UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

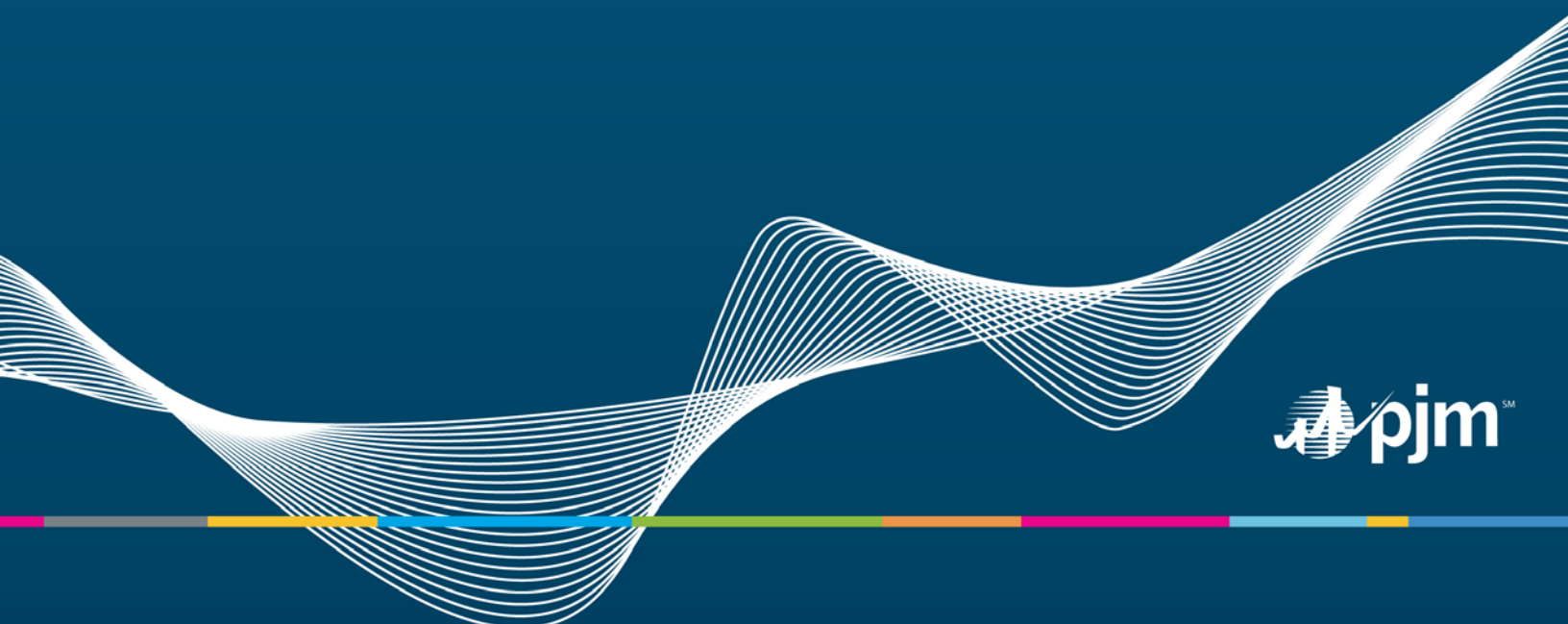
Centralized Capacity Markets in Regional Transmission Organizations and Independent System Operators

Docket No. AD13-7-000

STATEMENT OF ANDREW OTT

EXECUTIVE VICE PRESIDENT – MARKETS

PJM INTERCONNECTION, L.L.C.



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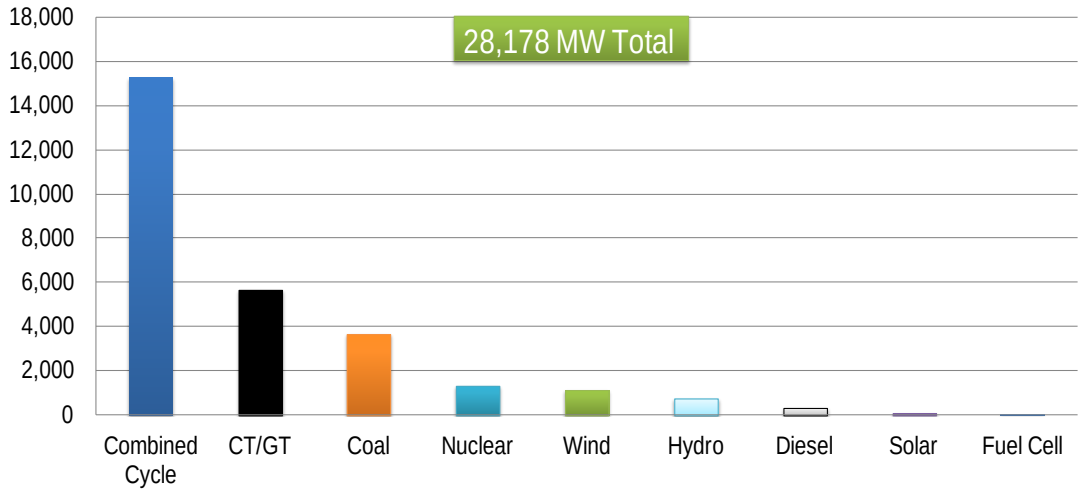
PJM welcomes this opportunity for the Commission to undertake a comprehensive look at the role of centralized capacity markets including examining their goals, design elements as well as the progress achieved toward meeting those stated goals. The Commission's focus on soliciting input on future challenges and potential solutions is also welcome and an important part of this conference. We appreciate the opportunity to engage in this broader discussion outside of the usual case by case discussion of issues.

Before addressing the specific Commission questions, it will be helpful to step back and examine the original goals of PJM's capacity market design (known as the Reliability Pricing Model or RPM) and the record to date in our achieving those goals. Those goals were memorialized succinctly in testimony PJM presented at a commission technical conference in February of 2006, a copy of which I have attached for ease of reference. They are as relevant today as they were at the time of that Conference seven years ago. In my testimony below, I detail the goals of RPM and its key design elements as presented by PJM at the February 2006 technical conference.

Although RPM has been subject to continual review and improvement, we are far better off having confronted and resolved the major design issues back in 2006. At that time, we were looking at a level of generation retirements in eastern PJM as a result of implementation of local environmental rules in a number of the mid-Atlantic states, such as requirements triggered by the New Jersey High Energy Demand Day rule and the Maryland Healthy Air Act as well as U.S. Environmental Protection Agency (EPA) enforcement actions. Using a forward capacity construct like RPM to respond to those potential retirements proved a valuable "test run" of its resiliency in addressing the far more extensive reach into virtually every coal unit in our fleet as a result of the promulgation of the U.S. EPA's Mercury and Air Toxics Standards (MATS) and related EPA rules. The MATS rule, when coupled with today's record low natural gas prices, represents a true "shock to the system" – resulting in a rapid changeover of the generation fleet over the next three years that, in the past, has taken over a decade to occur. The fact that since the inception of RPM we have been able to attract over 28,178 megawatts in new generation, over 14,370 MW of demand response resources and 1,113 MW of energy efficiency resources to replace plant retirements is a testament to the importance of the market designs, which we discussed back in 2006, in achieving their intended results.

Figure 1: Capacity Additions by Fuel Type Since RPM Implementation in 2007



As summarized in the 2011 performance assessment of RPM by an independent consultant, the forward capacity market has reduced overall costs of satisfying reliability requirements by fostering competition and has enabled cost effective responses to the challenges presented by increasingly stringent environmental rules. RPM has facilitated economically efficient tradeoffs among investment in environmental retrofits, retirement and replacement with lower-cost alternative supplies.

Of course, this does not mean that we should be complacent. In response to the Commission's inquiry concerning a look forward, I discuss, in response to question #5 below, some of the critical elements that we need to address going forward to:

1. better align the operational characteristics of the demand response resources with the value they are being assigned in the capacity market,

2. better recognize some of the operational challenges we will face as we see a rapid increase in imports from other regions,

3. address issues related to interaction of base auctions and incremental auctions in creating proper incentives for physical delivery of commitments, and

4. review performance of the sloped demand curve in managing price volatility.

I welcome this dialogue and look forward to elaborating on these issues in the discussion phase of this Technical Conference.

Response to Commission Inquiries from August 27 Notice and Final Agenda

Below, I address each of the questions set forth in the Commission's September 25 agenda:

I. What are the key goals of the existing centralized capacity market in your region?

II. How successful has the current capacity market design been in meeting those goals?

III. What are the metrics used to measure the success of the centralized capacity market?

IV. What design elements are key to the functioning of the centralized capacity market in your region? How were these elements derived? How have those elements evolved over time? How does capacity market design account for the interrelationship between design elements?

