



Monitoring
Analytics

Proposal of the Independent Market Monitor re PJM's Capacity Performance Proposal

The Independent Market Monitor for PJM

October 28, 2014

This page intentionally left blank.

Introduction

PJM's Capacity Performance Proposal of October 7, 2014, is a timely, significant and constructive effort to address the significant issues with the current Reliability Pricing Model (RPM) capacity construct. PJM's October 7 Proposal reflects significant positive changes from its initial proposal. The IMM agrees with the fundamentals of the PJM approach. In this proposal we specify areas of agreement and areas of disagreement.

The IMM has identified issues with price formation and issues with performance incentives in the RPM model.¹ PJM's opening of the RPM design for significant modifications and improvements provides the appropriate opportunity to ensure that these issues are addressed. The IMM's proposal is made in response to the PJM October 7 proposal and also incorporates substantial elements of the recently approved proposal by ISO-NE to modify the ISO-NE capacity market.²

Well functioning capacity markets will ensure customers that reliability is being provided at the lowest possible cost, but no lower. In order to do that, well functioning capacity markets will ensure that prices are high enough to incent entry of new units and retention of existing resources, but no higher. In order to do that, well functioning capacity markets will ensure that resources are paid based on their performance consistent with performance in an all energy market, and thus that high performing resources will be rewarded and poorly performing resources will not be rewarded, regardless of the reasons for that performance.

¹ The most recent reports are Monitoring Analytics, LLC, "The 2017/2018 RPM Base Residual Auction: Sensitivity Analyses Revised," (August 26, 2014). Monitoring Analytics, LLC, "Analysis of the 2016/2017 RPM Base Residual Auction," (April 18, 2014). Monitoring Analytics, LLC "Analysis of Replacement Capacity for RPM Commitments: June 1, 2007 to June 1, 2013," (September 12, 2013). There is a complete list of capacity market related reports in the 2014 *State of the Market Report for PJM: January through June* which can be found at www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2014/2014q2-som-sec5.pdf.

² FERC Order Granting Rehearing for Further Consideration, Docket Nos. ER14-1050-002 and EL14-52-001(July 28, 2014).FERC Order 147 FERC ¶ 61,172 (May 30, 2014). ISO New England Inc. and New England Power Pool, Filings of Performance Incentives Market Rules Changes, Docket No. ER14-1050-000 (January 17, 2014). Answer of ISO New England Inc. in Opposition to NEPOOL Alternative Proposal Docket No. ER14-1050-000 and -001 (February 12, 2014). Motion for Leave to Answer Out-of-Time and Answer of ISO New England Inc. Docket No. ER14-1050-000 and -001 (March 3, 2014).

Definition of Capacity

The RPM capacity market design in PJM was created and defined as a result of revenue sufficiency issues in the energy market. The design of the capacity market reflected this tight integration between energy and capacity markets. The sale of capacity in the capacity market meant that the capacity had to be physical, that the energy from the capacity had to be deliverable to all loads in PJM, that the energy from the capacity had to be offered into the day-ahead energy market and real-time energy market every day, that the energy from the capacity was recallable in an emergency, that capacity resources had to meet minimum performance requirements and that owners of capacity resources had to report outage data.

Physical capacity is needed in order to provide the reliable delivery of energy under all system conditions. In practice that means, for example, that a firm liquidated damages contract is not physical and cannot be capacity. Payment of liquidated damages is not considered an acceptable substitute for the delivery of energy during a period when load approaches the capability of the generating capacity.

Deliverability means that the transmission system must be capable of delivering the energy output from the resource under peak conditions to load anywhere in PJM. Deliverability is enforced by requiring the builder of new capacity to pay for any transmission upgrades necessary to ensure that the energy is deliverable, according to transmission system analysis done by PJM and the transmission owners. This provides a strong incentive to locate where the transmission system is robust and also provides a market signal about the full cost of new capacity when transmission system upgrades are required.

In recognition of the tight integration between PJM energy and capacity markets to ensure reliability and revenue sufficiency, capacity resources are required to offer energy output equal to their full installed capacity value into the day-ahead energy market every day. This requirement reflects the fact that the purpose of the capacity market is to help ensure revenue sufficiency for units operating in PJM's energy markets rather than creating a standalone capacity product.

Energy from all capacity resources that clear in a capacity auction is recallable by PJM in an emergency. This ensures that even when such energy is being exported, PJM customers who paid for the capacity to ensure reliability, have a call on that energy at the PJM market clearing price if the energy is needed to meet load in PJM.

