

Introduction

The 2016/2017 Third Incremental Auction opened on February 29, 2016 and the results were posted on March 11, 2016. This document provides information for PJM stakeholders regarding the results of the 2016/2017 Third Incremental Auction. 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 combined with the appropriate share of the deferred Short-Term Resource Procurement Target.

2016/2017 RPM Third Incremental Auction Results

Table 1 summarizes the clearing prices and cleared participant activity of the 2016/2017 Third Incremental Auction. The Third Incremental Auction cleared with unique prices in four regions of the RTO. Price separation occurred due to locational capacity import limits, however, no price separation occurred across the capacity product types. In the PS-NORTH LDA, the resource clearing price for Limited, Extended Summer and Annual capacity was \$184.97/MW-Day. In the PSEG region outside of the PS-NORTH LDA, the resource clearing price for Limited, Extended Summer and Annual capacity was \$54.76/MW-Day. In the MAAC region outside of the PSEG LDA, which is comprised of the AECO, BGE, DPL, JCPL, Met-Ed, PECO, Penelec, PEPCO, PPL and RECO Zones, the resource clearing price for Limited, Extended Summer and Annual capacity was \$10.02/MW-Day. In the rest of the RTO, which is comprised of the AEP, APS, ComEd, Dayton, DEOK, DOM, EKPC and Duquesne Zones, the resource clearing price for Limited, Extended Summer and Annual capacity was \$5.02/MW-Day. In the ATSI LDA, the resource clearing price for Limited, Extended Summer and Annual capacity was \$5.02/MW-Day.

Across the entire RTO, total cleared participant buy bids (6,021.3 MW) exceeded total cleared participant sell offers (1,465.3MW) by 4,556.0MW meaning that PJM effectively released 4,556.0MW of previously procured capacity. Across the entire RTO, PJM effectively released 1,111.6 MW of previously procured Limited DR capacity, 127.7 MW of previously procured Extended Summer DR capacity, and 3,316.7MW of previously procured capacity from Annual Resources.



Table 1 – Summary of 2016/2017 Third Incremental Auction Results

		Clearing Price	Sell Offers	Cleared Participant Buy Bids	Participant Buy Bids
Region	Capacity Type	(\$/MW-Day)	(UCAP MW)	(UCAP MW)	(UCAP MW)
	Limited	\$5.02	219.1	430.2	211.1
RTO (minus MAAC and ATSI) (1)	Extended Summer	\$5.02	12.3	37.9	25.6
	Annual	\$5.02	558.7	1,872.7	1,314.0
	TOTAL		790.1	2,340.8	1,550.7
	Limited	\$10.02	19.5	278.2	258.7
MAAC (minus PSEG) ₍₂₎	Extended Summer	\$10.02	33.3	1.6	-31.7
	Annual	\$10.02	497.8	1,775.2	1,277.4
	TOTAL		550.6	2,055.0	1,504.4
	Limited	\$54.76	0.0	7.0	7.0
PSEG (minus PS-NORTH)	Extended Summer	\$54.76	0.0	0.0	0.0
	Annual	\$54.76	22.8	14.7	-8.1
	TOTAL		22.8	21.7	-1.1
	Limited	\$184.97	0.0	10.9	10.9
PS-NORTH	Extended Summer	\$184.97	0.0	0.0	0.0
	Annual	\$184.97	84.6	26.4	-58.2
	TOTAL		84.6	37.3	-47.3
	Limited	\$5.02	0.0	623.9	623.9
ATSI	Extended Summer	\$5.02	0.0		133.8
	Annual	\$5.02	17.2	808.8	791.6
	TOTAL		17.2	•	1,549.3
	Limited		238.6		1,111.6
TOTAL RTO	Extended Summer		45.6	173.3	127.7
	Annual		1,181.1	4,497.8	3,316.7
	TOTAL		1,465.3	6,021.3	4,556.0

