PJM’s Response

to the

2014 State of the Market Report

May 15, 2015

PJM Interconnection
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Introduction

The 2014 State of the Market Report issued by PJM's Independent Market Monitor (IMM) provides an assessment of market performance and recommendations aimed at enhancing PJM's market design or market performance. The Market Monitor performs an important role in providing an independent assessment of market performance and provides valuable insights in its conclusions and recommendations. This report will provide to stakeholders PJM's observations on the market and evaluations of each substantive recommendation offered by the IMM.

In the 2014 State of the Market Report, the IMM concludes that the PJM markets work. The IMM concludes that the results of the PJM Energy, Capacity, Regulation, Synchronized Reserve, Day-Ahead Scheduling Reserve and Financial Transmission Rights (FTR) markets were competitive. PJM believes the observed market results support these conclusions.

In the 2014 State of the Market Report, the data, information, analysis, and recommendations are organized by market type (Energy, Capacity, Ancillary Services and FTRs) and by specific topic area that touches on PJM markets (Operating Reserves, Demand Response, Generator Net Revenue, Environmental and Renewable Energy Regulation, Interchange Transactions, Congestion and Marginal Losses, and Generation and Transmission Planning). This paper follows a similar structure to provide easy reference to PJM's responses to the 2014 State of the Market Report conclusions and recommendations.

PJM's Markets Produce Competitive Results to Ensure Reliability at Least-cost

In 2014 the results of PJM's markets were competitive with offer behavior consistent with marginal costs, and market prices consistent with the marginal cost of delivering one more megawatt (MW) or megawatt-hour (MWh) to the market at a specific location. Further, observed entry and exit taking place from the PJM market is consistent with fundamental market competitiveness from the perspective of cost-effectiveness and innovation.

PJM maintains reliability through its markets. Reliability in real-time operations in maintained through security constrained unit commitment in the Day-Ahead and Real-Time Energy Markets through the use of Locational Marginal Prices (LMP) and market-based provision of Ancillary Services. Resource adequacy is maintained through the Reliability Pricing Model (RPM) Capacity Market to ensure sufficient resources both system-wide and in the right locations to serve peak load. All of these market mechanisms interact to produce competitive outcomes where reliability is achieved in the most efficient, cost-effective manner possible.

Given that power markets do not always mirror the characteristics of textbook competitive markets, the fact that the wholesale power markets in PJM have consistently achieved competitive results is a good indication that the fundamental design of the energy, ancillary services, and capacity market mechanisms are sound. Together with appropriate market power mitigation in place, the market design incents resources to offer at or close to marginal or incremental costs.

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2 2014 SoM Report at 1.
Beyond Traditional Measures ofCompetitiveness

In a power market and regulatory context, competitiveness is usually evaluated in the context of market behavior (offering services at marginal cost) or structure (the concentration of ownership that could permit resources to profitably execute economic or physical withholding to drive market prices above marginal cost). Beyond these traditional discussions of competitiveness, there are other aspects of market competitiveness, some of which are essential to ensure competitiveness, while others are a result of competitive forces.

These non-traditional measures of competitiveness in PJM’s markets fall into three general areas: 1) Retirement and new entry of generation resources; 2) Uplift and price formation; and 3) Gas-electric coordination. Going forward these issues will only increase in importance. The FERC has just recently issued the final rule on gas-electric coordination and has established an ongoing inquiry into price formation and uplift. Additionally, the EPA Clean Power Plan is due to be finalized by the summer of 2015 which could lead to more retirements. These three areas can be viewed through the lens of: a) information transparency; b) price formation; c) robustness to change; and d) the management and allocation of financial risk.

Transparency as an Essential Element to Ensure Competitiveness

One essential element of competitiveness that the IMM has continued to emphasize, and which PJM supports, is information transparency. Transparency of information allows market participants to make offers into PJM’s markets consistent with their “true” marginal costs, and allows efficient and economically rational decisions on entry and exit. In some cases the transparency of information comes directly from within the PJM market design, in other cases it must come from outside the PJM market design, and this raises the question of what PJM can do to better coordinate our markets with outside market dynamics to ensure better information.

A prime example of transparency facilitated by the PJM market design is the general long lead time resources provide for retirements. On average, resources are providing at least a 30-month notice. Figure 1 shows the distribution of notice times for pending retirements. Figure 1 shows many notices are more than three years in advance due to rules in the RPM Capacity Market that effectively require a retirement notice if resources want to be exempt from offering into RPM.

Figure 1 - Distribution of Deactivation Lead Times
PJM’s market design provides transparency to the market regarding retirements that leads to efficient new entry of other resources if they are needed. PJM’s experience stands in sharp contrast to other market areas where there has been less transparency regarding retirements, and Reliability Must-Run (RMR) arrangements have been more numerous and pronounced.

Price Formation that Ensures Individual Rationality is Essential to Competitiveness and Reliability

Power system operation and wholesale power markets do not always lend themselves to simple expression of prices, and one example is energy prices that can be expressed in $/MWh that cover all costs of all units. This is because generator operation has many discontinuities such as start-up and shut down costs, minimum run times, minimum down times, start times, minimum dispatch levels. Respecting these physical unit characteristics can result in the need for uplift payments, meaning that all the costs for which a given unit must be compensated are not reflected in the transparent $/MWh LMP.

Uplift payments to generators, along with energy payments in $/MWh form a set of prices that match dispatch instructions and ensure reliability in operations. These uplift payments, which could be thought of as unit specific prices needed to ensure reliability, are what economists would call “individually rational”. Stated another way, if these prices alone were sent to generators along with dispatch quantities, the prices alone would give the generators the incentive to exactly match those dispatch quantities. Without such prices, generators would have no incentive to follow dispatch instructions and would jeopardize reliable operations.

Uplift may also come from conservative practices in dispatch operations and a need to commit resources outside of the market to ensure certain reliability services, such as black start and reactive power, are provided. Alternatively, uplift may arise from the need to ensure sufficient resources, especially gas-fired resources, are available to meet winter peak loads when generation is competing with heating load for commodity gas and pipeline transportation. To the extent that such commitments can be done within the market itself, it is possible to minimize this uplift and the resulting “unhedgable” costs as discussed below.

Figure 2 below shows the improvements in uplift broken out by category. Outside of the winter months of 2014 and 2015, uplift over the past two years has been significantly reduced as many of the reliability commitments are being accounted for the Day-Ahead Energy Market which leads to the same individually rational price formation, but also minimizes uplift.

Figure 2 - Uplift Payments over the Past Two Years
Uplift payments are one area where increased transparency may be of benefit to the market. PJM is in the process of considering current confidentiality rules and what actions could be taken to increase transparency around uplift payments in response to stakeholder requests and to recommendations made in the 2014 State of the Market Report.

**Robust Ability to Handle Significant Changes in Market and Economic Conditions**

A good market design is flexible, and should not favor any one technology, fuel, size, or vintage of any resource. Under such a paradigm, market participants can make efficient, cost-effective decisions given the changing environment. Over the past seven years, the power industry has witnessed the emergence of shale gas, increasingly stringent environmental policy, flat or declining energy demand, and major technological advancements like no other time in the past. Information transparency has also enhanced this flexibility in that all market participants have information regarding retirements.

PJM’s markets have easily admitted the changing dispatch patterns from coal to gas, with exception of the winter of 2014. More than 26 GW of retirements from 2009-2016 (nearly 15 percent of the installed capacity) have easily been absorbed by new entry combined cycle gas and Demand Resources while still maintaining reserve margins above the target reserve margin, and with very few Reliability-Must-Run arrangements.
Table 1 shows the amount of new generation resources clearing, and the cleared reserve margin, for the last four Base Residual Auctions (BRA). Almost all of the new generation resources are combined cycle natural gas facilities that are benefiting from the technology and efficiency improvements along with low cost fuel and environmental regulations.

Table 1 - New Generation and Cleared Reserve Margins in the Last Four BRAs

<table>
<thead>
<tr>
<th>BRA Year</th>
<th>BRA Delivery Year</th>
<th>New Generation</th>
<th>Generation Uprates</th>
<th>Cleared Reserve Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>2017/2018</td>
<td>5,927.4</td>
<td>339.9</td>
<td>20.1%</td>
</tr>
<tr>
<td>2013</td>
<td>2016/2017</td>
<td>4,281.6</td>
<td>1,181.3</td>
<td>21.1%</td>
</tr>
<tr>
<td>2012</td>
<td>2015/2016</td>
<td>4,898.9</td>
<td>447.4</td>
<td>20.2%</td>
</tr>
<tr>
<td>2011</td>
<td>2014/2015</td>
<td>415.5</td>
<td>341.1</td>
<td>19.6%</td>
</tr>
</tbody>
</table>

Demand Resources are often a lower-cost alternative that provides an option value to some market participants to wait for better information on whether the current economic trends will continue. Figure 3 shows the change in offered and cleared Demand Resources in the RPM capacity market which have also helped to support the cleared reserve margins shown in Table 1.

