resources of these types constitute all of the new resources that have been qualified in the FCAs to date. Consequently, ignoring sunk-cost resources for the sake of this testimony appears to be without too much loss. (That said, should longer lead-time resources such as nuclear be viewed as an important source of potential new entry in the future, the problem of how properly to incentivize such resources should be carefully revisited.)
Q PLEASE DESCRIBE HOW THE FCA WOULD PERFORM IF THERE WERE NO APR.

A The FCA is a descending-clock procurement auction. Owners of qualified capacity participate in the auction and “bid” by deciding at what price to withdraw from the auction. I will discuss two of the alternative price rules—the February APR and the June APR—at length later in this testimony. However, for now suppose that there were no APR. In particular, suppose that the FCA operated as a uniform-price auction. In this hypothetical scenario, (i) capacity obligations would be awarded to all those who submitted bids less than the “FCA clearing price,” i.e., the lowest price at which more quantity is offered than needed to meet the Net ICR, and (ii) all clearing resources would be paid the FCA clearing price.

If all resources had economic costs equal to their stand-alone economic costs, such an auction would achieve the best possible outcome from an efficiency perspective.

Q PLEASE ELABORATE.

A A basic fact about uniform-price auctions is that bidders have a weakly dominant strategy to bid their economic cost. Consequently, if all resources have economic cost equal to their stand-alone economic cost, the FCA would generate Nash equilibrium outcomes in which (i) the Net ICR is met through a lowest-cost allocation and (ii) resources that receive an obligation are paid the economic price of reserve capacity. From an efficiency

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8 “Weakly dominant strategy,” “economic cost,” “stand-alone economic cost,” “Nash equilibrium,” “lowest-cost allocation,” and “economic price of reserve capacity” are defined in Part One. Please recall that economic cost includes benefits from the exercise of market power, and that a lowest-cost allocation only results when bids are equal to stand-alone economic costs.

9 In theory, there might be Nash equilibria in which some players do not play their weakly dominant strategy. However, such equilibria typically fail to meet even the weakest sorts of stability criteria. My judgment is that little is lost by focusing on the Nash equilibrium in which all bidders in the FCA adopt their weakly dominant strategy, should they all have weakly dominant strategies.
stand-point, this is the best possible outcome: (i) the Net ICR is met at minimal cost and
(ii) capacity resources are paid their marginal social value, incentivizing efficient
investment and disinvestment decisions.

Q **WHY MIGHT SOME RESOURCES’ ECONOMIC COST NOT EQUAL STAND-ALONE ECONOMIC COST?**

A **As noted above, a uniform-price auction would induce efficient outcomes in the FCM if**
all resources had economic cost equal to stand-alone economic cost. Unfortunately, there
are two potentially important reasons why the economic cost of some resources may be
less than stand-alone economic cost. *First*, the owners of some resources might have
buyer-side market power (discussed below), in which case they would receive the
benefit of lower FCA prices should those resources clear. *Second*, some resources might
receive benefits from third-parties (discussed below) should they enter and/or operate.

If, for these or other reasons, a substantial fraction of resources in the FCM have
economic costs substantially below their stand-alone economic cost, a uniform-price
auction could induce very inefficient outcomes in the FCM. In particular, resources
whose economic cost is artificially depressed by market power and/or third-party benefits
would be inefficiently over-represented in the FCM. Consequently, the Net ICR would
not be procured at minimal total economic cost and the FCA price would not provide a
meaningful signal of the marginal social value of reserves, distorting investment
decisions. Indeed, should market power or third-party benefits differentially benefit one
class of energy resources over another, the FCA could even distort incentives for the

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10 Seller-side market power is also a concern, if unmitigated. Resources controlled by those with seller-side
market power will have economic cost greater than stand-alone economic cost.
Research and Development needed to advance the most promising nascent energy technologies.

Q IN THIS EXPLANATION, YOU REFER TO “MARKET POWER.” CAN YOU EXPLAIN HOW YOU ARE USING THIS TERM?