The basic elements of the RPM capacity market design should continue to include the definition of capacity as an annual product, a must offer requirement for all capacity resources, a must buy requirement for all load, the recognition that capacity is a physical

product, performance incentives and a net revenue offset as the link between energy and capacity markets. The RPM design includes a sloped demand curve with defined inflection points, a three year forward procurement, a locational market definition, and market power mitigation rules.

IMM Capacity Market Design Proposal

PJM organized its October 7 updated proposal by section. The IMM proposal uses the same section titles for ease of comparison.

Section II – Capacity Products: PJM proposes two capacity products, the capacity performance product and the base product. PJM recognizes that there should be a transition to a single capacity performance product. PJM proposes that all new resources be capacity performance.

The IMM proposes that there be only a single capacity performance product with one set of performance incentives. There is no reason to have multiple products. With well designed performance incentives, all sources of capacity can determine how to offer the single capacity product consistent with the physical limits of the resource and the reliability needs of the PJM system.

The IMM recognizes that there may be transition issues for some specific units/resources. Other units/resources face more substantive issues. Such units have physical reasons for limited performance, e.g. intermittent resources and limited or extended summer demand resources. Any transition issues can be managed within a single product definition by limiting the potential penalty payments of units with unavoidable performance issues (PJM's definition of base capacity) to 1.0 times capacity market revenue received for the transition period.

If there is to be a transition as proposed by PJM, the transition should not exceed two years and the date of full transition should be specified in the tariff. This would mean a single product in the 2020/2021 delivery year. A longer transition period would only mean that resources that are not standalone capacity would have a continuing incentive and ability to participate as capacity resources with the attendant price suppressive and reduced reliability effects on the capacity market. The IMM supports the proposal to require all new resources to be capacity performance.

The IMM proposes that all capacity be required to be physical, including identifying the exact source of the capacity. For imports, units must be pseudo tied and be able to demonstrate that they can function electrically as if they were internal to PJM. All capacity resources must make economic offers into the day-ahead energy market every day at full ICAP level.

Market power continues to be endemic to the PJM capacity market as a result of the ownership structure of capacity resources. While moving towards an offer cap of net CONE eliminates some elements of market power review or reduces their significance, it creates others. The must offer requirement should be retained because the capacity market cannot function without a must offer requirement. ACR will continue to require review as will the various components of capacity market offers. Equal and open access to interconnection queues and elimination of queue bottlenecks becomes a more urgent issue.³

In the event that there are both a capacity performance product and a base product for a transition period, all capacity that offers as base must make a coupled offer including an offer for capacity performance reflective of the costs of meeting performance obligations. Only resources physically incapable of being capacity performance may offer as base only. Such resources include intermittent resources.

PJM's proposal to limit year to year changes in capacity prices should not be included in the design. The capacity price should reflect the market fundamentals even when that means a significant decrease in the price or a significant increase in the price. Artificial limits on price movements in a market are inconsistent with efficient, competitive markets.

Section III – Demand Response and Energy Efficiency: PJM proposes that demand response continue to be included in the capacity market but that it makes bids to reduce demand rather than supply offers. PJM proposes to continue to pay EE through the capacity market and to continue to include the PRD option in the capacity market.

The IMM proposes that the limited DR product be eliminated immediately and that the extended summer DR product be eliminated after a two year transition period. Only annual products would be included in the capacity market after the transition. Such products could make demand side bids subject to the capacity performance penalties and subject to verification based only on actual metered usage during the high load periods identified by PJM. Substantial work is required in order to define the obligations of demand side resources and the verification of demand side performance. Current measurement and verification is inadequate and is inconsistent with the proposed performance incentives for generation resources.

³ See the 2014 *State of the Market Report for PJM: January through June*, Section 12 – Generation and Transmission Planning
<http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2014/2014q2-som-pjm-sec12.pdf> (August 14, 2014).

The IMM agrees that the capacity market should no longer include any demand side resources on the supply side of the market, including energy efficiency resources (EE). Demand side resources should be on the demand side of the market. PJM needs to take clearly defined steps to facilitate such demand side participation. Load that does not want to pay for capacity and is willing to interrupt its use of capacity when that capacity is needed by those who do pay for it, should be able to avoid paying for capacity. That is the demand side of the market as it should work and can work.

Section IV – Methodology for Establishing Maximum Product Quantities: PJM will conduct analysis in order to establish the maximum quantities of limited products that may be cleared in capacity auctions, including a total cap on base capacity and a subcap on DR and EE.

The IMM proposes that if there is a base product included in the first year design, that all base products be eliminated after a two year transition period. The cap on the amount of base product should be reduced in the second year of the transition as should the subcap on DR and EE.

No new base capacity should be permitted, including limited DR, extended summer DR or EE.

