Market Monitoring Unit

Analysis of the 2007 – 2008 RPM Auction

PJM Market Monitoring Unit

August 16, 2007

Introduction

This report, prepared by the PJM Market Monitoring Unit (MMU), reviews the functioning of the first Reliability Pricing Model (RPM) auction (for the 2007-2008 delivery year) and responds to questions raised by PJM members about that auction. The MMU will prepare a similar report for each RPM auction.

The MMU verified the reasonableness of offer data and calculated the derived offer caps based on submitted data, calculated unit net revenues, verified capacity exports, verified the reasons for MW not offered, verified the maximum EFORd rates used, verified EFORd offer segments, verified clearing prices based on the demand curves and verified that the market structure tests were applied correctly. All participants in the RPM auction failed the market structure tests with the result that offer caps were applied to all sellers. Based on these facts, the MMU concludes that the results of the 2007-2008 RPM auction were competitive.

Preliminary Market Structure Screen (PMSS)

Under the terms of the PJM Tariff, the MMU is required to apply the preliminary market structure screen (PMSS) prior to RPM auctions.[1] The purpose of the PMSS is to determine whether additional data are needed from owners of capacity resources in the defined areas in order to permit the MMU to apply the market structure tests defined in the Tariff. For each locational deliverability area (LDA) and the PJM Region, the PMSS is based on: (1) the unforced capacity available for the delivery year from generation capacity resources located in such area; and (2) the LDA's reliability requirement and the PJM reliability requirement.[2]

An LDA or the regional transmission organization (RTO) Region fails the PMSS if any one of the following three screens is failed: (1) the market share of any capacity resource

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1 See PJM Open Access Transmission Tariff (OATT), "Attachment DD: Reliability Pricing Model," Original Sheet No. 605 (Effective June 1, 2007), section 6.3 (a) i.

2 The terms "PJM Region," "RTO Region" and "RTO" are synonymous in this report and include all capacity within the PJM footprint.

owner exceeds 20 percent; (2) the Herfindahl-Hirschman Index (HHI) for all capacity resource owners is 1800 or higher; or (3) there are not more than three jointly pivotal suppliers.[3] Capacity resource owners who own or control generation in the area that fails the PMSS are required to provide avoidable cost rate (ACR) data to the MMU.[4]

Consistent with the requirements of the Tariff, the MMU applied the PMSS two months prior to the 2007-2008 RPM auction. As shown in Table 1, all three defined areas failed the PMSS. The RTO Region passed the market share and HHI screens, but failed the three pivotal supplier screen. The Eastern Mid-Atlantic Area Council (EMAAC) LDA and Southwestern Mid-Atlantic Area Council (SWMAAC) LDA failed all three screens. Each of the three areas also failed the two pivotal supplier test and the one pivotal supplier test, using the same market definition applied with the three pivotal supplier test. As a result, capacity resource owners were required to submit ACR data to the MMU for resources for which they intended to submit non-zero sell offers unless certain other conditions were met.[5] Specified types of units in areas outside the two constrained LDAs were provisionally exempted from providing such data based on the assumption that these units would not affect the clearing price.[6]

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[3] See PJM Open Access Transmission Tariff (OATT), "Attachment DD: Reliability Pricing Model," Original Sheet No. 605 (Effective June 1, 2007), section 6.3 (a) ii.

[4] See PJM Open Access Transmission Tariff (OATT), "Attachment DD: Reliability Pricing Model," First Revised Sheets No. 609-612 (Effective June 20, 2007). The required data are defined at section 6.7.

[5] See PJM Open Access Transmission Tariff (OATT), "Attachment DD: Reliability Pricing Model," First Revised Sheet No. 610 (Effective June 20, 2007), section 6.7 (c).

[6] Attachment A provides the referenced MMU letter regarding provisional exemptions from the data requirement.

Table 1 Preliminary Market Structure Screen results: 2007-2008[7]

RPM Markets	Highest Market Share	HHI	Pivotal Suppliers	Pass/Fail
PJM	16.0%	895	1	Fail
EMAAC	32.0%	2155	1	Fail
SWMAAC	49.8%	4259	1	Fail

Offer Caps

The defined capacity resource owners were required to submit ACR data to the MMU by six weeks prior to the 2007-2008 RPM auction. If a capacity resource owner failed the market power test for the auction, avoidable costs were used to calculate offer caps for that owner's resources.

Avoidable costs are the costs that a generation owner would not incur if the generating unit did not operate for one year, in particular the delivery year. In effect, avoidable costs are the costs that a generation owner would not incur if the generating unit were mothballed for the year. In the calculation of avoidable costs, there is no presumption that the unit would retire as the alternative to operating, although that possibility could be reflected if the owner documented that retirement was the alternative. Avoidable costs also include annual capital recovery associated with investments required to maintain a unit as a capacity resource. Avoidable costs are defined to be net of net revenues from all other PJM markets and unit-specific bilateral contracts. The specific components of avoidable costs are defined in the PJM Tariff.

Capacity resource owners could provide ACR data by providing their own unit-specific data, by selecting the default ACR values, by submitting an opportunity cost for a possible export, by inputting a transition adder or by using permitted combinations of these options. The default ACR values were calculated by the MMU based on available unit data and posted to the PJM Web site in order to provide an alternative for owners that did not wish to calculate unit-specific ACR values or who believed that the default ACR values exceeded their unit-specific ACR values. The opportunity cost option allows

[7] The RTO includes EMAAC and SWMAAC.

resource owners to input a documented export opportunity cost as the offer for the unit. If the relevant RPM market clears above the opportunity cost, the unit's capacity is sold in the RPM market. If the opportunity cost is greater than the clearing price, the unit's capacity does not clear in the RPM market and it is available for export. The transition adder was added to the offer cap, if appropriate, regardless of the offer-cap calculation method.[8]

As shown in Table 2, of the 1,090 units which submitted offers, unit-specific offer caps were calculated for 125 units (11.5 percent). Owners submitted unit-specific cost data and net revenue data for these units and the MMU calculated the unit-specific offer caps based on that data. Offer caps of all kinds were used by 580 units (53.3 percent), of which 392, or about two-thirds, were the default ("proxy") offer caps calculated and posted by the MMU. Of the 1,090 units, the remaining 510 units were price takers, of which the offers for 507 units were zero and the offers for three units were set to zero because no data were submitted. The transition adder was part of 263 offers, of which 60 offers included only the transition adder. Of the 1,090 units which submitted offers, 119 (10.9 percent) included an Avoidable Project Investment Recovery Rate (APIR) component. The APIR component added $10.98 per MW-day on average to the offer cap of these units. The default ACR values include an average APIR of $0.91 per MW-day.

[8] The transition adder, which is added to the calculated offer cap, is $10.00 per MW-day for delivery years 2007-2008 and 2008-2009 and $7.50 per MW-day for delivery years 2009-2010. It can be applied only up to 3,000 MW of unforced capacity per owner, only in unconstrained markets and only by those parent companies which own no more than 10,000 MW of unforced capacity in PJM.