A Yes. A bidder that has the ability to influence the auction price through its bid is said to have “market power” in the auction. Unlike traditional notions of market power which are typically based on market share ownership or control, the ability to influence price in an auction can also depend on the auction rules. In poorly-designed auctions, even relatively small bidders may be able to influence the market price.

Any bidder with market power has an incentive to use that power to distort auction outcomes to its advantage. (Some bidders may prefer higher auction prices, while others may prefer lower auction prices.)

Q YOU ALSO REFER TO “THIRD-PARTY BENEFITS” IN YOUR RESPONSE. PLEASE EXPLAIN WHAT YOU MEAN BY THAT.

A Even absent market power, a resource’s economic cost can be less than its stand-alone economic cost if a third party has committed itself to pay for all or part of the resource’s costs (e.g., by providing a subsidy) or has made avoidance of these costs impossible (e.g., by requiring entry or continued operation) regardless of the auction price that results.

Such a resource will be willing to accept an auction price low enough to make entry or continued operation profitable, given only those costs that remain discretionary. (A new or existing resource’s discretionary costs are those that could be avoided if it were not selected to be a reserve capacity resource.)
WITH THE BENEFIT OF THE ABOVE CLARIFICATIONS AND EXPLANATIONS, CAN YOU SUMMARIZE YOUR VIEW OF WHY AN ALTERNATIVE PRICE RULE, OR APR, IS NEEDED IN THE FORWARD CAPACITY AUCTION?

The appeal of uniform-price auctions is that they can harness the power of competition to achieve efficient allocations and prices. However, such benefits only accrue when bidders’ incentives in the auction reflect underlying stand-alone economic costs. In the FCM, there are important reasons to be concerned that this pre-condition for efficiency may fail to be satisfied. In particular, some bidders’ incentives in the auction may be distorted by market power and/or third-party benefits. Because of this, an unmitigated uniform-price auction would most likely not function well in the FCM. Market power mitigation is needed to correct for the effect of market power, while APR mitigation is needed to correct for the effect of third-party benefits.

PART THREE: FEBRUARY APR

WHAT IS YOUR VIEW OF THE FEBRUARY APR?

My view is that the February APR needs to be improved.

EXPLAIN THE BASIS FOR THIS VIEW.

The aspiration of the APR is to restore the FCA outcome to something that approximates, as closely as possible, the efficient market outcomes and efficient market incentives that would have been generated in a uniform-price auction had there been no “out-of-market (OOM)” capacity. In this part of my testimony, I will discuss some important reasons why the February APR needs to be improved in order to achieve that objective more
fully. Understanding some of the flaws of the February APR helps one better to appreciate the design of the June APR. In Part Four of this testimony, I will discuss the June APR and how/why it improves on the February APR.

Q PLEASE BEGIN BY DESCRIBING THE FEBRUARY APR.

A The FCA under the February APR is very complicated. Here I will simply sketch some of the features of the February APR that are most salient to my testimony. There are three separate triggering events—APR-1, APR-2, and APR-3—in each of which the February APR pays all clearing resources an “APR price” instead of the FCA clearing price.

Q WHEN YOU REFER TO “TRIGGERING EVENTS,” WHAT EXACTLY ARE YOU TALKING ABOUT?

A The February APR is designed to have an effect on auction outcomes in certain circumstances, and designed not to have any effect in other circumstances. The “triggering events” are those circumstances in which the APR establishes a different auction outcome than what would otherwise have occurred in a uniform-price auction.

Q NOW, PLEASE DESCRIBE THE SPECIFIC TRIGGERING EVENTS MENTIONED ABOVE, APR-1, APR-2 AND APR-3.

A These triggering events are as follows:

APR-1 applies “when new capacity is needed in the Forward Capacity Auction … but that need is completely met by new OOM megawatts in the current Forward Capacity Auction.”

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11 My discussion of this issue is not exhaustive. For a more thorough discussion of this topic, see especially the March 2010 testimony of Mr. Robert Stoddard and Dr. Roy Shanker.

12 Quotes here are from the FCM Revision, Attachment 3, Prepared Testimony of Dr. Robert Ethier at 5-6.
APR-2 applies “when new capacity is not needed in the Forward Capacity Auction, but would have been needed if not for the entry of OOM megawatts in previous Forward Capacity Auctions.”