Section V – Unforced Capacity (UCAP) Calculations and Installed Reserve Margin (IRM): PJM proposes to eliminate OMC outages with the exception of outages related to unavailability of the transmission or distribution systems.

The IMM proposes that there be no excuses for generator nonperformance. If a unit does not perform it should pay the appropriate penalty, without exception. If the unit does perform it is paid the appropriate incentive, without exception. Performance in high load hours is required at the full ICAP level.

The capacity market should include clear performance incentives consistent with those that exist in an all energy market. The appropriate performance incentives increase payments when resources provide energy during high demand periods and reduce payments when resources do not provide energy during high demand periods. The IMM recommends a two settlement approach like that proposed by ISO-NE which is based on MW deviations from required performance measured as a share of the total requirement for capacity in an hour.

Consistent with that design objective, there are no excuses for lack of performance. Failure to perform means paying back a proportionate share of capacity market revenues with the potential of paying back more than the revenues in the case of poor performance subject to an appropriate cap on negative payments. The IMM proposes a limit on net negative payments by capacity resources comparable to the ISO-NE stop loss provisions.

Section VI – Capacity Performance Availability and Flexibility Requirements: PJM proposes specific eligibility, performance, availability and flexibility requirements for the defined capacity products. PJM proposes that during hot or cold weather alerts that units be held to physically based parameters and that notification periods be limited to one hour.

The IMM proposes that capacity resources be required to offer full ICAP into the day-ahead energy market. The outage rate used to calculate the lower UCAP level from the full ICAP is not relevant to the expected performance in a high load hour. The full installed capacity of the unit should be available to perform. That is the current performance requirement for capacity which sells UCAP in the capacity auctions and is required to perform at ICAP unless on an outage. The forced outage rate is one of the performance incentives in the capacity market. A requirement to offer only UCAP in the energy market would weaken that incentive.

The IMM agrees that capacity resources should be required to use parameters based on physical capability of units, but recognizing that physical capabilities can generally be improved through investment. Such parameter limits are financial not physical. The use of historical parameters is one benchmark for required performance but is not dispositive given that many units have used inappropriately inflexible parameters in recent years.

The essential point is that if units are called on and do not perform, they pay penalties and that parameters are not an excuse for nonperformance.

The IMM agrees with PJM that incentives to follow dispatch need to be retained in the capacity performance incentive structure. For example, if a unit is constrained down by PJM it would not incur a performance penalty.

A key parameter of all generator offers in the energy market is the price. If a unit is not dispatched by PJM during a high load period as a result of a high offer price, the unit should pay a nonperformance penalty to the extent that it would have been dispatched on its cost-based offer.

Section VII – Changes to Base Capacity Requirements: PJM proposes to establish requirements for Base Capacity.

The IMM proposes that if there is a base capacity product for a transition period that the base capacity have the same performance requirements as the capacity performance product with the exception that the time period of the obligation of the base resource should be limited to the period from May 15 through September 15.

Section VIII – Peak Period Performance Assurance: PJM proposes penalties that would apply for non performance by capacity resources. PJM proposes a two tier penalty with the first tier equal to net CONE divided by 350 hours and the second tier set at the scarcity price of \$2,700 per MWh.

The IMM proposes that the performance incentives should be linked directly to net CONE spread over an estimate of high load hours. For example, with a net CONE of \$351.78 per MW-day, or \$128,400 per MW-year and 100 high load hours per year, the hourly performance rate would be \$1,284 per MWh. For 50 high load hours per year, the hourly performance rate would be \$2,568 per MWh. For 40 high load hours per year, the hourly performance rate would be \$3,210 per MWh. The IMM recommends the use of no more than 50 high load hours per year. This is a conservatively high number of high load hours given historic scarcity hours but appropriately reflects that high load hours for required capacity performance include more than defined scarcity hours. If a unit provided more than its proportional share of energy in the high load hour, it would receive this payment and if a unit provided less than its proportional share of energy in the high load hour it would make this payment. The performance requirement should be a function both of total required generation and the unit's share of the total requirement for capacity on the system.⁴ Again following the FERC approved ISO-NE design, the IMM recommends that these payments be made by generators with below required performance to generators with above required performance. Load payment obligations would be determined in the auction and would not increase or decrease based on generator performance in the delivery year.

Performance cannot be limited to specific hours and cannot exclude any hours. Performance incentives must apply to all high load hours, regardless of when they occur or how many such hours occur consecutively.

The IMM proposes a monthly and annual stop loss provision consistent with those approved by FERC for ISO-NE.

Section IX – Product Offer Requirements: PJM proposes the current must-offer requirement and market mitigation rules would apply for the generation resources offering the Base Capacity product with the addition of a performance risk adder to reflect the increased penalty exposure for Base Capacity resources requirement.

