



2010/2011 RPM Base Residual Auction Results

Introduction

This document provides additional information for PJM stakeholders regarding the 2010/2011 Reliability Pricing Model (RPM) Base Residual Auction results. The discussion also provides a comparison of the 2010/2011 auction results to the results from the 2008/2009 and 2009/2010 RPM auctions.

2009/2010 Base Residual Auction Results Discussion

Table 1 contains a summary of the clearing prices resulting from the 2010/2011 RPM Base Residual Auction in comparison to those from the 2008/2009 and 2009/2010 RPM Base Residual Auctions. The Resource Clearing Price is the marginal clearing price that will be paid to each cleared Capacity Resource in \$ per MW day. The Base Zonal Capacity Transfer Right Credit Rate is the value of the capacity transfer capability available on the transmission system to import capacity into the constrained LDAs per MW of UCAP obligation in that zone. Any entity that serves load in a zone that has a non-zero Final Zonal Capacity Transfer Right Credit Rate will receive a credit for use of the transmission system to import capacity from a less constrained region. The Preliminary Net Load Price is the estimated price that each MW of UCAP obligation will pay in \$ per MW day. The Preliminary Net Load Price is calculated by subtracting the Base Zonal Capacity Transfer Right Credit Rate from the Resource Clearing Price in each LDA. A discussion of the factors that impacted the clearing price differences between these auctions is provided beginning on page 6 of this document.

Table 1 –RPM Base Residual Auction Pricing Results

Auction Prices [\$/MW-day]	RTO			EMAAC			SWMAAC			DPL-SOUTH
	2008/2009	2009/2010	2010/2011	2008/2009	2009/2010	2010/2011	2008/2009	2009/2010	2010/2011	2010/2011
Resource Clearing Prices	111.92	102.04	174.29	148.80	191.32	174.29	210.11	237.33	174.29	186.12
Capacity Transfer Right Credit Rate	-	-	-	5.29	2.77	-	29.53	19.21	-	0.30 **
Preliminary Net Load Price	111.92	102.04	174.29	143.51	188.55	174.29	180.58	218.12	174.29	178.27 **

* MAAC and SWMAAC LDAs have the same 2010/2011 Resource Clearing Price as RTO.