Table 2 Offer caps: 2007-2008 RPM auction

Calculation Type	Number of Units	Percent of Units Offered
Default ACR Selected	392	36.0%
ACR Data Input	125	11.5%
Opportunity Cost Input	3	0.3%
Transition Adder Only	60	5.5%
Offer Caps Calculated	580	53.3%
Price Takers	510	46.7%
Total Units Offered	1,090	100.0%

RPM Auction Results

MMU Methodology

The MMU reviewed the following inputs to and results of the 2007-2008 RPM auction:[9]

- **Offer Cap –** Verified that the avoidable costs, opportunity costs and net revenues used to calculate offer caps were reasonable and properly documented;
- **Net Revenues –** Calculated actual unit-specific net revenue from PJM energy and ancillary service markets for each PJM capacity resource for the period from 2001 through 2006;
- **Exported Resources –** Verified that capacity resources exported from PJM had firm external contracts or made documented opportunity cost offers;
- **Excused Resources –** Verified the specific reasons that capacity resources were excused from offering into the auction;

[9] All volumes and prices are in terms of unforced capacity (UCAP), which is calculated as installed capacity (ICAP) times (1-EFORd). The equivalent demand forced outage rate (EFORd) values in this report are the EFORd values used in the 2007-2008 RPM auction. They can be no greater than the EFORd for the 12 months ending September 30, 2006.

- **Maximum EFORd –** Verified that the maximum equivalent demand forced outage rate (EFORd) used in base offer segments was the one-year EFORd ending September 30, 2006;

- **EFORd Offer Segment –** Verified that the EFORd offer segments were calculated per the tariff. A total of 811.9 MW were included in EFORd offer segments;

- **Clearing Prices –** Verified that the auction clearing prices were accurate, based on submitted offers and the Variable Resource Requirement (VRR) curves;

- **Market Structure Test –** Verified that the market power test was properly defined using the three pivotal supplier (TPS) test, that offer caps were properly applied and that the TPS test results were accurate.

Market Structure Tests

As shown in Table 3, all participants in the total PJM market as well as both LDA RPM markets failed the TPS test. The result was that offer caps were applied to all sell offers. All participants in each market also failed the two pivotal supplier test, using the same market definition applied with the TPS test. All participants in both constrained LDAs failed the one pivotal supplier test as did about 20 percent of all participants in the RTO market, again using the same market definition applied with the TPS test.[10] Eighty-six percent of participants in the RTO market failed the one pivotal supplier test using a market definition that includes all offers with costs less than or equal to 1.05 times the clearing price.[11] Only those participants that fail the market power test are subject to offer capping. The RTO market includes all supply which cleared at or below the unconstrained clearing price. The LDA markets include the incremental supply inside

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[10] The market definition used for the TPS test includes all offers with costs less than or equal to 1.50 times the clearing price. The appropriate market definition to use for the one pivotal supplier test includes all offers with costs less than or equal to 1.05 times the clearing price. See *2006 State of the Market Report* (March 8, 2007), Appendix J, "Three Pivotal Supplier Test" for additional discussion.

[11] This is the appropriate market definition for a one pivotal supplier test.

the LDAs which was required to meet the demand for capacity in each LDA and which cleared at a price higher than the unconstrained price.

Table 3 presents the results of the TPS test using the Residual Supplier Index (RSI_x) as the metric.[12] A generation owner or owners are pivotal if the capacity of the owners' generation facilities is needed to meet the demand for capacity. The RSI_x is a general measure that can be used with any number of pivotal suppliers. The subscript denotes the number of pivotal suppliers included in the test. If the RSI_x is greater than 1.0, the supply of the specific generation owner or owners is not needed to meet market demand and those generation owners have a reduced ability to unilaterally influence market price. If the RSI_x is less than 1.0, the supply owned by the specific generation owner, or owners, is needed to meet market demand and the generation owners are pivotal suppliers with a significant ability to influence market prices.

Table 3 RSI results: 2007-2008 RPM auction[13]

	RSI_1	RSI_2	RSI_3
RTO	0.83	0.69	0.59
EMAAC	0.12	0.03	0.01
SWMAAC	0.06	0.00	0.00

RTO

Table 4 shows total RTO offer data for the 2007-2008 RPM auction, which includes the EMAAC and SWMAAC LDAs. Total internal RTO unforced capacity (UCAP) of 155,206.0 MW includes all generating units and demand resources (DR) that qualified as a PJM capacity resource for the 2007-2008 auction, excluding external units. This value includes owners' modifications to installed capacity ratings (Table 5), which are

[12] See *2006 State of the Market Report* (March 8, 2007), Appendix J, "Three Pivotal Supplier Test" for additional discussion on the TPS test.

[13] The RTO includes EMAAC and SWMAAC. The reported RSI_x results are the lowest calculated for each market and test.

permitted under the PJM Reliability Assurance Agreement (RAA) and associated manuals.[14] The installed capacity (ICAP) of a unit may only be reduced through a capacity modification (capmod) if the capacity owner does not intend to restore the reduced capability by the end of the planning period following the planning period in question.[15] Otherwise the owner must take an outage, as appropriate, if the owner cannot provide energy consistent with the ICAP of the unit.

Multiple owners submitted both positive and negative capacity modifications, with a net RTO increase of 34.1 MW of UCAP and a net RTO decrease of 35.3 MW of ICAP (Table 5). Capmod increases and decreases were the result of owner reevaluation of the capabilities of their generation resources, at least partially in response to the incentives and penalties contained in RPM. After accounting for fixed resource requirement (FRR), committed resources and for imports, RPM UCAP was 135,092.6 MW.[16] This amount was reduced by UCAP exports of 3,938.5 MW[17] and 270.3 MW which were excused from the RPM must-offer requirement as a result of environmental regulations (151.0 MW), generation moving behind the meter (13.3 MW), non-utility generator (NUG) ownership questions (18.4 MW), expected unit retirements (79.8 MW) and other factors (7.8 MW). Subtracting 35.8 MW of FRR optional volumes not offered, resulted in 130,848.0 MW of

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14 See "Reliability Assurance Agreement among Load-Serving Entities in the PJM Region" (June 1, 2007) (Accessed July 19, 2007) http://www.pjm.com/documents/ downloads/ agreements/ raa.pdf> (1.92 MB).

15 See PJM "Manual 21: Rules and Procedures for Determination of Generating Capability," Revision 04 (August 15, 2005), p. 8 (Accessed July 18, 2007) <http://www.pjm.com/ contributions/pjm-manuals/pdf/m21.pdf> (228 KB). The manual states "the end of the next planning period."

16 The FRR alternative allows an LSE, subject to certain conditions, to avoid direct participation in the RPM auctions. The LSE is required to submit a FRR capacity plan to satisfy the unforced capacity obligation for all load in its service area.