⁽¹⁾ Comprised of AEP, APS, ComEd, Dayton, DEOK, DOM, EKPC and Duquesne Zones

⁽²⁾ Comprised of AECO, BGE, DPL, JCPL, Met-Ed, PECO, Penelec, PEPCO, PPL and RECO Zones



Participant Sell Offers and Buy Bids

Table 2 shows the offered and cleared quantities for participant sell offers. A total of 5,164.0 MW of supply was offered into the Third Incremental Auction composed of uncleared capacity from prior 2016/2017 auctions and new capacity in the form of uprates or new resources that were not previously capacity resources in PJM. Across the entire RTO, 1,465.3 MW of participant sell offers cleared, mostly in the form of Annual capacity.

Table 2 – Participant Sell Offers (Offered and Cleared Quantities)

		Sell Offers (L	ICAP MW) *		Cleared Sell Offers (UCAP MW)						
		Extended				Extended					
LDA	Limited	Summer	Annual	Total	Limited	Summer	Annual	Total			
DPL-SOUTH	0.0	0.0	11.4	11.4	0.0	0.0	11.4	11.4			
PS-NORTH	0.0	0.0	155.0	155.0	0.0	0.0	84.6	84.6			
PSEG (rest of)	2.2	0.0	33.8	36.0	0.0	0.0	22.8	22.8			
EMAAC (rest of)	30.6	13.5	719.3	763.4	5.7	13.5	244.8	264.0			
EMAAC Total	32.8	13.5	919.5	965.8	5.7	13.5	363.6	382.8			
PEPCO	4.9	19.8	52.4	77.1	0.0	19.8	52.1	71.9			
SWMAAC (rest of)	16.2	0.0	109.4	125.6	0.0	0.0	22.7	22.7			
SWMAAC Total	21.1	19.8	161.8	202.7	0.0	19.8	74.8	94.6			
MAAC (rest of)	60.9	0.1	1,212.9	1,273.9	13.8	0.0	166.8	180.6			
MAAC Total	114.8	33.4	2,294.2	2,442.4	19.5	33.3	605.2	658.0			
ATSI (rest of)	26.4	20.8	32.2	79.4	0.0	0.0	11.2	11.2			
ATSI-CLEVELAND	3.0	0.0	6.0	9.0	0.0	0.0	6.0	6.0			
ATSI Total	29.4	20.8	38.2	88.4	0.0	0.0	17.2	17.2			
RTO (rest of)	379.4	33.4	2,220.4	2,633.2	219.1	12.3	558.7	790.1			
RTO Total	523.6	87.6	4,552.8	5,164.0	238.6	45.6	1,181.1	1,465.3			

^{*} Sell Offers include the MW amounts offered from all Product Types of coupled DR sell offers, only one of which is capable of clearing in the auction.



Participant demand in an Incremental Auction is composed of 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. Cleared Buy Bids purchased in an Incremental Auction may be used as replacement capacity to cover Delivery Year commitment and compliance shortfalls. Table 3 shows bid and cleared quantities of participant buy bids. There was a total of 12,240.5 MW of buy bids submitted by participants into the auction. Across the entire RTO, 6,021.3 MW of participant buy bids cleared comprised of 1,350.2 MW of Limited capacity buy bids, 173.3 MW of Extended Summer buy bids and 4,497.8 MW of Annual capacity buy bids.