APR-3 applies “when new capacity is not needed in the Forward Capacity Auction even without the OOM megawatts that entered in previous FCAs, but when the FCA price is depressed as a result of de-list bids that are rejected for reliability reasons.”

These triggering events depend on which resources are designated as being OOM, a process that depends in part on bidding in the auction. Namely, a new resource is designated as OOM when (a) its bid is less than a pre-designated threshold and (b) this bid is not appropriately justified with the market monitor ahead of the auction, or its delist bid is rejected for reliability reasons.

Under APR-1 and APR-2, the APR price is computed to equal the lower of an administratively-determined CONE or one penny below the offer price of the lowest-bid new in-merit resource that does not clear. (To keep this testimony as brief as possible, I will not discuss APR-3.)

Q YOU STATED ABOVE THAT THE FEBRUARY APR NEEDS TO BE IMPROVED. EXPLAIN WHAT YOU MEAN.

A I will focus here on two weaknesses of the February APR. First, the triggering events are incomplete. Second, when APR-1 or APR-2 is triggered, the APR price will typically not equal the economic price of reserve capacity.\(^\text{13}\)

\(^{13}\) The “economic price of reserve capacity” is defined in Part One, as the market-clearing price that results when all resources bid their stand-alone economic cost.
Q  WHY ARE THE TRIGGERING EVENTS OF THE FEBRUARY APR INCOMPLETE?
A  The presence of OOM always has a potential to suppress auction prices, since OOM resources have an incentive to bid less than their stand-alone economic costs. However, there are circumstances in which OOM is present but the APR is not triggered. For example, when new capacity is needed, there is some new in-merit entry, and there is some OOM capacity in the auction, none of APR-1, APR-2 or APR-3 is triggered despite the potentially price-suppressing effect of that OOM.\textsuperscript{14}

Q  WHY MIGHT THE APR-1 AND APR-2 PRICE NOT BE EQUAL TO THE ECONOMIC PRICE OF RESERVE CAPACITY?
A  The economic price of reserve capacity (or, more simply, “economic price”) is the stand-alone economic cost of the marginal economic resource or, equivalently, the market-clearing price that would result if all resources were bid at their stand-alone economic cost. By contrast, recall that the APR-1 and APR-2 price is equal to the lower of CONE or one penny below the offer price of the lowest-bid new in-merit resource that does not clear.

The APR-1 and APR-2 price will tend not to equal the economic price for several reasons, two of which I will highlight here.

First, in those events when the APR-1 and APR-2 price is less than CONE, the lowest-bid new in-merit resource that does not clear is typically not the marginal economic resource. Consequently, even if all in-merit resources were to bid truthfully, the APR-1 and APR-2 price would not equal the economic price. This effect can cause the APR-1 and APR-2 price to be higher or lower than the economic price. For instance,

\textsuperscript{14} See Section IV-B, especially ¶¶ 32-33, of Mr. Stoddard’s Affidavit, filed with NEPGA’s Protest in Docket ER10-787-000 on March 15, 2010.
consider a situation in which the marginal economic resource is a new in-merit resource that does not clear, but not the \textit{lowest-cost} new in-merit resource that does not clear. In this case, the APR-1 and APR-2 price would be lower than the economic price under truthful bidding by all in-merit resources. Or, consider a situation in which (i) the marginal economic resource is an existing in-merit resource and (ii) all new in-merit resources cost more than this existing resource. In this case, the APR-1 and APR-2 price would be higher than the economic price under truthful bidding.