** DPL-SOUTH CTR Credit Rate and Preliminary Net Load Price apply to the entire DPL Zone.

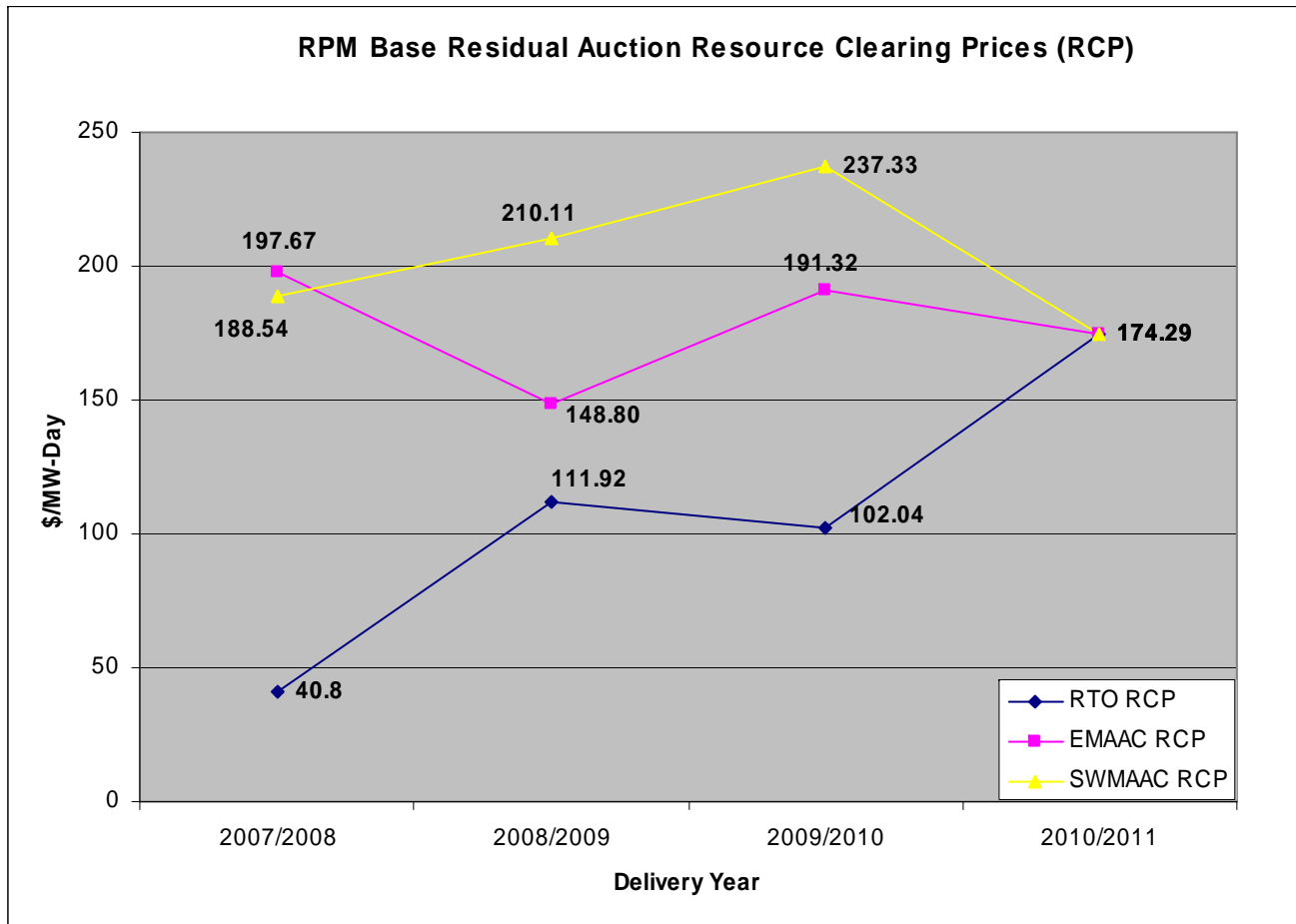
Mitigation – For each auction, all regions of the RTO, including the RTO as a whole, failed the Three-Pivotal Supplier Test. As a result, mitigation was applied to all existing units in the execution of the RPM auction clearing. Therefore cost-based offers were utilized in the RPM auction clearing for all existing units.



2010/2011 RPM Base Residual Auction Results

Figure 1 plots the Resource Clearing Prices for each RPM Auction cleared to date.

Figure 1 – Base Residual Auction Resource Clearing Prices





2010/2011 RPM Base Residual Auction Results

Table 2 contains a summary of the offer and clearing data for the each cleared Base Residual Auction. The summary includes all resources located in the RTO (including all LDAs within the RTO) and each constrained LDA separately, and notes the capacity located outside the PJM footprint that was offered into the auction.

Table 2 –RPM Base Residual Auction Generation and Demand Information

Auction Supply (all values in ICAP)	RTO*			MAAC*	DPL-SOUTH	SWMAAC		
	2008/2009	2009/2010	2010/2011	2010/2011	2010/2011	2008/2009	2009/2010	2010/2011
Internal PJM Capacity	166,037.9	167,026.3	168,457.3	68,474.7	1,652.3	11,868.6	11,745.9	11,890.6
Imports Offered	2,612.0	2,563.2	2,982.4	0.0	0.0	0.0	0.0	0.0
Total Eligible RPM Capacity	168,649.9	169,589.5	171,439.7	68,474.7	1,652.3	11,868.6	11,745.9	11,890.6
Exports / Delistings	4,205.8	2,240.9	3,378.2	676.0	0.0	0.0	0.0	0.0
FRR Commitments	24,953.5	25,316.2	26,305.7	0.0	0.0	0.0	0.0	0.0
Excused	722.0	1,121.9	1,290.7	232.2	0.0	316.0	334.3	37.0
Total Eligible RPM Capacity - Excused	29,881.3	28,679.0	30,974.6	908.2	0.0	316.0	334.3	37.0
Remaining Eligible RPM Capacity	138,768.6	140,910.5	140,465.1	67,566.5	1,652.3	11,552.6	11,411.6	11,853.6
Generation Offered	138,076.7	140,003.6	139,529.5	66,660.9	1,637.1	11,249.1	11,066.7	11,352.0
DR Offered	691.9	906.9	935.6	905.6	15.2	303.5	344.9	501.6
Total Eligible RPM Capacity Offered	138,768.6	140,910.5	140,465.1	67,566.5	1,652.3	11,552.6	11,411.6	11,853.6
Total Eligible RPM Capacity Unoffered	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