Table 3 – Participant Buy Bids (Bid and Cleared Quantities)

		Buy Bids (U	CAP MW)		Cleared Buy Bids (UCAP MW)					
		Extended				Extended				
LDA	Limited	Summer	Annual	Total	Limited	Summer	Annual	Total		
DPL-SOUTH	24.6	0.0	198.0	222.6	9.5	0.0	98.0	107.5		
PS-NORTH	57.2	0.0	62.5	119.7	10.9	0.0	26.4	37.3		
PSEG (rest of)	52.4	0.0	39.7	92.1	7.0	0.0	14.7	21.7		
EMAAC (rest of)	149.1	0.0	1,284.1	1,433.2	73.0	0.0	655.7	728.7		
EMAAC Total	283.3	0.0	1,584.3	1,867.6	100.4	0.0	794.8	895.2		
PEPCO	74.7	0.0	287.6	362.3	34.6	0.0	87.6	122.2		
SWMAAC (rest of)	48.1	0.0	31.9	80.0	29.4	0.0	31.9	61.3		
SWMAAC Total	122.8	0.0	319.5	442.3	64.0	0.0	119.5	183.5		
MAAC (rest of)	330.7	1.6	3,059.2	3,391.5	131.7	1.6	902.0	1,035.3		
MAAC Total	736.8	1.6	4,963.0	5,701.4	296.1	1.6	1,816.3	2,114.0		
ATSI (rest of)	354.7	126.1	848.3	1,329.1	354.5	126.1	808.8	1,289.4		
ATSI-CLEVELAND	269.6	7.7	0.0	277.3	269.4	7.7	0.0	277.1		
ATSI Total	624.3	133.8	848.3	1,606.4	623.9	133.8	808.8	1,566.5		
RTO (rest of)	1,091.9	37.9	3,802.9	4,932.7	430.2	37.9	1,872.7	2,340.8		
RTO Total	2,453.0	173.3	9,614.2	12,240.5	1,350.2	173.3	4,497.8	6,021.3		



Table 4 provides a further breakdown of the capacity offered and cleared into the 2016/2017 Third Incremental Auction. A total of 5,122.0 MW of supply was offered into the Third Incremental Auction composed of uncleared capacity from prior 2016/2017 auctions and new capacity in the form of uprates or new resources that were not previously capacity resources in PJM.

Table 4 - 2016/2017 Third Incremental Auction Supply Resource Mix

Resource Type	Туре	Total Sell Offers (MW UCAP)	Cleared Sell Offers (MW UCAP)
DEMAND	DEMAND	581.7	286.3
EE	EE	156.6	126.9
GEN	New Generation (including Uprates)	165.9	73.9
	Uncleared from Prior Auction	4,217.8	978.2
		5,122.0	1,465.3



PJM Sell Offers and Buy Bids

The total net amount of capacity procured or released by PJM is a function of the clearing of the PJM sell offers and buy bids. Tables 5a and 5b show the offered and cleared quantities of PJM sell offers and PJM buy bids, respectively, employed in the 2016/2017 Third Incremental Auction. For the 2016/2017 Third Incremental Auction, across the entire RTO region, cleared PJM sell offers totaled 4,818.0 MW and cleared PJM buys bids totaled 262.0 MW; therefore PJM released a total net capacity amount of 4,556.0 MW. Table 5b includes 126.9 MW of PJM Annual Buy Bids to reflect an increase in the reliability requirement of the RTO and each applicable LDA equal to the total UCAP Value of EE Resources that cleared in the auction

Table 5a – PJM Sell Offers (Offered and Cleared Quantities)

		Sell Offers (UCAP MW)		Cleared Sell Offers (UCAP MW)					
		Extended				Extended				
LDA	Limited	Summer	Annual	Total	Limited	Summer	Annual	Total		
DPL-SOUTH	0.0	0.0	45.0	45.0	0.0	0.0	30.2	30.2		
PS-NORTH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
PSEG (rest of)	0.0	0.0	267.2	267.2	0.0	0.0	0.0	0.0		
EMAAC (rest of)	0.0	0.0	173.4	173.4	0.0	0.0	173.4	173.4		
EMAAC Total	0.0	0.0	485.6	485.6	0.0	0.0	203.6	203.6		
PEPCO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
SWMAAC (rest of)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
SWMAAC Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
MAAC (rest of)	0.0	0.0	1,568.1	1,568.1	0.0	0.0	1,450.0	1,450.0		
MAAC Total	0.0	0.0	2,053.7	2,053.7	0.0	0.0	1,653.6	1,653.6		
ATSI (rest of)	0.0	0.0	2,287.6	2,287.6	0.0	0.0	2,287.6	2,287.6		
ATSI-CLEVELAND	0.0	0.0	159.1	159.1	0.0	0.0	153.8	153.8		
ATSI Total	0.0	0.0	2,446.7	2,446.7	0.0	0.0	2,441.4	2,441.4		
RTO (rest of)	0.0	0.0	723.0	723.0	0.0	0.0	723.0	723.0		
RTO Total	0.0	0.0	5,223.4	5,223.4	0.0	0.0	4,818.0	4,818.0		



