



## **2012/2013 RPM First Incremental Auction Results**

### **Introduction**

This document provides information for PJM stakeholders regarding the results of the 2012/2013 Reliability Pricing Model (RPM) First Incremental Auction. The 2012/2013 First Incremental Auction opened on September 13, 2010 and the results were posted on September 24, 2010.

This is the first Incremental Auction conducted under revised rules that expand the role of Incremental Auctions. The expanded Incremental Auctions provide both a forum for capacity suppliers to purchase replacement capacity, and a means for PJM to adjust previously committed capacity levels due to reliability requirement increases or decreases and to recoup the appropriate share of the deferred Short-Term Resource Procurement Target.

This document begins with a high level summary of the Incremental Auction results followed by sections containing detailed descriptions of the configuration and results of the 2012/2013 First Incremental Auction.

### **Summary of 2012/2013 RPM First Incremental Auction Results**

Table 1 summarizes the results of the 2012/2013 First Incremental Auction. In the region encompassing the Rest of RTO LDA, the SWMAAC LDA, and the Rest of MAAC LDA (MAAC LDA minus EMAAC and SWMAAC LDAs), participants procured a total net capacity amount of 1,232.7 MW of replacement capacity at a clearing price of \$16.46/MW-Day. In the EMAAC LDA, a total net capacity amount of 1,172.4 MW of resource-specific capacity was sold by suppliers with available, uncommitted capacity at a clearing price of \$153.67/MW-Day.

The total net amount of capacity procured or released by PJM is a function of (1) the procurement and release of capacity to resolve reduced LDA import limits introduced by the removal of the Susquehanna-Roseland Project from the model and (2) the clearing of the PJM sell offers and PJM buy bids submitted due to changes in RTO and LDA reliability requirements and procurement of the deferred short-term resource procurement.



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In the region encompassing the Rest of RTO LDA, the SWMAAC LDA, and the Rest of MAAC LDA (MAAC LDA minus EMAAC and SWMAAC LDAs), PJM released to participants a total net capacity amount of 1,232.7 MW at a clearing price of \$16.46/MW-Day. In the EMAAC LDA, PJM procured a total net capacity amount of 1,172.4 MW at a clearing price of \$153.67/MW-Day. Across the entire RTO, PJM released a total net capacity amount of 60.3 MW meaning total prior commitments were reduced by 60.3 MW.

**Table 1 – Summary of 2012/2013 First Incremental Auction Results**

Region	Total Net Capacity Procured by Participants (MW UCAP) *	Total Net Capacity Procured by PJM (MW UCAP) *	Clearing Price (\$/MW-Day)
RTO minus EMAAC SubTotal	1,232.7	-1,232.7	16.46
EMAAC Sub Total	-1,172.4	1,172.4	153.67
RTO TOTAL	60.3	-60.3	

\* A negative MW value indicates that capacity was released

### 2012/2013 RPM First Incremental Auction Configuration

#### **Participant Buy Bids and Sell Offers**

RPM Incremental Auctions provide capacity suppliers with an opportunity to sell or purchase capacity for the Delivery Year through a PJM-administered auction process. Resource-specific sell offers are submitted into this auction by suppliers with available, uncommitted capacity. All resource-specific sell offers into an Incremental Auction are subject to market power mitigation through the application of the Market Structure Test.

Any party that desires to purchase LDA-specific replacement capacity for the Delivery Year may do so by submitting a buy bid into the Incremental Auction. Cleared Buy Bids purchased in an Incremental Auction may be used as replacement capacity to cover Delivery Year commitment and compliance shortfalls.



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### **PJM Buy Bids and Sell Offers**

Sections 5.4 and 5.12 of Attachment DD of the Tariff define the Incremental Auction requirements regarding the procurement or sale of capacity by PJM. Section 5.4 describes the triggering tests used by PJM prior to an Incremental Auction to determine the need for the procurement and/or sale of capacity by PJM in relation to updates of the reliability requirement and capacity already procured. Section 5.12 describes the determination of the MW amounts and prices of buy bids and/or sell offers that PJM will submit when the various tests in section 5.4 are triggered.