PJM's original goals in establishing the key design elements of RPM were detailed in testimony we submitted to the commission for a technical conference on these very issues held in February 2006.[1]

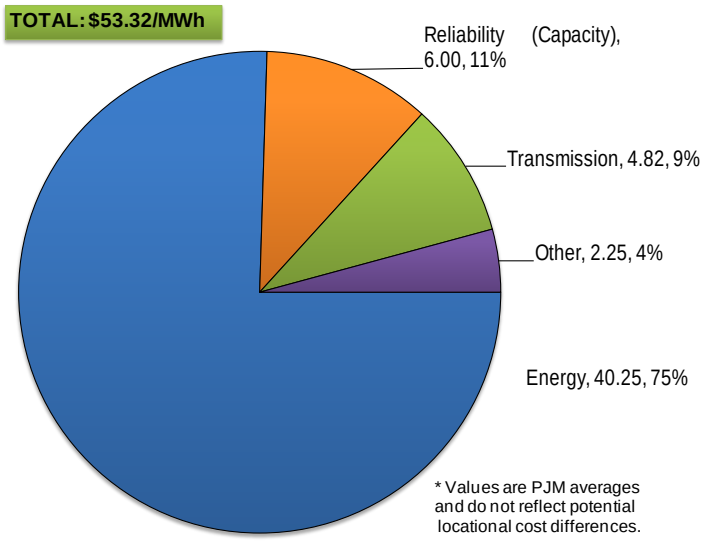
As a foundation to its 2006 testimony, PJM outlined the proverbial "three legs of the stool" each of which is a critical element to ensuring reliable, low-cost supplies of electricity to ultimate customers. As we outlined at that time, those three legs include:

- A liquid energy market providing competitive supply and demand options for customers to meet their short-term needs and price transparency to support their long-term bilateral arrangements;
- An independent regional transmission planning process that produces transmission solutions that support economically efficient and competitive wholesale energy and capacity markets; and
- A forward capacity market to ensure the availability of necessary resources that can be called upon to ensure reliability of the grid.

These three elements are designed to work together to produce reliable service and just and reasonable rates for consumers. Although this discussion is about capacity markets, as shown in Figure 2 below, it is worth noting that capacity makes up less than 12 percent of the total cost in the market, the energy market continues to be the primary revenue stream for most resources in the markets.

[1] A copy of PJM's February, 2006 Technical Conference testimony in Docket No. ER05-1410 is attached.

Figure 2: PJM Wholesale Cost (YTD July 2013)



Moreover, PJM, with the Commission's support, has developed a number of improvements to its energy and ancillary service markets as well as transmission planning reforms to strengthen these other two legs and their coordination with the capacity market. Nevertheless, capacity markets, remain an extremely important tool to ensure long term supply adequacy.

In our original 2006 testimony, we contrasted PJM's then-existing daily and monthly capacity markets and these short-term markets' disincentives to attracting long-term generation commitments. After reviewing the problems with theses short-term markets, we outlined three key goals of an appropriate capacity market design:

Goal 1: Providing Mechanism to Ensure Rational Retirement Decisions

One critical concern that we faced in 2006 was a series of impending retirements and the lack of a long term forward auction to ensure that PJM had sufficient resources to meet its future reserve margin. In 2006, those retirements were driven by a series of local environmental rules imposed in New Jersey, Maryland, and certain other states in the mid-Atlantic region along with U.S. EPA enforcement actions. In our original testimony, we highlighted the need for a long-term forward commitment, locational considerations and a sloped demand curve as key elements to appropriately value capacity that may otherwise be retired simply because its reliability value was not being appropriately considered and priced.

How Has RPM Fared in Addressing Generation Retirements?

Starting with the first auction in 2007, the capacity market provided an important forward price signal that helped to ensure more informed decisions surrounding generator retirement. Although retirements of uneconomic capacity occurred, the key design elements (sloped demand curve, locational consideration and forward commitment) all worked to provide critical transparent information that unit owners could use in making informed decisions on whether

to retire or retrofit generation resources. Our goal was not to prevent retirements of uneconomic generation. Rather, our goal always was to ensure that retirement decisions were informed by transparent information and pricing that valued the locational and operational value of a given unit and thereby retain generation resources that were cost-effective to retrofit and keep in service. The key metric is to ensure that price signals are consistent with reliability requirements, which minimizes the need for out-of-market reliability-must-run payments. PJM customers have incurred very few of these payments since RPM was implemented; in the face of nearly 22,000 MW of generation retirements since January 1, 2011, only about 1,700 MW of short-term reliability must run contracts have been required. From the commencement of the first Delivery Year for RPM in 2007/2008 through the 2010/2011 Delivery Year, no new Reliability Must Run contracts were needed, nearly 700 MW worth of RMR contracts were terminated as resources withdrew their requested deactivations given the presence of RPM and at least 550 MW of possible RMR contract payments were avoided. In RPM's early years, it resulted in unit owners retaining over 4,600 MWs in generation – reversing their original position to retire that generation – based on forward capacity prices that were more consistent with reliability requirements. This experience proved to be a prescient "trial run" of a much broader RTO-wide impact associated with EPA's implementation of a new suite of environmental rules including the Mercury and Air Toxics rule.

Implementation of the MATS rule in PJM has proceeded more smoothly in PJM as a result of the forward certainty that RPM has brought. Although over 20,319 MW of mostly mid-merit coal units have retired, over 47,000 MW of existing coal units committed their availability in the 2016 RPM Base Residual Auction, representing a decision of the unit owners to retrofit their units, as necessary, based on the forward price signal that RPM provides. The RPM design elements consistently have enabled PJM to procure resources above our reserve margin in each of the early years of the MATS rule implementation – a particularly stressful time for the industry. As well as attracting new investment as detailed below, these forward commitments have provided the forward certainty that has enabled unit owners to make informed decisions whether to retrofit units and has provided PJM and customers the forward certainty that sufficient megawatts of resources are committed to meet and exceed the target reserve margin for the PJM footprint. This certainty is in marked contrast to other regions, which today are struggling with incomplete information and have to rely on surveys of generation owners to assess whether capacity requirements can be met going forward.

GOAL 2: The Need for New Infrastructure Investment

A second goal outlined in 2006 was the need to attract new infrastructure investment. Given the existence of price caps and customers' intolerance for extreme energy price volatility, dependence on energy market prices alone to incent new generation simply was not realistic. Therefore, we designed the three key elements of RPM with a focus on attracting new investment as follows:

> The locational signal – It provides the investor with a signal as to where to build a new unit taking into account transmission constraints on the PJM system (including the scheduled transmission upgrades to address those constraints). In short, through the locational element, we were better able to attract generation where it was needed most, complementing and reinforcing the Locational Marginal Pricing (LMP)

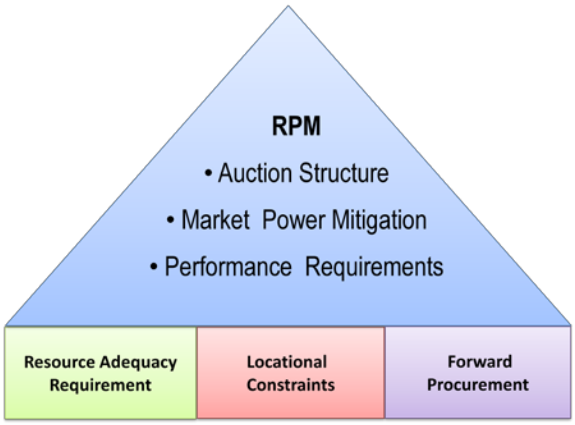
signals that potential new entrants can observe in the PJM energy market, rather than continuing with the fiction that the capacity from a unit anywhere in PJM's footprint was somehow deliverable everywhere else in the PJM footprint.

The three year forward commitment – In addition to providing certainty to PJM that sufficient resources were committed, the annual three-year forward commitment provided a transparent, and known forward revenue stream to help guide new investment decisions by reducing future revenue uncertainty. Although many argued in the original deliberations on RPM for a longer commitment period – with some arguing for a shorter commitment period, three years was agreed upon as an appropriate period to provide a forward signal to the market while still avoiding shifting undue risk to customers by locking in resources years in advance.[2]

The sloped demand curve – The sloped demand curve was designed to address the historically "lumpy" nature of capacity investment and smooth out the "boom/bust" cycle of capacity pricing present with a vertical demand curve for capacity, which discourages long-term investments in increased capacity. The greater price stability offered by the sloped demand for capacity also incents new investment when it is needed by providing greater certainty about capacity prices over time. Moreover, the sloped demand that permits cost-effective procurement of capacity resources beyond the Installed Reserve Margin (IRM) recognizes that capacity beyond the IRM does provide additional reliability.

The key design elements of RPM are illustrated in Figure 3.

Figure 3: Foundation for Forward Capacity Market



How Has RPM Fared in Attracting New Investment?

Although stemming uneconomic retirements has been an important result of RPM, perhaps its most notable recent achievement is the attraction of new investments to replace retiring units. As a result of the implementation of the