17 If all of the exports had been offered into the auction at $0.00 per MW-day, the clearing price would have been approximately $12.00 per MW-day.

UCAP that were available to be offered into the auction.[18] Only 4.3 MW, from multiple resources, were unoffered into the RPM auction, which had no effect on either the RTO or LDA resource clearing prices.

There were no new generating units in the 2007 – 2008 RPM auction. The owners of some units increased their ICAP MW and the owners of other units decreased their ICAP MW. On an ICAP basis, capacity modification increases were less than capacity modification decreases, resulting in a net decrease in ICAP. On a UCAP basis, increases exceeded decreases because of the higher EFORd associated with the units for which decreases were made, resulting in a net increase in UCAP.

The downward sloping demand curve resulted in more capacity cleared in the market than the reliability requirement. The 129,409.2 unforced MW of cleared resources for the entire RTO represented an installed reserve margin (IRM) of 19.8 percent, which was 3,604.2 MW greater than the reliability requirement of 125,805.0 MW (IRM of 15.0 percent). [19] [20] As shown in Figure 1, the downward sloping demand curve resulted in a price of $40.80 per MW-day. If the demand curve had been vertical at the reliability requirement, as shown in Figure 3, the clearing price would have been approximately $13.00 per MW-day.

As shown in Table 4, the net load price that LSEs will pay is $40.69 per MW-day in the RTO area not included in the constrained LDAs. This value is the final zonal capacity price. The final zonal capacity price is the resource clearing price adjusted for differences between the certified interruptible load for reliability (ILR) for the delivery year and the forecasted RTO ILR obligation.

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[18] FRR entities are allowed to offer into the RPM auction excess volumes above their FRR quantities, subject to a sales cap amount. The 35.8 MW are excess volumes included in the sales cap amount which were not offered into the auction.

[19] This is the reliability requirement after FRR adjustments.

[20] The reliability requirement is plotted on the VRR curve as the reliability requirement less the ILR forecast obligation.

As also shown in Table 4, net excess, which is the cleared volumes less the reliability requirement, was 3,604.2 MW, which was a decrease of 5,329.9 MW from the net excess of 8,934.1 MW on May 31, 2007. This decrease in net excess was mainly because of an increase in the RTO load forecast of 3,921.0 MW from 133,500.0 MW to 137,421.0 MW, effective June 1, 2007. Certified ILR was 1,631.4 MW.

Figure 2 shows that the RTO would have cleared at $70.00 per MW-day if there had been no constraints and the RTO had cleared as a single market with the downward sloping demand curve.[21] This price is greater than the clearing price for the unconstrained part of the RTO, but less than the clearing prices for the constrained LDAs.

[21] Note that the prior MMU posting indicating that the unconstrained price was $100 was in error.

Table 4 RTO offer statistics: 2007-2008 RPM auction[22]

	ICAP (MW)	UCAP (MW)	Percent of Available ICAP	Percent of Available UCAP
Total Internal RTO Capacity (Gen and DR)	165,111.2	155,206.0		
FRR	(24,717.0)	(22,922.6)		
Imports	2,983.8	2,809.2		
RPM Capacity	143,378.0	135,092.6		
Exports	(4,373.9)	(3,938.5)		
FRR Optional	(43.0)	(35.8)		
Excused	(463.4)	(270.3)		
Available	138,497.7	130,848.0	100.0%	100.0%
Generation Offered	138,369.0	130,716.1	99.9%	99.9%
DR Offered	123.5	127.6	0.1%	0.1%
Total Offered	138,492.5	130,843.7	100.0%	100.0%
Unoffered	5.2	4.3	0.0%	0.0%
Cleared in RTO	134,034.1	126,666.7	96.8%	96.8%
Cleared in LDAs	2,949.5	2,742.5	2.1%	2.1%
Total Cleared	136,983.6	129,409.2	98.9%	98.9%
Uncleared in RTO	1,479.1	1,405.1	1.1%	1.1%
Uncleared in LDAs	29.8	29.4	0.0%	0.0%
Total Uncleared	1,508.9	1,434.5	1.1%	1.1%
Reliability Requirement		125,805.0		
Total Cleared		129,409.2		
Net Excess/(Deficit)		3,604.2		
ILR Certified		1,631.4		
Resource Clearing Price ($ per MW-day)		$40.80	A	
Final Zonal Capacity Price ($ per MW-day)		$40.69	B	
Final Zonal CTR Credit Rate ($ per MW-day)		$0.00	C	
Final Zonal ILR Price ($ per MW-day)		$40.80	A-C	
Net Load Price ($ per MW-day)		$40.69	B-C	

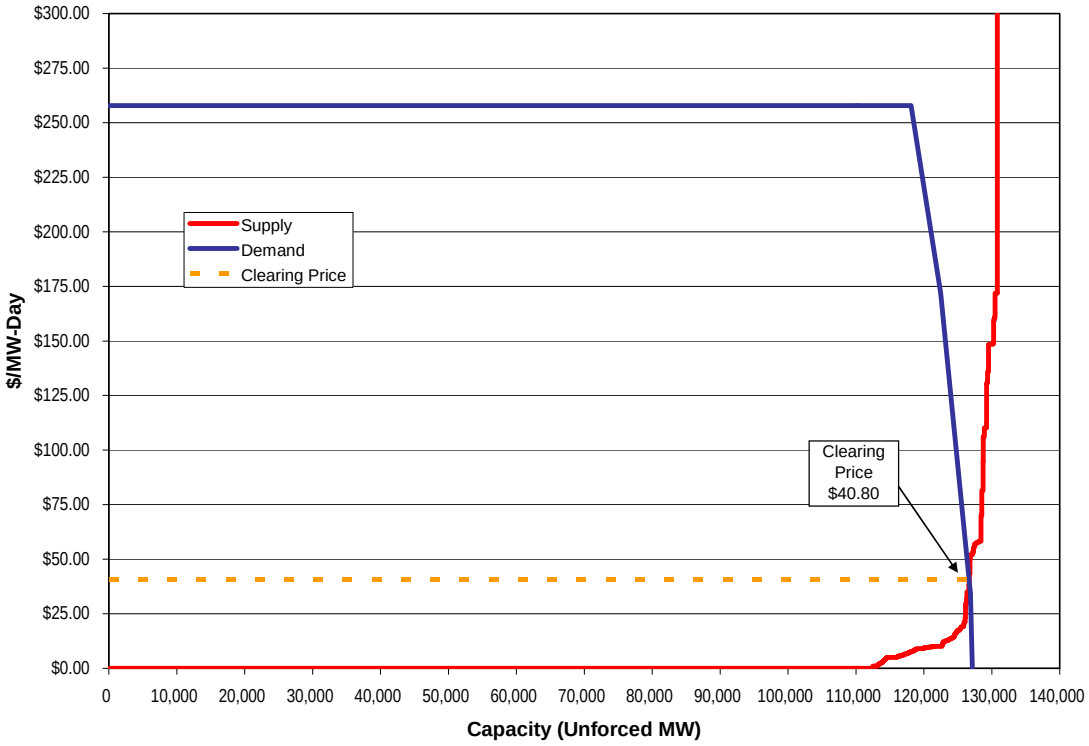
[22] Prices are only for those generating units outside of EMAAC and SWMAAC.

