



2009/2010 RPM Base Residual Auction Results

Introduction

This document provides additional information for PJM stakeholders regarding the 2009/2010 Reliability Pricing Model (RPM) Base Residual Auction results. The discussion also provides a comparison of the 2009/2010 auction results to the results from the 2007/2008 and 2008/2009 RPM auctions.

2009/2010 Base Residual Auction Results Discussion

Table 1 contains a summary of the clearing prices resulting from the 2009/2010 RPM Base Residual Auction in comparison to the those from the 2007/2008 and 2008/2009 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

	RTO			MAAC+APS	EMAAC			SWMAAC		
	2007/2008	2008/2009	2009/2010	2009/2010	2007/2008	2008/2009	2009/2010	2007/2008	2008/2009	2009/2010
Resource Clearing Prices (\$/MW Day)	40.80	111.92	102.04	191.32	197.67	148.80	191.32	188.54	210.11	237.33
Capacity Transfer Right Credit Rate (\$/MW Day)	-	-	-	2.77	20.16	5.29	2.77	48.38	29.53	19.21
Preliminary Net Load Price (\$/MW Day)	40.80	111.92	102.04	188.55	177.51	143.51	188.55	140.16	180.58	218.12

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.



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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 LDAs 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+APS*	EMAAC			SWMAAC		
	2007/2008	2008/2009***	2009/2010	2009/2010	2007/2008**	2008/2009	2009/2010	2007/2008	2008/2009	2009/2010
Internal PJM capacity	165,111.2	166,037.9	167,026.3	78,257.2	32,957.6	33,490.4	33,727.2	11,546.1	11,868.6	11,745.9
Imports Offered	2,983.8	2,612.0	2,563.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Eligible RPM Capacity	168,095.0	168,649.9	169,589.5	78,257.2	32,957.6	33,490.4	33,727.2	11,546.1	11,868.6	11,745.9
Exports / Delistings	4,373.9	4,205.8	2,240.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FRR Commitments	24,717.0	24,953.5	25,316.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excused	506.4	722.0	1,121.9	434.1	14.1	18.1	33.6	316.0	316.0	334.3
Total Eligible RPM Capacity - Excused	29,597.3	29,881.3	28,679.0	434.1	14.1	18.1	33.6	316.0	316.0	334.3
Remaining Eligible RPM Capacity	138,497.7	138,768.6	140,910.5	77,823.1	32,943.5	33,472.3	33,693.6	11,230.1	11,552.6	11,411.6
Generation Offered	138,369.0	138,076.7	140,003.6	77,028.6	32,900.2	33,140.3	33,329.0	11,211.1	11,249.1	11,066.7
DR Offered	123.5	691.9	906.9	794.5	43.3	332.0	364.6	19.0	303.5	344.9
Total Eligible RPM Capacity Offered	138,492.5	138,768.6	140,910.5	77,823.1	32,943.5	33,472.3	33,693.6	11,230.1	11,552.6	11,411.6
Total Eligible RPM Capacity Unoffered	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

* RTO numbers include MAAC+APS, MAAC+APS numbers include EMAAC and SWMAAC

** Values corrected from 2008/2009 report

*** There was a typographical error in the previous report that has been corrected in this column. This is not related to the 2009/2010 reposting.

A total of 169,292.2 MW of installed capacity was eligible to be offered into the 2009/2010 Base Residual Auction. Of this eligible amount, 2,563.2 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 reduced by nearly 2,000 MW in the 2009/2010 auction compared to the previous auction which means that more supply remained available within PJM as capacity resources rather than electing to delist the resources to support external capacity sales.



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A total of 140,910.5 MW of installed capacity was offered into the Base Residual Auction. A difference of 28,679.0 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 offering into the auction. Resources were excused from the must offer requirement for the following reasons: environmental restrictions, generation moving behind the meter, 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 133,551 MW were offered into the 2009/2010 Base Residual Auction, comprised of 132,614.2 MW of generation capacity and 936.8 MW of capacity from Demand Resources. Of those offered, a total of 132,231.8 MW of capacity was cleared in the auction. Of the cleared amount, 131,338.9 MW was from generation capacity and 892.9 MW was 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. *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+APS*	EMAAC			SWMAAC		
	2007/2008	2008/2009	2009/2010	2009/2010	2007/2008	2008/2009	2009/2010	2007/2008	2008/2009	2009/2010
Generation Offered	130,716.1	131,164.8	132,614.2	72,177.3	30,782.5	31,036.0	31,307.6	10,181.5	10,312.0	9,955.4
DR Offered	127.6	715.8	936.8	820.6	44.7	343.4	376.6	19.7	314.1	356.3
Total Offered	130,843.7	131,880.6	133,551.0	72,997.9	30,827.2	31,379.4	31,684.2	10,201.2	10,626.1	10,311.7
Generation Cleared	129,281.6	129,061.4	131,338.9	71,733.8	30,753.1	30,062.6	31,278.2	10,181.5	10,312.0	9,558.4
DR Cleared	127.6	536.2	892.9	813.9	44.7	168.7	372.4	19.7	309.2	356.3
Total Cleared	129,409.2	129,597.6	132,231.8	72,547.7	30,797.8	30,231.3	31,650.6	10,201.2	10,621.2	9,914.7
Uncleared	1,434.5	2,283.0	1,319.2	450.2	29.4	1,148.1	33.6	0.0	4.9	397.0

* RTO numbers include MAAC+APS, MAAC+APS numbers include EMAAC 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 2008/2009 Base Residual Auction to the 2009/2010 Base Residual Auction. A net total of 927.1 MW of incrementally new capacity was available for the 2009/2010 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. However, as shown in *Table 3*, each LDA, with the exception on SWMAAC, and the RTO as a whole experienced a net increase in installed capacity resources that for the 2009/2010



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Base Residual Auction as compared to the 2008/2009 Base Residual Auction. Table 4 also illustrates the total amount of resource additions and reductions over the three Delivery years since the implementation of the RPM construct. Over the period covering the first three RPM auctions, 2,588.5 MW of new capacity MW were added which were partially offset by 1,600.2 MW of capacity derations over the same period. Additionally, 1,344.7 MW of new Demand Resources were cleared over these first three auctions. The total net increase in Installed capacity over the period of the first three RPM auctions was 2,333.0 MW.