Prior to each Incremental Auction, PJM recalculates the RTO reliability requirement and each LDA reliability requirement based on an updated peak load forecast, updated Installed Reserve Margin and an updated CETO. The recalculated reliability requirements are compared to the reliability requirements used in the prior auction for the same Delivery Year and a determination is made as to the need for the procurement and/or sale of capacity by PJM.

For a 1<sup>st</sup> or 2<sup>nd</sup> Incremental Auction, if the RTO or LDA reliability requirement increases by more than the lesser of 500 MW or 1% then PJM will submit a buy bid in a MW amount equal to the increase in reliability requirement plus the Short-Term Resource Procurement Target Applicable Share (STRPTAS). For a 1<sup>st</sup> or 2<sup>nd</sup> Incremental Auction, the STRPTAS is equal to 0.2 times the Short-Term Resource Procurement Target used in the Base Residual Auction (BRA). The price of the PJM buy bid is based on the Updated VRR Curve Increment which is the portion of the Updated VRR Curve remaining beyond the point representing all capacity already procured for the Delivery Year.

For a 1<sup>st</sup> or 2<sup>nd</sup> Incremental Auction, if the RTO or LDA reliability requirement decreases by more than the lesser of 500 MW or 1% then PJM will net the reliability requirement decrease with the STRPTAS and submit either a buy bid to procure additional capacity or a sell offer to release previously committed capacity depending on the outcome of the netting. If the magnitude of the reliability requirement decrease is less than the STRPTAS then PJM will submit a buy bid to procure additional capacity for the net amount. If the magnitude of the reliability requirement decrease is greater than the STRPTAS then PJM will submit a sell offer to release previously committed capacity for the net amount. The price of a PJM sell offer is based on the Updated VRR Curve Decrement which is the portion of the Updated VRR Curve to the left of the point representing all capacity already procured for the Delivery Year.



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If the amount of capacity previously procured for the Delivery Year is less than the prior RTO or LDA reliability requirement adjusted for the Short-Term Resource Procurement Target and the difference is more than the lesser of 500 MW or 1% then PJM will seek to procure additional capacity. In this case, PJM will employ the entire Updated VRR Curve Increment in the clearing of the Incremental Auction.

Based on an application of the Incremental Auction requirements of Sections 5.4 and 5.12 of Attachment DD of the Tariff and summarized above, PJM submitted the buy bids and sell offers, shown in Table 2, into the 1<sup>st</sup> Incremental Auction for the 2012/2013 Delivery Year. Table 2 also defines the pricing points associated with the PJM buy bids and PJM sell offers. Note that a PJM sell offer is indicated by a negative PJM buy bid in Table 2.



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**Table 2 – PJM Buy Bids and PJM Sell Offers for 2012/2013 First Incremental Auction**

Location	PJM Buy Bid (MW) *	Price Points for PJM Buy Bids and PJM Sell Offers					
		Point 1 x-axis (MW)	Point 1 y-axis (\$/MW-Day)	Point 2 x-axis (MW)	Point 2 y-axis (\$/MW-Day)	Point 3 x-axis (MW)	Point 3 y-axis (\$/MW-Day)
RTO (Rest of)	-187.3	0.0	\$0.00	187.3	\$0.00	--	--
MAAC (Rest of)	-144.4	0.0	\$127.47	144.4	\$135.66	--	--
EMAAC (Rest of)	-145.8	0.0	\$93.39	145.8	\$111.42	--	--
SWMAAC	409.6	0.0	\$209.83	232.7	\$176.14	409.6	\$135.17
PS (Rest of)	-122.8	0.0	\$77.44	122.8	\$122.94	--	--
PS NORTH	-41.6	0.0	\$151.78	41.6	\$184.34	--	--
DPL SOUTH	-56.2	0.0	\$134.54	47.0	\$212.13	56.2	\$221.62
<b>TOTAL</b>	<b>-288.5</b>						

\* A PJM Sell Offer is indicated by a negative PJM Buy Bid.