\textit{Second}, even in-merit resources—that lack market power and receive no third-party benefits—may have an incentive to bid less than their stand-alone economic costs under the February APR. (I refer to such untruthful bidding by in-merit resources as \textit{“innocent bid-shading.”} \footnote{Such bid-shading is \textit{“innocent”} because the bidder has no market power and hence cannot manipulate the price. Rather, innocent bid-shading is a response to distorted incentives created by the auction rules.})

**Q** WHY MIGHT IN-MERIT RESOURCES HAVE AN INCENTIVE TO SHADE THEIR BIDS BELOW THEIR STAND-ALONE ECONOMIC COSTS?

**A** Here is a scenario in which an in-merit bidder would strictly benefit by bidding less than its stand-alone economic cost. Suppose that bidding is such that (i) APR-1 is triggered and (ii) there are some existing in-merit “between” resources whose going-forward economic cost is less than the APR price but greater than the FCA clearing price. (“Between” resources are illustrated in Exhibit RBS-3 of Mr. Stoddard’s March 2010 testimony.) Were these in-merit “between” resources to bid truthfully, they would not clear because their stand-alone economic cost exceeds the FCA clearing price. However, they would strictly prefer to clear since their stand-alone economic cost is less than the
APR price. Thus, these in-m merit resources strictly prefer to deviate from truthful bidding
with a bid that is less than or equal to the FCA clearing price, so as to clear.

By contrast, I am aware of no situation under the February APR in which an in-
merit resource strictly prefers to bid more than its stand-alone economic cost.

PART FOUR: JUNE APR

Q DO YOU HAVE A VIEW REGARDING THE JUNE APR?

A Yes. In this part of my testimony, I will discuss the June APR and make two main
points. First, I will show how the June APR resolves some of the weaknesses inherent in
the February APR. Second, I will argue that the two-tiered pricing structure introduced in
the June APR is sensible and economically sound.

Q PLEASE DESCRIBE THE BASIS FOR THE VIEWS YOU WILL ARTICULATE
REGARDING THE JUNE APR.

A At the time when I developed this testimony, some details of the June APR are not
known. Earlier in June 2010, ISO-NE staff presented an outline of the June APR, but
details will be offered in a July filing contemporaneous with mine. (At that point,
presumably, the fully-known APR proposal will be referred to as the July APR, to
distinguish discussion of ISO-NE’s formal filing in July from discussion of its informal
presentation in June.) Nonetheless, I will venture here to sketch what appear to be some
of the June APR’s most salient features.

Q WITH THAT CAVEAT, PLEASE DESCRIBE YOUR UNDERSTANDING OF THE
JUNE APR.

A First, the June APR is triggered automatically whenever any OOM is present. Second,
not all clearing resources are paid the same price. New resources and all OOM resources
(new and carried-forward) are paid the FCA clearing price while existing resources are
paid the APR price. *Third*, not all resources clear equally. New resources must bid less
than the FCA clearing price to clear, while existing resources must bid less than the APR
price to clear. *Fourth*, the APR price is computed by replacing the FCA bids of all OOM
resources with administratively-determined estimates of their stand-alone economic
costs. *Finally*, OOM is determined as under the February APR.

Q WHAT KIND OF BIDDING INCENTIVES DOES THE JUNE APR CREATE?

A Under the June APR, every bidder has a weakly dominant strategy to bid its economic
cost.16 (By contrast, I showed in Part Three that bidders sometimes stand to gain by
bidding less than economic cost under the February APR.) There are two steps to the
argument why. *First*, under the June APR, every bidder has bidding incentives *as if* in a
uniform-price auction. *Second*, in any uniform-price auction, every bidder has a weakly
dominant strategy to submit a bid equal to its economic cost on each unit of capacity.

Q PLEASE WALK US THROUGH THIS ARGUMENT. FIRST, WHY DOES EVERY
BIDDER HAVE BIDDING INCENTIVES *AS IF* IN A UNIFORM-PRICE AUCTION?

A New resources must bid less than the FCA clearing price in order to clear and, when they
clear, new resources are paid the FCA clearing price. Thus, new resources face the same
strategic bidding problem *as if* in a uniform-price auction in which all resources’ bids are
equal to their bids in the FCA.

Existing resources must bid less than the APR price in order to clear and, when
they clear, existing resources are paid the APR price. Thus, existing resources face the
same strategic bidding problem *as if* in a uniform-price auction in which (i) all non-OOM

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16 “Weakly dominant strategy” and “economic cost” were defined in Part One.
bids are equal to their bids in the FCA and (ii) all OOM bids are equal to administratively-determined estimates of their stand-alone economic costs. (Given such bids, the market-clearing price is equal to the APR price under the June APR.)

