2017/2018 RPM Base Residual Auction Results

Executive Summary

The 2017/2018 Reliability Pricing Model (RPM) Base Residual Auction (BRA) cleared 167,003.7 MW of unforced capacity in the RTO. Accounting for load and resource commitments under the Fixed Resource Requirement (FRR) the reserve margin for the entire RTO for the 2017/2018 Delivery Year is projected to be 19.7%, or 4.0% higher than the target reserve margin of 15.7%.

The 2017/2018 RPM BRA included two new RPM design elements that were approved by FERC since last year's BRA: (1) maximum limits on the procurement of the more-limited capacity product types are established for the RTO and each modeled LDA and replace the previous implementation of minimum annual and extended summer resource requirements, and (2) Capacity Import Limits (CILs) are established on the amount of external generation capacity that can be reliably committed to PJM. A separate CIL is established for each of five external source-zones and a single total CIL is established for the overall RTO. External generation resources may seek exception to the CIL by meeting all three of the following conditions prior to the start of the auction: (i) they commit to becoming pseudo-tied generation resources prior to the start of the Delivery Year; that is, they will be treated like internal generation, subject to redispatch and locational pricing, and are not subject to TLR-5 curtailments; (ii) they have long-term firm transmission service confirmed on the complete transmission path from such resource into PJM; and (iii) they agree to be subject to the same capacity must-offer requirement as PJM's internal resources.

As a result of these improved design elements, there was a significant shift to the types of demand resources that have more operational flexibility and a greater contribution to reliability. There were significantly more "annual" and "extended summer" demand resources clearing in this auction than "summer-only" demand resources. This shift gives system operators more year-round flexibility in drawing on demand response when needed. Additionally, with the implementation in this auction of capacity import limits, reliance on external generation resources to meet PJM's capacity returned to historic and more acceptable levels consistent with reliability.

2017/2018 BRA Resource Clearing Prices

Resource Clearing Prices (RCPs) for the 2017/2018 BRA are shown in the table below. The RCP for Annual Capacity Resources (Generation, Annual DR and EE Resources) is $120/MW-day across the entire RTO except for the PSEG LDA where the Annual RCP is $215.00/MW-day. The PSEG LDA is only locational constrained LDA in the 2017/2018 BRA as the capacity import levels are below the capacity import limit for all other modeled LDAs. The Annual RCP in the rest of RTO Region increased from $59.37/MW-day in the 2016/2017 BRA to $120.00/MW-day in 2017/2018 BRA. The Annual RCP in the MAAC region increased slightly from $119.13/MW-day in the 2016/2017 BRA to $120/MW-day in the 2017/2018 BRA; and the Annual RCP in the PSEG LDA decreased slightly from $219.00/MW-day in the 2016/2017 BRA to $215.00/MW-day in the 2017/2018 BRA.

2017/2018 RPM Base Residual Auction Results

Capacity Type	2017/18 BRA Resource Clearing Prices ($/MW-day)		
	Rest of RTO	PSEG LDA	PPL LDA
Annual	120.00	215.00	120.00
Extended Summer	120.00	215.00	53.98
Limited	106.02	201.02	40.00

The Maximum Limited DR Constraint for the overall RTO is a binding constraint in the auction resulting in a price decrement for Limited DR of $13.98/MW-day relative to the RCP of Extended Summer DR for resources located in the same LDA; and, additionally, the Maximum Sub-Annual DR Constraint for the PPL LDA is a binding constraint resulting in a price decrement for Extended Summer DR of $66.02/MW-day relative to the RCP of Annual Resources located in the PPL LDA.

The RCP for Limited DR, Extended Summer DR and Annual Resources located throughout the RTO except for the PSEG LDA and the PPL LDA is $106.02/MW-day, $120.00/MW-day and $120.00/MW-day, respectively. In the PSEG LDA, the RCP for Limited DR, Extended Summer DR and Annual Resources is $201.02/MW-day, $215.00/MW-day and $215.00/MW-day, respectively. In the PPL LDA, the RCP for Limited DR, Extended Summer DR and Annual Resources is $40.00/MW-day, $53.98/MW-day and $120/MW-day, respectively.

2017/2018 BRA Cleared Capacity Resources

As seen in the table below, the 2017/2018 BRA procured 5,927.4 MW of capacity from new generation, the highest quantity of new generation procured since the start of RPM. Approximately 4,800 MW of the new generation is the form of new gas-fired combined cycle generation clearing for the first time in the 2017/18 BRA and all of which is located downstream of west-to-east transmission constraints or in LDAs with need for capacity which has driven the price convergence between the rest of RTO and MAAC.

Megawatts of Unforced Capacity Procured by Type

BRA Delivery Year	New Generation	Generation Uprates	Imports	Demand Response	Energy Efficiency
2017/2018	5,927.4	339.9	4,525.5	10,974.8	1,338.9
2016/2017	4,281.6	1,181.3	7,482.7	12,408.1	1,117.3
2015/2016	4,898.9	447.4	3,935.3	14,832.8	922.5
2014/2015	415.5	341.1	3,016.5	14,118.4	822.1

The quantity of capacity procured from external generation capacity resources in the 2017/2018 BRA is 4,526 MW which is a decrease of 2,957 MW from that procured in last year's BRA. Of the 4,526 MW of external generation resources that cleared in the 2017/18 BRA, nearly 4,000 MW of these resources have met the requirements for CIL exception.

The total quantity of DR procured in the 2017/2018 BRA is 10,975 MW which is a decrease of about 1,433 MW from that procured from DR in last year's BRA. The breakdown of the procured DR by capacity type has changed significantly: cleared Limited DR is 2,322 MW representing a 7,527 MW decrease from that procure in last year's BRA; cleared Extended Summer DR is 7,163 MW representing a 4,693 MW increase from that procured in last year's BRA; and cleared Annual DR is 1,489 MW representing a 1,401 MW increase from that procured in last year's BRA.

2017/2018 RPM Base Residual Auction Results

Introduction

This document provides information for PJM stakeholders regarding the results of the 2017/2018 Reliability Pricing Model (RPM) Base Residual Auction (BRA). The 2017/2018 BRA opened on May 12, 2014 and the results were posted on May 23, 2014.

In each BRA, PJM seeks to procure a target capacity reserve level for the RTO in a least cost manner while recognizing the following reliability-based constraints on the location and type of capacity that can be committed:

- Internal PJM locational constraints are established by setting up Locational Deliverability Areas (LDAs) with each LDA having a separate target capacity reserve level and a maximum limit on the amount of capacity that it can import from resources located outside of the LDA.
- Constraints on the procurement of the more-limited capacity product types are established for the RTO and each modeled LDA. The Limited DR Constraint limits the quantity of Limited DR that can be procured in each LDA or in total across the entire RTO; and the Sub-Annual DR constraint limits the quantity of the sum of Limited DR and Extended Summer DR that can be procured in each LDA or in total across the entire RTO. These constraints are being implemented for the first time in the 2017/18 BRA and replace the prior implementation of minimum requirements for the annual and extended summer capacity product types.
- Effective with 2017/2018 BRA, Capacity Import Limits (CILs) are established on the amount of external generation capacity that can be reliably committed to PJM. A separate CIL is established for each of five external source-zones and a single total CIL is established for the overall RTO. As described in more detail later in this report, external generation resources may seek exception to the CIL by meeting all three of the following conditions prior to the start of the auction: (1) they are committed to being pseudo-tied generation resources prior to the start of the Delivery Year; that is, they will be treated like internal generation, subject to redispatch and locational pricing, and are not subject to TLR-5 curtailments; (2) they have long-term firm transmission service confirmed on the complete transmission path from such resource into PJM; and (3) they agree to be subject to the same capacity must-offer requirement as PJM's internal resources.