Table 4 – Incremental Capacity Resource Additions and Reductions Between the 2007/2008 Base Residual Auction and the 2009/2010 Base Residual Auction

Capacity Changes (in ICAP)	RTO*			MAAC+APS*	EMAAC			SWMAAC			Total
	2007/2008	2008/2009	2009/2010	2009/2010	2007/2008	2008/2009	2009/2010	2007/2008	2008/2009	2009/2010	To Date
Increase in Generation Capacity	602.0	724.2	1,262.3	431.9	134.7	293.4	231.3	0.0	52.0	32.0	2,588.5
Decrease in Generation Capacity	-674.6	-375.4	-550.2	-293.4	-257.7	-51.6	-27.1	-112.0	-14.0	-196.1	-1,600.2
Net Increase in Demand Resource Capacity**	555.0	574.7	215.0	159.0	43.3	288.7	32.6	19.0	284.5	41.4	1,344.7
Net Increase in Installed Capacity	482.4	923.5	927.1	297.5	-79.7	530.5	236.8	-93.0	322.5	-122.7	2,333.0

* RTO numbers include MAAC+APS, MAAC+APS numbers include EMAAC and SWMAAC

** 2007/2008 values represent all DR for 2007/2008. 2008/2009 values represent increases in DR from 2007/2008 to 2008/2009.

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 2009/2010 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 3,069.5 MW of cleared unforced capacity in the 2009/2010 Base Residual Auction with most of the capacity in the EMAAC LDA.

Table 5 – Changes to Generation Retirement Decisions Since RPM Approval

	RTO*	MAAC+APS*	EMAAC	SWMAAC
Withdrawn Deactivation Requests [MW]	1783.8	1693.6	1621.8	0.0
Postponed or Cancelled Retirement [MW]	1143.2	1091.6	445.2	646.4
Reactivation [MW]	142.5	142.5	142.5	0.0
Total [MW]	3,069.5	2,927.7	2,209.5	646.4

Values Represent Cleared UCAP in the 2009/2010 BRA

* RTO values include EMAAC+APS. MAAC+APS includes EMAAC and SWMAAC

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



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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 2009/2010 auction, the capacity exports were 2,240.9 MW and the capacity imports were 2,563.2 MW resulting in a net capacity import of 322.3 MW. Therefore 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 3,705.6 MW.

The minimum net impact of the RPM implementation on the availability of Installed Capacity resources for the 2009/2010 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 2009/2010 compared to what would have happened absent this implementation was $3,705.6 \text{ MW} + 2,333.0 \text{ MW} + 3,069.5 \text{ MW} = 9,108.1 \text{ MW}$. This calculation indicates that the net increase in capacity available to PJM for the 2009/2010 planning year due to the RPM implementation is 9,108.1 MW.

Discussion of Factors Impacting the RPM Clearing Prices

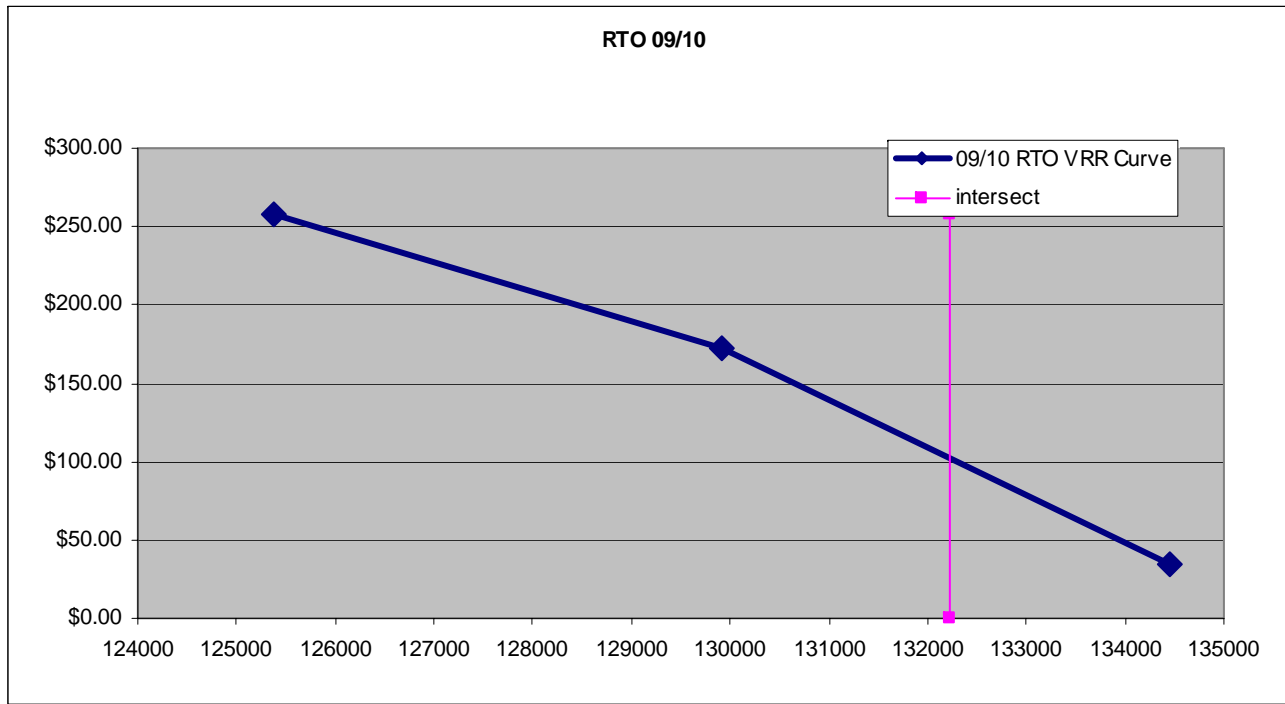
RTO Clearing Price

The market clearing price of \$102.04/ MW-Day in the RTO was set by the intersection of the Supply Curve with the Variable Resource Requirement (VRR) Curve on a vertical segment. This represents a decrease of \$9.88/MW-day from the 2008/2009 Base Residual Auction where the clearing price was \$111.92/MW-day. The 132,231.8 MW of UCAP cleared in the auction represents an increase in cleared UCAP of 2,634.2 MW over the 2008/2009 Base Residual Auction results and a reserve margin of just under 18%. Figure 1 graphically shows the clearing of the RTO.