Q SECOND, WHY DOES EVERY BIDDER IN A UNIFORM-PRICE AUCTION HAVE A WEAKLY DOMINANT STRATEGY TO BID ITS ECONOMIC COST ON EVERY UNIT OF CAPACITY?

A When a bidder submits a bid equal to its economic cost, that bidder will clear when the market-clearing price that it will be paid is greater than its economic cost, and not clear when the market-clearing price that it would have been paid is less than its economic cost. Thus, the resource in question clears when it is profitable to clear and avoids clearing when it is unprofitable to do so. In particular, bidding economic cost is always a best response, regardless of others’ bids.

Q WILL THE JUNE APR INDUCE A LOWEST-COST ALLOCATION?17

A Since in-merit resources have an incentive—indeed, a weakly-dominant strategy—to submit bids equal to their stand-alone economic costs and OOM resources’ bids are replaced with administrative estimates of their stand-alone economic costs when computing the APR price, my judgment is that the June APR will tend to come closer to reflecting a lowest-cost allocation than the February APR does. However, there are circumstances in which the June APR will not achieve a lowest-cost allocation.

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17 “Lowest-cost allocation” and other terms used in the following discussion—such as “economic cost” and “stand-alone economic cost”—were defined in Part One.
Q CAN YOU PROVIDE AN EXAMPLE OF A SITUATION WHERE THE JUNE APR
WILL NOT ACHIEVE A LOWEST-COST ALLOCATION?

A Yes. Consider the following scenario: (i) some new OOM resource bids less than the
FCA clearing price; and (ii) this OOM resource has stand-alone economic cost greater
than some in-merit resource that does not clear. This OOM resource is bid low enough to
clear, but it is more costly than some resource that did not clear. Thus, the allocation
does not minimize total cost.

Q UNDER THE JUNE APR, WILL THE APR PRICE EQUAL THE ECONOMIC PRICE
OF RESERVE CAPACITY? 18

A Given that a lowest-cost allocation is not always realized, the June APR will also not
always set the APR price equal to the economic price of reserve capacity. Nonetheless,
since OOM bids are replaced with estimates of their stand-alone economic costs—rather
than left in the bid-stack and the APR set to the lower of CONE or one cent below the
price of the lowest-bid new in-merit resource that did not clear—it is my judgment that
the June APR will likely generate an APR price that more closely reflects the economic
price than the February APR does.

Q UNDER THE JUNE APR, NEW RESOURCES ARE PAID LESS THAN EXISTING
RESOURCES. DOES THIS TWO-TIERED PRICING STRUCTURE PROVIDE
SOUND INCENTIVES FOR EFFICIENT ENTRY AND EXIT?

A Yes. I find the two-tiered pricing structure of the June APR to be economically sound.
To incentivize efficient investment and disinvestment in capacity resources, ideally we
would like the FCA to generate a stream of auction payments, over each resource’s

18 The “economic price of reserve capacity” was defined in Part One.
lifetime, equal to the economic price of reserve capacity in every period. However, by
design, the June APR only pays an APR price approximating the economic price of
reserve capacity when a resource is “existing.” “New” resources are paid the FCA
clearing price, which tends to be lower than the APR price.

The advantage of paying existing resources a price that more closely reflects the
economic price is that doing so—if one were to do so for the rest of a unit’s operational
lifetime—will allow existing in-merit resources to better internalize the future societal
benefit of their continued operation.

Conversely, because new resources are paid a “too-low” price, in-merit resources
have relatively weak incentives to enter. However, this may actually be a strength of the
June APR. When OOM is *unavoidably* present in the FCM and it causes the supply stack
to exceed the cumulative incremental installed capacity needs, it is *efficient* to provide in-
merit resources with weaker incentives to participate in the FCM. This may sound
paradoxical, so let me explain. Should all participants in the FCM be “efficiently
incentivized” to participate by payments equal to the economic price, such incentives will
coordinate their behavior so as to maximize social welfare. However, when some market
participants—such as OOM resources—have “more-than-efficient” incentives to
participate, social welfare is typically maximized by giving other market participants
“less-than-efficient” incentive to enter.