Table 5 Generating capacity modifications: 2007-2008 RPM auction[23]

	ICAP (MW)			UCAP (MW)		
	RTO	EMAAC	SWMAAC	RTO	EMAAC	SWMAAC
Capmod Increases	587.3	134.7	0.0	549.2	115.2	0.0
Capmod Decreases	(622.6)	(220.6)	(112.0)	(515.1)	(145.8)	(109.0)
Net Increase/(Decrease)	(35.3)	(85.9)	(112.0)	34.1	(30.6)	(109.0)

[23] Only capmods that became effective on the June 1, 2007 start date of the RPM delivery year are included. Capmods for a unit which netted out to zero are not included. Demand resource (DR) capmods are not included as they represent a change in demand and not a change in supply.

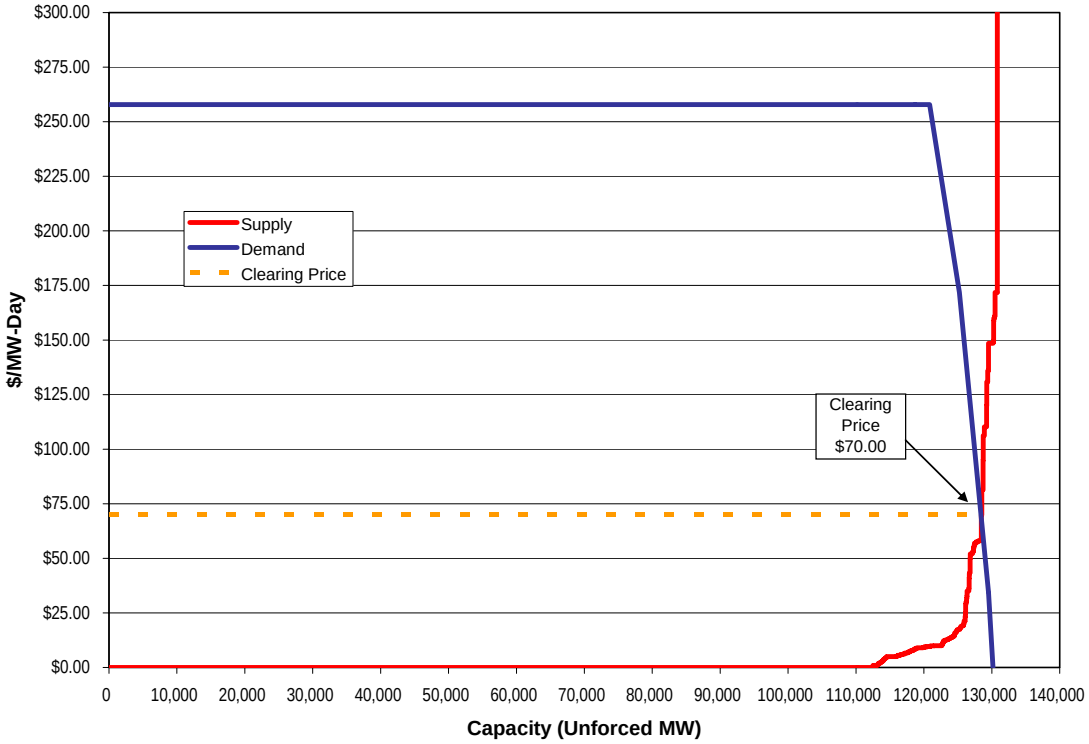
Figure 1 RTO market supply/demand curves: 2007-2008 RPM auction[24, 25]



[24] The supply curve includes all supply offers at the lower of offer price or offer cap. The demand curve excludes incremental demand which cleared in EMAAC and SWMAAC.

[25] For ease of viewing, the graph was truncated at $300.00 per MW-day and does not show an uncleared offer of approximately $800.00 per MW-day.

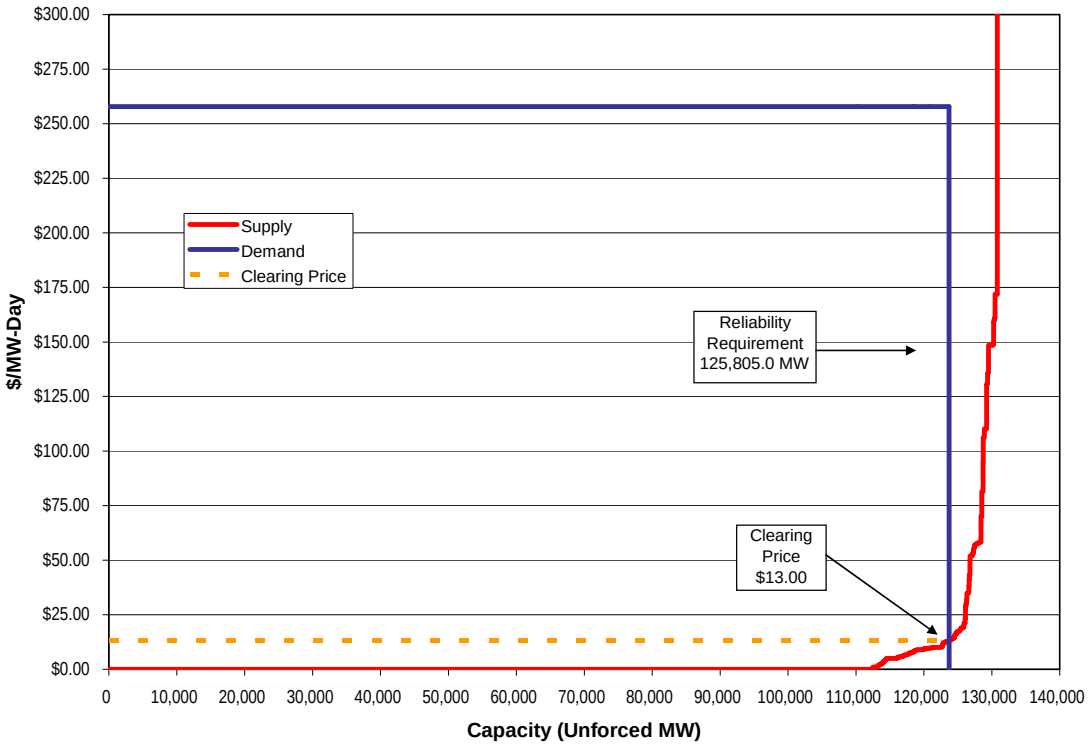
Figure 2 PJM RTO supply/demand curves: 2007-2008 RPM auction[26, 27]



[26] The supply curve includes all supply offers at the lower of offer price or offer cap. The demand curve includes all demand in the entire RTO, including EMAAC and SWMAAC.