**LDA Capacity Import Limits**

Section 5.11A of Attachment DD of the Tariff describes the milestones that a Backbone Transmission Project must meet for it to be included and remain in the system model for a given Delivery Year. The Susquehanna-Roseland 500 kV Transmission Project was included in the model used for the 2012/2013 RPM Base Residual Auction (BRA) that was conducted in May of 2009 but the project does not satisfy the requirements of Section 5.11A needed to remain in the 2012/2013 Delivery Year model. As a result, the project has been removed from the model for the 1<sup>st</sup> Incremental Auction and all subsequent Incremental Auctions for the 2012/2013 Delivery Year as stipulated by this section of the Tariff.

The removal of the project from the 2012/2013 RPM model negatively impacts the Capacity Emergency Transfer Limits (CETL) of the EMAAC, PS and PS-NORTH LDAs. Table 3 shows the CETL modeled in the 2012/2013 BRA for each LDA and the CETL that was utilized by capacity imports into each LDA in the BRA solution. Table 3 also shows the updated CETL for each LDA that reflects



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the removal of the Susquehanna-Roseland Transmission Project. The CETL remaining for use in the 1<sup>st</sup> IA for the 2012/2013 Delivery Year shown in the last row of Table 3 represents the LDA capacity import limits that were employed in the 1<sup>st</sup> IA for the 2012/2013 Delivery Year.<sup>1</sup>

**Table 3 – LDA Capacity Import Capability for 2012/2013 First Incremental Auction**

	LDA					
	MAAC	EMAAC	SWMAAC	PS	PS NORTH	DPL SOUTH
Base Residual Auction (BRA) CETL	6,377.0	9,079.0	7,400.0	6,356.0	2,755.0	1,746.0
Capacity Import Level (BRA Results)	6,377.0	9,079.0	5,561.4	6,255.6	2,755.0	1,746.0
Updated CETL	6,377.0	7,624.0	7,400.0	6,077.0	2,675.0	1,746.0
<b>Capacity Import Limit for 1st Incremental Auction</b>	<b>0</b>	<b>-1455</b>	<b>1838.6</b>	<b>-178.6</b>	<b>-80</b>	<b>0</b>

### **Incremental Auction Clearing**

Participant supply offers and buy bids are combined with the PJM sell offers and buy bids shown in Table 2 to form the supply and demand curves. The solution algorithm clears all buy bids and sell offers in a least-cost manner while respecting the capacity import limits into each LDA.

To the extent possible, negative capacity import limits are resolved through the clearing of additional supply offers located in the constrained-side area of each transfer limit coupled with the clearing of an equal and off-setting amount of buy bids located in the unconstrained-side area of each transfer limit. Capacity transfers are forced from child LDA to parent LDA in order to resolve the

<sup>1</sup> Section 5.4(e) of Attachment DD of the Tariff stipulates that PJM must conduct a Conditional Incremental Auction for a given delivery year if the in-service date of a backbone transmission upgrade that was modeled in the BRA for that delivery year is delayed beyond July 1 of the delivery year and if such delay causes a reliability criteria violation. A reliability criteria violation is identified when an LDA's CETO exceeds the LDA's CETL. Although the CETLs of the EMAAC, PS and PSEG LDAs are negatively impacted by the removal of the Susquehanna-Roseland project, all LDA CETL values remain above the respective LDA CETO values, therefore the removal of the Susquehanna-Roseland project does not cause a reliability criteria violation and the requirement for a Conditional Incremental Auction is not met.



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negative capacity import limit but only if the cost to achieve the transfer is less than a predetermined cost threshold. The cost threshold assigned to each negative transfer limit is based on the price at the intersection of the updated VRR curve of the LDA with the level of previously procured capacity for the LDA adjusted by the reduction in CETL. Once the cost threshold is reached, the algorithm will no longer force the transfer even if the full desired capacity transfer was not accomplished and the constraint is relaxed even if continued transfers are available but at a higher cost.

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#### **Participant Buy Bids and Sell Offers**

Table 4 shows the offered and cleared quantities for participant buy bids and sell offers. A total of 7,085.8 MW of supply was offered into the First Incremental Auction composed of uncleared capacity from the 2012/2013 Base Residual Auction, new capacity in the form of uprates or resources that were not previously capacity resources in PJM.

Participant demand in an Incremental Auction is composed of LDA-specific buy bids submitted by participants. The buy bids are specified in UCAP terms and, if cleared, are binding commitments to purchase capacity for the entire Delivery Year. There was a total of 9,339.1 MW of buy bids submitted by participants into the auction.