The auction clearing process commits capacity resources to procure a target capacity reserve level for the RTO in a least-cost manner while recognizing and enforcing these reliability-based constraints. The clearing solution may be required to commit capacity resource out-of-merit order but again in a least-cost manner to ensure that all of these constraints are respected. In those cases where one or more of the constraints results in out-of-merit commitment in the auction solution, resource clearing prices will be reflective of the price of resources selected out of merit order to meet the necessary requirements.

2017/2018 RPM Base Residual Auction Results

This document begins with a high level summary of the BRA results followed by sections containing detailed descriptions of the 2017/2018 BRA results and a discussion of the results in the context of the ten previous BRAs.

Summary of Results

The 2017/2018 Reliability Pricing Model (RPM) Base Residual Auction (BRA) cleared 167,003.7 MW of unforced capacity in the RTO representing a 20.1% reserve margin. When the Fixed Resource Requirement (FRR) load and resources are considered the reserve margin for the entire RTO is 19.7%.

Resource Clearing Prices (RCPs) for the 2017/2018 BRA are shown in Table 4. The RCP for Annual Capacity Resources (Generation, Annual DR and EE Resources) is $120/MW-day across the entire RTO except for the PSEG LDA where the Annual RCP is $215.00/MW-day. The PSEG is only locational constrained LDA in the 2017/2018 BRA as the capacity import levels are below the capacity import limit for all other modeled LDAs. The Annual RCP in the rest of RTO Region increased from $59.37/MW-day in the 2016/2017 BRA to $120.00/MW-day in 2017/2018 BRA. The Annual RCP in the MAAC region increased slightly from $119.13/MW-day in the 2016/2017 BRA to $120.00/MW-day in the 2017/2018 BRA; and the Annual RCP in the PSEG LDA decreased slightly from $219.00/MW-day in the 2016/2017 BRA to $215.00/MW-day in the 2017/2018 BRA.

The Maximum Limited DR Constraint for the overall RTO is a binding constraint in the auction resulting in a price decrement for Limited DR of $13.98/MW-day relative to the RCP of Extended Summer DR for resources located in the same LDA; and, additionally, the Maximum Sub-Annual DR Constraint for the PPL LDA is a binding constraint resulting in a price decrement for Extended Summer DR of $66.02/MW-day relative to the RCP of Annual Resources located in the PPL LDA.

The RCP for Limited DR, Extended Summer DR and Annual Resources located throughout the RTO except for the PSEG LDA and the PPL LDA is $106.02/MW-day, $120.00/MW-day and $120.00/MW-day, respectively. In the PSEG LDA, the RCP for Limited DR, Extended Summer DR and Annual Resources is $201.02/MW-day, $215.00/MW-day and $215.00/MW-day, respectively. In the PPL LDA, the RCP for Limited DR, Extended Summer DR and Annual Resources is $40.00/MW-day, $53.98/MW-day and $120/MW-day, respectively.

The total quantity of new generation capacity resources offered into the auction was 6,587.3 MW (UCAP) comprised of 6,128.1 MW of new generation units and 459.2 MW of uprates to existing generation units. The new generation includes facilities that were previously slated for deactivation, but were reactivated and are switching fuel types. The quantity of new generation capacity resources cleared was 6,267.3 MW (UCAP) comprised of 5,927.4 MW (UCAP) from new generation units and 339.9 MW from uprates to existing generation units.

Effective with the 2017/2018 BRA, Capacity Import Limits (CILs) are established on the amount of external generation capacity that can be reliably committed to PJM. A separate CIL is established for each of five external source-zones and a single total CIL is established for the overall RTO. External generation resources may seek exception to the CIL by meeting three conditions prior to the start of the auction: (i) they are committed to being pseudo-tied generation resources prior to the start of the Delivery Year; that is, they will be treated like internal generation, subject to redispatch and locational pricing, and are not subject to TLR-5 curtailments; (ii) they have long-term firm transmission service confirmed on the complete transmission path from such resource into PJM; and (iii) they agree to be subject to the same capacity must-offer requirement as PJM's internal resources.

The quantity of capacity procured from external generation capacity resource in the 2017/2018 BRA is 4,526 MW which is a decrease of 2,957 MW from that procured in last year's BRA. Of the 4,526 MW of external generation resources that cleared in the 2017/18 BRA, nearly 4,000 MW of these resources have met the requirements for CIL exception. These requirements help to ensure that external resources offering into the RPM auction have reasonable expectation of physically delivering on any RPM commitment and have high likelihood of being available for PJM when needed.

The total quantity of DR procured in the 2017/2018 BRA is 10,975 MW which is a decrease of about 1,433 MW from that procured from DR in last year's BRA. The breakdown of the procured DR by capacity type has changed significantly: cleared Limited DR is 2,322 MW representing a 7,527 MW decrease from that procure in last year's BRA; cleared Extended Summer DR is 7,163 MW representing a 4,693 MW increase from that procured in last year's BRA; and cleared Annual DR is 1,489 MW representing a 1,401 MW increase from that procured in last year's BRA.

The total quantity of EE procured in the 2017/2018 BRA is 1,339 MW representing an increase of 222 MW from that procured in last year's BRA.

All existing generation sell offers into the 2017/2018 BRA were subject to market power mitigation through the application of the Market Structure Test (i.e., the Three-Pivotal Supplier Test). The RTO as a whole failed the Market Structure Test, resulting in mitigation of any existing generation resources. Mitigation was applied to a supplier's existing generation resources resulting in utilizing the lesser of the supplier's approved offer cap for such resource or the supplier's submitted offer price for such resource in the RPM Auction clearing.

All generation capacity resources (including uprates to existing resources) of 20 MW or greater that are based on combustion turbine, combined cycle and integrated gasification combined cycle technologies that have not cleared an RPM Auction prior to February 1, 2013 are subject to the Minimum Offer Price Rule (MOPR). External generation capacity resources meeting the above criteria and that

have entered commercial operation on or after January 1, 2013 and that require sufficient transmission investment for delivery into PJM are also subject to MOPR. To avoid application of the MOPR, Capacity Market Sellers may request exemption through either a Competitive Entry Exemption request or a Self-Supply Exemption request. The table below shows the requested, granted and cleared aggregate quantity (in ICAP MW) of each exemption type received and processed by PJM.

Exemption Type	Requested Quantity (ICAP MW)	Granted Quantity (ICAP MW)	Cleared Quantity (ICAP MW)
Competitive Entry	13,089.8	13,089.8	4,230.0
Self-Supply	940.0	940.0	940.0
Total	**14,029.8**	**14,029.8**	**5,170.0**

A further discussion of the 2017/2018 Base Residual Auction results and additional information regarding the 2017/2018 Reliability Pricing Model (RPM) Base Residual Auction results are detailed in the body of this report. The discussion also provides a comparison of the 2017/2018 auction results to the results from the 2007/2008 through 2016/2017 RPM auctions.

2017/2018 RPM Base Residual Auction Results

2017/2018 Base Residual Auction Results Discussion

Table 1 contains a summary of the RTO clearing prices resulting from the 2017/2018 RPM Base Residual Auction in comparison to those from 2007/2008 through 2016/2017 RPM Base Residual Auctions.