Figure 3 - Offered and Cleared Demand Resources and Energy Efficiency in RPM
Finally, wholesale energy prices have fallen dramatically since the 2006-2008 period as natural gas prices have fallen and total energy demand has remained relatively flat on a weather normalized basis. Figure 4 shows the actual and fuel cost adjusted wholesale energy market prices over time. The secular change in fuel costs and demand are readily apparent in wholesale energy prices showing how flexible the wholesale market is to changing economic conditions.

![Figure 4 - Load-Weighted Average LMP and Fuel Cost Adjusted LMP](image)

**Competitive Markets Allocate Financial Risk among Market Participants**

One result of competitive markets is the ability to manage financial risk and to allocate the financial risk to those best able to bear that risk. Because of the transparency regarding the exit or retention of existing resources due to economic and environmental policy conditions, the owners of those resources can see the costs of going forward versus the likely new entry that would occur under these market conditions. Retirement decisions, and any associated costs not yet recovered on resources, are borne by generation owners.

In the past two years there has also been a change in how new resources are being financed. Given the historically low interest rates and generally lower returns, new entry is benefitting from financing terms and conditions where banks are competing to lend money which results in a lower cost of debt. Additionally, there are equity investors willing to accept lower returns than has historically been the case. Finally, financial players are involved in taking on risk through signing hedging agreements of three to seven years tied to the output of the new entrants.

In contrast, in a regulated paradigm, many of existing resources may have inefficiently installed pollution controls to continue in operation with the risks associated with the additional costs being borne by consumers. Analogously, new entry being market driven ensures only the most cost-effective resources enter, and without any guarantee that consumers will bear the burden of the entire cost of the new resource if it performs poorly or turns out to be uneconomic. The transparency on returns in the competitive market framework allows projects to be built at a lower cost of capital than has historically been the case under the regulated paradigm.

Minimizing uplift to the extent possible reduces the amount of “unhedgable” risk in the energy market. Financial markets outside of PJM allow market participants to hedge against price risk, but no such mechanisms or contracts exist for uplift charges. To the extent that uplift is minimized, energy market risk can be better allocated to those who can bear the risk.
Significant Events in 2014 and Proposed Changes

January 2014 Winter Weather: Polar Vortex and Winter Storms

In early January of 2014, sustained arctic temperatures – known as the “polar vortex” – tested the limits of reliability in the PJM system. During the first week of January, record cold temperatures leading to all-time winter peaks along with record generator outages resulted in the implementation of shortage pricing and calls for voluntary use of Demand Resources which had no obligation to perform. Effective price formation from the implementation of shortage pricing provided the economic incentive for Demand Resources to respond and for imports to come into PJM to ensure reliability. January 2014 was a vivid reminder that weather threats to the region’s electric grid are not limited to the heat and humidity of summer.

The impacts of the January 2014 on the system were extensive:

- Eight of the 10 highest winter peaks PJM had experienced up until that time occurred in January 2014;
- Demand frequently reached levels 20,000 to 30,000 megawatts higher than during a typical January;
- On Jan. 7, when the PJM region reached new all-time winter peaks, more than 40,000 megawatts of generating capacity were unavailable – 22 percent of system capacity and 30,000 megawatts more than expected;
- The inability of some generators to secure natural gas supplies or to run as needed on back-up fuel;
- The use of inflexible operating parameters by generators to ensure gas supplies that led to a record amount of uplift.

The January 2014 events calls attention to many of the recommendations the IMM has made in previous State of the Market Reports regarding performance incentives for capacity resources, the need to enforce annual performance for Demand Resources, and for ensuring as much flexibility as possible regarding generator operating parameters.

While power continued to flow without interruption on the high-voltage transmission system in spite of all these challenges, January 2014 made transparent the need for market design improvements, many of which have are identified in the 2014 State of the Market Report.

Capacity Performance

In light of the urgent need to address issues that have been building for some time and were highlighted during January 2014, PJM stakeholders undertook an intensive review process to identify how to enhance the capacity market to help improve generator performance, availability and flexibility as well as to ensure the security of generator fuel supplies.

The Capacity Performance proposal that evolved through months of discussion addresses issues identified by the IMM State of the Market Reports as well as new market realities – namely, the coal-to-gas fuel transition and its impacts on the way capacity helps to ensure reliability.

PJM’s capacity auction construct has been successful in attracting new generation and ensuring resource adequacy but it has been less effective at providing sufficient incentives for generator performance during system peaks and in ensuring all procured capacity is obligated to perform during the entire year. Effective incentives for generator performance should incentivize generators to invest in fuel security such as gas infrastructure development or dual fuel capability and provide sustained support for investments in existing generation such as weatherization. This was a key lesson from January
2014. Lengthy periods of arctic cold strained the power system and showed that PJM needed to rethink the way generating capacity is defined, maintained and compensated.

At the end of 2014, PJM filed with the FERC a Capacity Performance proposal to enhance reliability by strengthening the obligation for capacity resources to deliver energy when the system is most in need, with payment depending on whether and how well a capacity resource meets its commitment. In this pay-for-performance construct, meeting the capacity obligation would be the minimum level of acceptable performance for a generator. Over-performing generators would be rewarded with funds collected from generators that under-perform. The filed Capacity Performance proposal effectively adopts most, if not all, of the IMM’s recommendations with respect to the RPM capacity market and many of the associated recommendations regarding Demand Resources as discussed in the 2014 State of the Market Report.

Capacity Performance will promote investment to build or upgrade generation resources. It will reward resources regardless of technology or fuel type for power production when it is needed most. In addition to the Capacity Performance proposal, PJM proposed improvements to market rules (currently pending at the FERC) to reduce inflexibility in generator operating parameters that will have the effect of ensuring performance and further reduce uplift payments.

**RPM Auction Results**

In 2014, the PJM Reliability Pricing Model Capacity Market proved to be a valuable tool in helping PJM and its members manage the reliability impacts of the coal-to-gas fuel transition. Under RPM, resources are procured three years in advance to meet system needs. In the latest capacity auction for the 2017/2018 delivery year, PJM secured 167,004 megawatts. This is the second full Delivery Year beyond the extended compliance deadline with the EPA Mercury and Air Toxics Standards (MATS).

The 2017/2018 auction procured 5,927 megawatts of capacity from new generation; the highest amount of new generation in an auction since the start of RPM in 2007. The shift to increased amounts of new natural gas-fired generation was evident, with about 4,800 megawatts of new combined-cycle gas generation clearing for the first time in the auction.

Energy efficiency also continued its growth trend in PJM’s capacity auctions. A record of 1,339 megawatts of energy efficiency was procured in the auction, an increase of 222 megawatts from last year.

The results of the auction reflected the FERC-approved changes to set a limit on capacity imports and to require increased operational flexibility from demand resources.

Changes that the Capacity Performance proposal would bring to RPM are intended to strengthen the level of commitment and performance that capacity resources make to PJM.

**Interregional Cooperation Expands**

In order to support reliability across the Eastern Interconnection and promote effective market interactions, grid operators have developed operating agreements that establish frameworks for coordination and cooperation.

Under their joint operating agreement, for example, PJM and the NYISO implemented a Coordinated Transaction Scheduling system to streamline electricity movement across their borders and reduce production costs and partly addresses one of the IMM’s recommendations regarding collaboration with adjacent regions to better optimize interchange.
The scheduling system enables market participants in PJM and NYISO to gain access to the least-expensive power sources in the two regions while helping grid operators use their connecting transmission lines more efficiently. The system also factors projected price differences between the two markets into scheduling decisions.

Annual production-cost savings for the scheduling system are estimated to reach up to $26 million.

Other initiatives implemented previously by PJM and NYISO included market-to-market coordination and intra-hour transaction scheduling.

PJM, the Midcontinent ISO, and their respective stakeholders also have been examining a lengthy list of enhancements to their joint market coordination and planning. Among the issues worked in 2014 are enhanced data exchange, day-ahead market coordination, coordinated transaction scheduling, optimizing interchange, capacity deliverability, generation interconnection queue and study coordination and cross-border planning projects. Many of these initiatives also go toward addressing some of the IMM recommendations regarding interchange transactions listed in the 2014 State of the Market Report.