* RTO numbers include all LDAs, MAAC numbers include DPL-SOUTH and SWMAAC.

A total of 171,439.7 MW of installed capacity was eligible to be offered into the 2010/2011 Base Residual Auction. Of this eligible amount, 2,982.4 MW were from external resources that had fulfilled the eligibility requirements to be considered a PJM Capacity Resource. A portion of the external resource total was included in FRR Capacity Plans, and the remainder was offered into the auction. As illustrated in Table 2, the amount of capacity exports increased by 1,137.3 MW in the 2010/2011 auction compared to the previous auction. FRR commitments also increased by 989.5 MW over the 2009/2010 Delivery Year.

A total of 140,465.1 MW of installed capacity was offered into the Base Residual Auction. A difference of 30,974.6 MW was eligible, but was not offered due to 1) inclusion in an FRR Capacity Plan, 2) export of the resource, or 3) having been excused from



2010/2011 RPM Base Residual Auction Results

offering into the auction. Resources were excused from the must offer requirement for the following reasons: environmental restrictions, generation moving behind the meter, approved retirement requests not yet reflected in eRPM, and ownership changes.

Participants' sell offer EFORd values were used to translate the generation installed capacity values into unforced capacity (UCAP) values. DR sell offers were converted using the appropriate DR Factor and FPR for the delivery year. In UCAP, a total of 133,092.7 MW were offered into the 2010/2011 Base Residual Auction, comprised of 132,124.8 MW of generation capacity and 967.9 MW of capacity from Demand Resources. Of those offered, a total of 132,190.5 MW of capacity was cleared in the auction. Of the cleared amount, 131,251.5 MW were from generation capacity and 939.0 MW were from Demand Resources. Capacity that was offered but not cleared in the Base Residual Auction will be eligible to offer into the Second and Third Incremental Auctions for the 2010/2011 Delivery Year. *Table 3* illustrates the Generation and Demand Response Offered and Cleared translated into Unforced Capacity MW amounts.

Table 3 – Generation and Demand Response Offered and Cleared Represented in Unforced Capacity MW

Auction Results (all values in UCAP**)	RTO*			MAAC	DPL-SOUTH	SWMAAC		
	2008/2009	2009/2010	2010/2011	2010/2011	2010/2011	2008/2009	2009/2010	2010/2011
Generation Offered	131,164.8	132,614.2	132,124.8	62,981.9	1,530.4	10,312.0	9,955.4	10,409.2
DR Offered	715.8	936.8	967.9	936.9	15.7	314.1	356.3	519.0
Total Offered	131,880.6	133,551.0	133,092.7	63,918.8	1,546.1	10,626.1	10,311.7	10,928.2
Generation Cleared	129,061.4	131,338.9	131,251.5	62,505.0	1,504.8	10,312.0	9,558.3	10,354.4
DR Cleared	536.2	892.9	939.0	908.0	14.9	309.2	356.3	519.0
Total Cleared	129,597.6	132,231.8	132,190.5	63,413.0	1,519.7	10,621.2	9,914.6	10,873.4
Uncleared	2,283.0	1,319.2	902.2	505.8	26.4	4.9	397.1	54.8

* RTO numbers include all LDAs, MAAC numbers include DPL-SOUTH and SWMAAC.

** UCAP calculated using sell offer EFORd for Generation Resources. DR UCAP values include appropriate FPR and DR Factor.