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Figure 1 – Graphical Illustration of RTO Clearing Results for 2009/2010 Base Residual Auction



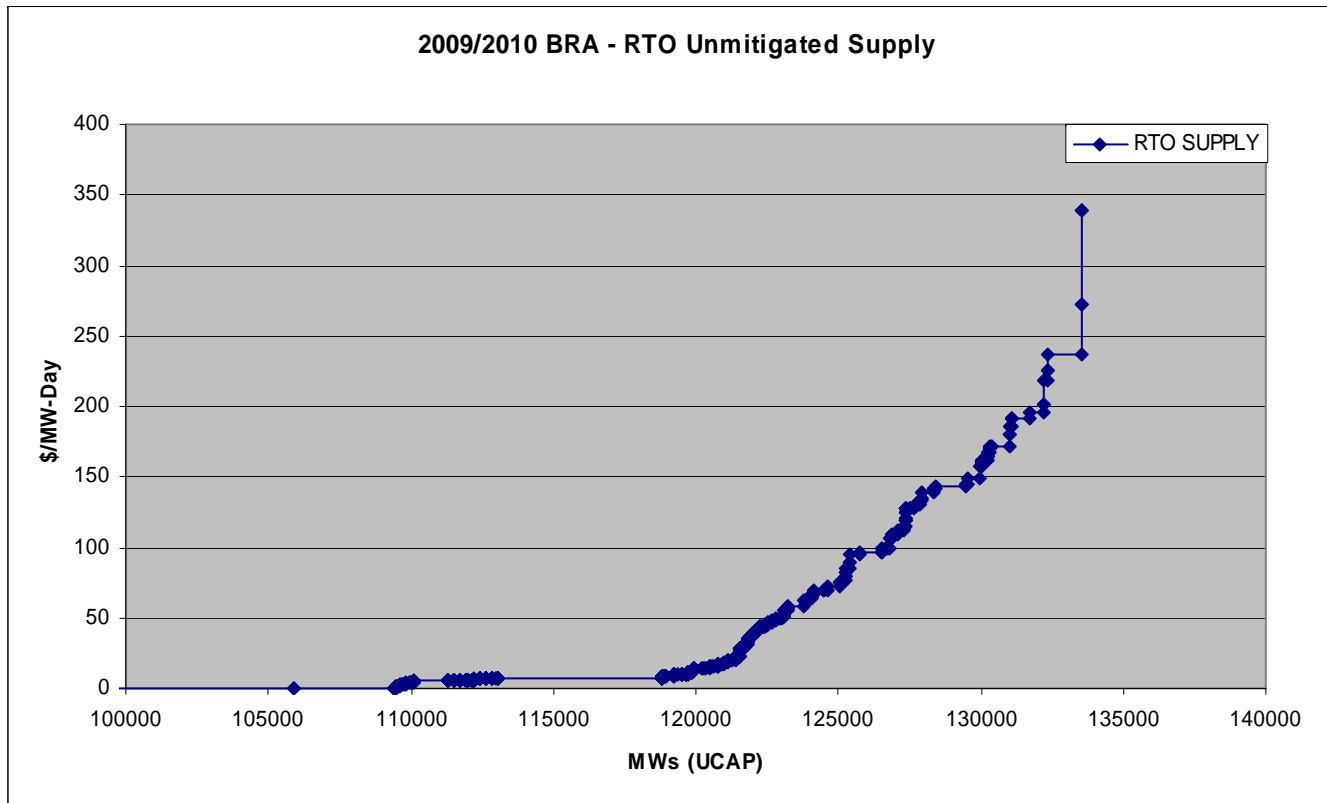
The increase in cleared UCAP in the RTO and the decrease in the clearing price were a result of the new capacity introduced in this auction and also a large decrease in the amount of exports leaving the PJM system. Combined, these account for over 2,650 MW that were offered into the 2009/2010 Base Residual Auction that were not offered into the 2008/2009. This growth in available capacity exceeds the demand growth in the RTO, modeled in the VRR curve, and thus causes a decrease in the RTO clearing price and a higher reserve margin.

The unmitigated supply curve for the RTO is depicted in Figure 2. The plot represents the UCAP offered by all participants at the EFORd and price submitted with that offer. Figure 3 shows the mitigated supply curve for the RTO. The mitigated supply curve was used to clear the 2009/2010 Base Residual Auction.



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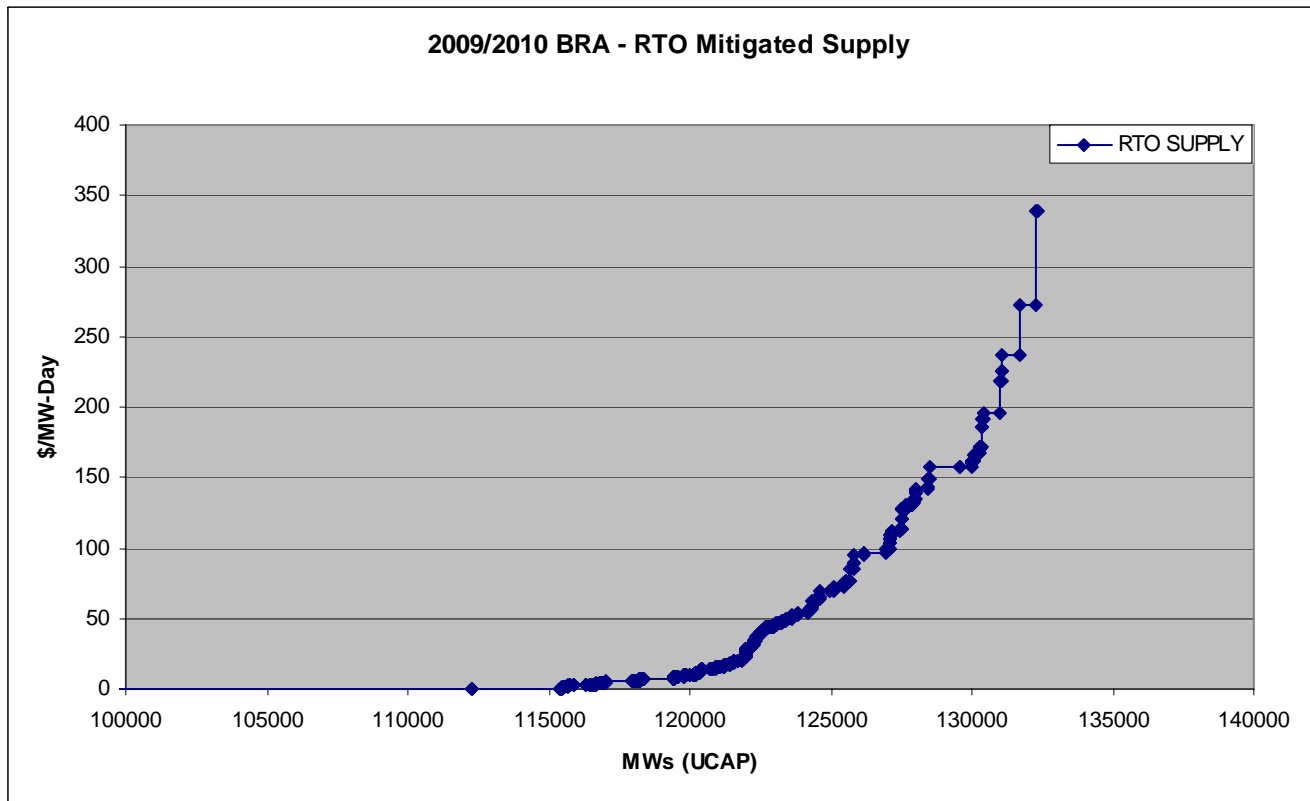
Figure 2 - Supply Curve for the RTO (unmitigated)