The two grid operators gained approval from the FERC in 2014 for changes to their joint operating agreement to better coordinate the handling of incremental auction revenue rights between them.

The rapidly evolving electricity industry demands an approach that is attuned to and prepared for change. PJM’s ability to anticipate change, its willingness to adapt and its collaboration with members, stakeholders, and neighbors to advance effective solutions benefits the region and the reliability of the high-voltage electric grid.
PJM Response to IMM Recommendations from the 2014 State of the Market Report

Some recommendations made by the IMM have been repeated in past State of the Market Reports. Some of these recommendations have already been addressed or are being actively discussed within the stakeholder process. Several of the recommendations have been discussed by stakeholders in the past and have not been adopted or have been decided in a different direction by the FERC. A more detailed PJM response to the conclusions and recommendations from 2014 State of the Market Report is provided below. PJM has either implemented or is in the process of addressing 66 percent of the recommendations.

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
<th>Number of Recommendations</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implemented</td>
<td>These recommendations have been implemented.</td>
<td>20</td>
<td>22%</td>
</tr>
<tr>
<td>Stakeholder Process</td>
<td>These recommendations are under active discussion in the PJM stakeholder process or other stakeholder forum.</td>
<td>25</td>
<td>27%</td>
</tr>
<tr>
<td>Pending before the FERC</td>
<td>These recommendations are being considered by the FERC.</td>
<td>14</td>
<td>15%</td>
</tr>
<tr>
<td>Action Planned</td>
<td>PJM expects to take action or initiate a stakeholder discussion on this recommendation in 2015.</td>
<td>12</td>
<td>13%</td>
</tr>
<tr>
<td>No further action planned</td>
<td>PJM has reviewed this recommendation but does not plan to act on this issue in the near future due to No Stakeholder consensus (13%), Rejected by the FERC (13%), PJM concerns (63%), or this recommendation is outside of PJM control (13%).</td>
<td>15</td>
<td>16%</td>
</tr>
<tr>
<td>Low Priority</td>
<td>These issues have low impact to the markets and PJM stakeholders. No action is planned in the near future.</td>
<td>7</td>
<td>8%</td>
</tr>
</tbody>
</table>

**Energy Market Recommendations**

The IMM has offered recommendations regarding the Energy Market.

**IMM Recommendation:** The MMU recommends the elimination of Frequently Mitigated Unit and Associated Unit adders. Since the implementation of FMU adders, PJM has undertaken major redesigns of its market rules addressing revenue adequacy, including implementation of the RPM capacity market construct in 2007, and changes to the scarcity pricing rules in 2012. The reasons that FMU and AU adders were implemented no longer exist. FMU and AU adders no longer serve the purpose for which they were created and interfere with the efficient operation of PJM markets. The MMU and PJM proposed, and on Oct. 31, 2014, the Commission approved, a compromise that maintained the ability of certain generating units to qualify for FMU adders but limiting FMU adders to units with net revenues less than unit going forward costs or ACR. The MMU considers this recommendation accepted and will review the results of the Commission order on FMU status for at least 12 months prior to considering any additional recommendation related to FMUs.

**Status – Implemented**

**PJM Response:** PJM worked closely with the IMM to develop the joint proposal that was filed and accepted at the FERC. The change in the Frequently Mitigated Unit rules was implemented in Fall, 2014.
PJM Response to the 2014 State of the Market Report

**IMM Recommendation:** The MMU recommends that PJM require all generating units to identify the fuel type associated with their offered schedules.

**Status – Implemented**

**PJM Response:** The PJM Operating Committee identified the need to track generator fuel type and will require users to enter Energy Fuel Type and Startup Fuel Type for their units starting April 1, 2015. Generation owners will also have the ability to enter additional unit information such as Operational Restrictions and Hours and Full Load Remaining for any restrictions, Dual Fuel Capability, Time to Transition and MWs to Transition. These improvements were implemented as a result of recommendations driven by the winter of 2014.

**IMM Recommendation:** The MMU recommends that the definition of maximum emergency status in the Tariff apply at all times rather than during maximum emergency events.

**Status – No Further Action Planned; Outside of PJM Control**

**PJM Response:** PJM believes this recommendation is made moot by the implementation of shortage pricing rules on Oct. 1, 2012. The impact and importance of Maximum Emergency as an event impacting pricing has been superseded by shortage pricing and the Capacity Performance improvements to the RPM Capacity Market.

**IMM Recommendation:** The MMU recommends that PJM not use the ATSI closed loop interface or create similar interfaces to set zonal prices to accommodate the inadequacies of the demand side resource capacity product.

**Status – Stakeholder Process**

**PJM Response:** PJM establishes interfaces such as ATSI to ensure the correct pricing signal is sent to the market and to have the price of the marginal resource properly reflected. PJM believes it is critical for appropriate prices to be reflected in market outcomes. PJM stakeholders are discussing improvements related to the transparency of closed loop interfaces in the Market Implementation Committee.

**IMM Recommendation:** The MMU recommends that PJM routinely review all transmission facility ratings and any changes to those ratings to ensure that the normal, emergency and load dump ratings used in modeling the transmission system are accurate and reflect standard ratings practice.

**Status – Implemented/ Action Planned**

**PJM Response:** This recommendation consists of two parts; the review of facility ratings as they are submitted, and the routine review of all facility ratings. PJM reviews and approves all changes to transmission facility ratings that are submitted by transmission owners. As a practical matter, given the changes in the NERC requirements, all PJM Transmission Owners have made changes to their ratings methodologies and as a result, over the last five years PJM has reviewed nearly all transmission ratings on reportable facilities. PJM agrees that a process, by which periodic review of ratings and methodologies would occur, would be beneficial. PJM staff will work to develop such a process. PJM continues to work with all transmission owners to ensure ratings are as accurate as possible.

**IMM Recommendation:** The MMU recommends that PJM update the outage impact studies, the reliability analyses used in RPM for capacity deliverability and the reliability analyses used in RTEP for transmission upgrades to be consistent with the more conservative emergency operations (post contingency load dump limit exceedance analysis) in the energy market that were implemented in June 2013.
Status – Action Planned

**PJM Response:** PJM is currently reviewing the real-time post-contingency load dump exceedance analysis and expects to implement improvements. Following any modifications, PJM will determine the feasibility of including similar analysis in the other areas identified.

**IMM Recommendation:** The MMU recommends that the roles of PJM and the transmission owners in the decision making process to control for local contingencies be clarified, that PJM's role be strengthened, and that the process be made transparent.

Status – Action Planned

**PJM Response:** PJM and the Transmission Owners continue to work to define a well-practiced process for committing generation at the expense of the Transmission Owner for local facility control or late outages as described in the PJM manuals. PJM will work to clarify specific concerns that the IMM has regarding this process.

**IMM Recommendation:** The MMU recommends that PJM explore an interchange optimization solution with its neighboring balancing authorities that removes the need for market participants to schedule physical power.

Status – Implemented/ Stakeholder Process

**PJM Response:** Interchange optimization is being addressed within the Joint and Common Market Stakeholder process. PJM and NYISO successfully implemented Coordinated Transaction Scheduling on November 4, 2014 to improve interchange scheduling and efficiency. PJM and MISO are in the process of creating a similar construct to improve interchange scheduling along the shared seam.

**IMM Recommendation:** The MMU recommends that PJM include in the appropriate manual an explanation of the initial creation of hubs, the process for modifying hub definitions and a description of how hub definitions have changed.

Status – No Further Action Planned; PJM concerns

**PJM Response:** Hubs are created at the suggestion of and following discussion with stakeholders. As such, the methodology for creating a particular Hub is documented as it is created. Once a Hub is created, Hub definitions are not changed, and as such there is no need to document the methodology.

**IMM Recommendation:** The MMU recommends that during hours when a generation bus shows a net withdrawal, the energy withdrawal be treated as load, not negative generation, for purposes of calculating load and load weighted LMP. The MMU also recommends that during hours when a load bus shows a net injection, the energy injection be treated as generation, not negative load, for purposes of calculating generation and load weighted LMP.

Status – No Further Action Planned; PJM concerns

**PJM Response:** PJM disagrees with the first part of this recommendation and believes that when a generation bus is showing a net withdrawal, the payment should be the responsibility of the generation owner rather than impacting the load serving entities. While the State Estimator solution can occasionally result in injections at certain load buses, by definition there is no generator modeled at such a bus, and therefore no Market Seller to which to attribute actual generation injection. As such, the only feasible method by which to include such cases in the market settlements is to treat them as negative load at the particular load bus location.
IMM Recommendation: The MMU recommends that PJM identify and collect data on available behind the meter generation resources, including nodal location information and relevant operating parameters.