Table 4 contains a summary of capacity additions and reductions from the 2009/2010 Base Residual Auction to the 2010/2011 Base Residual Auction. This includes any changes in capacity both before and after the 2008/2009 Third Incremental Auction. A net total of 1503.1 MW of incrementally new capacity was available for the 2010/2011 Base Residual Auction. Incrementally new capacity includes new generation capacity resources, capacity upgrades to existing generation capacity resources, new Demand Resources, and upgrades to existing Demand Resources. The net increase is partially offset by generation capacity resource retirements and derations to existing generation capacity resources.



2010/2011 RPM Base Residual Auction Results

The 1503.1 MW net capacity increase is composed of 1,776.2 MW and 28.7 MW of increased generating and demand resource capacity, respectively. These increases are slightly offset by 301.8 MW of derations and retirements. The 1,503.1 MW net increase in capacity represents over 39% of the net increase in capacity since the implementation of RPM and the largest single year increase thus far.

Table 4 also illustrates the total amount of resource additions and reductions over the four Delivery years since the implementation of the RPM construct. Over the period covering the first four RPM auctions, 4,364.7 MW of new capacity MW were added which were partially offset by 1,902.0 MW of capacity derations or retirements over the same period. Additionally, 1,373.4 MW of new Demand Resources were cleared over these first four auctions. The total net increase in Installed capacity over the period of the first four RPM auctions was 3,836.1 MW.

Table 4 – Incremental Capacity Resource Additions and Reductions Between the 2008/2009 Base Residual Auction and the 2010/2011 Base Residual Auction

Capacity Changes (in ICAP)	RTO*			MAAC*	DPL-SOUTH	SWMAAC			Total
	2008/2009	2009/2010	2010/2011	2009/2010	2010/2011	2008/2009	2009/2010	2010/2011	To Date^
Increase in Generation Capacity	724.2	1,272.3	1,776.2	403.2	0.0	52.0	32.0	1.0	4,364.7
Decrease in Generation Capacity	-375.4	-550.2	-301.8	-188.6	-92.0	-14.0	-196.1	-13.0	-1,902.0
Net Increase in Demand Resource Capacity**	574.7	215.0	28.7	101.1	15.2	284.5	41.4	156.7	1,373.4
Net Increase in Installed Capacity	923.5	937.1	1,503.1	315.7	-76.8	322.5	-122.7	144.7	3,836.1

* RTO numbers include all LDAs, MAAC numbers include DPL-SOUTH and SWMAAC.

** Values are with respect to the quantity offered in the previous year's Base Residual Auction.

^ Values include 2007/2008 values not posted in this report but available on PJM.com.

Table 5 shows the changes that have occurred regarding resource deactivation and retirement since the RPM was approved by FERC. The MW values illustrated in Table 5 represent the quantity of unforced capacity cleared in 2010/2011 Base Residual Auction that came from resources that have either withdrawn their request to deactivate, postponed retirement, or been reactivated (i.e., came out of retirement or mothball state for the RPM auctions) since the RPM Settlement. This total accounts for 3,227.7 MW of cleared unforced capacity in the 2010/2011 Base Residual Auction.



2010/2011 RPM Base Residual Auction Results

Table 5 – Changes to Generation Retirement Decisions Since RPM Approval

	RTO*	MAAC*	SWMAAC
Withdrawn Deactivation Requests	1861.8	1761.9	0.0
Postponed or Cancelled Retirement	1220.4	1170.8	618.2
Reactivation	145.5	145.5	0.0
Total	3227.7	3078.2	618.2

Values Represent Cleared UCAP in the 2010/2011 BRA

* RTO numbers include all LDAs, MAAC numbers include SWMAAC.

Note: Not all survey data has been returned by participants. Values represent latest totals.

RPM Impact To Date

In the planning year preceding the RPM auction implementation, 2006/2007, there was a net capacity export of 3,383.3 MW. As shown in Table 2, for the 2010/2011 auction, the capacity exports were 3,378.2 MW and the capacity imports were 2,982.4 MW resulting in a net capacity export of 395.8 MW. Although PJM is still a net exporter of capacity in the 2010/2011 planning year, the net change in capacity available to PJM as a result of reductions in exports and increases in imports over the period of RPM implementation was an increase of 2987.5 MW.