[27] For ease of viewing, the supply curve was truncated at $300.00 per MW-day and does not show an uncleared offer of approximately $800.00 per MW-day.

Figure 3 PJM RTO supply/demand curves at reliability requirement: 2007-2008 RPM auction[28, 29, 30]



Eastern MAAC (EMAAC)

Table 6 shows total EMAAC offer data for the 2007-2008 RPM auction. Total internal EMAAC UCAP of 30,825.1 MW includes all generating units and demand resources that qualified as a PJM capacity resource, excluding external units. This value includes owners' modifications to ICAP ratings (Table 5). Multiple owners submitted both

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28 The supply curve includes all supply offers at the lower of offer price or offer cap. The demand curve includes all demand in the entire RTO, including EMAAC and SWMAAC.

29 For ease of viewing, the supply curve was truncated at $300.00 per MW-day and does not show an uncleared offer of approximately $800.00 per MW-day.

30 The reliability requirement is plotted on the VRR curve as the reliability requirement less the ILR forecast obligation.

positive and negative capacity modifications, with a net decrease of 85.9 MW of ICAP and a net decrease of 30.6 of UCAP in EMAAC. Including imports of 15.9 MW into EMAAC, RPM UCAP was 30,841.0 MW. This amount was reduced by 13.3 MW which were excused from the RPM must-offer requirement as a result of generation moving behind the meter, resulting in 30,827.7 MW of UCAP that were available to be offered into the auction. Only 0.5 MW were unoffered into the RPM auction, which had no effect on either the RTO or LDA resource clearing prices.

Of the 30,797.8 MW cleared in EMAAC, 28,705.4 MW were cleared in the RTO before EMAAC became constrained. Once the constraint was binding, based on the 5,845.0 MW capacity emergency transfer limit (CETL) value, only the incremental supply located in EMAAC was available to meet the incremental demand in the LDA. Of the 2,121.8 MW of incremental supply, 2,092.4 MW cleared, which resulted in a resource clearing price of $197.67 per MW-day, as shown in Figure 4. The price was determined by the intersection of the incremental supply and demand curves. The uncleared MW were the result of offer prices which exceeded the demand curve.

As shown in Table 6, total resources in EMAAC were 36,642.8 MW, which was 593.9 MW (1.6 percent) less than the reliability requirement of 37,236.7 MW. Certified ILR was 385.5 MW. As shown in Figure 4, the downward sloping demand curve resulted in a resource clearing price in EMAAC of $197.67 per MW-day. If the demand curve had been vertical at the incremental reliability requirement with the same maximum price as for the downward sloping demand curve, as shown in Figure 5, the clearing price would have been $222.71 per MW-day.

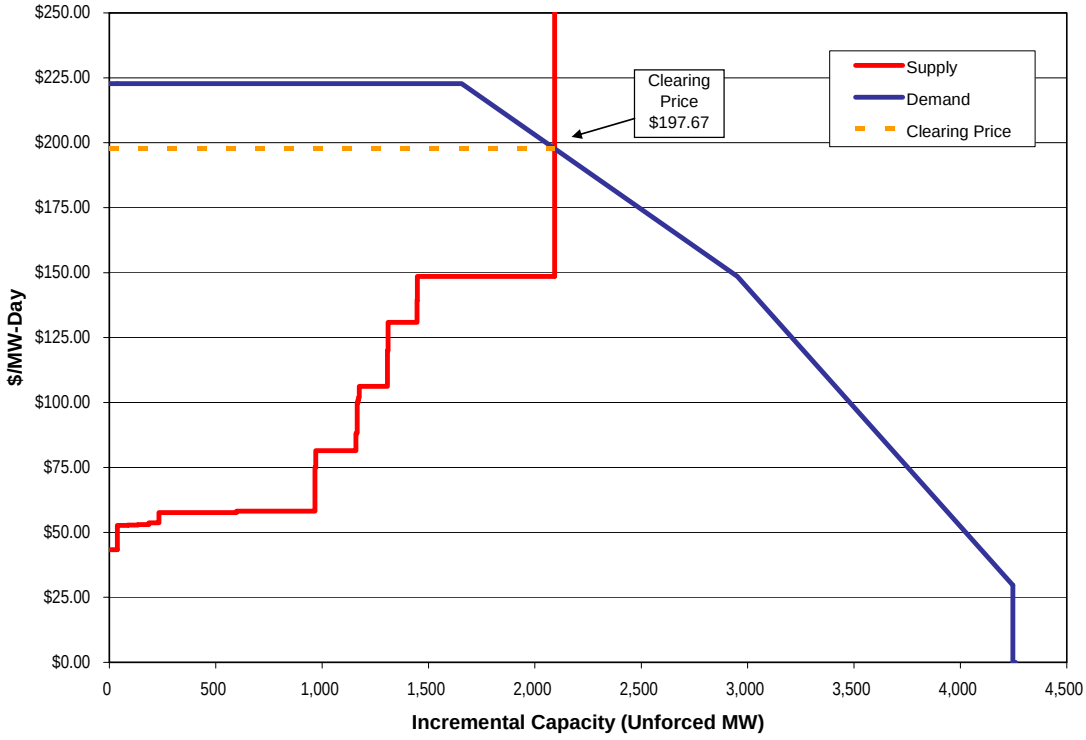
As shown in Table 6, the net load price that LSEs will pay is $177.00 per MW-day. This value is the final zonal capacity price ($197.16 per MW-day) less the final capacity transfer right (CTR) credit rate ($20.16 per MW-day). The final zonal capacity price is the resource clearing price adjusted for differences between the certified ILR for the delivery year and the forecasted RTO ILR obligation. The CTR MW value allocated to load in an LDA is the LDA UCAP obligation less the cleared generation internal to the LDA less the ILR forecast for the LDA. This MW value is multiplied by the locational price adder for the LDA to arrive at the economic value of the CTRs allocated to the load in the LDA. This value is then divided by the LDA UCAP obligation to arrive at the final CTR credit rate for the LDA. The final CTR credit rate is an allocation of the economic value of transmission import capability that exists in constrained LDAs and serves to offset a portion of the locational price adder charged to load in constrained LDAs. The CTR

credit is not based on the total CETL, the total MW of capacity from outside the LDA that helps meet the LDA obligation, because the load in the LDA must pay for the capacity obligation at the clearing price and not for the capacity deliverable to the LDA.