Status – Action Planned

PJM Response: This recommendation raises important issues related to the grid operator's ability to maintain the balance between load and supply as distributed generation grows. PJM is working with the transmission owners and state commissions to provide better visibility to behind-the-meter generation in the PJM territory. This effort originated from one of the recommendations from the September 2013 load shed events.

IMM Recommendation: The MMU recommends that generation owners be permitted to submit cost-based offers above the $1,000/MWh offer cap if they are calculated in accordance with PJM's Cost Development Guidelines excluding the ten percent adder, subject to after the fact review by the MMU. Such offers should be allowed to set LMP.

Status – Pending before the FERC

PJM Response: The FERC has a proceeding underway examining price formation issues. PJM submitted commentary following a recent technical conference. As a general matter, PJM believes there should be a higher cap and such offers should be eligible to set LMP.

IMM Recommendation: The MMU recommends that PJM create and implement clear, explicit and detailed rules that define the conditions under which PJM will and will not recall energy from PJM capacity resources and prohibit new energy exports from PJM capacity resources. The MMU recommends that those rules define the conditions under which PJM will purchase emergency energy while at the same time not recalling energy exports for PJM capacity resources.

Status – Action Planned

PJM Response: These protocols were developed in 2012 and are established in Manual 11. PJM believes these protocols are sufficient but will further discuss with the IMM on specific changes they believe are needed.

Energy Market Uplift Recommendations

The IMM has offered recommendations regarding Energy Market Uplift. Many of the recommendations regarding Energy Market Uplift are under discussion in the Energy Market Uplift Senior Task Force.

IMM Recommendation: The MMU recommends that PJM not use closed loop interfaces to set zonal prices, rather than use nodal prices, to accommodate the inadequacies of the demand side resource capacity product or the inability of the LMP model to fully accommodate reactive issues.

Status – Stakeholder Process

PJM Response: PJM establishes interfaces such as ATSI to ensure the correct pricing signal is sent to the market and to have the price of the marginal resource properly reflected. PJM believes it is critical for appropriate prices to be reflected in market outcomes. PJM does not understand the relationship between these interfaces and demand side resources as suggested in this recommendation and will pursue further conversation with the IMM. The issue is currently being discussed in the Market Implementation Committee as one of the issues under Operations Transparency.
IMM Recommendation: The MMU recommends that the implementation of closed loop interface constraints be studied carefully sufficiently in advance to identify issues and that closed loop interfaces be implemented only after such analysis, only after significant advance notice to the markets and only if the result is consistent with energy market fundamentals.

Status – Stakeholder Process

PJM Response: This issue is currently under review at the Market Implementation Committee.

IMM Recommendation: The MMU recommends that PJM clearly identify and classify all reasons for incurring operating reserves in the Day-Ahead and the Real-Time Energy Markets and the associated operating reserve charges in order for all market participants be aware of the reason of these costs and to help ensure a long term solution to the issue of how to allocate the costs of operating reserves.

Status – Implemented

PJM Response: Operating Reserve charges are currently classified by reasons for allocation purposes. These issues have been discussed in detail at stakeholder meetings and PJM has improved data transparency through this process.

IMM Recommendation: The MMU recommends that PJM revise the current operating reserve confidentiality rules in order to allow the disclosure of complete information about the level of operating reserve charges by unit and the detailed reasons for the level of operating reserve payments by unit in the PJM region.

Status – Action Planned

PJM Response: PJM is reviewing this recommendation as part of a review of data transparency, posting, and confidentiality rules and may propose changes in this area later in 2015.

IMM Recommendation: The MMU recommends the elimination of the day-ahead operating reserve category to ensure that units receive an energy uplift payment based on their real-time output and not their day-ahead scheduled output.

Status – Stakeholder Process

PJM Response: This item is currently under discussion in the Energy Market Uplift Senior Task Force.

IMM Recommendation: The MMU recommends reincorporating the use of net regulation revenues as an offset in the calculation of balancing operating reserve credits.

Status – Stakeholder Process

PJM Response: PJM agrees with this recommendation. This item is currently under discussion in the Energy Market Uplift Senior Task Force.

IMM Recommendation: The MMU recommends not compensating self-scheduled units for their startup cost when the units are scheduled by PJM to start before the self-scheduled hours.

Status – Stakeholder Process

PJM Response: PJM agrees with this recommendation. This item was discussed in the Energy Market Uplift Senior Task Force and is currently being voted on in senior committees.
IMM Recommendation: The MMU recommends that the lost opportunity cost in the Energy and Ancillary Services Markets be calculated using the schedule on which the unit was scheduled to run in the Energy Market.

Status – Stakeholder Process
PJM Response: This item is under discussion in the PJM stakeholder process and is being voted on in senior committees.

IMM Recommendation: The MMU recommends including no load and startup costs as part of the total avoided costs in the calculation of lost opportunity cost credits paid to combustion turbines and diesels scheduled in the Day-Ahead Energy Market but not committed in real time.

Status – Stakeholder Process
PJM Response: PJM agrees with recommendation. This item is under discussion in the PJM stakeholder process and is being voted on in senior committees.

IMM Recommendation: The MMU recommends calculating LOC based on segments of hours not on an hourly basis in the calculation of credits paid to combustion turbines and diesels scheduled in the Day-Ahead Energy Market but not committed in real time.

Status – Low Priority
PJM Response: This recommendation has not been discussed at stakeholder meetings. PJM believes there are technical obstacles surrounding this solution that would have to be resolved prior to implementation.

IMM Recommendation: The MMU recommends using the entire offer curve and not a single point on the offer curve to calculate energy lost opportunity cost.

Status – Stakeholder Process
PJM Response: PJM agrees with this recommendation. This item is under discussion in the PJM stakeholder process and is being voted on in senior committees.

IMM Recommendation: The MMU recommends that up-to congestion transactions be required to pay operating reserve charges.

Status – Stakeholder Process
PJM Response: PJM agrees with recommendation. This topic is under discussion in the Energy Market Uplift Senior Task Force.

IMM Recommendation: The MMU recommends eliminating the use of internal bilateral transactions (IBTs) in the calculation of deviations used to allocate balancing operating reserve charges.

Status – Stakeholder Process
PJM Response: PJM agrees with recommendation. This topic is under discussion in the Energy Market Uplift Senior Task Force.

IMM Recommendation: The MMU recommends allocating the energy uplift payments to units scheduled as must run in the Day-Ahead Energy Market for reasons other than voltage/reactive or black start services as a reliability charge to real-time load, real-time exports and real-time wheels.
Status – Stakeholder Process

PJM Response: This topic is under discussion in the Energy Market Uplift Senior Task Force.

IMM Recommendation: The MMU recommends reallocating the operating reserve credits paid to units supporting the Con Edison – PJM Transmission Service Agreements.

Status – No Further Action Planned; PJM Concerns

PJM Response: The Con Edison – PSEG wheeling contract is now defined as a firm point-to-point transmission service transaction under the PJM Tariff. As such, PJM does not see how it would be possible to treat the allocation of operating reserve credits differently for this transaction than any other similar transaction in the market. Furthermore, PJM cannot unilaterally alter the terms of the wheeling agreement.

IMM Recommendation: The MMU recommends that the total cost of providing reactive support be categorized and allocated as reactive services. Reactive services credits should be calculated consistent with the operating reserve credits calculation.

Status – Stakeholder Process

PJM Response: PJM supports uniform allocation of Reactive credits. This topic is under discussion in the Energy Market Uplift Senior Task Force.

IMM Recommendation: The MMU recommends including real-time exports and real-time wheels in the allocation of the cost of providing reactive support to the 500 kV system or above which is currently allocated to real-time RTO load.

Status – Low Priority

PJM Response: PJM agrees with the IMM in believing this is a low priority issue. Implementing this recommendation would require changes in wheeling agreements.

IMM Recommendation: The MMU recommends enhancing the current energy uplift allocation rules to reflect the elimination of day-ahead operating reserves and the timing of commitment decisions.

Status – Stakeholder Process

PJM Response: This topic is under discussion in the Energy Market Uplift Senior Task Force.

Capacity Market Recommendations

PJM believes, and the IMM has recognized, that many of the IMM’s recommendations will be addressed by the Capacity Performance enhancements to PJM’s Reliability Pricing Model Capacity Market. PJM is focused on these improvements as a means of providing reliability in future years with appropriate incentives for reliability services in the face of an evolving landscape. These enhancements will address issues such as the changing role of natural gas fuels, more demanding winter operating conditions, and so on.

Because PJM believes many of these recommendations will be addressed by Capacity Performance, detailed responses will not be provided at this time. PJM looks forward to working with the IMM and all stakeholders on continuing to improve the RPM Capacity Market.