Table 1 –RPM Base Residual Auction Resource Clearing Price Results in the RTO

	RTO										
Auction Results	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012[1]	2012/2013	2013/2014[2]	2014/2015[3]	2015/2016[4]	2016/2017[5]	2017/2018
Resource Clearing Price	$40.80	$111.92	$102.04	$174.29	$110.00	$16.46	$27.73	$125.99	$136.00	$59.37	$120.00
Cleared UCAP (MW)	129,409.2	129,597.6	132,231.8	132,190.4	132,221.5	136,143.5	152,743.3	149,974.7	164,561.2	169,159.7	167,003.7
Reserve Margin	19.1%	17.4%	17.6%	16.4%	17.9%	20.5%	19.7%	18.8%	19.3%	20.3%	19.7%

1) 2011/2012 BRA was conducted without Duquesne zone load.
2) 2013/2014 BRA includes ATSI zone
3) 2014/2015 BRA includes Duke zone
4) 2015/2016 BRA includes a significant portion of AEP and DEOK zone load previously under the FRR Alternative
5) 2016/2017 BRA includes EKPC zone

The cleared UCAP is the amount of unforced capacity that was procured in the auction to meet the RTO demand for capacity. The 2017/2018 Reliability Pricing Model (RPM) Base Residual Auction cleared 167,003.7 MW of unforced capacity in the RTO representing a 20.1% reserve margin. When the Fixed Resource Requirement (FRR) load and associated resources are considered the actual reserve margin for the entire RTO is 19.7%. The Reserve Margin presented in Table 1 represents the percentage of installed capacity cleared in RPM and committed by FRR entities in excess of the RTO load (including load served under the Fixed Resource Requirement alternative).

New Generation Resource Participation

The 2017/2018 Base Residual Auction results reflect a continuation of last year's strong participation by new generation capacity resources mostly in the form of new (or uprates to existing) gas-fired combustion turbine and combined cycle generation units. The total quantity of new generation capacity resources offered into the auction was 6,587.3 MW (UCAP) comprised of 6128.1 MW of new generation units and 459.2 MW of uprates to existing generation units. The quantity of new generation capacity resources cleared was 6267.3 MW (UCAP) comprised of 5,927.4 MW from new generation units and 339.9 MW from uprates to existing generation units. The 6267.3 MW of cleared new generation capacity resources exceeds last year's then-record number of new generation capacity resources cleared in any single RPM auction of 5462.9 MW.

Table 2A shows the breakdown, by major LDA, of capacity in UCAP terms of new units and uprates at existing units offered in the auction and capacity actually clearing in the auction. 95% of the new generation capacity that offered into the 2017/2018BRA cleared the auction.

Table 2A – Offered and Cleared New Generation Capacity by LDA (in UCAP MW)

	Offered			Cleared		
LDA	Uprate	New Unit	Total	Uprate	New Unit	Total
EMAAC	65.3	1,746.4	**1,811.7**	65.3	1,746.4	**1,811.7**
MAAC	159.2	4,499.3	**4,658.5**	159.2	4,417.9	**4,577.1**
Total RTO	459.2	6,128.1	**6,587.3**	339.9	5,927.4	**6,267.3**

*All MW Values are in UCAP Terms

*MAAC includes EMAAC

**RTO includes MAAC

Capacity Import Participation

As shown in Table 2B, the 2017/2018 BRA results reflect a significant decrease in the quantity of imports cleared. The imports cleared in the 2017/2018 BRA were 4,526 MW (UCAP) which represents an decrease of 2,957 MW (39.5%) from the imports that cleared in the 2016/2017 BRA. The majority of the imports are from resources located in regions west of the PJM RTO. Of the 4,526 MW of external generation resources that cleared in the 2017/2018 BRA, 3980.8 MW of these resources have met the requirements for an exception from the Capacity Import Limits.

Table 2B – Offered and Cleared Capacity Imports (in UCAP MW)

	External Source Zones					
	NORTH	WEST 1	WEST 2	SOUTH 1	SOUTH 2	Total
Offered MW (UCAP)	271.5	1,268.3	2,624.3	234.7	545.9	4,944.7
Cleared MW (UCAP)	222.5	1,268.3	2,624.3	234.7	175.7	4,525.5
Resource Clearing Price ($/MW-day)	$120.00	$0.00	$120.00	$120.00	$0.00	

Note: Cleared MW quantities include resources that received CIL Exception and those associated with pre-OATT grandfathered transmission

Demand Resource Participation

The total quantity of demand resources offered into the 2017/2018 BRA was 11,293.7 MW (UCAP), representing a decrease of 22.2% over the demand resources that offered into the 2016/2017 BRA. Of the 11,293.7 MW of total demand response that offered in this auction, 10,974.8 MW cleared and will be awarded capacity payments. The cleared demand response is 1,433.3 MW less than that which cleared in the 2016/2017 BRA representing an 11.6% decrease. Of this change, 1,073.1 fewer MWs of DR cleared in the MAAC LDA and 360.2 fewer MWs of DR cleared outside of the MAAC LDA. Table 3A contains a comparison of the Demand Resources Offered and Cleared in 2016/2017 BRA & 2017/2018 BRA represented in UCAP.

2017/2018 RPM Base Residual Auction Results

Table 3A – Comparison of Demand Resources Offered and Cleared in 2016/17 BRA & 2017/18 BRA represented in UCAP

		Offered MW*			Cleared MW*		
LDA	Zone	2016/2017	2017/2018	Increase in Offered MW	2016/2017	2017/2018	Increase in Cleared MW
EMAAC	AECO	189.8	134.8	(55.0)	172.3	134.7	(37.6)
EMAAC/DPL-S	DPL	471.4	372.9	(98.5)	439.5	369.7	(69.8)
EMAAC	JCPL	252.0	169.8	(82.2)	222.7	159.4	(63.3)
EMAAC	PECO	592.9	494.1	(98.8)	531.1	480.0	(51.1)
PSEG/PS-N	PSEG	636.5	392.7	(243.8)	630.7	388.4	(242.3)
EMAAC	RECO	12.4	3.4	(9.0)	10.1	3.4	(6.7)
EMAAC Sub Total		**2,155.0**	**1,567.7**	**(587.3)**	**2,006.4**	**1,535.6**	**(470.8)**
PEPCO	PEPCO	683.8	619.8	(64.0)	663.9	608.4	(55.5)
BGE	BGE	970.0	803.2	(166.8)	936.6	791.2	(145.4)
MAAC	METED	407.6	306.6	(101.0)	313.6	298.9	(14.7)
MAAC	PENELEC	452.0	367.7	(84.3)	431.5	356.8	(74.7)
PPL	PPL	1,035.1	812.7	(222.4)	998.2	686.2	(312.0)
MAAC Sub Total**		**5,703.5**	**4,477.7**	**(1,225.8)**	**5,350.2**	**4,277.1**	**(1,073.1)**
RTO	AEP	1,720.6	1,445.5	(275.1)	1,377.2	1,426.1	48.9
RTO	APS	945.1	940.8	(4.3)	684.6	928.9	244.3
ATSI/ATSI-C	ATSI	1,920.7	1,064.4	(856.3)	1,811.9	1,020.2	(791.7)
COMED	COMED	1,722.3	1,499.6	(222.7)	1,236.2	1,478.1	241.9
RTO	DAY	301.3	211.9	(89.4)	246.8	209.4	(37.4)
RTO	DEOK	394.9	194.0	(200.9)	304.4	192.4	(112.0)
RTO	DOM	1,457.5	1,157.8	(299.7)	1,120.6	1,141.1	20.5
RTO	DUQ	204.5	161.9	(42.6)	143.1	161.4	18.3
RTO	EKPC	136.8	140.1	3.3	133.1	140.1	7.0
Grand Total		**14,507.2**	**11,293.7**	**(3,213.5)**	**12,408.1**	**10,974.8**	**(1,433.3)**

*All MW values are expressed in UCAP

**MAAC sub-total includes all MAAC Zones

Each demand resource (DR) offering into the 2017/2018 RPM BRA was identified by the DR provider as being one of three DR product types: (1) Annual DR, (2) Extended Summer DR or (3) Limited DR. A DR provider with a resource that can potentially qualify as more than one of the three DR product types may submit separate but coupled sell offers for each DR product type for which it qualifies. By coupling separate DR offers, the seller informs PJM and the RPM auction clearing engine that only one of the coupled demand resources may clear at most. Submitting DR offers in a coupled manner is not a requirement; it is an optional offer type available to the seller in addition to the conventional, non-coupled offer type. DR offers that are not specified as being coupled offers are cleared independent of each other and each offer could potentially clear.