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Figure 3 - Supply Curve for the RTO (mitigated)



MAAC+APS Clearing Price

Although previously not binding, the MAAC+APS LDA was a constrained LDA in the 2009/2010 Base Residual Auction as a result of transmission limitations into the MAAC + APS region. It contains the PN, PL, ME and APS zones in addition to the EMAAC and

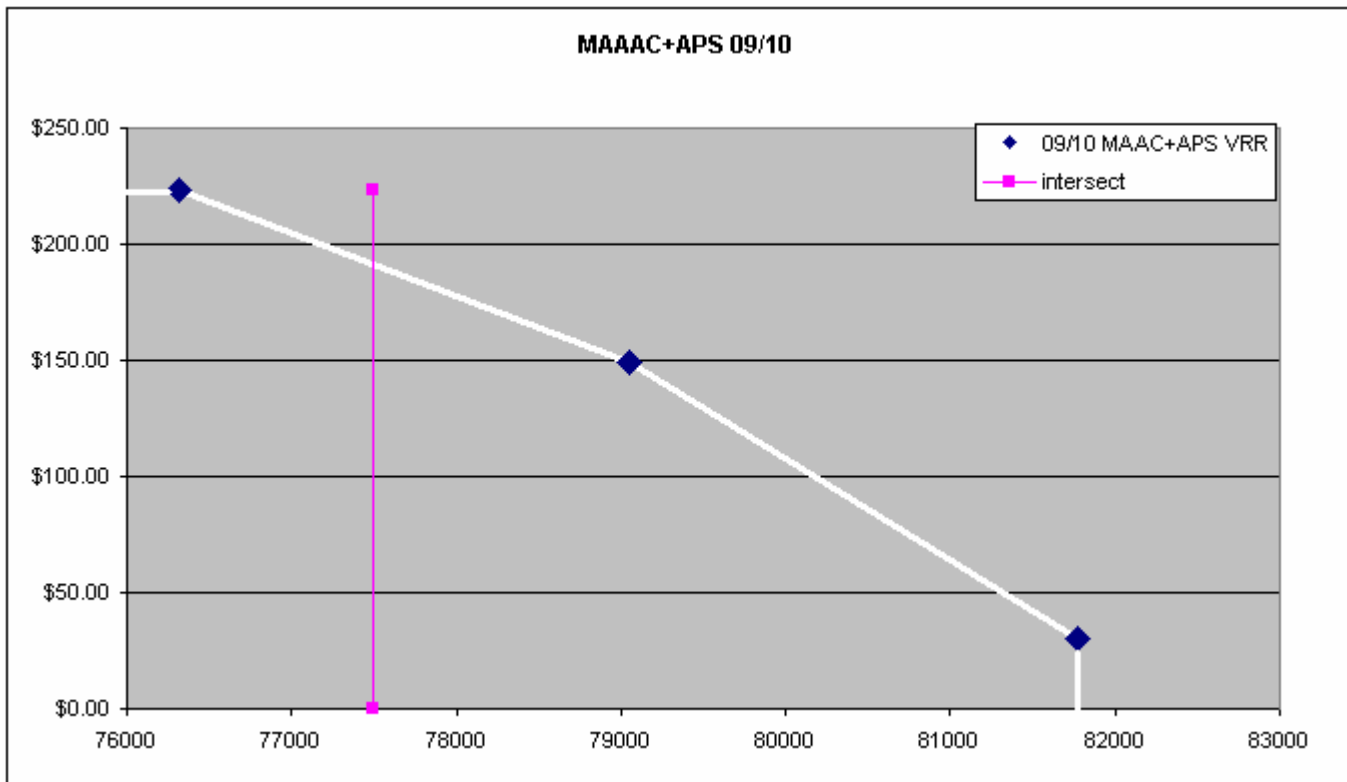


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SWMAAC LDAs. The clearing results for MAAC+APS were created by a vertical extension of the Supply Curve to meet the VRR at a price of \$191.32/MW-day. 72,547.8 MW of UCAP cleared in the LDA including 813.9 MW of demand resources.

Figure 4 graphically shows the clearing of the MAAC+APS LDA.

Figure 4 – Graphical Illustration of MAAC+APS Clearing Results for 2009/2010 Base Residual Auction