IMM Recommendation: The MMU recommends the enforcement of a consistent definition of capacity resource. The MMU recommends that the requirement to be a physical resource be enforced and enhanced. The requirement to be
physical resource should apply at the time of auctions and should also constitute a commitment to be physical in the relevant Delivery Year. The requirement to be a physical resource should be applied to all resource types, included planned generation, demand resources and imports.

**Status – Pending before the FERC**

**PJM Response:** PJM agrees with this recommendation. This topic is currently before the FERC in the Capacity Performance docket.

**IMM Recommendation:** The MMU recommends that the definition of demand side resources be modified in order to ensure that such resources be fully substitutable for other generation capacity resources. Both the Limited and the Extended Summer DR products should be eliminated in order to ensure that the DR product has the same unlimited obligation to provide capacity year round as generation capacity resources.

**Status – Pending before the FERC**

**PJM Response:** PJM agrees with this recommendation. This topic is currently before the FERC in the Capacity Performance docket. In the docket, PJM proposed eliminating the Limited DR product, and phasing out the Extended Summer DR product over two years, thereby addressing this recommendation for the long term.

**IMM Recommendation:** The MMU recommends that the use of the 2.5 percent demand adjustment (Short Term Resource Procurement Target) be terminated immediately. The 2.5 percent should be added back to the overall market demand curve.

**Status – Pending before the FERC**

**PJM Response:** PJM agrees with this recommendation. This topic is currently before the FERC in the Capacity Performance docket. In that docket, PJM proposed eliminating the Short Term Resource Procurement Target effective with the 18/19 Delivery Year.

**IMM Recommendation:** The MMU recommends that the test for determining modeled Locational Deliverability Areas in RPM be redefined. A detailed reliability analysis of all at risk units should be included in the redefined model.

**Status – Implemented**

**PJM Response:** PJM has studied at-risk units as part of the RTEP process over the past several years, and has provided that information to stakeholders. PJM has also made substantive changes to LDA modeling assumptions to improve coordination between RPM and RTEP process. PJM currently identifies at-risk units and models LDAs where retirement of at-risk units would result in exceeding CETL values. PJM will continue working with both the IMM and the stakeholders on refining the models.

**IMM Recommendation:** The MMU recommends that there be an explicit requirement that Capacity Resource offers in the Day-Ahead Energy Market be competitive, where competitive is defined to be the short run marginal cost of the units.

**Status – No Further Action Planned; PJM Concerns**

**PJM Response:** PJM disagrees with this recommendation. In the PJM market, capacity resources that are deemed to present a local market power risk (i.e. those that fail the three pivotal-supplier test) are subject to market power mitigation at short-run marginal cost. PJM believes this recommendation would extend offer mitigation to all operating hours for any capacity resource, even when the resource has passed very conservative market power screens. PJM believes offer capping resources that have been deemed to satisfy market power screens is
inconsistent with FERC’s authority and action to grant market-based rates for resources in the energy market. PJM notes the analysis of market-based offers presented in the 2014 State of the Market Report does not appear to support or justify this recommendation. PJM believes the additional, unnecessary mitigation that is recommended in a market that has been demonstrated to be operating competitively could have unintended and adverse consequences, which ultimately could create incentives for resources to limit their operational flexibility and availability to PJM, which could inhibit PJM’s ability to maintain reliable and efficient grid operation, efficient dispatch of resources and efficient operation of the energy market.

**IMM Recommendation:** The MMU recommends that clear, explicit operational protocols be defined for recalling the energy output of Capacity Resources when PJM is in an emergency condition. PJM has modified these protocols, but they need additional clarification and operational details.

**Status – Action Planned**

**PJM Response:** These protocols were developed in 2012 and are established in Manual 11. PJM believes these protocols are sufficient but the IMM has not presented specific information on what details it feels are missing.

**IMM Recommendation:** The MMU recommends that Generation Capacity Resources be paid on the basis of whether they produce energy when called upon during any of the hours defined as critical. One hundred percent of capacity market revenue should be at risk rather than only fifty percent.

**Status – Pending before the FERC**

**PJM Response:** PJM agrees with this recommendation. This topic is currently before the FERC in the Capacity Performance docket. The proposed Capacity Performance product is an obligation to deliver energy, if scheduled and dispatched by PJM, during Compliance Hours. Compliance Hours are the hours during the delivery year when PJM implements any emergency procedure event requiring implementation of Demand Response or the loading of emergency capacity. Each resource is required to deliver its pro-rata share of system requirements during Compliance Hours. The resource’s pro-rata share is calculated during Compliance Hours as the lesser of the resource’s cleared capacity megawatt quantity times the ratio of real-time demand plus reserves divided by PJM’s total quantity of cleared capacity megawatts and the resource’s economic dispatch point, net of any PJM-approved outages. If a resource delivers less than its pro-rata share of system requirements during a Compliance Hour, it will pay a Performance Payment equal to the megawatts of shortfall times the Performance Payment Rate. Performance Payments collected from under-performing resources are allocated pro-rata to all over-performing resources in the hour, even those with no capacity commitment.

**IMM Recommendation:** The MMU recommends that a unit which is not capable of supplying energy consistent with its day-ahead offer should reflect an appropriate outage.

**Status – Pending before the FERC**

**PJM Response:** PJM agrees with this recommendation. This topic is currently before the FERC in the Capacity Performance docket.

**IMM Recommendation:** The MMU recommends that PJM eliminate all OMC outages from the calculation of forced outage rates used for any purpose in the PJM Capacity Market.

**Status – Pending before the FERC**
**PJM Response:** PJM agrees with this recommendation. This topic is currently before the FERC in the Capacity Performance docket. As part of the Capacity Performance proposal, PJM proposes that Outside Management Control outages no longer be taken into consideration in the calculation of UCAP except for those outages resulting from physical damage to the surrounding transmission and/or distribution network that do not permit the operation of the resource. Historically, PJM has allowed generation resources to remove forced outages that were defined as Outside Management Control (OMC) from the forced outage rate that determined the amount of UCAP that could be sold into RPM auctions. Moving forward, when the electric transmission and/or distribution facilities necessary to allow the generator to deliver energy to the PJM system are physically unavailable such that the generator cannot operate, the performance penalties in this proposal will not apply, and the generator’s forced outage will continue to be considered OMC.

**IMM Recommendation:** The MMU recommends that PJM eliminate the broad exception related to lack of gas during the winter period for single-fuel, natural gas-fired units.

**Status – Pending before the FERC**

**PJM Response:** PJM does not agree that a broad exception exists with respect to the application of penalties to units that experience fuel supply interruptions. Regarding lack of fuel outages, the NERC guidelines state:

“Lack of fuels (water from rivers or lakes, coal mines, gas lines, etc.) in the cases where the operator of the unit is not in control of contracts, supply lines, or delivery of fuels. However, if the operator elected to contract for fuels where the fuel (for example, natural gas) can be interrupted so that the fuel suppliers can sell the fuels to others (part of the plant fuel cost-saving measure), then the lack of fuel is under management control and is not applicable to this case.”

PJM further notes that this issue is currently before the FERC in the Capacity Performance docket. When a generator is unable to obtain fuel needed to produce energy it was obligated to deliver to the PJM system, the performance penalties in this proposal will apply since the inability to obtain fuel will not be considered an OMC event.

**Demand Response Recommendations**

Beginning with the U.S. Court of Appeals decision to vacate FERC Order 745, the future of Demand Response has been unclear. This uncertainty is likely to persist for some time while the various legal challenges proceed. PJM recently filed with the FERC a stop-gap proposal for demand response products in the PJM markets, but this proposal was rejected as “premature” in April 1, 2015. PJM will continue to work with regulators and stakeholders to help shape the future of demand response participation in PJM in a constructive and positive manner. However, PJM believes the legal issues must be resolved before there can be any substantive discussion of the specific recommendations presented in the 2014 State of the Market Report.

**IMM Recommendation:** The MMU recommends that, if demand response remains in the PJM market, there be only one demand response product, with an obligation to respond when called for all hours of the year, and that the demand response be on the demand side of the capacity market.

**Status – Pending before the FERC**
PJM Response: PJM agrees with this recommendation. This topic is currently before the FERC in the Capacity Performance docket. In that docket, PJM proposed eliminating the Limited DR product, and phasing out the Extended Summer DR product over two years, thereby addressing this recommendation for the long term.

IMM Recommendation: The MMU recommends that, if demand response remains in the PJM market, the emergency load response program be classified as an economic program, responding to economic price signals and not an emergency program responding only after an emergency is called.