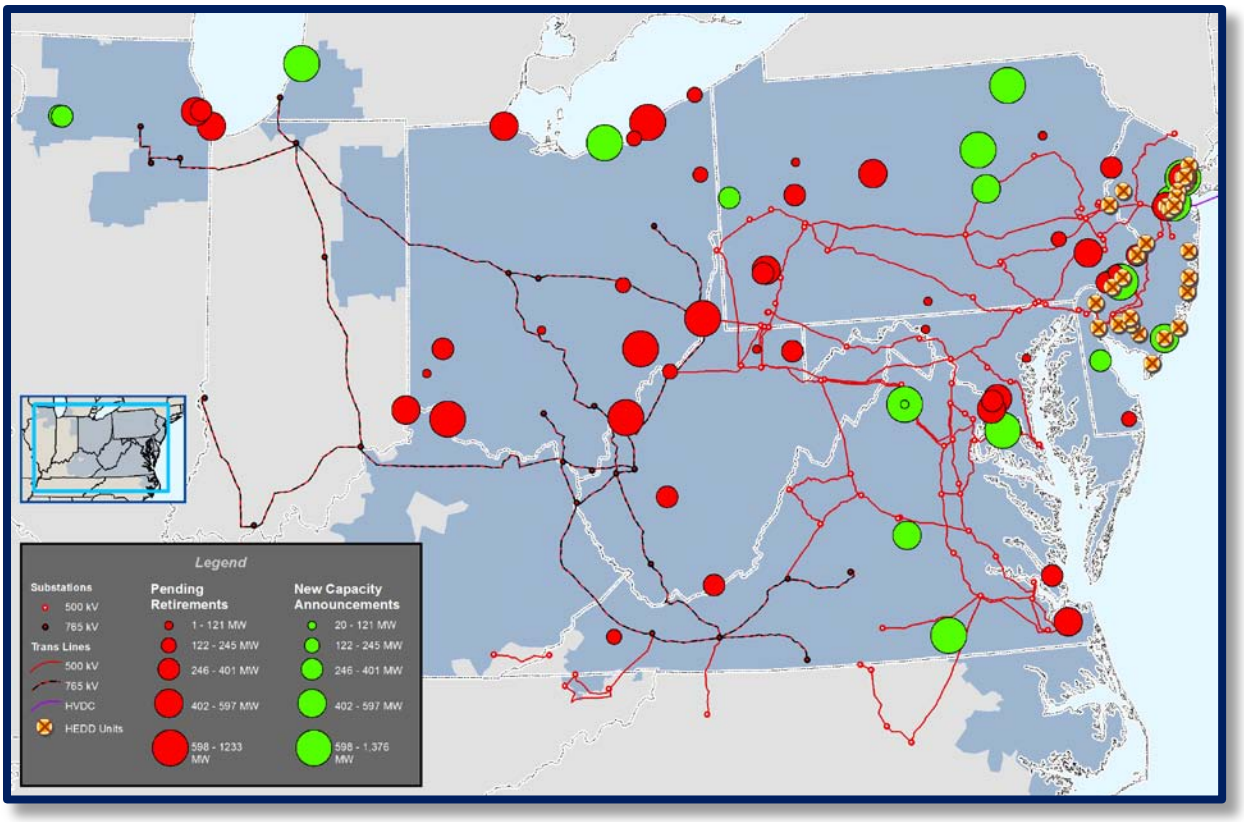
[2] Moreover, nothing in RPM precludes entities from entering into longer term bilateral arrangements, such as contracts for differences, based off of the RPM forward price signal.

MATS rule and related EPA rules and seemingly long-term shift in natural gas market fundamentals, the electric system must have the ability to respond rapidly to the resulting unprecedented reconfiguration of the resource mix.. Moreover, given the unit-specific "command and control" nature of the MATS rule, the economics of *each* existing coal unit has been "stress-tested" and decisions to develop new resources have been brought into focus as a result of the large number of unit owners who have decided to retire rather than retrofit their units.

Over the period covering the first 10 RPM Base Residual Auctions, 28,177.8 MW of new generation capacity was added along with 14,370 MW of new demand response resources and 1,113 MW of new energy efficiency resources. When compared against the generation retirements during this period, RPM netted over 23,342 MW of new installed capacity in the PJM footprint despite significant retirements and relatively slack economy..

Figure 4 below provides a locational overview of resource additions and retirements.

Figure 4: Generation Deactivation and New Capacity Announcements



Goal 3: Promoting Innovation: Treating Demand Response as a Comparable Capacity Resource

As PJM outlined in 2006, the third goal of RPM was to promote innovation by introducing the ability of non-generation resources such as demand response and energy efficiency to compete as capacity resources comparable to generation resources. PJM approached this challenge using two separate vehicles:

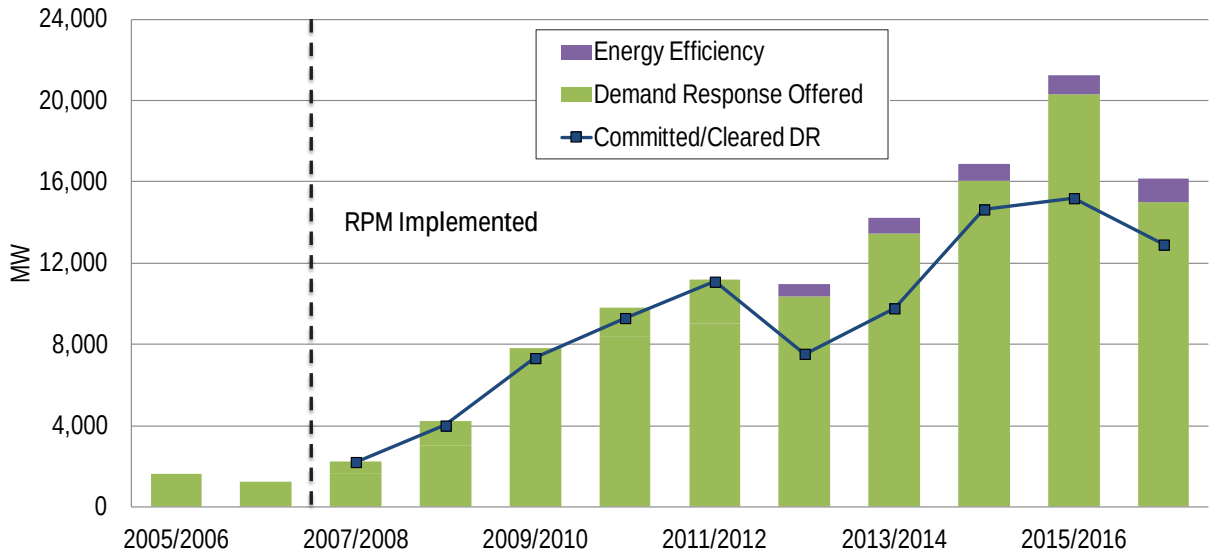
- developing supply-side rules for demand response participation in the capacity market (supply-side resources) and
- opening opportunities for demand to consider demand-side response by providing a means for load serving entities and states to reduce their capacity obligations through Price Responsive Demand (PRD).

On the supply side, PJM's rules allow demand response to offer into the forward capacity auction. With this Commission's support, we have developed rules to ensure an accurate means of measureable and verifiable demand response offers and have worked with your Office of Enforcement when entities have tried to abuse those rules. We have been guided by the Commission's principle of comparability of commitments as between generation and demand response. As noted below, in some instances, that focus on comparability has been muted to make accommodations to this new resource, leading us to comprehensively reexamine our rules to ensure comparability between generation and demand response resources. However, creating a market for demand response to substitute for generation as a capacity resource has been a valuable addition that, over time, will set the stage for development of true competition between comparable supply and demand-side resources to meet future capacity needs.

How Has Demand Response Fared in PJM's Capacity Market?

As noted above, since its inception, RPM has incented over 14,370 MW of cleared demand response resources substituting for traditional generation resources to meet PJM's capacity requirements. In addition, over 1,112.6 MW of new energy efficiency resources cleared during the same period. The amount of demand response that offered into RPM has steadily increased over time, as well, ranging from 2,000 MW during the 2007/2008 base residual auction to over 14,000 MW in the 2015/2016 base residual auction.

Figure 5: Demand Side Participation in Capacity Market (2005/2006 through 2016/2017)



Thus, the original goal of stimulating innovation and competition from alternative resources has been met. As noted below, given this very large dependence on demand response, new operational flexibility issues have emerged – issues that were not as pressing when demand response was a smaller part of the overall capacity portfolio. These matters are further discussed below.

V. Going forward, what are the key challenges facing centralized capacity markets in your region? How is each RTO/ISO going about addressing those challenges?

RPM has proven itself a critical tool to incent new investment and provide far more forward price certainty than exists under shorter-term capacity market designs. It has been "stress tested" under extreme conditions – first stemming retirements in the eastern PJM region as a result of various state environmental rules and more recently, on an RTO-wide basis, ensuring sufficient capacity resources during a time of targeted unit-specific compliance requirements brought on by the EPA MATS rule. We are grateful for the Commission's support for the basic market design over these years.

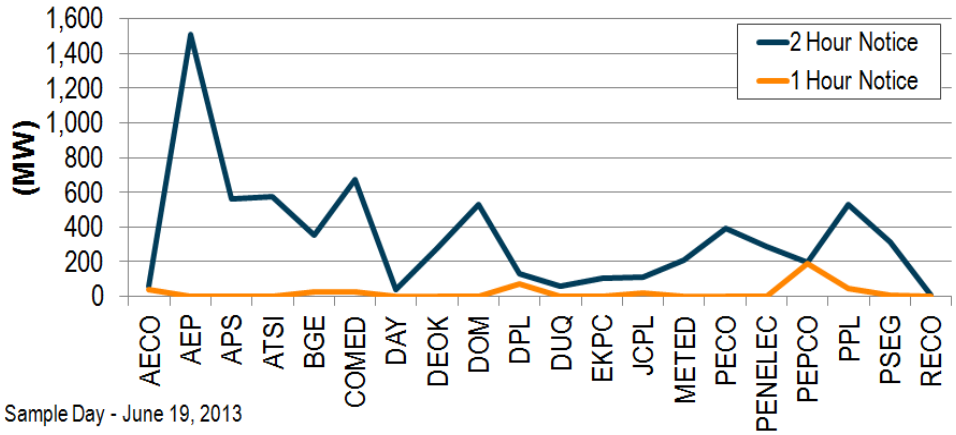
As previously noted, RPM has managed a dramatic reconfiguration in our capacity portfolio. We have seen significant increases in the amount of demand response resources clearing as capacity resources. PJM's experience has demonstrated that demand response performance during emergency events consistently has been dependable and reliable.