The IMM agrees with PJM's proposed approach to market power mitigation for base resources if base resources are included in the transitional capacity construct.

⁴ The design of the incentives follows FERC Order 147 FERC ¶ 61,172 (May 30, 2014).

PJM proposes to accept the IMM's approach to offer caps for capacity performance resources.

The IMM proposes that the capacity market should include an explicit price formation mechanism designed to result in prices equal to the amount of the net revenue shortfall. This is net CONE (cost of new entry). Net CONE is the gross annual cost of new entry for a peaking unit net of expected revenues from the energy, ancillary services and other markets, including uplift payments. To the extent that net CONE is positive, the other PJM markets are not providing enough revenue to induce entry or to sustain existing investments and net CONE must be consistently recovered in the capacity market.

The IMM proposes that offers in the capacity market be capped at net CONE, adjusted for the ratio of total demand to total capacity purchased.⁵ There is no need for an additional risk premium as relevant risk is captured in the rate of return included in the net CONE calculation.

The IMM recognizes that this would be a substantial departure from the current price formation process but it is a change that is required if the capacity market is to function as intended. IMM analysis has shown that prices which would result from an RPM construct with its major flaws corrected are close to net CONE.⁶ Competition could reduce actual clearing prices to levels below net CONE or above net CONE but the expected equilibrium price is net CONE. The demand or Variable Resource Requirement (VRR) curve is unaffected by this recommendation.

Section X – Cost Allocation: PJM proposes to maintain the current allocation of capacity costs to LSEs based on the summer peak load measured as the average of the five coincident peak loads.

The IMM proposes that the cost allocation for capacity costs be modified to be consistent with the fundamental capacity performance design. The costs of capacity should be allocated to LSEs using the same high load hours during which capacity resources are required to perform or pay a penalty. It is essential to the incentive structure of the market that the payments for capacity be linked to the hours during which capacity is valued. This will in turn provide the appropriate incentive for those customers wishing

⁵ Additional details are required to make this concept precise and operational including the need to address unit performance and the option for existing resources to increase offers above net CONE if net ACR is greater than performance revenues.

⁶ BRA sensitivities report Monitoring Analytics, LLC, "The 2017/2018 RPM Base Residual Auction: Sensitivity Analyses Revised," (August 26, 2014).

to avoid paying for capacity by interrupting load in the same hours that PJM values capacity.

Section XI – Application to FRR Entities: PJM proposes to make the Capacity Performance requirements equally applicable to Fixed Resource Requirement (FRR) Entities.

The IMM supports PJM's proposal to make the Capacity Performance requirements equally applicable to Fixed Resource Requirement (FRR) Entities.

Section XII – Short-Term Resource Procurement Target: PJM proposed to eliminated the 2.5 percent offset to the VRR curve, known as the Short-Term Resource Procurement Target.

The IMM supports PJM's proposal to eliminate the Short-Term Resource Procurement Target.

Section XIII – Transition Auction Mechanism for Delivery Years 2015/16, 2016/17, 2017/18: PJM proposes a detailed transition mechanism for each of the next three delivery years, 2015/16, 2016/17, 2017/18.

The IMM believes that PJM's proposals are a good starting point for defining transition rules but also believes that additional analysis is required to more accurately define the need for additional capacity for the 2015/2016 delivery year and the need for limited amounts of performance capacity for the 2016/2017 and 2017/2018 delivery years. The IMM believes that defined interim steps should be taken for these delivery years.

PJM has indicated a need to acquire additional resources and to enhance performance requirements for the 2015/2016 delivery year, although the BRA for that year has been run and prices established.

For the 2015/2016 delivery year, the IMM recommends that performance requirements be immediately enhanced by: eliminating all OMC outages; eliminating all lack of fuel outages for calculating performance; putting 100 percent of capacity market revenues at risk; and applying the same performance incentives to all resources. There is no reason not to make all these changes immediately. These are minimum requirements for capacity resources to meet performance obligations and should have been implemented in prior years.

The IMM recognizes that additional steps may be needed for the 2015/2016 delivery year in order to ensure reliability.

For the 2016/2017 and 2017/2018 delivery years, the defined interim steps should include steps addressed to price formation and steps addressed to performance incentives. The

interim steps related to price formation should include: elimination of the 2.5 percent shift of the demand curve; elimination of the limited demand response product; elimination of the summer unlimited demand response product; potential substitution of a true demand side product for the annual demand response product; and inclusion of all required and appropriate fuel related costs in ACR and APIR. The interim steps related to performance incentives should include: eliminating all OMC outages; eliminating all lack of fuel outages for calculating performance; putting 100 percent of capacity market revenues at risk; and applying the same performance incentives to all resources.