 $Table \ 5b-PJM \ Buy \ Bids \ (Bid \ and \ Cleared \ Quantities)$

_		Buy Bids (U	CAP MW)	Cleared Buy Bids (UCAP MW)					
		Extended				Extended			
LDA	Limited	Summer	Annual	Total	Limited	Summer	Annual	Total	
DPL-SOUTH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
PS-NORTH	46.6	0.0	0.7	46.6	46.6	0.0	0.7	46.6	
PSEG (rest of)	0.0	0.0	1.1	0.0	0.0	0.0	1.1	0.0	
EMAAC (rest of)	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	
EMAAC Total	46.6	0.0	2.8	49.4	46.6	0.0	2.8	49.4	
PEPCO	8.4	0.0	52.1	60.5	8.4	0.0	52.1	60.5	
SWMAAC (rest of)	80.1	0.0	0.0	80.1	80.1	0.0	0.0	80.1	
SWMAAC Total	88.5	0.0	52.1	140.6	88.5	0.0	52.1	140.6	
MAAC (rest of)	0.0	0.0	7.6	7.6	0.0	0.0	7.6	7.6	
MAAC Total	135.1	0.0	62.5	197.6	135.1	0.0	62.5	197.6	
ATSI (rest of)	0.0	0.0	11.2	11.2	0.0	0.0	11.2	11.2	
ATSI-CLEVELAND	0.0	0.0	6.0	6.0	0.0	0.0	6.0	6.0	
ATSI Total	0.0	0.0	17.2	17.2	0.0	0.0	17.2	17.2	
RTO (rest of)	0.0	0.0	47.2	47.2	0.0	0.0	47.2	47.2	
RTO Total	135.1	0.0	126.9	262.0	135.1	0.0	126.9	262.0	



2016/2017 RPM Third 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 sell offers into an Incremental Auction from existing generation capacity resources are subject to market power mitigation through the application of the Market Structure Test. All Generation Capacity Resources and Energy Efficiency Resources are of the Annual Capacity type. Demand Resources offering into the Incremental Auction must specify the type of Capacity being offered. A Demand Resource with the potential to qualify as two or more of the capacity types may submit separate but coupled Sell Offers for each Demand Resource type for which it qualifies at different prices and the auction clearing algorithm will select the Sell Offer that yields the least-cost solution. For such coupled Demand Resource offers, the offer price of an Annual Demand Resource offer must be at least \$.01 per MW-day greater than the offer price of a coupled Extended Summer Demand Resource offer must be at least \$.01 per MW-day greater than the offer price of a coupled Limited Demand Resource offer.

Any party that desires to purchase replacement capacity for the Delivery Year may do so by submitting a buy bid into the Incremental Auction. In addition to quantity, price and LDA-specific location, participants submitting a buy bid must also specify the desired capacity type (Annual, Extended Summer or Limited). Cleared Buy Bids purchased in an Incremental Auction may be used as replacement capacity to cover a Delivery Year commitment provided the cleared buy bid has the same locational characteristics and same or better temporal characteristics than the resource that it replaces. Cleared buy bids of Annual capacity type may replace commitments of Annual Resources, Extended Summer DR and/or Limited DR. Cleared buy bids of Extended Summer capacity type may replace commitments on Extended Summer DR and/or Limited DR but may not replace commitments of Annual Resources. Cleared buy bids of Limited capacity type may replace commitments of Limited DR but may not replace commitments of Annual Resources or Extended Summer DR.