Operational Challenges to the Deployment of Today's Demand Response Products-

However, while the amount of demand response has increased, almost all demand resources are specifying two-hour notice requirements and emergency-only status resulting in over 12,000 MW of demand response-based capacity resources having very similar operational characteristics. PJM has experienced a large operational discontinuity because of the marked difference in operational comparability between generation and demand response given the notice requirements and emergency-only status of most of the demand response resources. These significant differences in levels of comparability to generation limits the usefulness of today's demand response resources to PJM operators in preventing the triggering of emergency conditions and then responding to emergency conditions once they have materialized. Unfortunately, to date, those demand response resources do not offer more diverse operational characteristics even though they are physically capable of doing so. PJM believes demand response resources can be available in a manner largely comparable to generation and that market rules should be adapted to provide the necessary incentives. For example, one category of demand response, the Limited Demand Response product (a holdover from a legacy demand response product known as Interruptible Load for Reliability), can be called upon only on for a maximum of ten events occasions for up to six hours per event. This restriction leads to significant operational challenges for PJM because our dispatchers simply do not have the same flexibility as they do with other resources to tailor use of this resource to meet specific needs. Rather, they are locked into a limited number of occasions when they can call upon the product and a set number of hours for a given event. Although this product has some capacity resource value, by definition, its value is more significantly limited. Yet, it is paid the same as unlimited demand response and generation resources despite the obvious lack of comparability with those other resources.

All demand response types also have notice times of one hour or two hours, and given the need to make an emergency declaration to deploy all demand response, this adds to the operational discontinuity and complexity faced by PJM dispatchers. The distribution of one-hour and two-hour notice demand response by zone is shown in Figure 6.

Figure 6: Demand Response Resource Notification Time Offered



In short, because the majority of DR resources have demanded two-hour notice, the operators flexibility to deploy them quickly is reduced in real time when flexibility is the most valuable. This large block of resources with similar deployment restrictions causes a large discontinuity during periods of high demand which complicates reliable grid operations rather than facilitating it.

Based on operational events this summer and our increased dependence on demand response resources, we see the need to return to the principles of comparability that were intended to be the guiding bedrock principle in the regulatory treatment of demand response and generation resources. PJM is working with our stakeholders and states on developing proposals to better integrate the capacity market design with these operational requirements, and we may well be presenting such reforms to you for consideration before the next base residual auction.

Operational Challenges Resulting from Levels of Imported Resources

The success of the RPM structure in attracting new investment has also led to a dramatic shift in the profile of our capacity resources between resources within our control in the PJM footprint versus resources that are imports dependent on transmission through one or more external systems. In 2006, we pointed out that, because of transmission constraints, a resource in Chicago is not necessarily comparable to a local resource to address a capacity constraint in the Mid-Atlantic Region. Therefore, we developed a locational feature in our capacity market design, which included the ability to determine new locational deliverability areas when needed based on reliability analysis. PJM's tariff contains procedures to deploy those constraints that could impact the deliverability of resources into transmission constrained areas.

Those same principles should apply to external resources clearing as capacity resources in PJM. Just like a resource in Chicago does not have the same deliverability to northern New Jersey as a local unit, so, too, a distant resource in another region, subject to curtailments through TLRs of intervening systems, is not necessarily as dependable to PJM as a resource within the PJM footprint. With our stakeholders, we are examining this issue, looking at those resources already available under RPM to ensure comparability of the analysis of units within and outside the footprint and whether any additional requirements or tools may be needed. We will continue to work with the commission and our stakeholders and the states on these important issues.

In summary, we have come a long way since our original 2006 RPM testimony. The RPM model has proven its worth through a very challenging time and has assured resource adequacy at competitive prices to the 61 million Americans living within the PJM region. As we move forward with additional reforms, we would be remiss if we didn't take this pause to recognize all of the accomplishments and thank this Commission as well as our stakeholders and states for their dedication and support to developing an effective capacity market design in the PJM region.

Craig A. Glazer
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February 2, 2006

Honorable Magalie R. Salas, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E., Room 1A
Washington, D.C. 20426

Re: Docket Nos. ER05-1410 and EL05-148

Dear Ms. Salas:

Enclosed for the Commission's convenience, please find advance copies of the prepared written presentations to be delivered tomorrow morning by Audrey Zibelman, PJM Executive Vice President and Chief Operating Officer, and Andrew L. Ott, PJM Vice President – Markets, on behalf of PJM Interconnection, L.L.C. in the Commission's Technical Conference in the above referenced matter. If you have any questions, please contact Craig Glazer at (202) 423-4743.

Respectfully submitted,

Craig Glazer

Craig Glazer
PJM Interconnection, L.L.C.
V.P., Federal Government Policy

UNITED STATES OF AMERICA

BEFORE THE

FEDERAL ENERGY REGULATORY COMMISSION

	)		
PJM Interconnection, L.L.C.	)	Docket Nos.	ER05-1410-000
	)		EL05-148-000

STATEMENTS OF AUDREY A. ZIBELMAN AND ANDREW OTT FOR TECHNICAL CONFERENCE RE: RELIABILITY PRICING MODEL FILED BY PJM INTERCONNECTION, L.L.C.

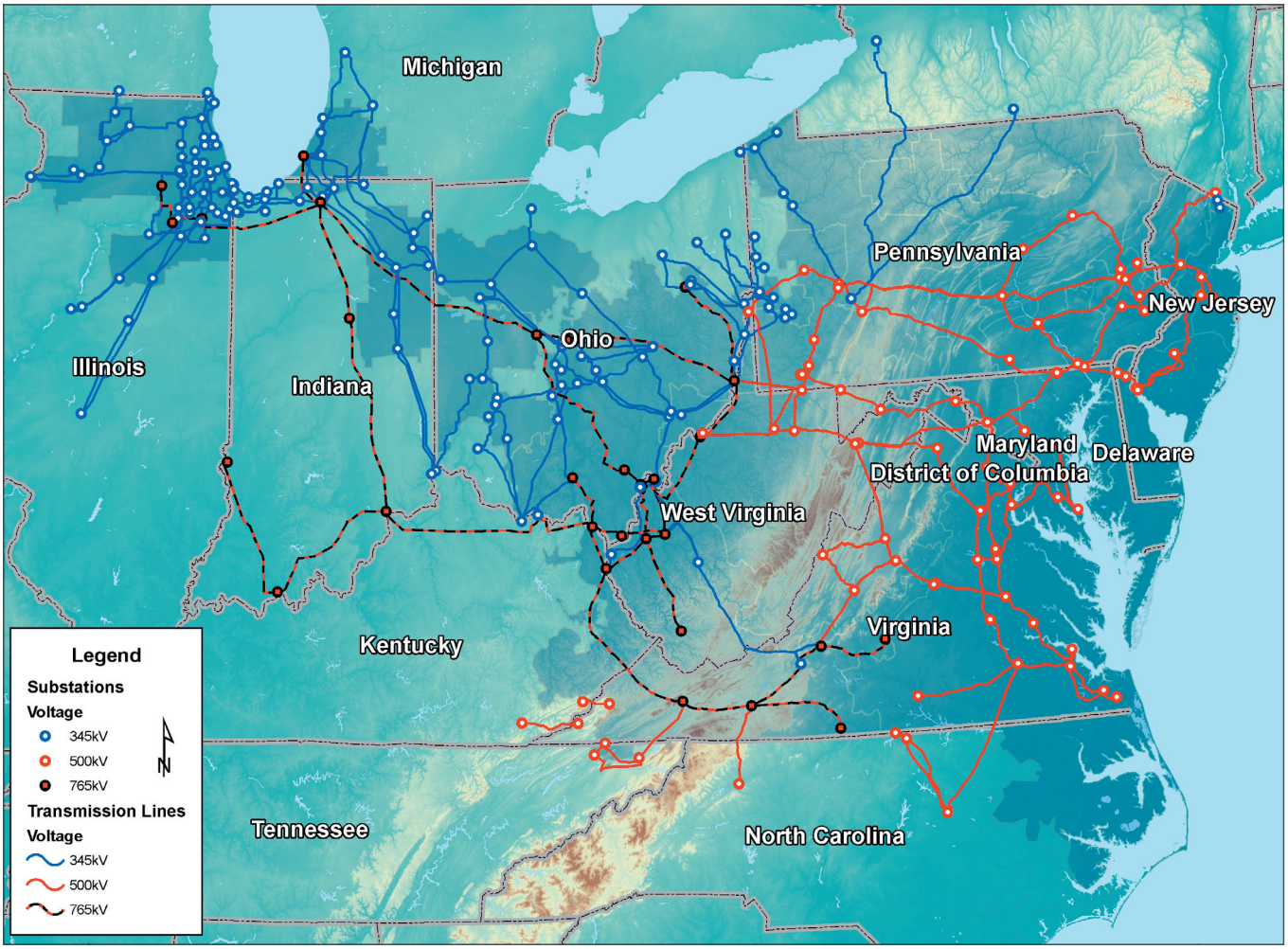
February 3, 2006

Statement of Audrey A. Zibelman,
executive vice president & COO, PJM

I thank the Commission and other parties for holding this technical conference. It is an important step in what has been a five-year process of dialogue and discussion on how best to address the reliability and investment challenge we see the PJM region facing in the next few years and beyond. Much has worked well in the PJM market. However, we see unmistakable signs of a looming problem in ensuring the new investment needed to maintain reliability throughout our footprint.

Today, Andy Ott, PJM's vice president–Markets, and I will outline for you those concerns and provide facts you requested on PJM infrastructure. Given the limited time available for these presentations, we will provide you with an overview of the reliability challenges that have given rise to RPM. We will also outline our proposed solution, the development of which has benefited immensely from the valuable input of our state commissions, as well as other stakeholders who have worked with us on this issue through countless meetings, exchanges of papers, presentations to our Board and this Commission's technical conference last June on PJM capacity issues.