Table 3B shows a breakdown of Demand Resources Offered and Cleared in the 2017/2018 BRA grouped by the potential Demand Resource coupling scenarios.

Table 3B – Breakdown of Demand Resources Offered versus Cleared by Product Type in the 2017/18 BRA in UCAP

	Resource Offer MW (UCAP)			Cleared MW (UCAP)		
Coupling Scenario	Limited Product Type	Extended Summer Product Type	Annual Product Type	Limited Product Type	Extended Summer Product Type	Annual Product Type
Annual, Extended Summer, and Limited	2,685.3	2,630.2	2,373.9	716.4	1,576.1	140.6
Annual and Extended Summer	-	4,139.6	4,139.7	-	3,921.0	218.6
Annual and Limited	-	-	-	-	-	-
Extended Summer and Limited	727.5	727.4	-	415.2	297.1	-
Annual Only	-	-	1,130.2	-	-	1,130.2
Extended Summer Only	-	1,369.1	-	-	1,369.1	-
Limited Only	1,240.0	-	-	1,190.5	-	-
Grand Total	**4,652.8**	**8,866.3**	**7,643.8**	**2,322.1**	**7,163.3**	**1,489.4**

Energy Efficiency Resource Participation

An energy efficiency (EE) resource is a project that involves the installation of more efficient devices/equipment or the implementation of more efficient processes/systems exceeding then-current building codes, appliance standards, or other relevant standards at the time of installation as known at the time of commitment. The EE resource must achieve a permanent, continuous reduction in electric energy consumption (during the defined EE performance hours) that is not reflected in the peak load forecast used for the Base Residual Auction for the Delivery Year for which the EE resource is proposed. The EE resource must be fully

implemented at all times during the delivery year, without any requirement of notice, dispatch, or operator intervention. Of the 1,340.0 MWs of energy efficiency that offered into the 2017/2018 Base Residual Auction, 1,338.9 MW of EE resources cleared in the auction and will be awarded capacity payments.

Table 3C contains a summary of the demand resources and energy efficiency resources that offered and cleared by zone in the 2017/2018 Base Residual Auction. Approximately 97.2% of the demand resources and 99.9% of the energy efficiency resources that were offered into the BRA cleared. The uncleared resources were offered at a price above the applicable clearing price for the LDA in which the resource was offered.

Figure 1 illustrates the demand side participation in the PJM Capacity Market from 2005/2006 Delivery Year to the 2017/2018 Delivery Year. Demand side participation includes active load management (ALM) prior to 2007/2008 Delivery Year, Interruptible Load for Reliability (ILR) and demand resources offered into each BRA and nominated in FRR Plans, and energy efficiency resources starting with the 2012/2013 Delivery Year. The demand side participation in the capacity market has increased dramatically since the inception of RPM in the 2007/2008 Delivery Year through the 2015/2016 BRA, but as shown in Figure 1, total demand side participation and cleared resources for the 2017/2018 BRA have fallen below the levels seen in the 2014/2015 BRA.

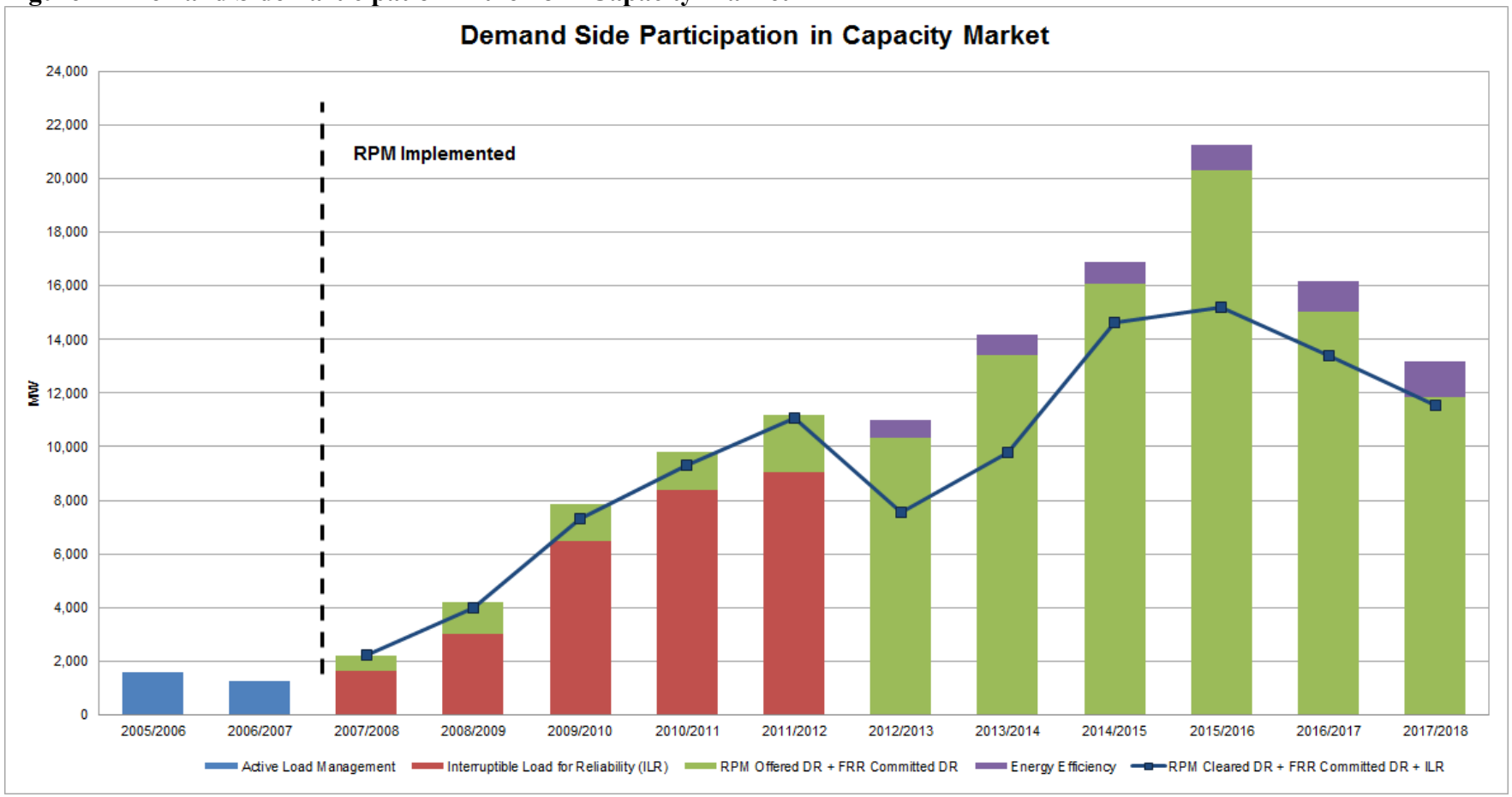
Table 3C – Comparison of Demand Resources and Energy Efficiency Resources Offered versus Cleared in the 2017/18 BRA