Table 6 EMAAC offer statistics: 2007-2008 RPM auction

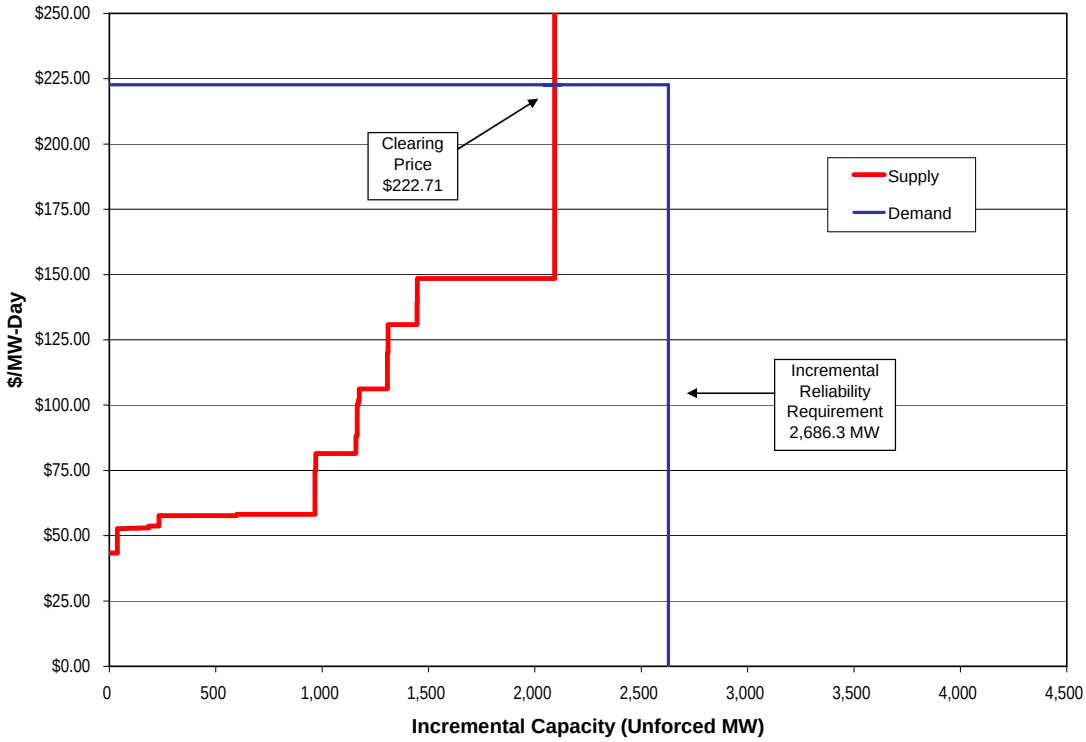
	ICAP (MW)	UCAP (MW)	Percent of Available ICAP	Percent of Available UCAP
Total Internal EMAAC Capacity (Gen and DR)	32,942.3	30,825.1		
Imports	15.9	15.9		
RPM Capacity	32,958.2	30,841.0		
Exports	0.0	0.0		
Excused	(14.1)	(13.3)		
Available	32,944.1	30,827.7	100.0%	100.0%
Generation Offered	32,900.2	30,782.5	99.9%	99.9%
DR Offered	43.3	44.7	0.1%	0.1%
Total Offered	32,943.5	30,827.2	100.0%	100.0%
Unoffered	0.6	0.5	0.0%	0.0%
Cleared in RTO	30,634.2	28,705.4	93.0%	93.1%
Cleared in LDA	2,279.5	2,092.4	6.9%	6.8%
Total Cleared	32,913.7	30,797.8	99.9%	99.9%
Uncleared	29.8	29.4	0.1%	0.1%
Reliability Requirement		37,236.7		
Total Cleared		30,797.8		
CETL		5,845.0		
Total Resources		36,642.8		
Net Excess/(Deficit)		(593.9)		
ILR Certified		385.5		
Resource Clearing Price ($ per MW-day)		$197.67	A	
Final Zonal Capacity Price ($ per MW-day)		$197.16	B	
Final Zonal CTR Credit Rate ($ per MW-day)		$20.16	C	
Final Zonal ILR Price ($ per MW-day)		$177.51	A-C	
Net Load Price ($ per MW-day)		$177.00	B-C	

Figure 4 EMAAC incremental supply/demand curves: 2007-2008 RPM auction[31]



[31] The supply curve was truncated at $300.00 per MW-day and does not show an uncleared offer of approximately $800.00 per MW-day.

Figure 5 EMAAC incremental supply/demand curves at reliability requirement: 2007-2008 RPM auction[32, 33]



Southwestern MAAC (SWMAAC)

Table 7 shows total SWMAAC offer data for the 2007-2008 RPM auction. Total internal SWMAAC UCAP of 10,352.2 MW includes all generating units and demand resources that qualified as a PJM capacity resource, excluding external units. This value includes owners' modifications to ICAP ratings (Table 5). Multiple owners submitted negative capacity modifications, which resulted in a net decrease of 112.0 MW of ICAP and 109.0 MW of UCAP in SWMAAC. Since there were no imports from outside PJM into

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32 For ease of viewing, the graph was truncated at $300.00 per MW-day and does not show an uncleared offer of approximately $800.00 per MW-day.

33 The reliability requirement is plotted on the VRR curve as the reliability requirement less the ILR forecast obligation.

SWMAAC, RPM UCAP was 10,352.2 MW. This amount was reduced by 151.0 MW which were excused from the RPM must-offer requirement as a result of environmental regulations, resulting in 10,201.2 MW of UCAP that were available to be offered into the auction. All capacity resources were offered into the RPM auction.

Of the 10,201.2 MW cleared in SWMAAC, 9,551.1 MW were cleared in the RTO before SWMAAC became constrained. Once the constraint was binding, based on the 5,699.0 CETL value, only the incremental supply in SWMAAC was available to meet the incremental demand in the LDA. All of the 650.1 MW of incremental supply cleared, but since there was not enough incremental supply to meet the incremental demand, the resource clearing price of $188.54 per MW-day was set by the demand curve, as shown in Figure 6.

As shown Table 7, total resources in SWMAAC were 15,900.2 MW, which was 175.1 MW (1.1 percent) less than the reliability requirement of 16,075.3 MW. Certified ILR was 273.2 MW. As shown in Figure 6, the downward sloping demand curve resulted in a clearing price of $188.54 per MW-day. If the demand curve had been vertical at the incremental reliability requirement with the same maximum price as for the downward sloping demand curve, as shown in Figure 7, the clearing price would have been $238.02 per MW-day.

As shown in Table 7, the net load price that LSEs will pay is $139.67 per MW-day. This value is the final zonal capacity price ($188.05 per MW-day) less the final CTR credit rate ($48.38 per MW-day). The final zonal capacity price is the resource clearing price adjusted for differences between the certified ILR for the delivery year and the forecasted RTO ILR obligation. The CTR MW value allocated to load in an LDA is the LDA UCAP obligation less the cleared generation internal to the LDA less the ILR forecast for the LDA. This MW value is multiplied by the locational price adder for the LDA to arrive at the economic value of the CTRs allocated to the load in the LDA. This value is then divided by the LDA UCAP obligation to arrive at the final CTR credit rate for the LDA. The final CTR credit rate is an allocation of the economic value of transmission import capability that exists in constrained LDAs and serves to offset a portion of the locational price adder charged to load in constrained LDAs. The CTR credit is not based on the total CETL, the total MW of capacity from outside the LDA that helps meet the LDA obligation, because the load in the LDA must pay for the capacity obligation at the clearing price and not for capacity deliverable to the LDA.