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 quantities, capacity types 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 Reliability Requirement, Minimum Annual Resource Requirement and Minimum Extended Summer Resource Requirement for the RTO and each LDA based on an updated peak load forecast, updated Installed Reserve Margin and an updated Capacity Emergency Transfer Objective (CETO). For the RTO and each LDA, PJM sums the following component quantities to determine the total quantity that it will seek to procure or release in each Incremental Auction:

- the Updated Reliability Requirement minus the Reliability Requirement utilized in the most recent prior auction
 conducted for that Delivery Year. Note that this quantity is negative if the Updated Reliability Requirement is less than
 the Reliability Requirement utilized in the most recent prior auction. For a 1st or 2nd Incremental Auction, this
 difference is only considered if the change in Reliability Requirement is greater than the lesser of 500 MW or 1% of the
 prior auction's Reliability Requirement,
- plus the Short-Term Resource Procurement Target Applicable Share (STRPTAS). For a 1st or 2nd Incremental Auction, the STRPTAS is equal to 0.2 times the Short-Term Resource Procurement Target (STRPT) used in the Base Residual Auction (BRA). For a 3rd Incremental Auction, the STRPTAS is equal to 0.6 times the STRPT used in the BRA,
- plus/minus the amount of committed capacity that PJM sought to procure/release that did not clear in previous Incremental Auctions for the same Delivery Year,
- minus any capacity PJM seeks to release in a parent LDA as a result of any Conditional Incremental Auction commitments for the same Delivery Year.

If the result of such summation is a positive quantity, PJM will seek to procure such quantity by employing a PJM buy bid. The price of the PJM buy bid is based on the Updated VRR Curve Increment which is the portion of the Updated VRR Curve located to the right of the point representing all capacity already procured for the Delivery year. If previously procured levels of Annual Resources and Extended Summer DR are short of the updated Minimum Annual and Extended Summer Resource Requirements then the PJM buy bid may be broken into multiple, smaller buy bids of the capacity types needed to make up any shortage. If no shortage exists then the PJM buy bid will be of the Limited capacity type.

If the result of such summation is a negative quantity, PJM will seek to release such quantity by employing a PJM sell offer. The price of the 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. The capacity type of a PJM sell offer is determined in a manner such that PJM will not release prior committed capacity from Annual Resources and Extended Summer DR below the updated Minimum Annual and Extended Summer Resource Requirements.



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 6, into the 3rd Incremental Auction for the 2016/2017 Delivery Year¹. Note that a PJM sell offer is indicated by a negative PJM buy bid in Table 6 and that PJM submitted sell offers for the 3rd Incremental Auction for the 2016/2017 Delivery Year in each LDA with the exception of the SWMAAC, PS-NORTH and PEPCO LDAs. All PJM sell offers were of the Annual capacity type. All PJM buy bids were of the Limited capacity type. Table 6 also defines the pricing points associated with the PJM buy bids and PJM sell offers.

Table 6 – PJM Buy Bids and PJM Sell Offers for 2016/2017 Third Incremental Auction