Figure 1. PJM backbone transmission map with states



The Three Legs of the Stool: Energy Markets, Regional Planning and Capacity Markets

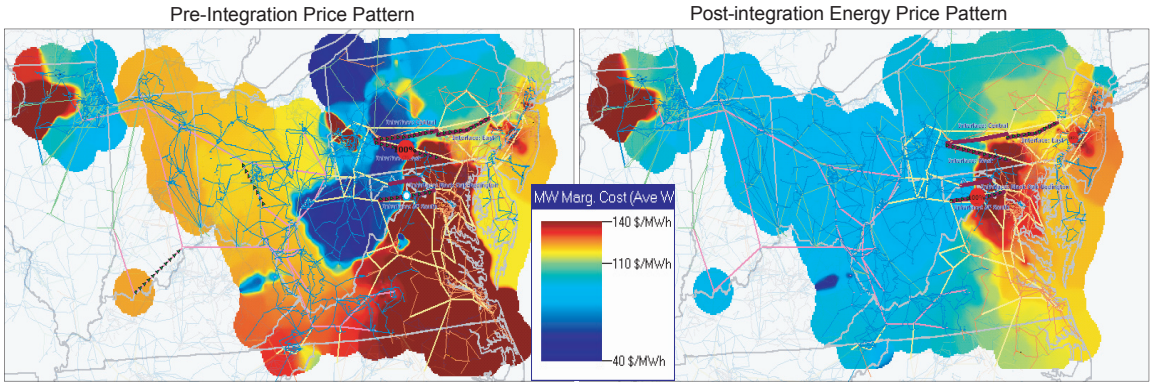
The interrelationship of energy markets, capacity markets and regional planning is complex. Like a giant ecological system, a successful capacity market needs to work in concert with a competitive wholesale energy market and an independent planning process that provides the right level of information and transparency to support the development of a robust electric transmission network. I will outline that relationship in just a moment, but first, I want to provide some context for the discussion.

As I indicated, there are three key components of the PJM marketplace today that can be thought of as three legs of a stool, all working together to support reliability and a robust competitive wholesale market delivering value to customers:

- A **liquid energy market** providing competitive supply and demand options for customers to meet their short-term needs and price transparency to support their long-term bilateral arrangements;
- An **independent regional transmission planning process** that produces transmission solutions that support economically efficient and competitive wholesale energy and capacity markets; and
- A **capacity market** to ensure the availability of necessary resources that can be called upon to ensure reliability of the grid.

The first leg of the stool, the PJM energy market, has provided demonstrable savings for customers. Energy Security Analysis' recent study found annual recurring savings of more than $500 million just from expanding the PJM market through the recent integrations. Other analyses show similarly robust efficiency gains. Figure 2 illustrates the dramatic change in prices throughout PJM as a result of the integrations – a benefit shared by customers throughout our footprint in 13 states and the District of Columbia. We also have recently filed before the FERC enhancements to our demand response program to move it beyond being just an add-on to fully integrating it into the markets - energy, capacity and ancillary services.

Figure 2. Lower energy prices across the expanded PJM region



Lower energy prices across the expanded PJM region

- ESAI's technical study: region-wide energy price without integration would be $0.78/MWh higher in 2005 than with integration.
- Spreading these savings over the total PJM RTO's energy demand of 700 terawatt-hours (TWh) per year yields aggregate savings of over $500 million per year.

Figures 3 and 4 indicate the dramatic growth in demand response; yet it cannot be bid as a capacity resource under current rules. PJM is committed to advancing the role of demand response and RPM is an important step forward.

Figure 3. PJM Market Annual Demand Response Activity

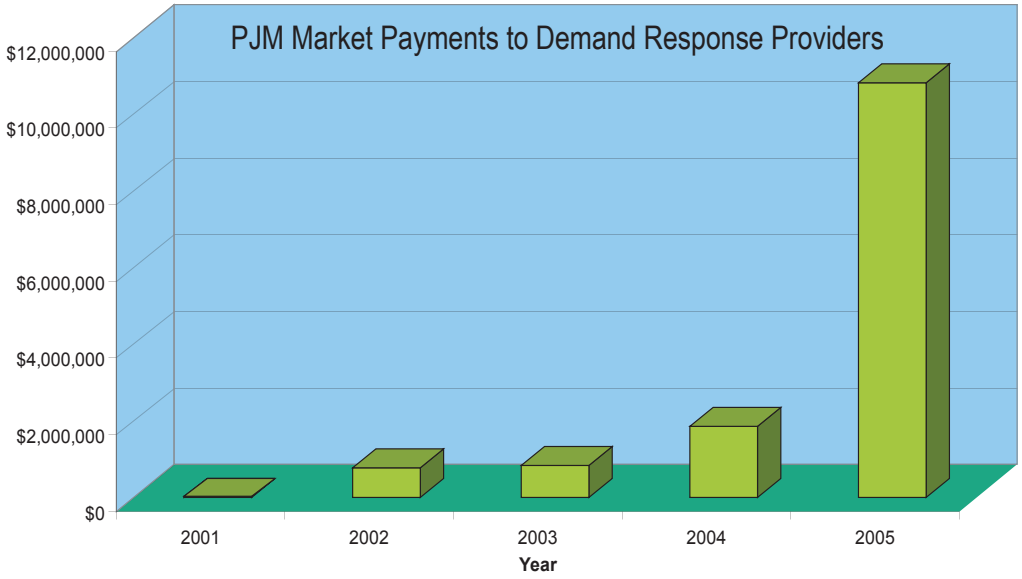


Figure 4. Opportunities for Demand Response as PJM has Evolved in 2005

Revenue Opportunity	Central Station Generation (PJM)		PJM (January 2005)	PJM (as of December 31, 2005)	PJM with approval of RPM	PJM with addition of Forward Energy
Real-Time/ Spot Energy Sales	✓	→	✓	✓	✓	✓
Day-Ahead Energy Sales	✓	Demand Side Response	✓	✓	✓	✓
Forward Energy Sales	✓		No ✗	No ✗	No ✗	Forward Energy Reserve ✓
Forward Capacity Sales	RPM will enhance ✓	→	Limited ✗	Limited ✗	RPM auction ✓	RPM auction ✓
Energy & Capacity payment for emergencies	✓	→	Not in all cases ✗	✓	✓	✓
Ancillary Services	Spin, regulation, etc… ✓	→	No ✗	✓	✓	✓

Although a transparent competitive energy market can ensure the most efficient dispatch of generation, absent fully unconstrained prices at both the retail and wholesale level – an efficient energy market alone cannot sufficiently incent long term investment. The need for long-term price signals that work in tandem with a robust spot energy market is one of the key drivers of our RPM proposal.

The second leg of the stool is regional planning. In my testimony before this Commission during its April 22, 2005, incentive transmission rate workshop, I indicated that our current

regional transmission planning process needs improvement. Our regional planning process has worked well to ensure timely upgrades to support new generation interconnection. We have seen more than $2 billion in new transmission investment committed through our planning process, about 65 percent of which represents transmission upgrades needed for reliability with the balance representing transmission additions to support generator interconnection to the grid.

Although successful in addressing short-term needs, our process did not focus enough on the long-term. Recognizing that need, we already have extended our planning horizon to 15 years beginning with this year's planning cycle, and we are working with our stakeholders on new planning criteria that move us to a better distinction between reliability and economic upgrades.

Reforms to the regional planning process are complementary to, not a substitute for, the Reliability Pricing Model. You undoubtedly will hear state commissioners and other stakeholders in the PJM footprint urging reforms to our planning process, some of which we have already implemented as noted above and others of which we are working with stakeholders to refine for purposes of a filing before this Commission this year. We agree that the PJM planning process needs to be reformed. However, it would be shortsighted to cast the debate as an "either/or" proposition between RPM and long-term planning.

Rather, long-term commitments to generation under RPM will be important for a transmission grid that can support the new investment that RPM will provide. You can't very well rationally plan and commit to transmission improvements five, 10 and even 15 years out if generating units can retire on 60 days notice; or if all generation is considered deliverable throughout PJM irrespective of transmission constraints; or if load-serving entities don't have any requirement to identify their capacity resources other than 24 hours ahead of time. Yet, these are all faults of the present PJM capacity construct. Accordingly, it is not wise to focus on only one aspect of that ecological system, i.e., transmission, to the detriment of others, such as well-placed generation. The health of all components of that system must be maintained to ensure that the system will thrive. The planning process and the capacity market need to work in harmony with each supporting the other. Without providing long term commitments for new generation, the best planning process in the world won't work. And, given the prospect of persistent reliability challenges in parts of eastern PJM, we simply can't afford to wrap this up in one big regulatory ball of string where nothing can move forward until everything is resolved – a sure recipe for gridlock.

THE SUPPLY ADEQUACY CHALLENGE

The key drivers of the RPM model can be categorized into three distinct areas of concern. Although they are interrelated, we will provide you with an overview of the present state of PJM in each area of concern before summarizing the key features of RPM.

Reliability Challenges Driving RPM

First and foremost, we share an obligation to ensure reliability of the power grid. Your steps to form the ERO are an important step forward. But at the end of the day, minute-by-minute reliability is provided by ensuring that there is enough reliable generation on hand to serve the load along with a reasonable margin for contingencies. We should not put ourselves in the position of having to rely on transmission alone to solve our looming reliability issues. In parts of eastern PJM, we face the prospect of persistent and worsening imbalances between supply and demand—the result of load growth, lagging generation additions, and generation retirements—that require progressively more complex and expensive transmission upgrades. As shown on Figure 5, these areas violate, in each of the next several years, the reliability requirement for sufficient generation, including imports, to meet expected loads. While modest transmission upgrades can see us through 2006, the upgrades needed to overcome reliability criteria violations in 2007 through 2010 will be more extensive and take longer to implement.