		Offered MW*			Cleared MW*		
LDA	Zone	Demand	EE	Total	Demand	EE	Total
EMAAC	AECO	134.8	0.8	**135.6**	134.7	0.8	**135.5**
EMAAC/DPL-S	DPL	372.9	29.0	**401.9**	369.7	29.0	**398.7**
EMAAC	JCPL	169.8	7.1	**176.9**	159.4	7.1	**166.5**
EMAAC	PECO	494.1	24.8	**518.9**	480.0	24.8	**504.8**
PSEG/PS-N	PSEG	392.7	18.7	**411.4**	388.4	17.6	**406.0**
EMAAC	RECO	3.4	-	**3.4**	3.4	-	**3.4**
EMAAC Sub Total		**1,567.7**	**80.4**	**1,648.1**	**1,535.6**	**79.3**	**1,614.9**
PEPCO	PEPCO	619.8	104.2	**724.0**	608.4	104.2	**712.6**
BGE	BGE	803.2	123.7	**926.9**	791.2	123.7	**914.9**
MAAC	METED	306.6	12.8	**319.4**	298.9	12.8	**311.7**
MAAC	PENELEC	367.7	12.9	**380.6**	356.8	12.9	**369.7**
PPL	PPL	812.7	35.6	**848.3**	686.2	35.6	**721.8**
MAAC Sub Total**		**4,477.7**	**369.6**	**4,847.3**	**4,277.1**	**368.5**	**4,645.6**
RTO	AEP	1,445.5	136.3	**1,581.8**	1,426.1	136.3	**1,562.4**
RTO	APS	940.8	10.3	**951.1**	928.9	10.3	**939.2**
ATSI/ATSI-C	ATSI	1,064.4	142.0	**1,206.4**	1,020.2	142.0	**1,162.2**
COMED	COMED	1,499.6	583.3	**2,082.9**	1,478.1	583.3	**2,061.4**
RTO	DAY	211.9	49.2	**261.1**	209.4	49.2	**258.6**
RTO	DEOK	194.0	17.5	**211.5**	192.4	17.5	**209.9**
RTO	DOM	1,157.8	20.7	**1,178.5**	1,141.1	20.7	**1,161.8**
RTO	DUQ	161.9	10.6	**172.5**	161.4	10.6	**172.0**
RTO	EKPC	140.1	0.5	**140.6**	140.1	0.5	**140.6**
Grand Total		**11,293.7**	**1,340.0**	**12,633.7**	**10,974.8**	**1,338.9**	**12,313.7**

*All MW values are expressed in UCAP

**MAAC sub-total includes all MAAC Zones

Figure 1 – Demand Side Participation in the PJM Capacity Market



Renewable Resource Participation

803.7 MW of wind resources were offered into and cleared the 2017/2018 Base Residual Auction as compared to 870.5 MW of wind resources that offered into and cleared the 2016/2017 Base Residual Auction. The capacity factor applied to wind resources is 13%, meaning that for every 100 MW of wind energy, 13 MW are eligible to meet capacity requirements. The 803.7 MW of cleared wind capacity translates to 6,182 MW of wind energy nameplate capability that is expected to be available in the 2017/2018 Delivery Year.

116.4 MW of solar resources were offered into and cleared the 2017/2018 Base Residual Auction as compared to 89.8 MW of solar resources that offered into and cleared the 2016/2017 Base Residual Auction. The capacity factor applied to solar resources is 38%, meaning that for every 100 MW of solar energy, 38 MW are eligible to meet capacity requirements. The 116.4 MW of cleared solar capacity translates to 306.3 MW of solar energy that is expected to be available in the 2017/2018 Delivery Year.

LDA Results

An LDA was modeled in the Base Residual Auction and had a separate VRR Curve if (1) the LDA has a CETO/CETL margin that is less than 115%; or (2) the LDA had a locational price adder in any of the three immediately preceding Base Residual Auctions; or (3) the LDA is likely to have a locational price adder based on a PJM analysis using historic offer price levels; or (4) the LDA is EMAAC, SWMAAC, and MAAC.

As a result of the above criteria, MAAC, EMAAC, SWMAAC, PSEG, PS-NORTH, DPL-SOUTH, PEPCO, ATSI, ATSI-Cleveland, COMED, BGE and PL were modeled as LDAs in the 2017/2018 RPM Base Residual Auction; however, only the PSEG LDA was a binding constraint resulting in a Locational Price Adder for the PSEG LDA. A Locational Price Adder represents the difference in Resource Clearing Prices for the Limited capacity product between a resource in a constrained LDA and the immediate higher level LDA.

Table 4 contains a summary of the clearing results in the LDAs from the 2017/2018 RPM Base Residual Auction.

Table 4 –RPM Base Residual Auction Clearing Results in the LDAs

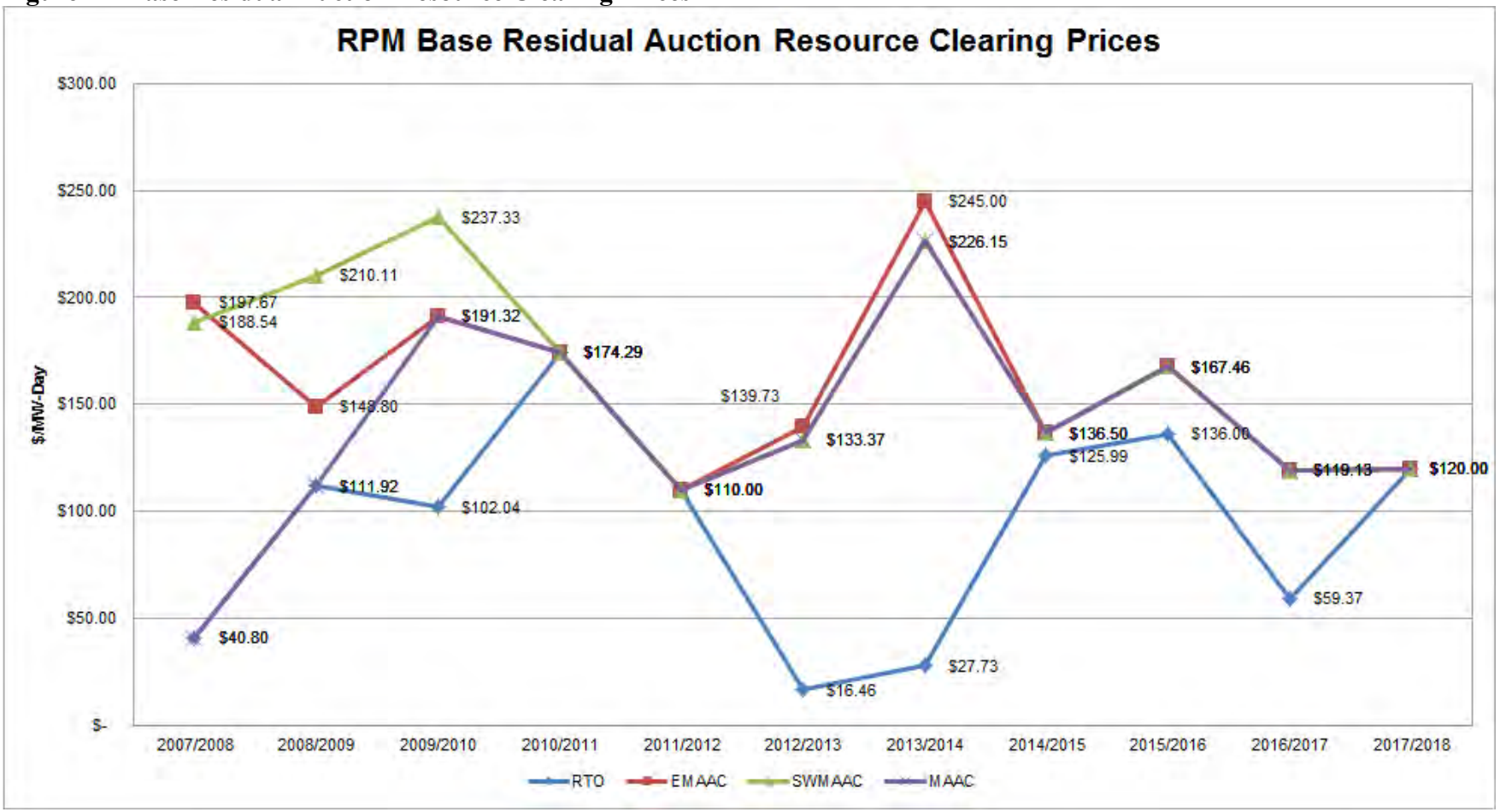
Auction Results	RTO	MAAC	SWMAAC	PEPCO	BGE	EMAAC	DPL-SOUTH	PSEG	PS-NORTH	ATSI	ATSI-CLEVELAND	PPL	COMED
Offered MW (UCAP)	178,838.5	72,351.3	12,645.0	6,133.7	4,107.0	33,706.0	1,684.1	6,833.1	4,039.0	12,172.6	2,561.0	10,727.6	26,701.3
Cleared MW (UCAP)	167,003.7	68,363.9	11,693.4	5,937.8	3,351.3	32,210.9	1,682.3	6,110.7	3,893.2	8,977.3	2,548.6	9,348.5	22,551.0
System Marginal Price	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00
Locational Price Adder*	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$95.00	$0.00	$0.00	$0.00	$0.00	$0.00
Sub-Annual Resource Price Decrement**	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	($66.02)	$0.00
Limited Price Decrement	($13.98)	($13.98)	($13.98)	($13.98)	($13.98)	($13.98)	($13.98)	($13.98)	($13.98)	($13.98)	($13.98)	($13.98)	($13.98)
RCP for Limited Resources	$106.02	$106.02	$106.02	$106.02	$106.02	$106.02	$106.02	$201.02	$201.02	$106.02	$106.02	$40.00	$106.02
RCP for Extended Summer Resources	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$215.00	$215.00	$120.00	$120.00	$53.98	$120.00
RCP for Annual Resources	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$215.00	$215.00	$120.00	$120.00	$120.00	$120.00