					Price Points for PJM Buy Bids and PJM Sell Offers									
					PJM	Buy Bid	Point 1			oint 2	Point 3		Point 4	
Location	Change in Reliability Requirement (MW)	STRPT (MW)	Uncleared PJM Buy Bids from Prior IA (MW)	Additional Buy Bids ₍₁₎	(MW) ₍₂₎	Capacity Type	x-axis (MW)	y-axis (\$/MW-Day)	x-axis (MW)	y-axis (\$/MW-Day)	x-axis (MW)	y-axis (\$/MW-Day)	x-axis (MW)	y-axis (\$/MW-Day)
RTO (Rest of)	-986.4	1,275.7	0.0	0.0	-723.0	Annual	0.0	\$0.00	723.0	\$0.00				
MAAC (Rest of)	-1,064.9	223.9	0.0	0.0	-1568.1	Annual	0.0	\$0.00	1450.0	\$0.00	1450.0	\$55.51	1568.1	\$66.89
EMAAC (Rest of)	-491.2	331.3	0.0	0.0	-173.4	Annual	0.0	\$0.00	173.4	\$0.00				
SWMAAC (Rest of)	-38.3	119.2	0.0	0.0	80.1	Limited	0.0	\$137.27	80.1	\$105.13				
PS (Rest of)	-168.0	89.3	-195.4	8.6	-267.2	Annual	0.0	\$67.27	267.2	\$235.23				
PS NORTH	-39.2	84.1	0.0	3.2	46.6	Limited	0.0	\$266.80	46.6	\$210.60				
DPL SOUTH	-66.4	39.9	-16.7	0.0	-45.0	Annual	0.0	\$0.00	30.2	\$0.00	30.2	\$66.14	45.0	\$103.94
PEPCO	-60.3	111.2	-41.9	0.0	8.4	Limited	0.0	\$106.34	8.4	\$99.81				
ATSI (Rest of)	56.2	142.8	0.0	0.0	-2287.6	Annual	0.0	\$0.00	2287.6	\$0.00				
ATSI-CLEVELAND	-233.7	74.6	0.0	0.0	-159.1	Annual	0.0	\$0.00	153.8	\$0.00	153.8	\$72.70	159.1	\$80.23
TOTAL	-3,092.3	2,491.9	-254.0	11.8	-5,088.3			<u> </u>		<u> </u>				<u> </u>

⁽¹⁾ Additional Buy Bids to account for Non-Viable DR commitments related to DR Operational Resource Flexibility Transition Provision.

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⁽²⁾ A PJM Sell Offer is indicated by a negative PJM Buy Bid.

¹ The determination of the PJM buy bid and sell offer quantities is detailed in the 2016/2017 3rd IA Planning Parameters located at http://www.pjm.com/~/media/markets-ops/rpm/rpm-auction-info/2016-2017-rpm-3rd-ia-parameters.ashx



LDA Capacity Import Limits

Table 7 shows each LDA's capacity import limit margin before and after the 2016/17 Third Incremental Auction.

Table 7 – LDA Capacity Import Capability for 2016/2017 Third Incremental Auction

	LDA										
	MAAC	EMAAC	SWMAAC	PSEG	PS-NORTH	DPL-SOUTH	PEPCO	ATSI	ATSI-C		
Capacity Import Limit Margin prior to 3rd Incremental Auction	0.0	582.1	3,409.5	0.0	0.0	453.0	3,635.9	0.0	1,447.7		
Capacity Import Limit Margin after 3rd Incremental Auction	0.0	223.9	3,180.0	0.0	0.0	387.1	3,525.1	874.9	1,324.4		

Incremental Auction Clearing

Participant supply offers and buy bids are combined with the PJM sell offers and buy bids shown in Table 6 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. Annual capacity buy bids may only clear against sell offers from Annual Resources; Extended Summer buy bids may only clear against sell offers from Annual Resources and/or Extended Summer DR; and Limited buy bids may clear against sell offers of any capacity type.

Mitigation in the 2016/2017 Third 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, the offer cap values were utilized in the RPM auction clearing. Demand Resources and Energy Efficiency Resources are not subject to market mitigation.



Revision History

3/11/2016: Original version posted

3/14/2016: Original version was revised to show offered and cleared EE MWs in UCAP MW terms instead of ICAP MW terms. The following tables and any narrative that referenced these tables were updated to reflect this revision: Table 1, Table 2, Table 4 and Table 5b.