Q  PLEASE SAY MORE ABOUT WHY PAYING NEW RESOURCES LESS THAN THE
APR PRICE MAY ACTUALLY BE A STRENGTH OF THE JUNE APR.

A  If OOM resources are in ample supply, it is *prospectively* uneconomic to build new in-
merit supply just because such supply would have been more economical ex ante. If new
resources were paid the APR price, in-merit resources would have an incentive for such prospectively inefficient entry caused by the higher APR price. Instead, the June APR’s two-tier pricing approach has the effect of minimizing the cost charged through the ISO for new capacity: if some new resources receive side payments outside of the FCA, those resources are allowed to displace another new resource, even if that other new resource would have been more efficient but for the side payments.

Q PLEASE RECAP YOUR VIEW ON THE TWO-TIERED PRICING STRUCTURE OF THE JUNE APR.

A The June APR’s approach of paying new resources the FCA clearing price and paying existing resources the APR price is sound and sensible, for several reasons. First, should there be no OOM capacity, the FCA clearing price will be equal to the APR price and there will be no distortion of new in-merit bidders’ incentives to enter. Second, when the presence of OOM depresses the FCA clearing price below the APR price, the June APR still provides some incentive for new in-merit resources to enter, but only if their cost of new entry is sufficiently low. Such reduced new entry incentives are appropriate to more efficiently rationalize the capacity mix in the FCM. Finally, when the presence of OOM depresses the FCA clearing price below the APR price, paying the FCA clearing price could dissuade some high-cost OOM resources from inefficiently entering.

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19 Further, new resources are allowed to displace existing resources, potentially in two ways. First, if a new resource is bid below the FCA clearing price, that new resource will clear and an existing resource will no longer clear. (Put differently, such a low bid by a new resource will lower both the FCA clearing price and the APR price.) Second, if a new resource is bid between the FCA clearing price and the APR price, it will cause an existing resource to fail to clear—reducing the “overhang” of capacity supplied beyond Net ICR—while failing to clear itself.
**PART FIVE: OTHER ISSUES**

Q: ARE THERE ANY OTHER ISSUES YOU WOULD LIKE TO ADDRESS IN YOUR TESTIMONY?

A: Yes, there are two more issues that I would like to address. *First*, in their presentation on June 15, 2010, ISO-NE staff mentioned the possibility that they may “limit [the] period during which resources get the alternative price.” Such a time-limit creates several potential problems. *Second*, because of some bidders’ incentive for what I shall call “OOM evasion,” some resources designated as “in-merit” could actually be OOM. If so, the APR price determined by the June APR could be substantially suppressed below the economic price of reserve capacity.

Q: WHAT IS THE EFFECT OF PUTTING A LIMIT ON HOW LONG A RESOURCE IS QUALIFIED TO RECEIVE THE APR PRICE?

A: Such a time limit creates several potential problems. First and most important, when new entry is needed, potential entrants will not be able to count on future auction payments equal to the future economic price of reserve capacity, reflecting the marginal social value of reserves. With lower anticipated future auction payments, their stand-alone economic costs in each individual auction will be higher.\(^{20}\) In particular, new resources will demand an *initial* auction payment strictly in excess of what they would have demanded had there been no limit on how much time they would enjoy the APR price, after they have qualified as “existing” and become eligible to receive the APR price.\(^{21}\) Indeed, putting a time-limit on when resources can receive the APR price will not have

\(^{20}\) “Stand-alone economic cost” was defined in Part One.

\(^{21}\) The economic cost of a new entrant accounts for expected future FCA payments. Decreasing future auction payments by $1 just increases by $1 how much that new entrant will demand up-front.
the effect of decreasing the lifetime auction payments that need to be paid to capacity resources. Instead, such a rule will simply “move the payments forward” to when a resource is first needed. This could increase the volatility of the FCA clearing price and, indeed, require the price sometimes to substantially exceed “administrative CONE” before new resources are incentivized to enter—even if administrative CONE is sensibly chosen to reflect what otherwise would be a reasonable estimate of economic CONE.\textsuperscript{22} If risk-aversion is a significant factor for some resources, such volatility could also increase the expected cost of maintaining sufficient capacity.