In the 2012/2013 First Incremental Auction, 507 MW of participant supply offers and 1,739.7 MW of participant buy bids cleared in the region encompassing the Rest of RTO LDA, the SWMAAC LDA, and the rest of MAAC LDA (MAAC LDA minus EMAAC and SWMAAC LDAs) at a clearing price of \$16.46/MW-Day. In this region, cleared buy bids exceeded cleared sell offers by 1,232.7 MW. In the EMAAC LDA, 1,181.7 MW of participant supply offers and 9.3 MW of participant buy bids cleared at a clearing price of \$153.67/MW-Day. In the EMAAC LDA, cleared sell offers exceeded cleared buy bids by 1,172.4 MW. Across the entire RTO, cleared participant buy bids exceeded cleared participant sell offers by 60.3 MW.



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**Table 4 - 2012/2013 First Incremental Auction Results / Participant Sell Offers and Buy Bids**

LDA	Total Sell Offers (MW UCAP)	Total Buy Bids (MW UCAP)	Cleared Sell Offers (MW UCAP)	Cleared Buy Bids (MW UCAP)	Net Cleared (MW UCAP)	Clearing Price (\$/MW-Day)
RTO (Rest of)	4,626.5	6,352.3	452.2	1,187.7	735.5	16.46
MAAC (Rest of)	320.0	2,348.5	16.1	456.6	440.5	16.46
SWMAAC	509.8	96.3	38.7	95.4	56.7	16.46
<b>SubTotal</b>	<b>5,456.3</b>	<b>8,797.1</b>	<b>507.0</b>	<b>1,739.7</b>	<b>1,232.7</b>	<b>16.46</b>
EMAAC (Rest of)	872.3	416.1	560.4	9.3	-551.1	153.67
PSEG (Rest of)	332.5	125.0	319.9	0.0	-319.9	153.67
PS-NORTH	226.3	0.9	133.6	0.0	-133.6	153.67
DPL-SOUTH	198.4	0.0	167.8	0.0	-167.8	153.67
<b>EMAAC Sub Total</b>	<b>1,629.5</b>	<b>542.0</b>	<b>1,181.7</b>	<b>9.3</b>	<b>-1,172.4</b>	<b>153.67</b>
<b>TOTAL</b>	<b>7,085.8</b>	<b>9,339.1</b>	<b>1,688.7</b>	<b>1,749.0</b>	<b>60.3</b>	

Table 5 provides a further breakdown of the capacity offered and cleared into the 2012/2013 First Incremental Auction. A total of 7,085.8 MW of supply was offered into the First Incremental Auction composed of uncleared capacity from the 2012/2013 Base Residual Auction, new capacity in the form of uprates or resources that were not previously capacity resources in PJM.



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**Table 5 - 2012/2013 First Incremental Auction Supply Resource Mix**

LDA	Resource Type	Type	Total Sell Offers (MW UCAP)	Cleared Sell Offers (MW UCAP)
RTO (Rest of)	DEMAND		1662.1	303.7
	EE		16.6	0
	GEN	New Generation	1351.4	22.1
		Uncleared from BRA	1510.3	106.7
		Uprates	86.1	19.7
MAAC (Rest of)	DEMAND		223.5	3.7
	GEN	New Generation	10.5	10.5
		Uncleared from BRA	78.6	1.9
		Uprates	7.4	0
SWMAAC	DEMAND		134.8	1.1
	GEN	Uncleared from BRA	375	37.6
<b>Sub Total</b>			<b>5456.3</b>	<b>507</b>
EMAAC (Rest of)	DEMAND		306.6	151.5
	GEN	New Generation	9.6	9.6
		Uncleared from BRA	528.5	371.7
		Uprates	27.6	27.6
DPL-SOUTH	DEMAND		32.1	1.5
	GEN	New Generation	0.8	0.8
		Uncleared from BRA	3.4	3.4
		Uprates	162.1	162.1
PSEG (Rest of)	DEMAND		24	11.4
	GEN	New Generation	7.4	7.4
		Uncleared from BRA	301.1	301.1
PS-NORTH	DEMAND		15	4.6
	GEN	New Generation	83.7	1.4
		Uncleared from BRA	127.6	127.6
<b>EMAAC Sub Total</b>			<b>1629.5</b>	<b>1181.7</b>
<b>Grand Total</b>			<b>7085.8</b>	<b>1688.7</b>