*Locational Price Adder is with respect to the immediate parent LDA

**Extended Summer and Limited DR receive the Sub-Annual Resource Price Decrement

Since the PSEG LDA was a constrained LDA, Capacity Transfer Rights (CTRs) will be allocated to loads in the constrained LDA for the 2017/2018 Delivery Year. CTRs are allocated by load ratio share to all Load Serving Entities (LSEs) in a constrained LDA that has a higher clearing price than the unconstrained region. CTRs serve as a credit back to the LSEs in the constrained LDA for use of the transmission system to import less expensive capacity into that constrained LDA and are valued at the difference in the clearing prices of the constrained and unconstrained regions.

Figure 2 – Base Residual Auction Resource Clearing Prices



*2014/2015 through 2017/2018 Prices reflect the Annual Resource Clearing Prices.

2017/2018 RPM Base Residual Auction Results

Table 5 contains a summary of the RTO resources for each cleared Base Residual Auction from 2008/09 through the 2017/2018 Delivery Years. The summary includes all resources located in the RTO (including FRR Capacity Plans)

A total of 208,778.3 MW of installed capacity was eligible to be offered into the 2017/2018 Base Residual Auction. Of this eligible amount, 6,300.9 MW were from external resources that had fulfilled the eligibility requirements to be considered a PJM Capacity Resource. As illustrated in Table 5, the amount of capacity exports in the 2017/2018 auction increased by 4.4 MW from that of the previous auction and FRR commitments increased by 199.5 MW from the 2016/2017 Delivery Year to 15,776.1 MW.

A total of 187,473.7 MW of capacity was offered into the Base Residual Auction. This is a decrease of 3,717.1 MW from that which was offered into the 2016/2017 BRA. A total of 21,304.6 MW was eligible, but not offered due to either (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, approved retirement requests not yet reflected in eRPM, and excess capacity owned by an FRR entity.

2017/2018 RPM Base Residual Auction Results

Table 5 –RPM Base Residual Auction Generation, Demand, and Energy Efficiency Resource Information in the RTO

	RTO[1]									
Auction Supply (all values in ICAP)	**2008/2009**	**2009/2010**	**2010/2011**	**2011/2012[2]**	**2012/2013**	**2013/2014[3]**	**2014/2015[4]**	**2015/2016[5]**	**2016/2017[6]**	**2017/2018**
Internal PJM Capacity	166,037.9	167,026.3	168,457.3	169,241.6	179,791.2	195,633.4	199,375.5	207,559.1	208,098.0	202,477.4
Imports Offered	2,612.0	2,563.2	2,982.4	6,814.2	4,152.4	4,766.1	7,620.2	4,649.7	8,412.2	6,300.9
Total Eligible RPM Capacity	**168,649.9**	**169,589.5**	**171,439.7**	**176,055.8**	**183,943.6**	**200,399.5**	**206,995.7**	**212,208.8**	**216,510.2**	**208,778.3**
Exports / Delistings	4,205.8	2,240.9	3,378.2	3,389.2	2,783.9	2,624.5	1,230.1	1,218.8	1,218.8	1,223.2
FRR Commitments	24,953.5	25,316.2	26,305.7	25,921.2	26,302.1	25,793.1	33,612.7	15,997.9	15,576.6	15,776.1
Excused	722.0	1,121.9	1,290.7	1,580.0	1,732.2	1,825.7	3,255.2	8,712.9	8,524.0	4,305.3
Total Eligible RPM Capacity - Excused	**29,881.3**	**28,679.0**	**30,974.6**	**30,890.4**	**30,818.2**	**30,243.3**	**38,098.0**	**25,929.6**	**25,319.4**	**21,304.6**
Remaining Eligible RPM Capacity	**138,768.6**	**140,910.5**	**140,465.1**	**145,165.4**	**153,125.4**	**170,156.2**	**168,897.7**	**186,279.2**	**191,190.8**	**187,473.7**
Generation Offered	138,076.7	140,003.6	139,529.5	143,568.1	142,957.7	156,894.1	153,048.1	166,127.8	176,145.3	175,329.5
DR Offered	691.9	906.9	935.6	1,597.3	9,535.4	12,528.7	15,043.1	19,243.6	13,932.9	10,855.2
EE Offered	0.0	0.0	0.0	0.0	632.3	733.4	806.5	907.8	1,112.6	1,289.0
Total Eligible RPM Capacity Offered	**138,768.6**	**140,910.5**	**140,465.1**	**145,165.4**	**153,125.4**	**170,156.2**	**168,897.7**	**186,279.2**	**191,190.8**	**187,473.7**
Total Eligible RPM Capacity Unoffered	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

[1]RTO numbers include all LDAs.

[2]All generation in the Duquesne zone is considered external to PJM for the 2011/2012 BRA.