Table 7 SWMAAC offer statistics: 2007-2008 RPM auction

	ICAP (MW)	UCAP (MW)	Percent of Available ICAP	Percent of Available UCAP
Total Internal SWMAAC Capacity (Gen and DR)	11,546.1	10,352.2		
Imports	0.0	0.0		
RPM Capacity	11,546.1	10,352.2		
Exports	0.0	0.0		
Excused	(316.0)	(151.0)		
Available	11,230.1	10,201.2	100.0%	100.0%
Generation Offered	11,211.1	10,181.5	99.8%	99.8%
DR Offered	19.0	19.7	0.2%	0.2%
Total Offered	11,230.1	10,201.2	100.0%	100.0%
Unoffered	0.0	0.0	0.0%	0.0%
Cleared in RTO	10,560.1	9,551.1	94.0%	93.6%
Cleared in LDA	670.0	650.1	6.0%	6.4%
Total Cleared	11,230.1	10,201.2	100.0%	100.0%
Uncleared	0.0	0.0	0.0%	0.0%
Reliability Requirement		16,075.3		
Total Cleared		10,201.2		
CETL		5,699.0		
Total Resources		15,900.2		
Net Excess/(Deficit)		(175.1)		
ILR Certified		273.2		
Resource Clearing Price ($ per MW-day)		$188.54	A	
Final Zonal Capacity Price ($ per MW-day)		$188.05	B	
Final Zonal CTR Credit Rate ($ per MW-day)		$48.38	C	
Final Zonal ILR Price ($ per MW-day)		$140.16	A-C	
Net Load Price ($ per MW-day)		$139.67	B-C	

Figure 6 SWMAAC incremental supply/demand curves: 2007-2008 RPM auction

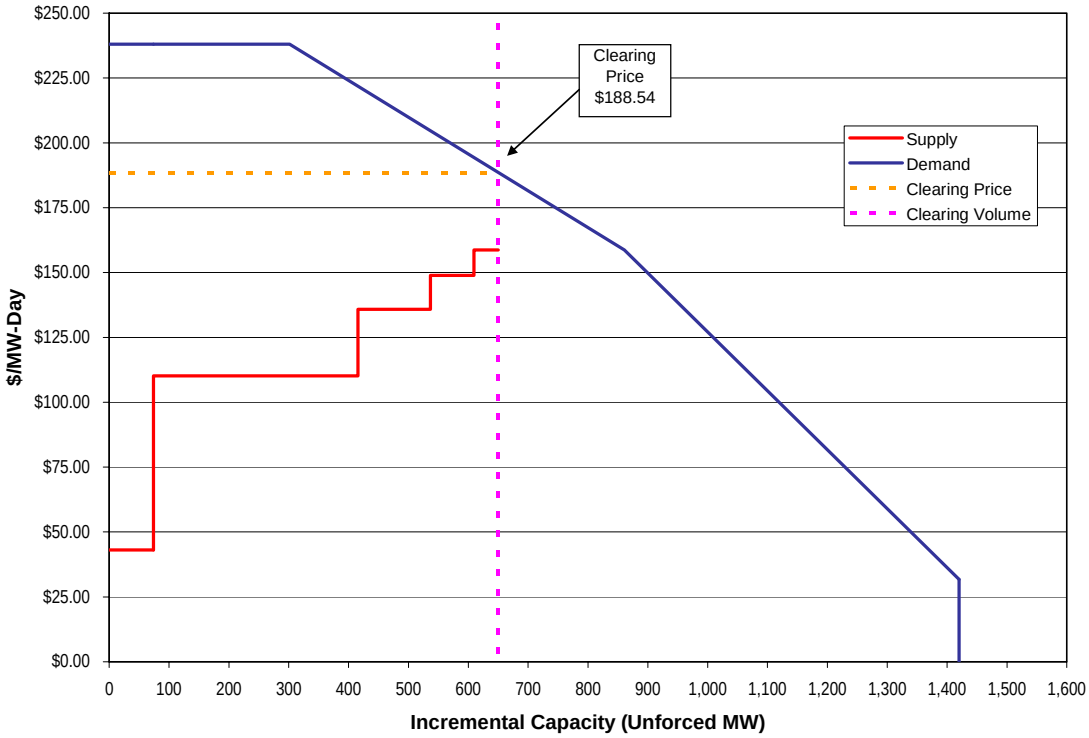
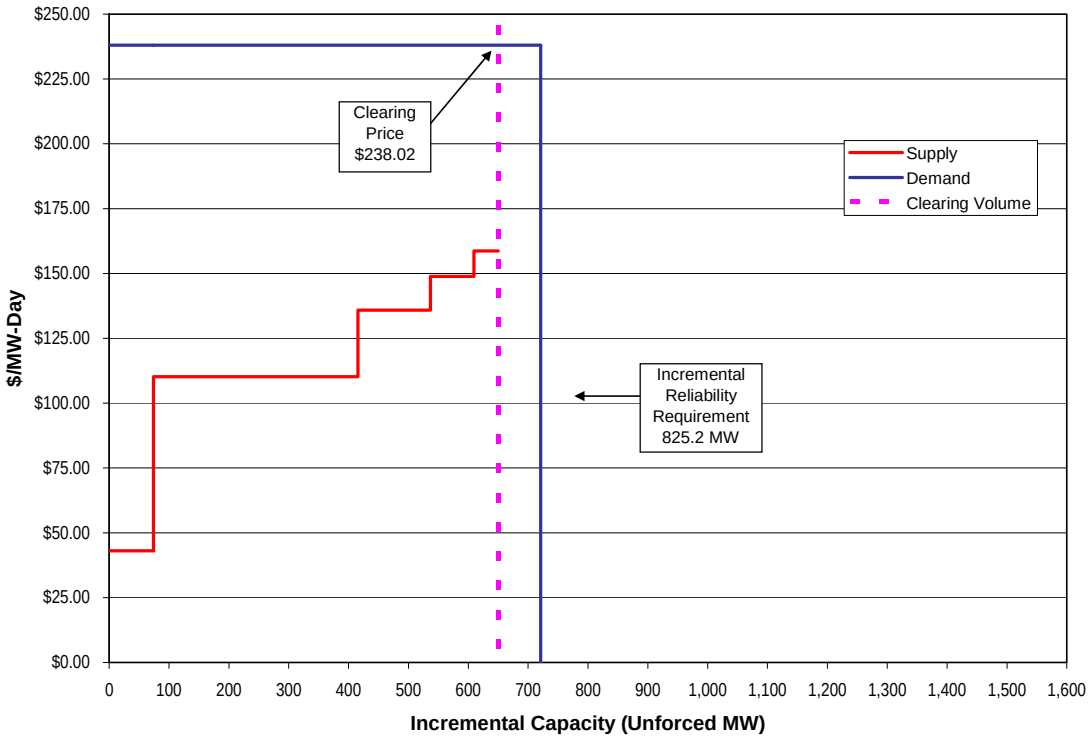


Figure 7 SWMAAC incremental supply/demand curves at reliability requirement: 2007-2008 RPM auction[34]



Load Management (LM)

Effective June 1, 2007, the PJM Active Load Management (ALM) program was replaced by the PJM Load Management (LM) program. Under ALM, providers had received a MW credit which offset their capacity obligation. With the introduction of LM, qualifying load management resources can be offered into the auction as a capacity resource and receive the resource clearing price, or can they can be offered outside of the auction and receive the final zonal ILR price.