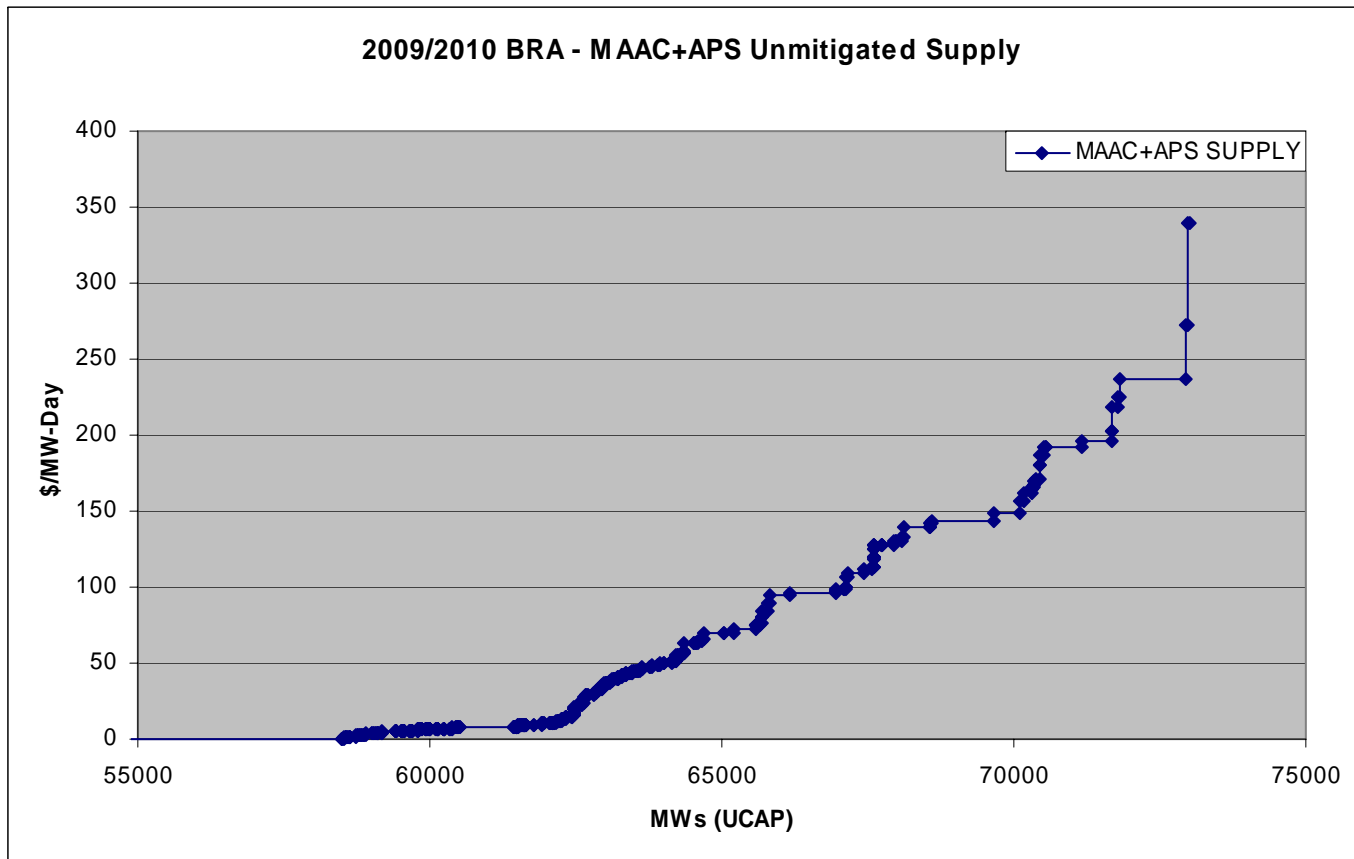


The unmitigated supply curve for the MAAC+APS is depicted in Figure 5. The plot represents the UCAP offered by all participants at the EFORD and price submitted with that offer. Figure 6 shows the mitigated supply curve for the MAAC+APS. The mitigated supply curve was used to clear the 2009/2010 Base Residual Auction.



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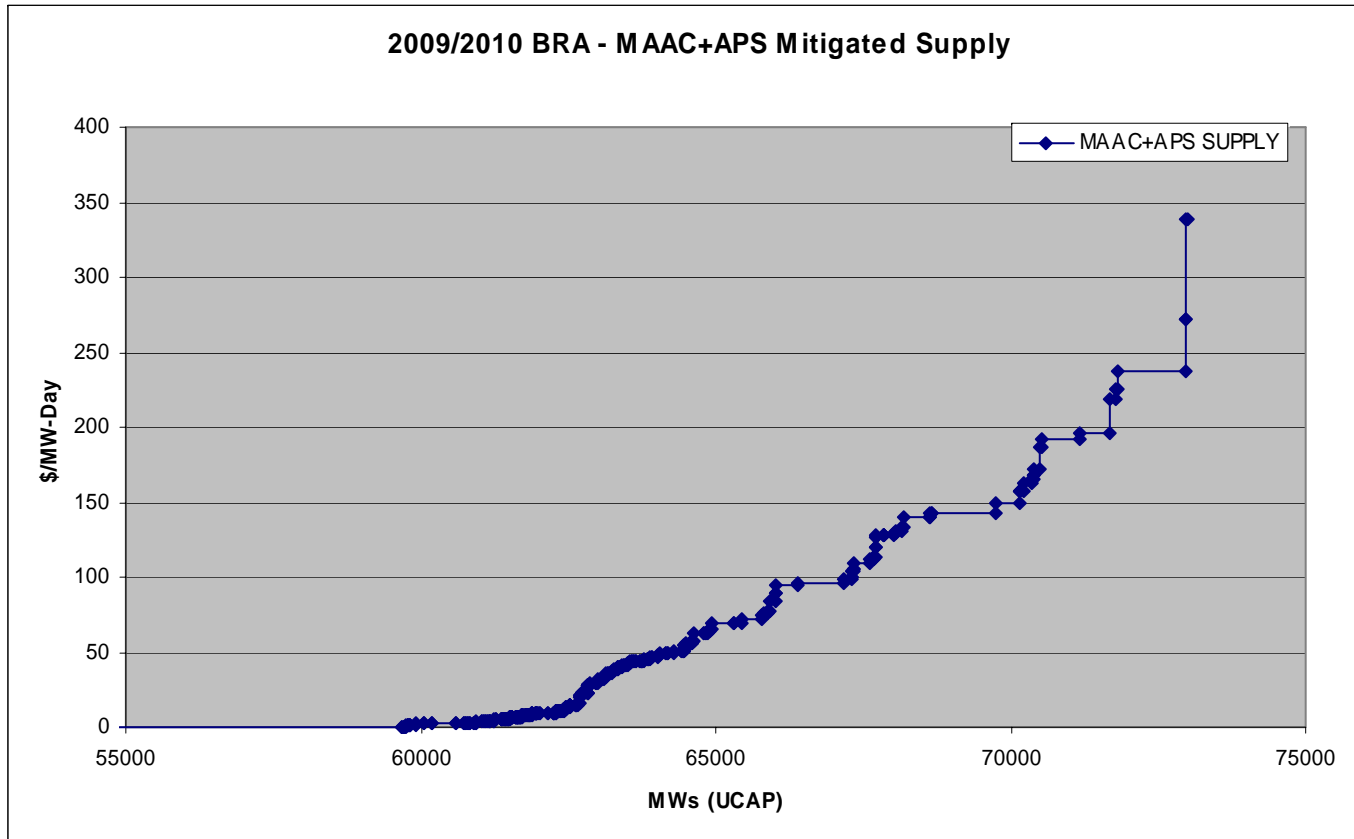
Figure 5 - Supply Curve for the MAAC+APS (unmitigated)





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Figure 6 - Supply Curve for the MAAC+APS (mitigated)