[3]2013/2014 includes ATSI zone and generation

[4]2014/2015 includes Duke zone and generation

[5]2015/2016 includes a significant portion of AEP and DEOK zone load previously under the FRR Alternative

[6]2016/2017 includes EKPC zone

2017/2018 RPM Base Residual Auction Results

Table 6 shows the Generation, Demand Resources, and Energy Efficiency Resources Offered and Cleared in the RTO translated into Unforced Capacity (UCAP) MW amounts. Participants' sell offer EFORd values were used to translate the generation installed capacity values into unforced capacity (UCAP) values. Demand resource (DR) sell offers and energy efficiency resource (EE) sell offers were converted into UCAP using the appropriate Demand Resource (DR) Factor and Forecast Pool Requirement (FPR) for the delivery year.

In UCAP terms, a total of 178,838.5 MW were offered into the 2017/2018 Base Residual Action, comprised of 166,204.8 MW of generation capacity, 11,293.7 MW of capacity from demand resources, and 1,340.0 MW of capacity from energy efficiency resources. Of those offered, a total of 167,003.7 MW of capacity was cleared in the auction.

Of the 167,003.7 MW of capacity that cleared in the auction, 154,690.0 MW were from generation capacity, 10,974.8 MW were from demand resources, and 1,338.9 MW were from energy efficiency resources. Capacity that was offered but not cleared in the Base Residual Auction will be eligible to offer into the First, Second and Third Incremental Auctions for the 2017/2018 Delivery Year.

Table 6 – Generation, Demand Resources, and Energy Efficiency Resources Offered and Cleared in UCAP MW

	RTO*									
Auction Results (all values in UCAP)**	**2008/2009**	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2013/2014**	**2014/2015**	**2015/2016**	**2016/2017**	**2017/2018**
Generation Offered	131,164.8	132,614.2	132,124.8	136,067.9	134,873.0	147,188.6	144,108.8	157,691.1	168,716.0	166,204.8
DR Offered	715.8	936.8	967.9	1,652.4	9,847.6	12,952.7	15,545.6	19,956.3	14,507.2	11,293.7
EE Offered	-	-	-	-	652.7	756.8	831.9	940.3	1,156.8	1,340.0
Total Offered	**131,880.6**	**133,551.0**	**133,092.7**	**137,720.3**	**145,373.3**	**160,898.1**	**160,486.3**	**178,587.7**	**184,380.0**	**178,838.5**
Generation Cleared	129,061.4	131,338.9	131,251.5	130,856.6	128,527.4	142,782.0	135,034.2	148,805.9	155,634.3	154,690.0
DR Cleared	536.2	892.9	939.0	1,364.9	7,047.2	9,281.9	14,118.4	14,832.8	12,408.1	10,974.8
EE Cleared	0.0	0.0	0.0	0.0	568.9	679.4	822.1	922.5	1,117.3	1,338.9
Total Cleared	**129,597.6**	**132,231.8**	**132,190.5**	**132,221.5**	**136,143.5**	**152,743.3**	**149,974.7**	**164,561.2**	**169,159.7**	**167,003.7**
Uncleared	2,283.0	1,319.2	902.2	5,498.8	9,229.8	8,154.8	10,511.6	14,026.5	15,220.3	11,834.8

* RTO numbers include all LDAs

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

2017/2018 RPM Base Residual Auction Results

Table 7 contains a summary of capacity additions and reductions from the 2007/2008 Base Residual Auction to the 2017/2018 Base Residual Auction. A total of 7,149.7 MW of incrementally new capacity in PJM was available for the 2017/2018 Base Residual Auction. This incrementally new capacity includes new generation capacity resources, capacity upgrades to existing generation capacity resources and new energy efficiency resources. The increase is more than offset by generation capacity deratings on existing generation capacity resources and a reduction in the quantity of offered demand resources to yield a net decrease of 5,688.1 MW of installed capacity.

Table 7 also illustrates the total amount of resource additions and reductions over eleven Delivery Years since the implementation of the RPM construct. Over the period covering the first eleven RPM Base Residual Auctions, 35,151.1 MW of new generation capacity was added which was partially offset by 30,079.5 MW of capacity de-ratings or retirements over the same period. Additionally, 11,293.0 MW of new demand resources and 1,289.0 MW of new energy efficiency resources were offered over the course of the eleven Delivery Years since RPM's inception. The total net increase in installed capacity in PJM over the period of the last ten RPM auctions was 17,653.6 MW.

Table 7 – Incremental Capacity Resource Additions and Reductions to Date

	RTO*											
Capacity Changes (in ICAP)	**2007/2008**	**2008/2009**	**2009/2010**	**2010/2011**	**2011/2012**	**2012/2013**	**2013/2014[1]**	**2014/2015[2]**	**2015/2016**	**2016/2017[3]**	**2017/2018**	**Total**
Increase in Generation Capacity	602.0	724.2	1,272.3	1,776.2	3,576.3	1,893.5	1,737.5	1,582.8	8,207.0	6,806.0	6,973.3	35,151.1
Decrease in Generation Capacity	-674.6	-375.4	-550.2	-301.8	-264.7	-3,253.9	-1,924.1	-1,550.1	-6,432.6	-4,992.0	-9,760.1	-30,079.5
Net Increase in Demand Resource	555.0	574.7	215.0	28.7	661.7	7,938.1	2,993.3	2,514.4	4,200.5	-5,310.7	-3,077.7	11,293.0
Net Increase in Energy Efficiency	0	0	0	0	0	632.3	101.1	73.1	101.3	204.8	176.4	1289
Net Increase in Installed Capacity	**482.4**	**923.5**	**937.1**	**1503.1**	**3973.3**	**7,210.0**	**2,907.8**	**2,620.2**	**6,076.2**	**-3,291.9**	**-5,688.1**	**17,653.6**

* RTO numbers include all LDAs

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

1) Does not include Existing Generation located in ATSI Zone

2) Does not include Existing Generation located in Duke Zone

3) Does not include Existing Generation located in EKPC Zone

Table 7A provides a further breakdown of the generation increases and decreases for the 2017/2018 Delivery Year on an LDA basis.

Table 7A – Generation Increases and Decreases by LDA Effective 2017/2018Delivery Year

LDA Name	Increases	Decreases
EMAAC	1881	-2393.1
MAAC	4982.8	-2608.3
Total RTO	**6973.3**	**-9760.1**

All Values in ICAP terms
*MAAC includes EMAAC
**RTO includes MAAC

Table 8 provides a breakdown of the new capacity offered into the each BRA into the categories of new resources, reactivated units, and uprates to existing capacity, and then further down into resource type. As shown in this table, there was a significant quantity of generating capacity from new resources and uprates to existing resources offered into the 2017/2018 BRA. The capacity offered in the 2017/2018 BRA resulted from both new generating resources and uprates to existing resources including gas, diesel, coal, wind, and nuclear resources. The largest growth remains in gas turbines and combined cycle plants.