Status – Implemented

PJM Response: PJM agrees with this recommendation, and has created the Pre-Emergency Demand Response category for any demand response resource that does not require an emergency condition to respond.

IMM Recommendation: The MMU recommends that, if demand response remains in the PJM market, a daily must offer requirement apply to demand resources, comparable to the rule applicable to generation capacity resources.

Status – Pending before the FERC

PJM Response: PJM does not believe that a day-ahead, economic, must offer requirement is necessary for demand resources because demand resources do not have the incentive to exert market power through physical withholding like generation resources do. Further, PJM has proposed significant revisions to its demand response provisions through the Capacity Performance filing currently before FERC.

IMM Recommendation: The MMU recommends that, if demand response remains in the PJM market, demand response programs adopt an offer cap equal to the offer cap applicable to energy offers from generation capacity resources, currently $1,000 per MWh.

Status – Pending before the FERC

PJM Response: PJM agrees that the caps should be comparable but instead recommends raising the generation offer cap to match the level of the demand response offer caps and has recommended this course of action to FERC.

IMM Recommendation: The MMU recommends that, if demand response remains in the PJM market, the lead times for demand resources be shortened to 30 minutes with an hour minimum dispatch for all resources. This recommendation has been adopted.

Status – Implemented

PJM Response: PJM implemented these changes effective in 2014. Demand resources can request an exception from the 30-minute and 1-hour requirements for physical reasons.

IMM Recommendation: The MMU recommends that, if demand response remains in the PJM market, demand resources be required to provide their nodal location on the electricity grid.

Status – No further action planned; Rejected by the FERC

PJM Response: Given the FERC’s aggregation requirements, the implementation of nodal dispatch is not likely to be possible.
**IMM Recommendation:** The MMU recommends that, if demand response remains in the PJM market, measurement and verification methods for demand resources be further modified to more accurately reflect compliance.

**Status – Implemented**

**PJM Response:** PJM continues to enhance measurement and verification protocols. In April 2015, the Members Committee endorsed residential measurement and verification enhancements to the 2016/17 Delivery Year to base load data from sample interval meters deployed in the field instead of static analysis.

**IMM Recommendation:** The MMU recommends that, if demand response remains in the PJM market, compliance rules be revised to include submittal of all necessary hourly load data, and that negative values be included when calculating event compliance across hours and registrations.

**Status – Action Planned**

**PJM Response:** PJM currently receives meter load data except for certain direct load control entities for which meter data would be impractical. PJM agrees with the IMM recommendation regarding negative values but action on this issue may not be feasible until the results of the EPSA court case are known.

**IMM Recommendation:** The MMU recommends that, if demand response remains in the PJM market, PJM adopt the ISO-NE five-minute metering requirements in order to ensure that dispatchers have the necessary information for reliability and that market payments to demand resources be calculated based on interval meter data at the site of the demand reductions.

**Status – Implemented/ No Further Action Planned**

**PJM Response:** PJM believes it has made appropriate changes to ensure that demand resource operators provide sufficiently granular data to PJM near real time such that PJM dispatchers have the information necessary to maintain system reliability. Further, PJM already settles demand response on an hourly integrated basis, which is the same basis as every other type of market activity.

**IMM Recommendation:** The MMU recommends that, if demand response remains in the PJM market, demand response event compliance be calculated for each hour and the penalty structure reflect hourly compliance.

**Status – Pending before the FERC**

**PJM Response:** This topic currently before the FERC in the Capacity Performance docket. PJM has proposed in its Capacity Performance filing to determine event compliance on an hourly basis for demand resources, instead of the average across the hours of an event as is currently done.

**IMM Recommendation:** The MMU recommends that, if demand response remains in the PJM market, demand resources whose load drop method is designated as “Other” explicitly record the method of load drop.

**Status – Low Priority**

**PJM Response:** PJM does not believe this recommendation is material enough to act on given other changes in this market area.

**IMM Recommendation:** The MMU recommends that, if demand response remains in the PJM market, load management testing be initiated by PJM with limited warning to CSPs in order to more accurately resemble the conditions of an emergency event.
Status – Low Priority

**PJM Response**: PJM agrees with the IMM that this is a low priority item. This issue was reviewed in the Capacity Senior Task Force but eventually dropped due to a lack of stakeholder interest in addressing it.

**IMM Recommendation**: The MMU recommends, as a preferred alternative to having PJM demand side programs, that demand response be on the demand side of the markets and that customers be able to avoid capacity and energy charges by not using capacity and energy at their discretion and that customer payments be determined only by metered load.

Status – **Pending before the FERC (awaiting EPSA decision)**

**PJM Response**: PJM has Price Responsive Demand already codified in its Tariff, which puts demand response on the demand side of the markets as this recommendation suggests. However, PJM also believes that elimination of supply side demand response is impractical at this time, pending the outcome of the EPSA court decision.

**Interchange Transactions Recommendations**

**IMM Recommendation**: The MMU recommends that PJM eliminate the IMO interface pricing point, and assign the transactions that originate or sink in the IESO balancing authority to the MISO interface pricing point.

Status – **Action Planned**

**PJM Response**: PJM will be implementing a new IMO interface price definition that resolves this concern. The IMM recommendation would result in inconsistent pricing for transactions to/from IMO that do not flow entirely through MISO.

**IMM Recommendation**: The MMU recommends that PJM monitor, and adjust as necessary, the weights applied to the components of the interfaces to ensure that the interface prices reflect ongoing changes in system conditions and that loop flows are accounted for on a dynamic basis. The MMU also recommends that PJM review the mappings of external balancing authorities to individual interface pricing points to reflect changes to the impact of the external power source on PJM tie lines as a result of system topology changes. The MMU recommends that this review occur at least annually.

Status – Low Priority

**PJM Response**: PJM agrees in concept with both recommendations and will set up a process to evaluate the Balancing Authority mappings with some periodicity, as well as assess whether a change is necessary with the interface bus pnode mappings.

**IMM Recommendation**: The MMU recommends that the submission deadline for real-time dispatchable transactions be modified from 1200 day-prior to three hours prior to the requested start time, and that the minimum duration be modified from one hour to 15 minutes. These changes would give PJM a more flexible product that could be utilized to meet load in the most economic manner.

Status – **Implemented/Stakeholder Process**

**PJM Response**: This topic has been addressed within the Coordinated Transaction Scheduling product and minimum duration has already been modified to 15 minutes as a result of PJM’s response to FERC Order 764.

**IMM Recommendation**: The MMU recommends that PJM explore an interchange optimization solution with its neighboring balancing authorities which removes the need for market participants to schedule physical transactions across seams. Such a solution would include an optimized joint dispatch approach that treats seams between balancing authorizes as a constraint, similar to any other constraint within an LMP market.
Status – Stakeholder Process

PJM Response: The Joint and Common Market initiative continues to look for opportunities to enhance the operation and coordination of markets across seams. Coordinated Transaction Scheduling was implemented with NYISO in November 2014. An Interchange optimization proposal with MISO has been developed and was approved by PJM Stakeholders in the 1st Quarter 2015. A FERC filing of this proposal is scheduled for the 2nd Quarter of 2015 with implementation for the 4th Quarter of 2016.

IMM Recommendation: The MMU recommends that PJM permit unlimited spot market imports as well as unlimited non-firm point-to-point willing to pay congestion imports and exports at all PJM Interfaces in order to improve the efficiency of the market.

Status – No Further Action Planned; No Stakeholder Consensus

PJM Response: PJM has had discussions with its neighbors related to this recommendation and there have been some objections to this approach under the terms of the Joint Operating Agreements. At this time, PJM does not expect to pursue this recommendation further.

IMM Recommendation: The MMU recommends that PJM implement a validation method for submitted transactions that would prohibit market participants from breaking transactions into smaller segments to defeat the interface pricing rule and receive higher prices (for imports) or lower prices (for exports) from PJM resulting from the inability to identify the true source or sink of the transaction.

Status – Implemented/No Further Action Planned

PJM Response: In July 2014, PJM and the IMM issued a joint statement on interchange scheduling which addresses partial path scheduling and the belief that this type of scheduling could be subject to referral by the IMM. At this time, PJM does not believe there is a need to implement a validation method that attempts to identify partial path schedules.

IMM Recommendation: The MMU recommends that the validation also require market participants to submit transactions on market paths that reflect the expected actual flow in order to reduce unscheduled loop flows.

Status – Stakeholder Process

PJM Response: The IMM previously presented a problem statement at the Market Implementation Committee. PJM staff does not believe there is a problem with PJM’s interface pricing nor does staff see a need to implement a path restriction similar to what NYISO has done. The IMM has committed to present a list of paths it believes to be problematic to stakeholders at the Market Implementation Committee.