EMAAC Clearing Price

Despite being modeled as an LDA in the 2009/2010 Base Residual Auction, the EMAAC LDA was not binding in the RPM auction clearing, therefore the clearing price for this LDA was the same as that of MAAC+APS. The main reason that the EMAAC LDA was

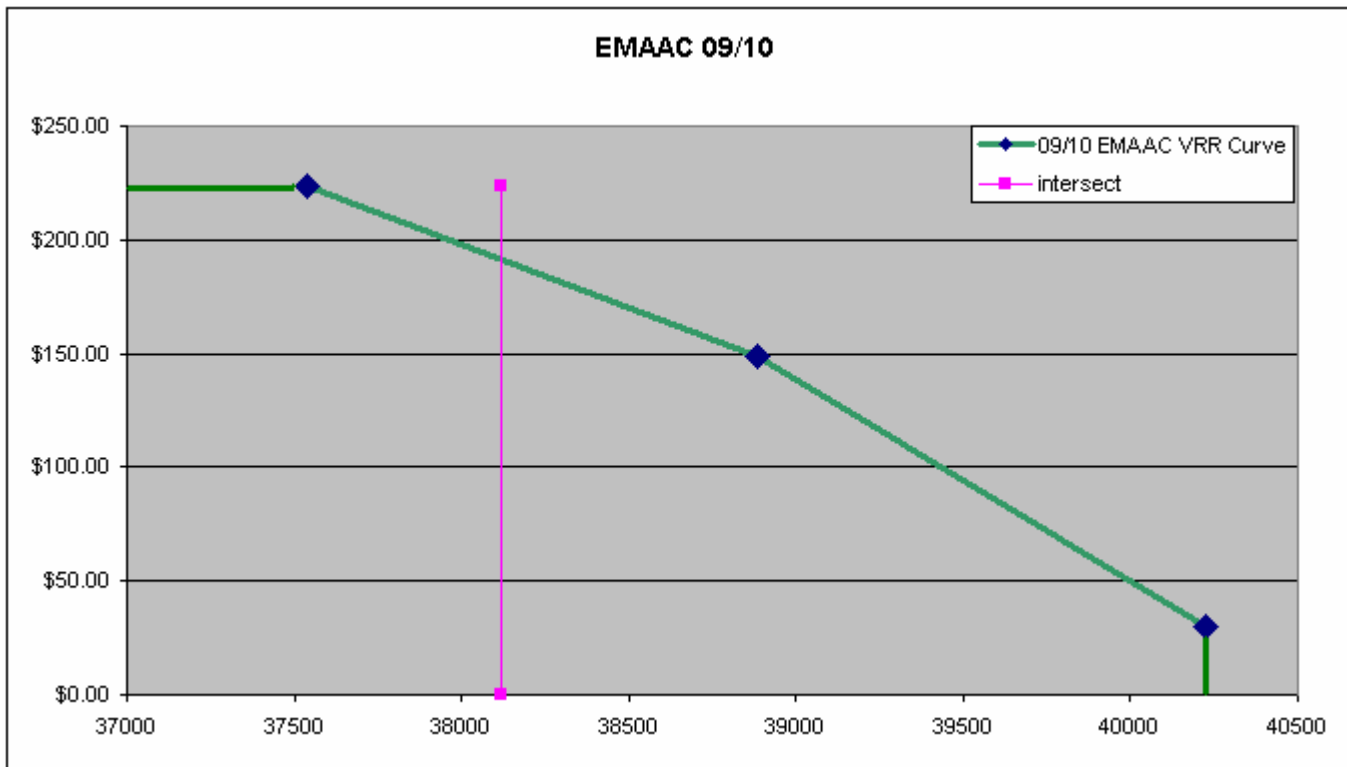


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not binding was a relatively large increase in CETL and an increase in available capacity in the LDA. The increase in CETL allows more capacity to be imported into this LDA from a less constrained LDA thus minimizing the cost of capacity.

Although the EMAAC LDA did not bind, all of the resources within this LDA are also a part of the larger MAAC+APS LDA. Therefore, the capacity in the EMAAC LDA is valued at the same clearing price as the MAAC+APS LDA.

Figure 7 - Graphical Illustration of EMAAC Clearing Results for 2009/2010 Base Residual Auction