The LM program introduced two RPM-related products:

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[34] The reliability requirement is plotted on the VRR curve as the reliability requirement less the ILR forecast obligation.

- **Demand Resource (DR)** – Capacity load resource that is offered into an RPM auction as capacity and receives the relevant LDA or RTO resource clearing price; and

- **Interruptible Load for Reliability (ILR) –** Capacity load resource that is not offered into the RPM auction, but receives the final zonal ILR price determined after the close of the auction.

As shown in Table 8, the LM program provided 1,759.0 MW, an increase of 4.9 percent or 82.3 MW over the final ALM MW provided before the implementation of RPM.

Table 8 Load management statistics: 2007-2008 RPM auction[35]

	UCAP (MW)		
	RTO	EMAAC	SWMAAC
DR Offered	127.6	44.7	19.7
ILR Certified	1,631.4	385.5	273.2
Total Load Management	1,759.0	430.2	292.9
ALM @ May 31, 2007	1,676.7		

There are a number of other differences between PJM's ALM program and the LM program that replaced it.

There is a difference in certification timing. Under the ALM program, customers could be nominated at any time prior to the day that ALM was called upon by PJM. Under RPM, DR resources must be offered into the auction for the delivery year in which they will participate while ILR resources must be certified by a published deadline which is after the base auction for the delivery year and at least three months prior to the delivery year in which they will participate.

Differences exist in the way compliance and settlement are handled. Under the ALM program, all data was input into eCapacity, and ALM providers received a levelized MW credit for the October-May period which resulted in ALM providers avoiding purchase of capacity. Under RPM, DR and ILR are certified and event compliance data

35 RTO includes EMAAC and SWMAAC.

are submitted in LoadResponse, which is part of PJM's eSuite. Under RPM, DR and ILR settlement rates are set prior to the delivery year and do not change. DR bid into an RPM base residual auction and receive the auction clearing price while ILR will be certified and receive a the final zonal ILR price (see Table 6 for example).

Attachment A

Preliminary Market Structure Screen

As stated in section 6.3 (a)(i) of Attachment DD of the PJM Tariff, "the Market Monitoring Unit shall apply the Preliminary Market Structure Screen (PMSS) to identify the LDAs in which Capacity Market Sellers must provide the data specified in section 6.7(b) for any auction conducted with respect to such Delivery Year and whether Capacity Market Sellers must provide this data for the entire PJM Region. For each LDA and for the PJM Region, the PMSS will be based on: (1) the Unforced Capacity available for such Delivery Year from Generation Capacity Resources located in such area; and (2) the Locational Deliverability Area Reliability Requirement and the PJM Reliability Requirement."

As stated in section 6.3 (a)(ii)Section of Attachment DD of the PJM Tariff, "An LDA, Unconstrained LDA Group,[1] or the entire PJM Region shall fail the Preliminary Market Structure Screen, and Capacity Market Sellers owning or controlling any Generation Capacity Resource located in such LDA, Unconstrained LDA Group, or region shall be required to provide the information specified in section 6.7(b), if any one of the following three conditions is met: (1) the market share of any Capacity Market Seller exceeds twenty percent; (2) the HHI for all such sellers is 1800 or higher; or (3) there are not more than three jointly pivotal suppliers."

Results

The Market Monitoring Unit applied the PMSS for the 2007-2008 Auction using Unforced Capacity from eCapacity effective as of June 1, 2007 and the LDA and PJM Reliability Requirements for 2007-2008.[2] As shown in the table below, all LDAs and the entire PJM Region failed the PMSS. As a result, except for the provisional exceptions listed, all Capacity Market Sellers owning or controlling any Generation Capacity Resource located in such LDA or the entire PJM Region shall be required to provide the information specified in section 6.7(b).

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[1] PJM did not define an Unconstrained LDA Group for this Auction.

[2] The PMSS was also run using Unforced Capacity from eCapacity effective January 8, 2007. All LDAs and the PJM Region failed.

RPM Preliminary Market Structure Screen Results: 2007-2008

	Highest Market Share	HHI	Pivotal Suppliers	Pass/Fail
PJM	16.0%	895	1	Fail
MAAC + APS	15.1%	966	1	Fail
Eastern MAAC	32.0%	2155	1	Fail
Southwestern MAAC	49.8%	4259	1	Fail

Data Requirements

As stated in section 6.7(b) of Attachment DD of the PJM Tariff, "Except as provided in subsection (c) below, potential participants in any PJM Reliability Pricing Model Auction in any LDA or unconstrained LDA Group that fails the Preliminary Market Structure Screen (or, if such region fails the screen, potential auction participants in the entire PJM Region) shall, in addition, submit the following data, (all submitted data is subject to verification by the MMU) together with supporting documentation for each item, to the Market Monitoring Unit no later than two months prior to the conduct of such auction:"

Exceptions

As stated in section 6.7(c) of Attachment DD of the PJM Tariff, "Potential auction participants identified in subsection (b) above need not submit the data specified in that subsection for any Generation Capacity Resource: (i) that is in an Unconstrained LDA Group or, if this is the relevant market, the entire PJM Region, and is in a resource class determined by the Market Monitoring Unit as not likely to include the marginal price-setting resources in such auction; or (ii) for which the potential participant commits that any Sell Offer it submits as to such resource shall not include any price above the level identified for the relevant resource class by the Market Monitoring Unit."

The Market Monitoring Unit has identified the following resource classes as not likely to include the marginal price-setting resources in such auction. The following resource

classes in the zones outside of the Eastern MAAC and Southwestern MAAC LDAs are provisionally excepted for the following unit types:[3]

- Nuclear units
- Coal units
- Combustion Turbines less than 10 years of age

In addition, combined cycle units in zones outside of Eastern MAAC and Southwestern MAAC, if an owner has more than one combined cycle unit and that owner provides data on one combined cycle unit, are provisionally excepted from the requirement to provide data in 6.7 (b).

[3] Provisionally excepted means that it is excepted unless the Market Monitoring Unit requires the data, per section (c).