Figure 5. Future Reliability Violations

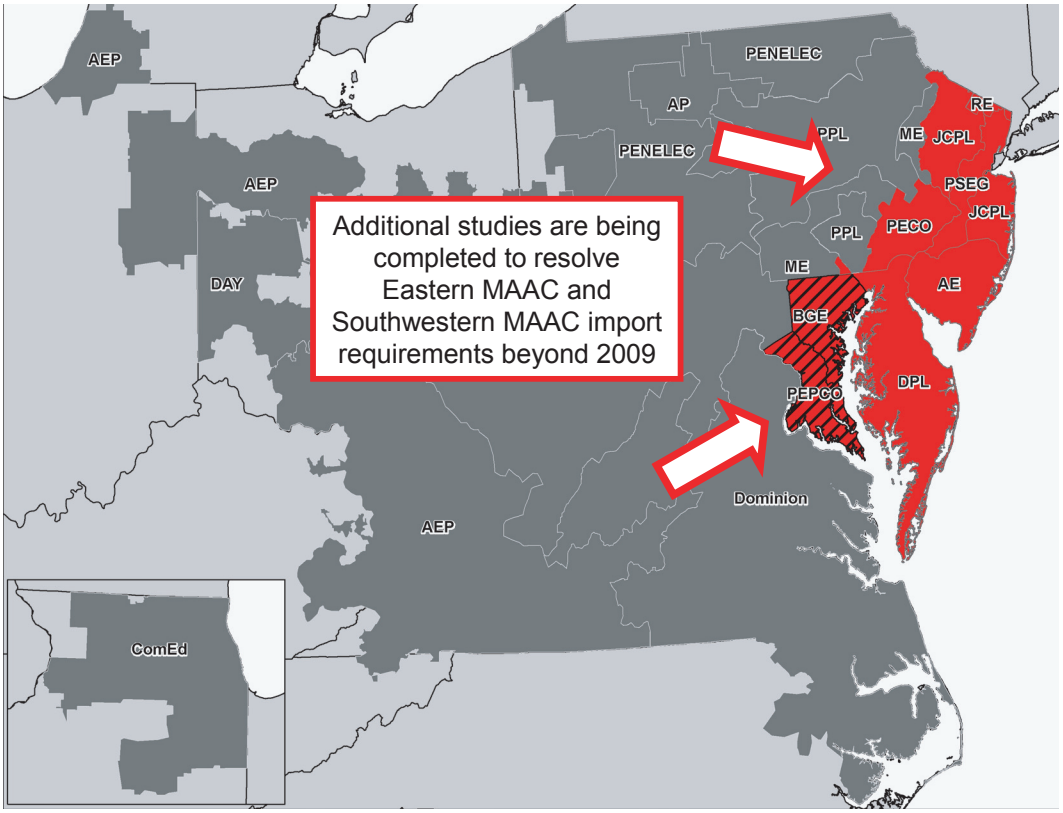
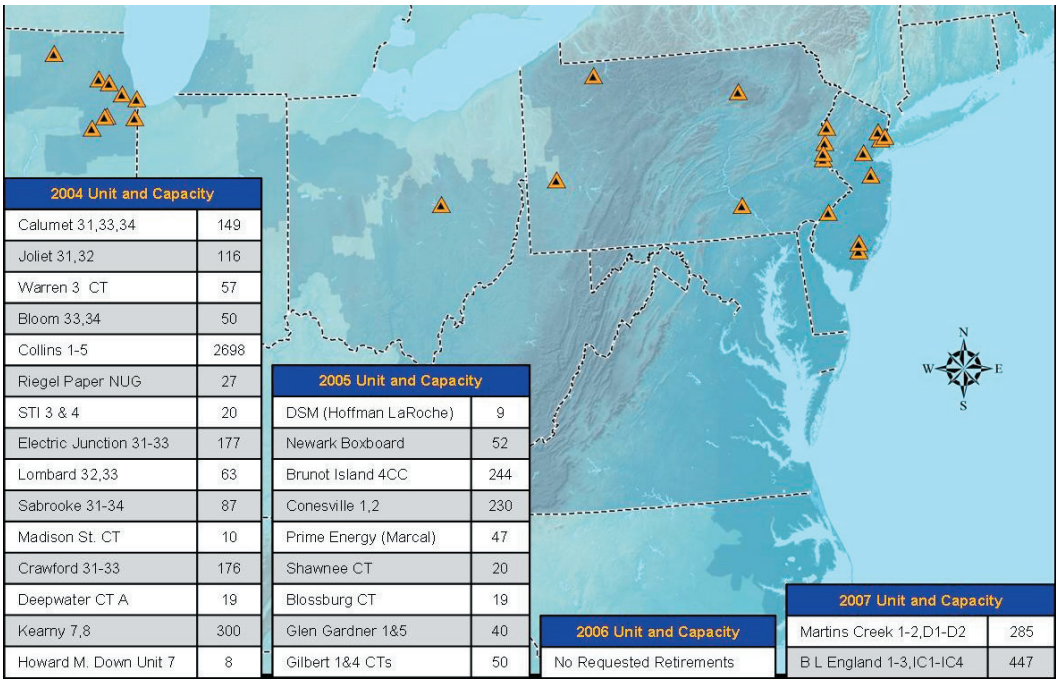


Figure 6 shows the increasing cost of the transmission solutions needed to resolve the reliability criteria violations as they recur each year. Despite these upgrades, the demand-supply imbalance persists in these areas and can be exacerbated on relatively short notice. The PJM region has seen a very high level of generation retirements recently, as shown on Figure 7. In 2004 we saw 3,957 MWs of generation retire, in 2005 711 MWs of generation retire and scheduled for 2007, 732 MWs of generation will retire. If further significant generation retirements are announced in eastern PJM, then PJM may require new

Figure 6. Eastern Baseline Upgrades

Figure 7. Generation Retirements



2004 Unit and Capacity	
Calumet 31,33,34	149
Joliet 31,32	116
Warren 3 CT	57
Bloom 33,34	50
Collins 1-5	2698
Riegel Paper NUG	27
STI 3 & 4	20
Electric Junction 31-33	177
Lombard 32,33	63
Sabrooke 31-34	87
Madison St. CT	10
Crawford 31-33	176
Deepwater CT A	19
Kearny 7,8	300
Howard M. Down Unit 7	8

2005 Unit and Capacity	
DSM (Hoffman LaRoche)	9
Newark Boxboard	52
Brunot Island 4CC	244
Conesville 1,2	230
Prime Energy (Marcal)	47
Shawnee CT	20
Blossburg CT	19
Glen Gardner 1&5	40
Gilbert 1&4 CTs	50

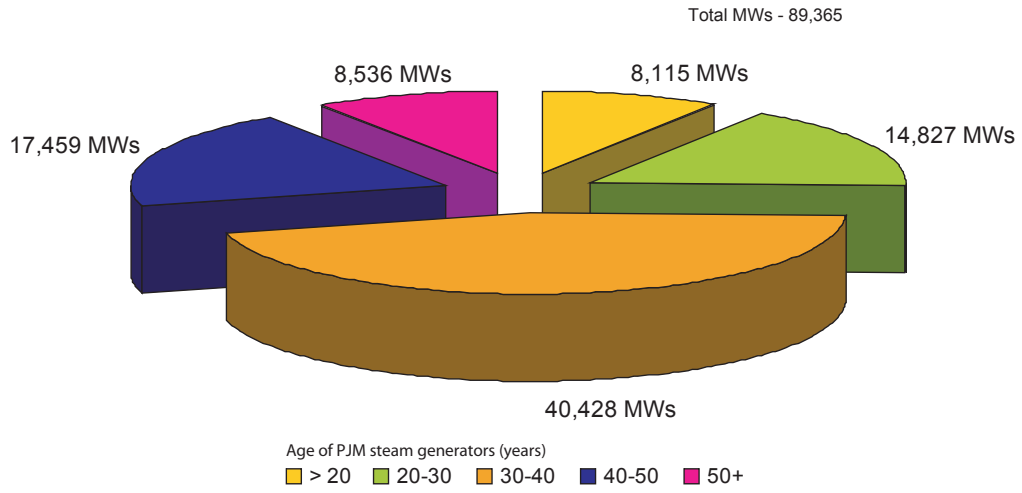
2006 Unit and Capacity
No Requested Retirements

2007 Unit and Capacity	
Martins Creek 1-2,D1-D2	285
B L England 1-3,IC1-IC4	447

500 kV facilities or substantial additional 230kV facilities. However, such facilities could take 10 years or more to complete, which would leave the system exposed to reliability violations in the interim if such a retirement occurred. Such retirements are a genuine risk. The PJM system has thousands of megawatts of generation units tied up in aging infrastructure. An example of this can be seen in Figure 8 where 75 percent of steam generators are 30 years or older, with 20 percent 50 years or older. Many of these units are located in the areas of concern in eastern PJM. Consequently, these reliability challenges are very real.

In short, we believe it is NOT good public policy to wait until the red lights are flashing throughout PJM before acting to reform our capacity construct. We seek to implement a forward market in reliability now that will be timed to meet the reliability challenge we face just as the problems rise in the next few years. If we delay too long, the problems will only fester, requiring us to make “quick fix” solutions, such as reliability must run contracts that have proven so problematic in New England. Consequently, we come to you in light of the present trends indicating an emerging reliability problem potentially affecting major population centers in the PJM footprint in the very near future.

Figure 8. MWs of Aging Infrastructure in Fossil Steam Generators



The Need for New Infrastructure Investment

The second challenge is one this Commission has spent much time considering: how do we attract sufficient investment in new generation in the right place to relieve these reliability problems? To date, the present PJM capacity market does very little to provide more investor certainty. The daily capacity market basically encourages load-serving entities to depend on short-term markets to meet their capacity requirements rather than entering into long-term arrangements. The investment community indicated at your last RPM Technical Conference in June that they are looking for a level of certainty of prices over a long-term to make the kinds of investments we need in this 13 state region.