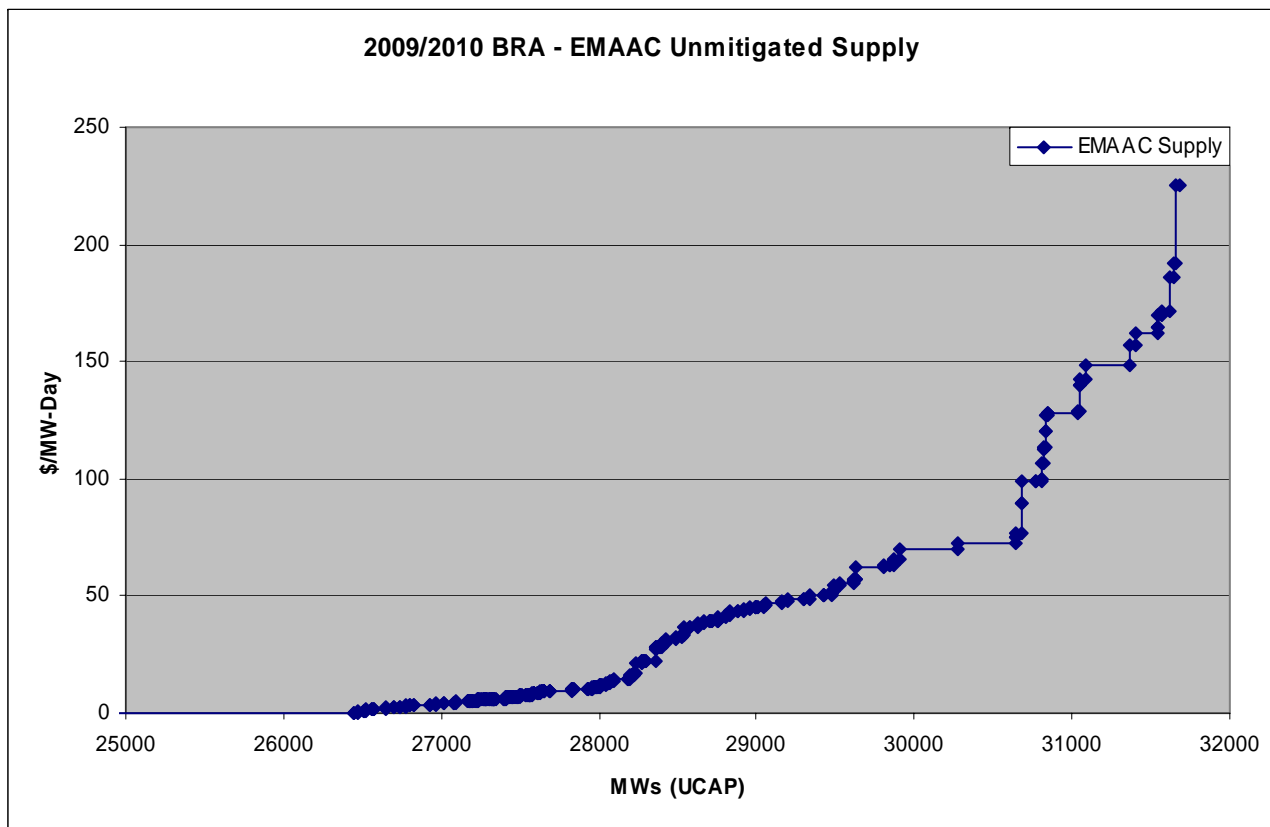




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The unmitigated supply curve for EMAAC is depicted below in Figure 8. The plot represents the UCAP offered by all resources in the LDA at the EFORd and price submitted with that offer. Figure 9 shows the mitigated supply curve for EMAAC. The mitigated supply curve was used to clear the 2009/2010 Base Residual Auction.

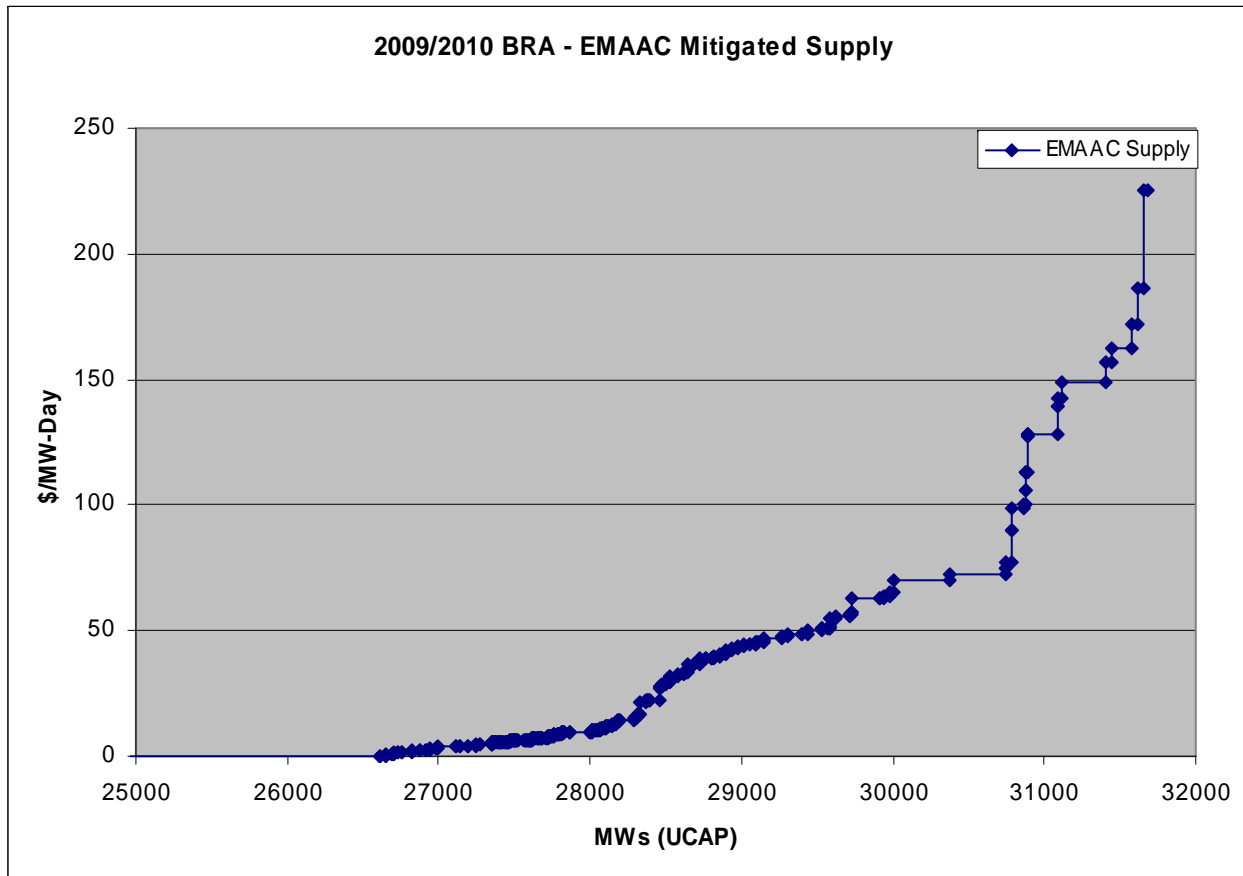
Figure 8 - Supply Curve for EMAAC (unmitigated)





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Figure 9 - Supply Curve for EMAAC (mitigated)