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### **PJM's Procurement and Release of Capacity**

Table 6 shows the total amount of capacity procured and released by PJM by LDA in the 2012/2013 First Incremental Auction. The total net amount of capacity procured or released by PJM is a function of (1) the procurement and release of capacity to resolve the reduced LDA import limits introduced by the removal of the Susquehanna-Roseland Project from the model and (2) the clearing of the PJM sell offers and PJM buy bids submitted due to changes in RTO and LDA reliability requirements and procurement of the deferred short-term resource procurement (i.e. the PJM sell offers and buy bids listed in Table 2).

In the region encompassing the Rest of RTO LDA, the SWMAAC LDA, and the rest of MAAC LDA (MAAC LDA minus EMAAC and SWMAAC LDAs), PJM released a total net capacity amount of 1,232.7 MW at a clearing price of \$16.46/MW-Day. In the EMAAC LDA, PJM procured a total net capacity amount of 1,172.4 MW at a clearing price of \$153.67/MW-Day. Across the entire RTO, PJM released a total net capacity amount of 60.3 MW.

**Table 6 - 2012/2013 First Incremental Auction Results / PJM's Procurement and Release of Capacity**

LDA	Total Capacity Released (MW UCAP)	Total Capacity Procured (MW UCAP)	Net Procured (MW UCAP)	Clearing Price (\$/MW-Day)
RTO (Rest of)	187.3	0	-187.3	16.46
MAAC (Rest of)	1,455.0	0.0	-1,455.0	16.5
SWMAAC	0	409.6	409.6	16.46
<b>SubTotal</b>	<b>1,642.3</b>	<b>409.6</b>	<b>-1,232.7</b>	<b>16.5</b>
EMAAC (Rest of)	145.8	1455	1309.2	153.67
PSEG (Rest of)	202.8	0.0	-202.8	153.7
PS-NORTH	2.4	80	77.6	153.67
DPL-SOUTH	11.6	0.0	-11.6	153.7
<b>EMAAC Sub Total</b>	<b>362.6</b>	<b>1,535.0</b>	<b>1,172.4</b>	<b>153.7</b>
<b>TOTAL</b>	<b>2,004.9</b>	<b>1,944.6</b>	<b>-60.3</b>	



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The LDA capacity import limit margins prior to and after the clearing of the First Incremental Auction for the 2012/2013 Delivery Year are shown on Table 7. The LDA capacity import limit margin represents the difference between the updated LDA capacity import limit and the actual capacity imported into the LDA. As discussed previously, the removal of the Susquehanna-Roseland Project from the model resulted in negative capacity import limit margins for the EMAAC, PSEG and PS-NORTH LDAs meaning that the previously procured capacity imports exceeded the updated capacity import limits for these LDAs. Table 7 shows that PJM’s procurement and release of capacity in the First Incremental Auction has restored the LDA capacity import limit margins to a non-negative value for the EMAAC, PSEG and PS-NORTH LDAs enhancing the reliability in these regions.

**Table 7 - 2012/2013 First Incremental Auction Results / LDA Capacity Import Limit Margins**

	LDA					
	MAAC	EMAAC	SWMAAC	PSEG	PS-NORTH	DPL SOUTH
Capacity Import Limit Margin prior to 1st Incremental Auction	0.0	-1,455.0	1,838.6	-178.6	-80.0	0.0
Capacity Import Limit Margin after 1st Incremental Auction	548.1	0.0	1,372.3	400.0	56.0	179.4

### **Mitigation in the 2012/2013 First Incremental Auction**

All regions of the RTO, including the RTO as a whole, failed the Market Structure Test. As a result, mitigation was applied to all existing generation resources in the execution of the RPM auction clearing. Therefore in the event a generator’s price-based offer exceeded the calculated offer cap, cost-based offers were utilized in the RPM auction clearing. Demand Resources and Energy Efficiency Resources are not subject to market mitigation.