**Q** WHAT IS “OOM EVASION”?

**A** Under the June APR, a resource is designated as OOM when (a) its bid is less than 0.8 times the Benchmark Offer for that resource (what I will call its “OOM threshold”) for that resource (see pg 36 of ISO-NE Presentation) and (b) this bid is not appropriately justified to the market monitor ahead of the auction, or when its delist bid is rejected for reliability reasons. Thus, a “truly OOM” resource whose economic cost is less than its OOM threshold could in principle avoid being designated as OOM by bidding its OOM threshold, instead of bidding its economic cost.

**Q** WHY MIGHT A BIDDER WANT TO EVADE BEING DESIGNATED AS OOM IN THIS WAY?

**A** For purposes of determining the APR price, its bid will be 0.8 times the Benchmark Offer. By contrast, if it submits a lower bid and is designated as OOM, its bid will be replaced by a higher bid equal to 0.9 times the Benchmark Offer. Thus, a bidder with

\textsuperscript{22} “Economic CONE” and “administrative CONE” were defined in Part One.
buyer-side market power—who stands to gain when the APR price is lower—may have an incentive to engage in OOM evasion.

Given OOM evasion, the set of resources designated as “out-of-market” could be biased not to include “truly OOM” resources controlled by bidders with buyer-side market power. In other words, the set of resources designated as “in-merit” could include some “truly OOM” resources that enjoy substantial market power. If so, bidders with buyer-side market power could, using the defined OOM threshold, successfully suppress the APR price below the economic price of reserve capacity.

The possibility of OOM evasion by those with buyer-side market power is not new to the June APR. Under the February (and Historic) APRs, bidders with buyer-side market power also have the ability to potentially lower the APR price via OOM evasion.

**Q** IS “OOM EVASION” MORE OR LESS OF A CONCERN UNDER THE JUNE APR?

**A** On balance, OOM evasion by bidders having buyer-side market power appears to be less of a concern under the June APR than under the February APR. The reason is that, in the June APR, raising one’s bid to the OOM threshold has an additional cost for such bidders of raising the FCA clearing price. Thus, any benefit from lowering the APR price paid to existing resources could be partially offset by the cost of raising the FCA clearing price paid to new resources.

**PART SIX: CONCLUSION**

**Q** CAN YOU PLEASE SUMMARIZE THE MAIN POINTS OF YOUR TESTIMONY?

**A** In my testimony, I have tried to emphasize a few main points.  

*First*, the June APR represents a substantial improvement over the February APR, in terms of generating an APR price that reflects the cost of new entry when new entry is
needed or when the need for new entry has been deferred due to carry-forward OOM resources.  

Second, the two-tier pricing approach introduced in the June APR is sensible and economically sound. Third, some features that ISO-NE is considering adding to the June APR—such as a limit on how long resources can qualify as “existing” to receive the APR price—may undermine its performance.

Q DOES THIS CONCLUDE YOUR TESTIMONY?

A Yes.
UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

New England Power Generators Association Inc. )
v. ) Docket No. EL10-50-000
ISO New England Inc. ) )
PSEG Energy Resources & Trade LLC, PSEG Power ) Docket No. EL10-57-000
Connecticut LLC, NRG Power Marketing LLC, Connecticut )
Jet Power LLC, Devon Power LLC, Middletown Power LLC, )
Montville Power LLC, Norwalk Power LLC, and Somerset )
Power LLC )

v. )
ISO New England Inc. )

I, David L. McAdams, being duly sworn, depose and state that the contents of the foregoing
Testimony on behalf of the New England Power Generators Association is true, correct, accurate
and complete to the best of my knowledge, information, and belief.

_____________________________________
David McAdams

SUBSCRIBED AND SWORN to before me this _____ day of June 2010.

_____________________________________
(Notary Public)

My commission expires: ____________