IMM Recommendation: The MMU recommends that PJM implement rules to prevent sham scheduling. The MMU’s proposed validation rules would address sham scheduling.

Status – Stakeholder Process

PJM Response: The IMM has presented information to stakeholders at the Market Implementation Committee but to date has not presented a formal problem statement. PJM staff does not believe there is an overarching problem with PJM’s interface pricing. The IMM has been supportive of PJM’s proposed change to the IMO interface pricing point definition and PJM has agreed to work with the IMM regarding paths the IMM may identify for which transaction pricing should be adjusted.
**IMM Recommendation:** The MMU recommends that PJM eliminate the NIPSCO and Southeast interface pricing points from the Day-Ahead and Real-Time Energy Markets and, with VACAR, assign the transactions created under the reserve sharing agreement to the South IMP/EXP pricing point.

**Status – Action Planned**

**PJM Response:** PJM supports the recommendation to remove the NIPSCO and SOUTHEAST interface pricing points from the Day-Ahead and Real-Time Energy Markets. Given that neither of these interface pricing points can be used for real time transactions, there is no need to have them available for day-ahead transactions. However, since there are existing, Long-Term FTR positions at the NIPSCO interface pricing point, PJM is required to establish a day-ahead price at which they are settled. PJM continues to believe that the SOUTHEAST interface pricing point is the applicable point for settling VACAR reserve sharing agreement energy transfers. PJM would need to investigate with stakeholders whether any rule or agreement changes would be required in order to continue to calculate these interface prices but make them ineligible for day ahead, real time, and virtual transactions.

**IMM Recommendation:** The MMU recommends that PJM immediately provide the required 12-month notice to Duke Energy Progress (DEP) to unilaterally terminate the Joint Operating Agreement.

**Status – No Further Action Planned; PJM Concerns**

**PJM Response:** PJM does not agree with the recommendation to terminate the PJM/PEC Joint Operating Agreement prior to renegotiating a new joint agreement. PJM concurs that updates and improvements to the agreement may be required and will continue to seek opportunities to work with DEP to update the agreement.

**IMM Recommendation:** The MMU recommends that PJM and MISO work together to align interface pricing definitions, using the same number of external buses and selecting buses in close proximity on either side of the border with comparable bus weights.

**Status – Stakeholder Process**

**PJM Response:** PJM agrees with this recommendation. This item is currently under discussion in the Joint and Common Market stakeholder process. PJM continues to work with the MISO IMM and PJM and MISO Stakeholders to resolve interface pricing issues and improve the alignment of interface price definitions.

**IMM Recommendation:** The MMU recommends that PJM implement additional business rules to remove the incentive to engage in sham scheduling activities using the PJM/IMO interface price.

**Status – Implemented**

**PJM Response:** PJM will be implementing a new IMO Interface Definition in June of 2015, which is a combination of the MISO and NYISO interface prices and dependent upon the relationship between the scheduled and actual flows over the Michigan/Ontario Phase Angle Regulators.

**IMM Recommendation:** The MMU recommends that PJM file revisions to the Marginal Loss Surplus Allocation method to fully comply with the Feb. 24, 2009, Order. The MMU recommends that marginal loss surplus allocations be capped such that the marginal loss surplus credits cannot exceed the contributions made to the fixed costs of the transmission system for any reason.
Status – No Further Action Planned; PJM Concerns

PJM Response: PJM believes that it is in full compliance with the FERC Order. PJM has not observed evidence that any marginal loss allocations have actually exceeded a participant's contributions to the fixed costs of the transmission system (i.e. – the transmission service charges paid by the participant) but should such a situation arise, PJM would work with the IMM on appropriate market rule changes.

Ancillary Services Recommendations

The IMM has offered recommendations regarding Ancillary Services.

IMM Recommendation: The MMU recommends that the Regulation Market be modified to incorporate a consistent application of the marginal benefit factor throughout the optimization, assignment and settlement process.

Status – No Further Action Planned; Rejected by the FERC

PJM Response: PJM agrees with this recommendation however FERC rulings have prevented application of the marginal benefits factor.

IMM Recommendation: The MMU recommends that the rule requiring the payment of tier 1 synchronized reserve resources when the non-synchronized reserve price is above zero be eliminated immediately.

Status – Stakeholder Process

PJM Response: This issue is currently under review at the Market Implementation Committee.

IMM Recommendation: The MMU recommends that no payments be made to tier 1 resources if they are deselected in the PJM market solution.

Status – Implemented

PJM Response: This recommendation was implemented in July 2014.

IMM Recommendation: The MMU recommends that the Tier 2 synchronized reserve must-offer provision of scarcity pricing be enforced. As of the end of Dec. 31, 2014 compliance with the Tier 2 must-offer provision is 99.5 percent.

Status – Implemented

PJM Response: PJM verifies compliance with the must-offer requirement during times of system stress when this is most likely to be a material issue.

IMM Recommendation: The MMU recommends that PJM be more explicit about why Tier 1 biasing is used in the optimized solution to the Tier 2 Synchronized Reserve Market. The MMU recommends that PJM define rules for calculating available Tier 1 MW and for the use of biasing during any phase of the market solution and then identify the relevant rule for each instance of biasing.

Status – Implemented

PJM Response: PJM has implemented, and continues to improve, calculation of Tier 1 reserves. However, PJM believes that dispatcher discretion and experience are critical tools used in maintaining system reliability and it is impossible to set rigid rules in this area without sacrificing reliability.
IMM Recommendation: The MMU recommends that PJM determine why secondary reserve was either unavailable or not dispatched on Sept. 10, 2013, Jan. 6, 2014, and Jan. 7, 2014, and that PJM replace the DASR Market with a real time secondary reserve product that is available and dispatchable in real time.

Status – No Further Action Planned; PJM Concerns

PJM Response: PJM saw secondary reserves both available and deployed on these days. PJM believes that the current Day-Ahead Scheduling Reserve Market results in scheduling the required resources to be operating in real time, and that a Real-time Market for the purpose of securing supplemental reserve during the operating day is unnecessary. PJM will work with IMM to clarify and improve this process.

IMM Recommendation: The MMU recommends that PJM revise the current confidentiality rules in order to specifically allow a more transparent disclosure of information regarding black start resources and their associated payments in PJM.

Status – Action Planned

PJM Response: PJM is reviewing this recommendation as part of a review of data transparency, posting, and confidentiality rules and may propose changes in this area later in 2015. However, it is likely that NERC and FERC rules regarding Critical Energy Infrastructure Information will limit the information that can be disclosed on this topic.

IMM Recommendation: The MMU recommends that the three pivotal-supplier test be incorporated in the DASR Market.

Status – Low Priority

PJM Response: Given the near-zero clearing prices and minimal impact of the DASR Market, PJM has not acted upon this recommendation. It is worth noting that the IMM’s analysis reports that at no time did the DASR market fail their after-the-fact TPS test in 2014 despite the challenging winter conditions.

Generation and Transmission Planning Recommendations

The IMM has offered recommendations regarding generation and transmission planning.

IMM Recommendation: The MMU recommends the creation of a mechanism to permit a direct comparison, or competition, between transmission and generation alternatives, including which alternative is less costly and who bears the risks associated with each alternative.

Status – No Further Action Planned; No Stakeholder Consensus

PJM Response: PJM agrees and is supportive of direct resource competition. PJM is committed to improving the available information so that the market can have the best information to make investment decisions given the uncertainty and long lead times involved in resource planning. This concept was examined during stakeholder discussions related to FERC Order 1000 but stakeholders had no strong interest in exploring this concept further. PJM is open to continuing discussion with the stakeholders and the IMM.

IMM Recommendation: The MMU recommends that rules be implemented to permit competition to provide financing of transmission projects. This competition could reduce the cost of capital for transmission projects and significantly reduce total costs to customers.

Status – Action Planned

PJM Response: PJM agrees with this recommendation on a conceptual level; however such a construct would require careful consideration to prevent any unintended consequences. A change of this nature is not a short term fix.
but instead a long term effort that will require many years to implement and would have to be undertaken by the FERC. PJM is currently reviewing lessons learned from the current implementation of FERC order 1000 including the use of cost containment options. PJM will continue to consider all options to improve the process.

**IMM Recommendation:** The MMU recommends that the question of whether Capacity Injection Rights (CIRs) should persist after the retirement of a unit be addressed. Even if the treatment of CIRs remains unchanged, the rules need to ensure that incumbents cannot exploit control of CIRs to block or postpone entry of competitors.