Moreover, given that capacity is priced uniformly throughout PJM, a load serving entity in Baltimore can pick up some very inexpensive capacity in the Ohio River Valley to satisfy its requirements. However, that capacity in the Ohio River Valley doesn't help operators very much when they face a reliability problem in Baltimore. And the "one size fits all" single pricing of capacity throughout the footprint that is characteristic of our present construct does little to attract the kind of targeted investment in new infrastructure that is sorely needed in these areas.

Treating Demand Response as a Capacity Resource

The third policy challenge relates to demand response, a subject on which you recently held an all day technical conference. A number of demand side providers have told us the importance of a stable, predictable multi-year revenue stream for large capital investment. Today, that long-term predictable revenue stream does not exist. One could invest millions of dollars on a demand-side technology only to find that a series of cool summers wipes out the return on that investment. A forward price for capacity as opposed to continued reliance on the ups and downs of a boom/bust capacity market will allow multi-year bilateral arrangements to be struck between demand side providers and customers. Although no pricing regime can guarantee profitability, we view RPM as a means to ensure that demand side can bid into the market and receive compensation that recognizes its true locational and resource value to meeting reliability needs.

Andy Ott will summarize for you the RPM proposal. However, before I close, I would like to suggest a proposed path for moving forward. We have all been at this a very long time. In our opinion, there are some fundamental policy issues, such as the use of locational capacity pricing, reliance on forward commitments and use of a demand curve, that we think the Commission can resolve on the current record to move this process forward in helping resolve this issue. We have framed in our answer in this docket those policy issues that we believe can be answered based on past Commission precedent and the record in this docket. They are:

(1) Whether a capacity obligation construct remains necessary and a just and reasonable element of the market design for the PJM region;

(2) Whether the capacity construct for the PJM region should incorporate locational pricing to reflect the greater value to the system of resources located in constrained areas;

(3) Whether the capacity construct for the PJM region should include forward determinations of specific obligations and commitments, to facilitate competition from new entry, provide price signals to promote longer-term forward bilateral contracts, and promote reliability by enhancing planning certainty;

(4) Whether a downward-sloping demand curve in principle is a necessary and just and reasonable component of a capacity obligation construct for the PJM region because it should reduce risk and volatility, lower consumer costs in the long run, and provide a necessary improvement over a capacity obligation system with a single deficiency rate;

(5) Whether the capacity construct should include explicit, targeted mitigation rules, including offer caps where applicable market-power tests are failed.

I urge you to give all the parties the guidance that is needed to get this issue off of dead center by providing the marketplace clarification of your views on these overarching policy issues. Some of these issues, such as the Commission's willingness to consider locational capacity pricing and a demand curve to aid in establishing appropriate compensation, are issues you have already addressed in other ISO proceedings. With policy guidance on these basic issues, we could, through paper hearing processes and concurrent settlement processes, then work with the parties to address the more fact-specific details which need final resolution. However, litigation is not the best place to resolve policy issues nor should the Commission's administrative law judges be required to serve as super-planners or grid operators in order to move the process forward. We trust that today the reliability challenges the region faces become self-evident and that, given the alternatives, the status quo is unacceptable and that the Reliability Pricing Model should be allowed to be put into place to begin to send the price signals that will drive the market toward the new investment that we all seek. With the planning and demand side reforms we have already instituted and others we are developing or have pending before you, RPM provides the stability brought by that proverbial third leg of the stool. I thank you for your time and consideration. I'll now turn the discussion over to Andy Ott.

I appreciate the opportunity to discuss the important issue of capacity market reform. A well-designed capacity market structure can provide transparent information to enable forward capacity market signals to support infrastructure investment. As Audrey Zibelman explained in her statement, PJM and its stakeholders presently are working on revisions to the PJM transmission planning process to support longer term planning and building transmission infrastructure to support the needs of a competitive market. However, transmission expansion alone will not be enough; the capacity market design must provide a forward mechanism to evaluate the ongoing reliability requirements in a transparent way to provide opportunity for generation, demand response and transmission solutions.

I would like to discuss with you the fundamental features of the proposed Reliability Pricing Model and to describe how each of these features directly address the challenges that were described by Audrey.

FUNDAMENTAL DESIGN ELEMENTS OF THE RELIABILITY PRICING MODEL

The overall design goal of the RPM is to align capacity pricing with system reliability requirements and to provide transparent information to all market participants far enough in advance for actionable response to the information. Today we have a "one price fits all" daily and seasonal capacity market. That market does not properly value capacity needed to address local constraints nor has it provided the price certainty needed to sustain investment and stem the growing list of generation retirements that Audrey illustrated. We designed RPM as a new construct designed to address those problems with the present capacity market while ensuring that the overall market design drives the most efficient solution that ensures reliability. The three most fundamental design elements of the RPM are the *Four-year forward commitment for generation and demand; Locational Capacity Pricing; and the Variable Resource Requirement mechanism.*

Four-year forward commitment for generation and demand

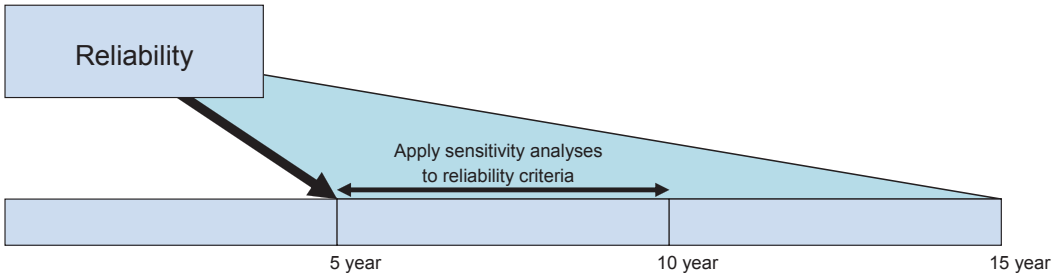
A number of our stakeholders across different segments have acknowledged to us and to this Commission at its last technical conference on the need for a better "forward" price signal for capacity, even though there was considerable debate on the mandatory nature of commitment by some and the term of commitment by others. PJM recognizes that selecting the proper time frame for the forward commitment involves a balance among competing legitimate concerns, and does not presume that four years is the only period that should be considered. Some would argue that in order to better integrate transmission or baseload power the term should be longer. Some would argue that for the sake of flexibility the term should be shorter. PJM believes that the most important considerations in determining the forward commitment period are 1) ensuring meaningful opportunity for participation of new entrants in the auction process and 2) ensuring forward commitment so that the PJM Regional Transmission Expansion Planning (RTEP) Process has adequate forward information on generation conditions for realistic coordination of transmission upgrades. Since generation, transmission and demand response installations require substantial lead times, we have determined that the four-year commitment period strikes an appropriate balance.

A binding forward commitment period is needed to ensure that the PJM RTEP Process has adequate forward information on generation conditions. PJM has implemented a RTEP Process that creates a long-term (15 year) plan to provide adequate transmission to maintain reliable grid operations into the future. Reliable grid planning and operation

depends upon a large degree of integration between generation adequacy and transmission adequacy planning. The current generation adequacy construct has not resulted in long-term commitment of generation that is needed for reliability. As a result, certain generation retirements have occurred with relatively short notice, which has created reliability problems that were not identified in the PJM RTEP Process.

Such short notice reliability problems have relatively few resolutions to replace the retiring generator due to the long lead time required for most transmission upgrades and generation installations. The load deliverability analysis that is performed in the PJM RTEP Process requires as input the generation capacity resources that will be available to support delivery of energy to load. Uncertainty in the generation installations for future years creates a significant amount of uncertainty in the future regional transmission plan. Since system reliability is a fundamental requirement, this planning uncertainty cannot be sustained. To correct this problem, the PJM region should return to a long-term forward capacity obligation, which should be driven by system reliability needs for future years.

Figure 9. Regional Planning Process



The four-year forward capacity auction also provides transparent forward pricing to allow the market to compare alternative solutions far enough in advance for investment to occur. This mechanism provides the opportunity for planned generation resources, planned demand response resources and planned transmission upgrades to compete equally in the auction. The participation of planned projects in the capacity auctions addresses several market structure and market power issues that exist under the current short-term auction mechanism.