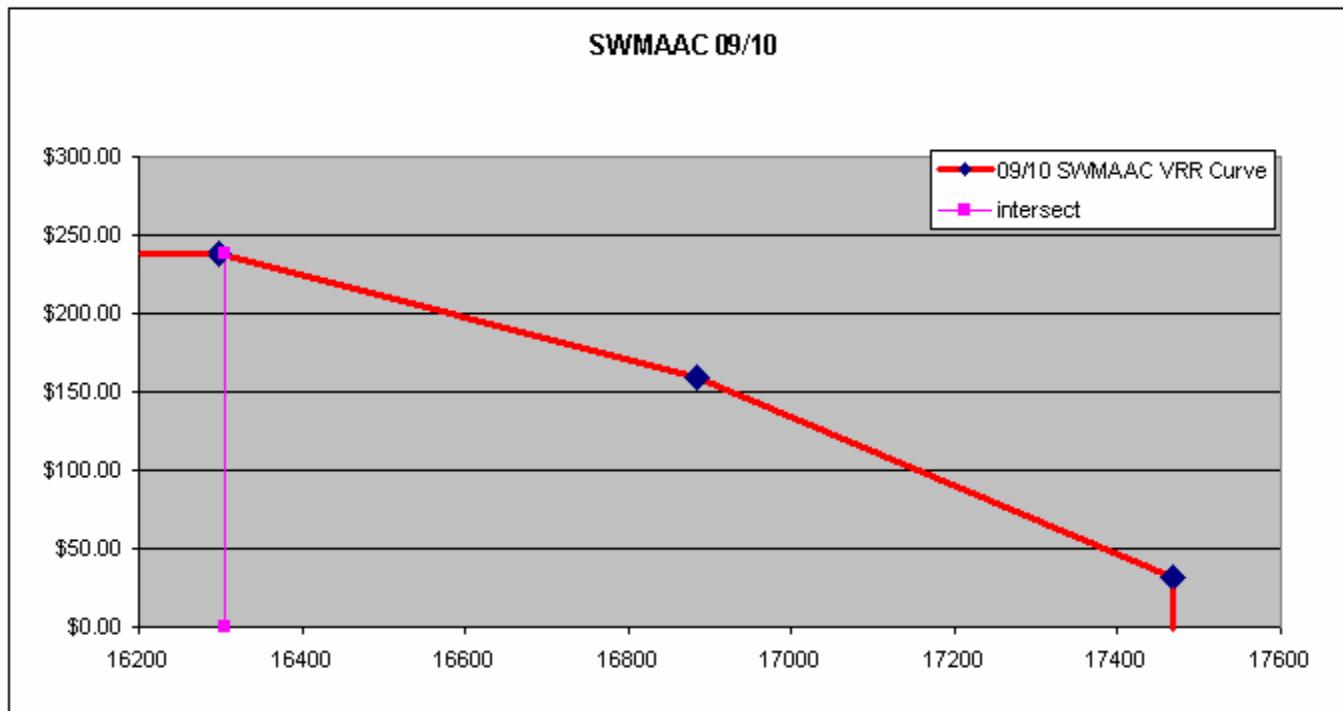


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SWMAAC Clearing Price

The 2009/2010 Base Residual Auction for SWMAAC shows that the LDA is more constrained than it was in the 2008/2009 BRA. This is evident through the increase in the clearing price from \$210.11/MW-Day in 2008/2009, to \$237.33/MW-Day in 2009/2010. Although the CETL increased by 781 MW, it was offset by a corresponding increase in CETO of 220MW, a net decrease in capacity of 122.7 MW due to derations and a net decrease in capacity cleared due to avoidable cost increases related to emission control system installations. The net impact was a reduction in capacity available to clear in the auction which caused a rise in the clearing price of \$27.22/MW-day.

Figure 10 - Graphical Illustration of SWMAAC Clearing Results for 2009/2010 Base Residual Auction

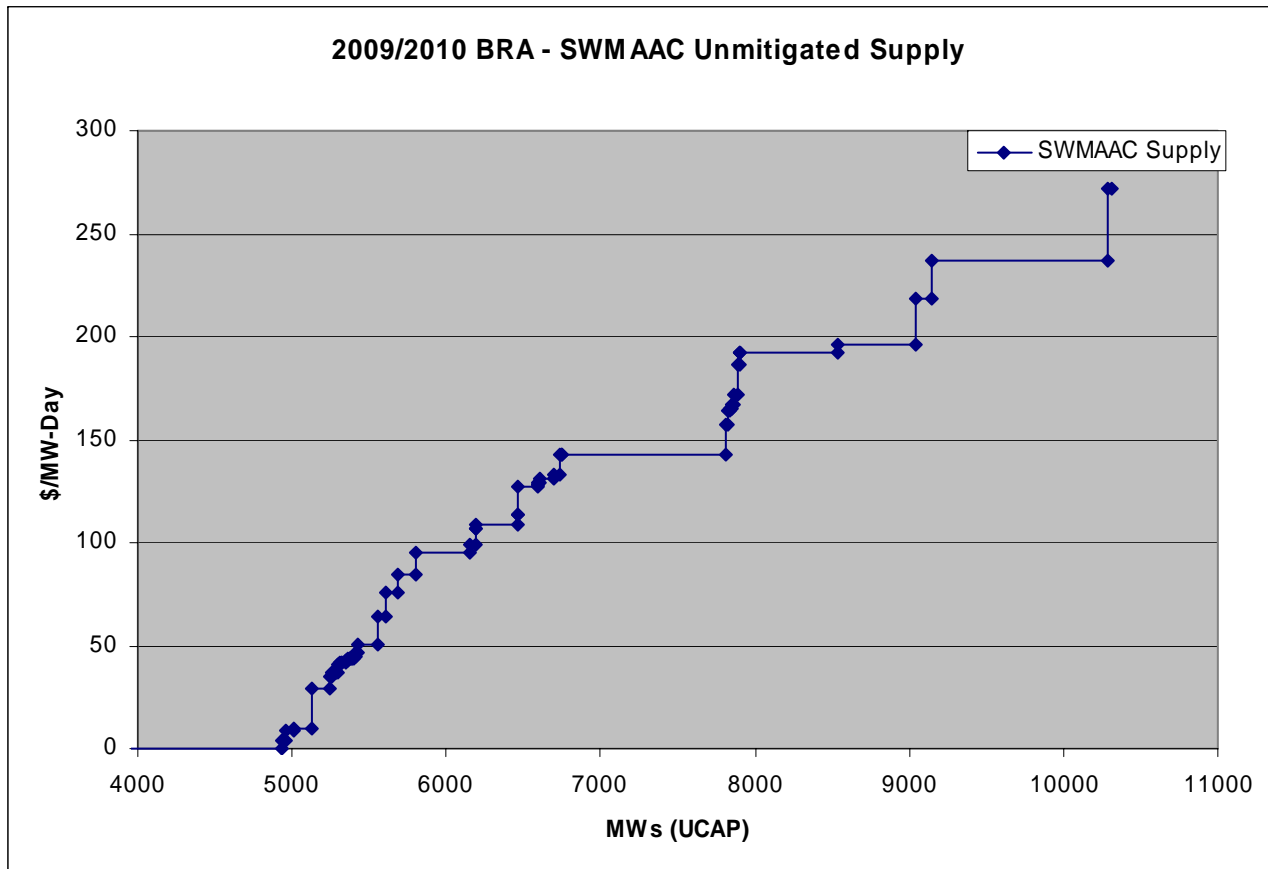




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The unmitigated supply curve for SWMAAC is depicted below in Figure 11. The plot represents the UCAP offered by all resources in the LDA at the EFORd and price submitted with that offer. Figure 12 shows the mitigated supply curve for SWMAAC. The mitigated supply curve was used to clear the 2009/2010 Base Residual Auction.

Figure 11 - Supply Curve for SWMAAC (unmitigated)





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Figure 12 - Supply Curve for SWMAAC (mitigated)