**Status – Implemented/No Further Action Planned**

**PJM Response:** The Interconnection Process Senior Task Force implemented several rule modifications that reduced or eliminated issues relating to existing CIRs. The revised CIR transfer rules reduced the period of time that incumbent CIR holders can hold onto CIRs without acting from three years to one year after deactivation. The new CIR transfer rules struck a balance between reducing the time an incumbent can hold their existing rights while still allowing the incumbent CIR holders the ability to continue to use their rights through timely entering the interconnection queue process to add new generation using those rights, or modifying their existing facility to reuse the CIRs. PJM does not feel any further changes are warranted at this time.

**IMM Recommendation:** The MMU recommends outsourcing interconnection studies to an independent party to avoid potential conflicts of interest. Currently, these studies are performed by incumbent transmission owners under PJM’s direction. This creates potential conflicts of interest, particularly when transmission owners are vertically integrated and the owner of transmission also owns generation.

**Status – Action Planned**

**PJM Response:** PJM disagrees with the IMM’s characterization of the responsibilities in this area. These studies are not performed by incumbent transmission owners under PJM’s direction. They are performed by PJM with the support of the incumbent transmission owner. Transmission owners are required to provide the upgrades necessary to correct any violations found during the studies which may require some analysis. PJM is currently discussing with some transmission owners the feasibility of contracting this work to a third party.

**IMM Recommendation:** The MMU recommends improvements in queue management including that PJM establish a review process to ensure that projects are removed from the queue if they are not viable, as well as a process to allow commercially viable projects to advance in the queue ahead of projects which have failed to make progress, subject to rules to prevent gaming.

**Status – No Further Action Planned; Outside of PJM Control**

**PJM Response:** Provided that a project is meeting the financial milestones required, PJM has limited information to know when a project is no longer planned to be completed by the developer. Stakeholders considered changes to the queue process in the Interconnection Process Senior Task Force, however, while some rule changes resulted from these discussions, there was no broad support for a review process of this nature.

**IMM Recommendation:** The MMU recommends an analysis of the study phase of PJM’s transmission planning to reduce the need for postponements of study results, to decrease study completion times, and to improve the likelihood that a project at a given phase in the study process will successfully go into service.

**Status – Implemented/Action Planned**
**PJM Response:** PJM believes the IMM is referring to interconnection studies in this recommendation. In recent years PJM has implemented process improvements that have drastically reduced study backlog, improved on-time performance, and reduced the age of backlog studies. PJM remains committed to on-going process improvements in this area.

**IMM Recommendation:** The MMU recommends that PJM establish fair terms of access to rights of way and property, such as at substations, in order to create real competition between incumbent transmission providers and non-incumbent providers.

**Status – No Further Action Planned; Outside of PJM Control**

**PJM Response:** This recommendation addresses issues of property rights and legal matters beyond PJM’s purview. PJM has no ability to compel transmission owners to forgo their legally established property rights. PJM is not aware of any issues in 2014 that this recommendation would have addressed had it been implemented. PJM will continue further discussion with the IMM to understand specific concerns.

**IMM Recommendation:** The MMU recommends that PJM reevaluate transmission outage tickets when the outage is rescheduled.

**Status – Implemented/No Further Action Planned**

**PJM Response:** PJM currently reviews rescheduled transmission outages to verify they do not cause congestion or reliability issues, or violate on-time submittal rules. PJM re-studies all the rescheduled outage requests during the near-term outage study process, which includes Three-Day Ahead Study, Two-Day Ahead Study and One-Day Ahead Study. If an outage is rescheduled to a future month, it will also be re-studied during PJM One-Month Ahead Study process. PJM only approves “On Time” outages if they do not jeopardize the reliability of the PJM System. PJM makes the final outage approval decision two days before the requested start of the outage.

**FTR and ARR Recommendations**

The IMM has offered recommendations regarding FTRs and ARRs.

**IMM Recommendation:** The MMU recommends that PJM report correct monthly payout ratios to reduce understatement of payout ratios on a monthly basis.

**Status – Stakeholder Process**

**PJM Response:** PJM supports this recommendation and it is under discussion at the FTR Senior Task Force. PJM and the IMM agree that changing the monthly reporting of FTR payout ratios will not change the final, end-of-year, reported payout ratio.

**IMM Recommendation:** The MMU recommends that PJM eliminate portfolio netting to eliminate cross subsidies among FTR marketplace participants.

**Status – Stakeholder Process**

**PJM Response:** PJM agrees that elimination of this netting will more equitably reflect the impact of negatively valued FTRs on all participants’ positively valued FTR funding results. This recommendation is under discussion at the FTR Senior Task Force. The IMM recommendation would not change the total PJM FTR payout dollars but will change the payout dollars for individual FTR participants.
**IMM Recommendation:** The MMU recommends that PJM eliminate subsidies to counter flow FTRs by applying the payout ratio to counter flow FTRs in the same way the payout ratio is applied to prevailing flow FTRs.

**Status – Stakeholder Process**

**PJM Response:** PJM believes that charging negatively valued FTRs more than 100% of their negative value would amount to those negatively valued FTRs subsidizing the payments to positively valued FTRs. PJM does not believe such a subsidy is justified. This recommendation is under discussion at the FTR Senior Task Force.

**IMM Recommendation:** The MMU recommends that PJM eliminate geographic cross subsidies.

**Status – Stakeholder Process**

**PJM Response:** In recommending the elimination of cross geographic subsidies, the IMM is suggesting that FTR underfunding be allocated to those FTR holders whose FTRs are across paths where the constraints causing the underfunding occurred. Changing the allocation mechanism for FTR underfunding such that revenue inadequacy was allocated to participants who’s FTRs impacted transmission constraints that drove the underfunding would be directly akin to “undoing” the ARR allocation(s) and/or FTR auction(s) through which the ARRs and FTRs were allocated or sold. This recommendation is under discussion at the FTR Senior Task Force.

**IMM Recommendation:** The MMU recommends that PJM improve transmission outage modeling in the FTR auction models.

**Status – Stakeholder Process**

**PJM Response:** PJM believes it has already addressed this recommendation through auction models. This topic has been part of stakeholder discussions at the existing FTR Senior Task Force.

**IMM Recommendation:** The MMU recommends that PJM reduce FTR sales on paths with persistent overallocation of FTRs including clear rules for what defines persistent overall location and how the reduction will be applied.

**Status – Implemented**

**PJM Response:** The PJM Tariff already provides PJM with the necessary authority to model the transmission system with the reduced capability necessary to minimize underfunding of FTRs. Therefore, PJM already reduces the capability modeled in the FTR auctions on historically constrained and underfunded paths to the greatest extent possible.

**IMM Recommendation:** The MMU recommends that PJM implement a seasonal ARR and FTR allocation system to better represent outages.

**Status – Low Priority**

**PJM Response:** PJM has discussed this recommendation on multiple occasions with PJM stakeholders. Stakeholders have not expressed an interest in these forums to change from an annual to a seasonal model. PJM does not believe this will have a significant impact on FTR Revenue Adequacy.

**IMM Recommendation:** The MMU recommends that PJM eliminate over allocation requirement of ARRs in the Annual ARR Allocation process.

**Status – Stakeholder Process**
**PJM Response:** This recommendation remains under discussion at the FTR Senior Task Force. PJM supports this recommendation but, as a result of increased FTR Revenue adequacy during the 2014/2015 FTR planning period, this has evolved to a low priority recommendation.

**IMM Recommendation:** The MMU recommends that PJM apply the FTR forfeiture rule to up to congestion transactions consistent with the application of the FTR forfeiture rule to increment offers and decrement bids.

**Status – Pending before the FERC**

**PJM Response:** The FERC has recently opened Section 206 investigation on this issue. PJM has offered information and data to support this FERC effort and is awaiting its outcome. In general, PJM believes the FTR forfeiture rule is being applied consistently because up-to-transaction bids are path based and increment and decrement bids are individual point based.

**IMM Recommendation:** The MMU recommends that PJM not use the ATSI Interface or create similar closed loop interfaces to set zonal prices to accommodate the inadequacies of the demand side resource capacity product. Market prices should be a function of market fundamentals. The MMU recommends that, in general, the implementation of closed loop interface constraints be studied in advance and, if there is good reason to implement, implemented so as to include them in the FTR Auction model to minimize their impact on FTR funding.

**Status – No Further Action Planned; PJM Concerns**

**PJM Response:** PJM establishes interfaces such as the ATSI interface to ensure the correct pricing signal is sent to the market and to have the price of the marginal resource properly reflected. PJM believes it is critical for appropriate prices to be reflected in the market outcomes.