The minimum net impact of the RPM implementation on the availability of Installed Capacity resources for the 2010/2011 planning year can be estimated by adding the net change in capacity imports and exports over the period, the net increase in Installed Capacity over the RPM implementation period from Table 4 and the net change generation retirements from Table 5. Therefore, the minimum estimated net impact of the RPM implementation on the availability of capacity in the 2010/2011 compared to what would have happened absent this implementation was $2,987.5 \text{ MW} + 3,836.1 \text{ MW} + 3,227.7 \text{ MW} = 10,051.3 \text{ MW}$. This calculation indicates that the net increase in capacity available to PJM for the 2010/2011 planning year due to the RPM implementation is 10,051.3MW.

Discussion of Factors Impacting the RPM Clearing Prices

RTO Clearing Results

The market clearing price of \$174.29/MW-Day in the RTO was set by the intersection of the Supply Curve with the Variable Resource Requirement (VRR) Curve on a horizontal segment. This represents an increase of \$72.25/MW-day from the 2009/2010 Base Residual Auction where the clearing price was \$102.04/MW-day. The 132,190.5 MW of UCAP cleared in this auction is 41.3



2010/2011 RPM Base Residual Auction Results

MW decrease from the 132,231.8 MW cleared in the 2009/2010 Base Residual Auction. The intersection at point B of the RTO VRR curve represents a 16.5% reserve margin.

MAAC and SWMAAC were also modeled in the 2010/2011 Base Residual Auction as LDAs but were not constrained as a result of the optimization. Similar to the Locational Marginal Pricing concept, an LDA will only be constrained in an auction if resources need to be committed out-of-merit in a specific LDA in order to respect the import limit and meet the resource requirement of that LDA. This is only done once all import capability is utilized in the clearing process and is the reason that prices may diverge between LDAs.