Locational Capacity Pricing

In the PJM market, the linkage between resource adequacy requirements and transmission adequacy requirements has been the transmission deliverability analysis. The term "load deliverability" refers to the capability of the transmission system to deliver energy to a portion of the system experiencing a localized shortage of generating capacity from the unaffected remainder of the system. Pricing capacity by location utilizes those deliverability limitations identified in the PJM Regional Transmission Plan to ensure that the capacity price in each transmission zone properly reflects the reliability value of generation in that zone.[1]

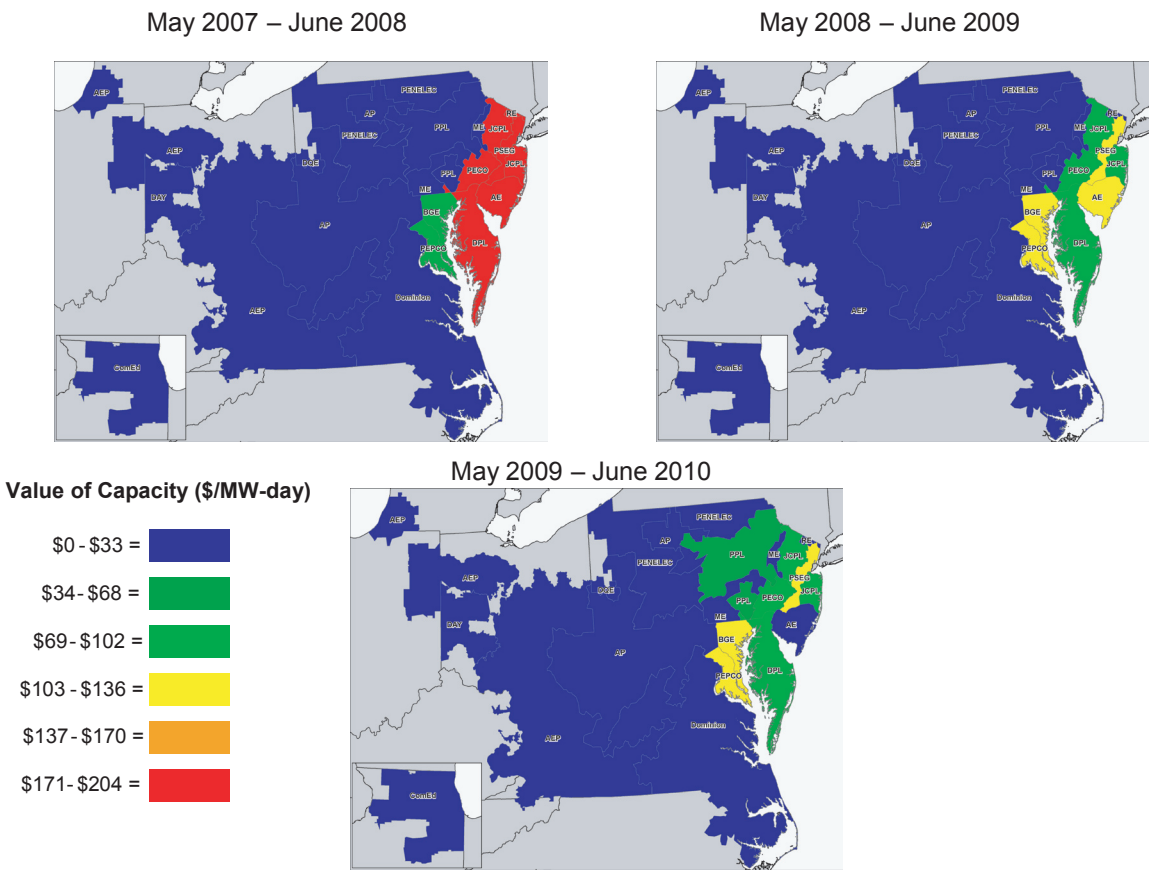
The current PJM capacity construct utilizes the concept of "universal deliverability;" namely, that a generator anywhere within the PJM footprint is deemed to be able to deliver everywhere within PJM. As a result, there is a single price for capacity across all of PJM. Universal

[1] PJM zones presently correspond to the service territories of the traditional utilities within PJM. As a result, the area served by AEP is a 'zone" within PJM, the area served by Commonwealth Edison is another zone etc.

deliverability arguably worked adequately when PJM was smaller and the transmission system was more robust, given the demands on the system at that time. But that concept breaks down as the transmission system becomes more constrained and the footprint larger. Clearly, infinite transfer capability is an impractical and, likely, an economically undesirable condition. In fact, under this construct, PJM has been forced to rely on Reliability Must Run contracts to defer retirements of generators in transmission-constrained locations in order to preserve reliability. Specifically, during this period when RPM is under consideration, we have utilized Reliability Must Run contracts to provide stop gap compensation to units in New Jersey that had announced their retirement. Based on these experiences, it has become clear that the capacity market construct must recognize locational constraints in order to provide consistent information regarding the relative value of generation, demand and transmission solutions.

The physical reality of power system planning and operations is that the reliability value of generation and demand response resources does vary by location because of the interaction of capacity and transmission adequacy. Figure 10 illustrates sample RPM pricing results that demonstrate the concept of locational capacity prices. It has been clearly demonstrated in PJM and elsewhere that the consequence of ignoring the physical reality of power delivery in the pricing of services creates substantial cost shifts and market manipulation potential. The addition of locational constraints may in the short term increase costs in certain zones but such increases are necessary to properly value capacity costs that result from physical system conditions. To help offset these costs, the RPM includes a Capacity Transfer Right that will act as a hedge against these locational price differences. A Capacity Transfer Right is the right to import capacity into a constrained zone, this right will be allocated to Load Serving Entities in constrained areas to provide them with access to capacity resources outside the zone that may be more economical.

Figure 10. RPM Simulation Results



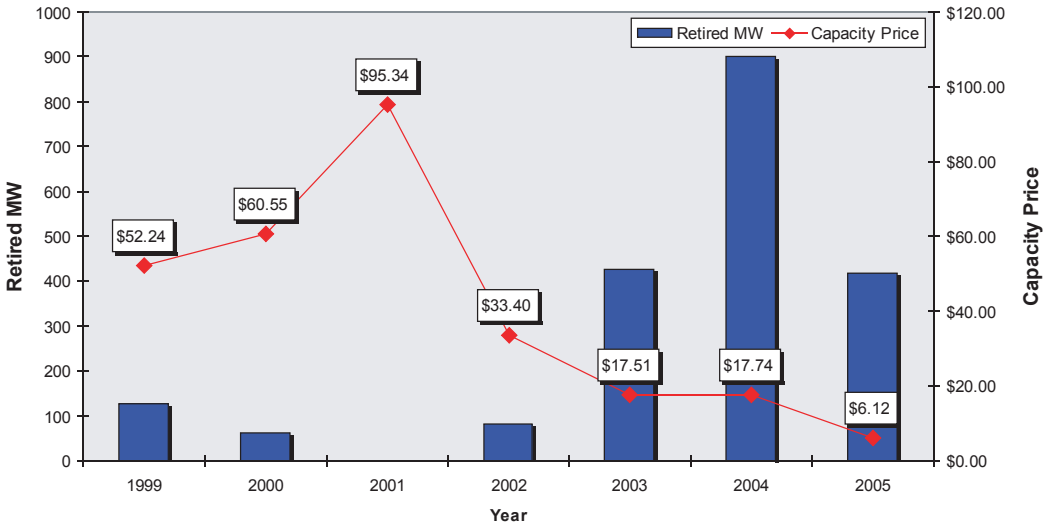
Variable Resource Requirement

The variable resource requirement is a family of price/quantity points that provide a specified price for various levels of installed capacity reserve. The variable resource requirement, often called a demand curve, has caused considerable debate. We must recognize that all of the capacity market proposals include some form of demand curve. The design question we must address is whether the demand curve is based on a single reserve value (vertical) or a family of values (sloped).

There are several general advantages of a variable resource requirement mechanism relative to the single-value approach of the current capacity structure. In a single-value system, prices are zero if there are a few MW of excess capacity available above the installed reserve margin target and prices are very high if there is a shortage of a few MW. On the other hand, compared to a single-value system, a variable resource requirement curve will reflect the reality that additional capacity over and above a target reserve margin nevertheless has value.

There are at least two sources of this value. One is that in the face of uncertain load growth, weather and capacity availability, the probability of available capacity being less than what is required to meet load and operating reserves never reaches zero, even for large reserve margins. Thus, reserves beyond the target are valuable for reducing the risk of capacity shortfalls. The second source of value is that reserves beyond the target lessen the risk of large suppliers being pivotal or otherwise able to exercise market power. Conversely, if reserves are below the target, a downward sloping variable resource requirement curve provides increasing incentives for new capacity to the extent that the system is short, reflecting in a general way the greater risks of shortages and market power.
A major advantage of a variable resource requirement curve compared to the current single-value approach is that the stream of capacity payments received by generators will be more stable. In contrast, a system such as PJM's current vertical demand curve can bounce between two pricing extremes, depending on whether there is too little capacity or too much relative to the target. The resulting large swings in net revenues can exaggerate boom-bust behavior. Boom-bust cycles occur where after a period of high prices too much capacity is added, followed by a period of low or no capacity payments, resulting in a drying up of capacity additions until reserves are again short of target levels. Such swings have been observed in the current PJM ICAP market, and such volatile revenues cannot be hedged because of incomplete forward markets, which increases risks to investors.

Figure 11. Generation Retirements and Capacity Prices



Because capital markets do not like risk, more volatile profits mean that higher rates of return will be required for new generation investments. To obtain the higher returns required by risk-averse investors, shortages of capacity would have to happen more frequently, resulting in higher costs and risks to consumers. In comparison, as shown in dynamic economic analysis performed by Professor Benjamin Hobbs for PJM, a variable resource requirement curve-based system will lower the variation in generator revenues, especially for peak capacity. Further reductions in risk to investors result if capacity commitments are made years in advance, as opposed to the present PJM system. As a result, market simulations show that risk-averse investors will accept lower rates of return, ultimately decreasing costs and risks to consumers.

Another advantage of a downward sloping variable resource requirement curve relative to a single-value vertical demand curve is that the incentive is reduced to engage in either economic or physical withholding of capacity from the capacity market. This is because the slope of the variable resource requirement means that a given reduction in capacity or a given increase in the capacity bid will have considerably less effect on the price of capacity than when the curve is vertical, as it effectively is for a single-value based system.

In summary, the three key features of RPM build upon the needs of the PJM region and are designed to address the shortcomings of the present capacity market design. As Audrey mentioned, the status quo does not move us forward to addressing the very real local reliability issues we see in PJM in the very near future. The status quo is, in some ways, part of the problem that gives rise to the generator retirements and limited demand response where it is most needed. The RPM model builds on key features already accepted by this Commission in other regions while tailoring the model to meet the unique needs of this region.