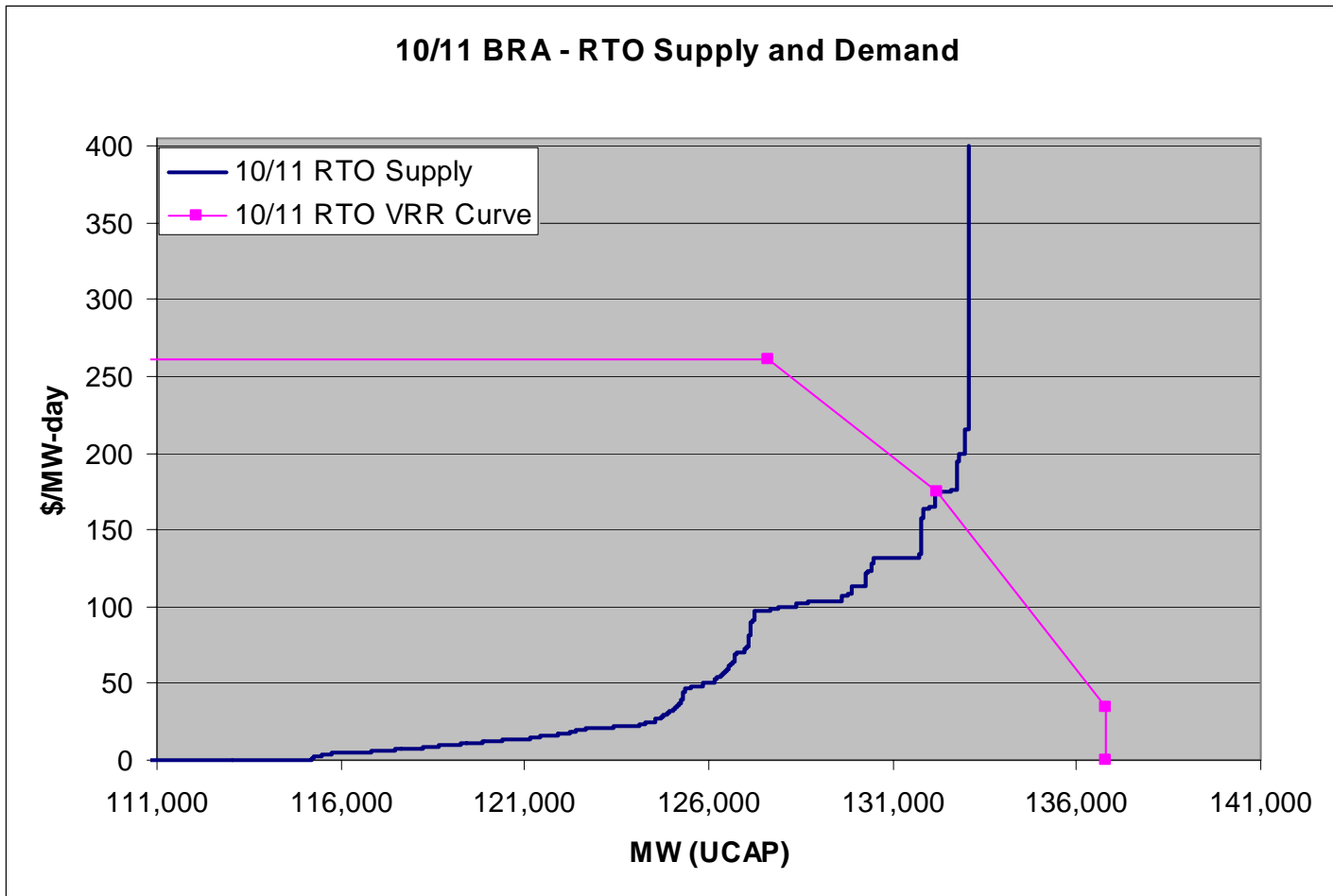
In the 2010/2011 Base Residual Auction, the MAAC LDA was unconstrained because not all of the import capability was utilized to meet the reliability requirement of the LDA. This means that the next incremental MW of supply could either be provided internally from the MAAC LDA itself, or could be imported from the RTO using the remaining import capability. Because the marginal supply could come from either region, the price of the MAAC LDA is the same as that of the RTO.

The SWMAAC LDA did not bind in the 2010/2011 Base Residual Auction because the clearing price of MAAC and the RTO were both higher than the highest point on the SWMAAC VRR curve, \$169.16/MW-day. The resources modeled in the SWMAAC LDA, are also a part of the MAAC LDA and the RTO, and receive the highest of the three clearing prices, \$174.29/MW-day. Figure 1 below depicts the intersection of the mitigated RTO supply curve with the RTO VRR curve.



2010/2011 RPM Base Residual Auction Results

Figure 1 – Graphical Illustration of RTO Clearing Results for 2010/2011 Base Residual Auction



Although *Table 2* shows a net increase in the “Total Eligible RPM Capacity,” increases in exports, FRR commitments, and excused capacity decreased the amount of capacity that was offered into the auction from 140,910.5 MW in the 2009/2010 BRA, to 140,465.1



2010/2011 RPM Base Residual Auction Results

MW in 2010/2011. This decrease in the amount of capacity offered into the auction, coupled with the increase in the RTO Reliability Requirement, results in an increase in the RTO clearing price.

DPL-South Clearing Results

Although previously not binding, the DPL-South LDA was a constrained LDA in the 2010/2011 Base Residual Auction as a result of limited internal generation and import limitations into the LDA. The DPL-South LDA contains the portion of the DPL Zone that is interconnected below 230kV as per Attachment E of PJM Manual 14. The clearing for the DPL-South LDA was created by a vertical extension of the Supply Curve to meet the VRR at a price of \$186.12/MW-day. A total of 1,519.7 MW of UCAP cleared in the LDA including 14.9 MW of demand resources. Figure 2 illustrates the clearing of the DPL-South LDA



2010/2011 RPM Base Residual Auction Results

Figure 2 – Graphical Illustration of DPL-South Clearing Results for 2010/2011 Base Residual Auction