2017/2018 RPM Base Residual Auction Results

Table 8 – Further Breakdown of Incremental Capacity Resource Additions from 2007/2008 to 2017/18

	Delivery Year	CT/GT	Combined Cycle	Diesel	Hydro	Steam	Nuclear	Solar	Wind	Fuel Cell	Total
New Capacity Units (ICAP MW)	2007/2008			18.7	0.3						19.0
	2008/2009			27.0					66.1		93.1
	2009/2010	399.5		23.8		53.0					476.3
	2010/2011	283.3	580.0	23.0					141.4		1,027.7
	2011/2012	416.4	1,135.0			704.8		1.1	75.2		2,332.5
	2012/2013	403.8		7.8		621.3			75.1		1,108.0
	2013/2014	329.0	705.0	6.0		25.0		9.5	245.7		1,320.2
	2014/2015	108.0	650.0	35.1	132.9			28.0	146.6		1,100.6
	2015/2016	1,382.5	5,914.5	19.4	148.4	45.4		13.8	104.9	30.0	7,658.9
	2016/2017	171.1	4,994.5	38.3		24.0		32.1	54.3		5,314.3
	2017/2018	131.0	5,010.0	124.8	6.0	90.0		27.0			5,388.8
Capacity from Reactivated Units (ICAP MW)	2007/2008					47.0					47.0
	2008/2009					131.0					131.0
	2009/2010										-
	2010/2011	160.0		10.7							170.7
	2011/2012	80.0				101.0					181.0
	2012/2013										-
	2013/2014										-
	2014/2015			9.0							9.0
	2015/2016										9.0
	2016/2017					21.0					21.0
	2017/2018					991.0					991.0
Uprates to Existing Capacity Resources (ICAP MW)	2007/2008	114.5		13.9	80.0	235.6	92.0				536.0
	2008/2009	108.2	34.0	18.0	105.5	196.0	38.4				500.1
	2009/2010	152.2	206.0		162.5	61.4	197.4		16.5		796.0
	2010/2011	117.3	163.0		48.0	89.2	160.3				577.8
	2011/2012	369.2	148.6	57.4		186.8	292.1		8.7		1,062.8
	2012/2013	231.2	164.3	14.2		193.0	126.0		56.8		785.5
	2013/2014	56.4	59.0	0.3		215.0	47.0		39.6		417.3
	2014/2015	104.9		0.5	41.5	138.6	107.0	7.1	73.6		473.2
	2015/2016	216.8	72.0	4.7	15.7	63.4	149.2	2.2	24.1		548.1
	2016/2017	436.6	420.0	3.3	7.4	484.3	102.6	1.7	14.8		1,470.7
	2017/2018	71.9	212.5	5.1	105.9	64.8	11.0	0.4	2.1		473.7
	Total	5,843.8	20,468.4	461.0	854.1	4,782.6	1,323.0	122.9	1,145.5	30.0	35,040.3

Figure 4: Cumulative Generation Capacity Increases by Fuel Type

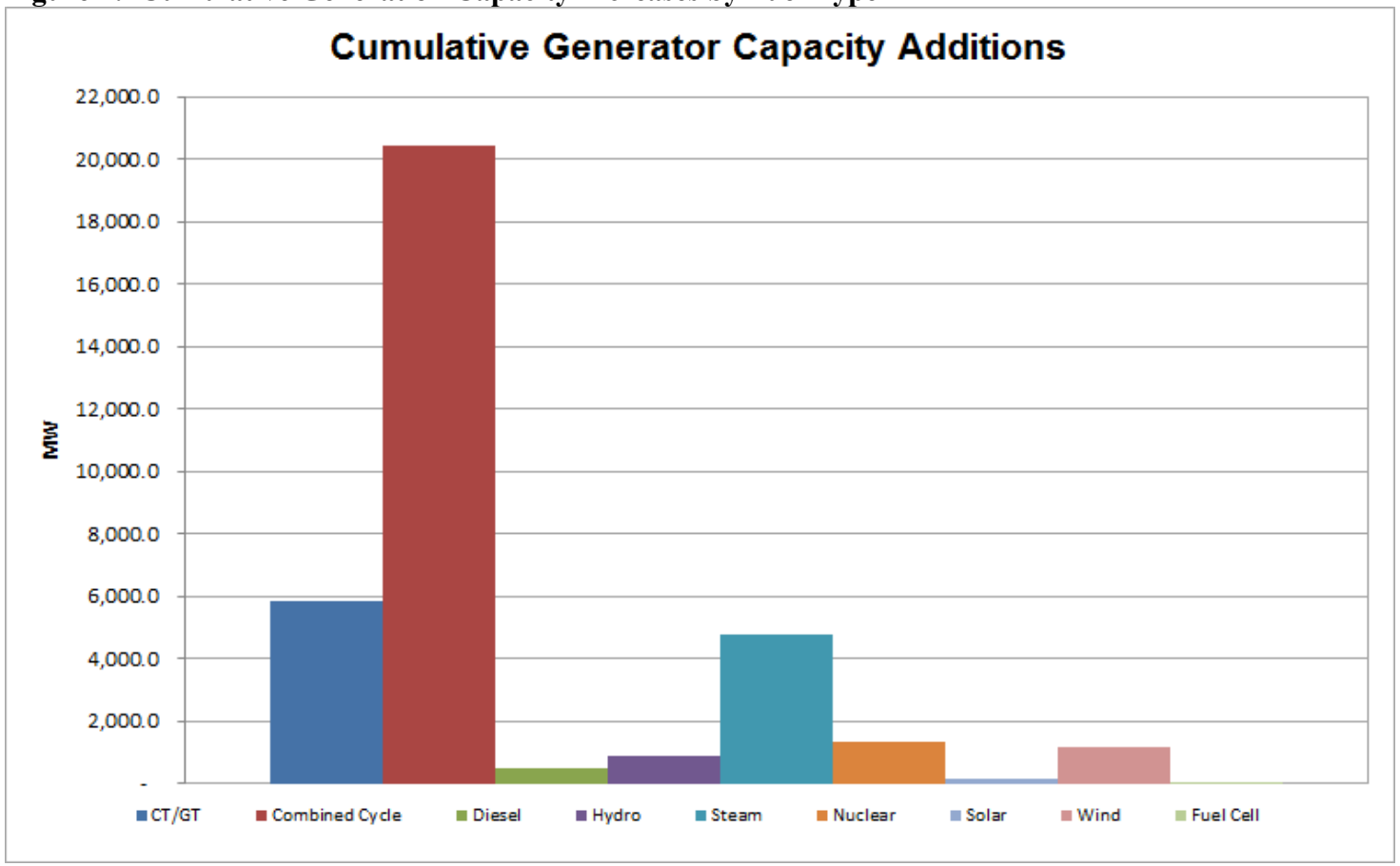


Table 9 shows the changes that have occurred regarding resource deactivation and retirement since the RPM was approved by FERC. The MW values shown in Table 9 represent the quantity of unforced capacity cleared in the 2017/2018 Base Residual Auction that came from resources that have either withdrawn their request to deactivate, postponed retirement, or been reactivated (i.e., came out of retirement or mothball state for the RPM auctions) since the inception of RPM. This total accounts for 6,408.7 MW of cleared UCAP in the 2017/2018 BRA which equates to 7506.2 MW of ICAP Offered.

Table 9 – Changes to Generation Retirement Decisions since Commencement of RPM in 2007/2008

	RTO*	
Generation Resource Decision Changes	ICAP Offered	UCAP Cleared
Withdrawn Deactivation Requests	2203.6	1771.6
Postponed or Cancelled Retirement	4009.5	3413.5
Reactivation	1293.1	1223.6
Total	**7506.2**	**6408.7**

RPM Impact to Date

As illustrated in Table 5, for the 2017/2018 auction, the capacity exports were 1,223.2 MW and the offered capacity imports were 6,300.9MW. The difference between the capacity imports and exports results is a net capacity import of 5,077.7 MW.

In the planning year preceding the RPM auction implementation, 2006/2007, there was a net capacity export of 2,616.0 MW. In this auction, PJM is now a net importer of 5,077.7 MW. Therefore RPM's impact on PJM capacity interchange is 7,693.7 MW.

The minimum net impact of the RPM implementation on the availability of Installed Capacity resources for the 2017/2018 planning year can be estimated by adding the net change in capacity imports and exports over the period, the forward demand and energy efficiency resources, the increase in Installed Capacity over the RPM implementation period from Table 8 and the net change in generation retirements from Table 9. Therefore, as illustrated in Table 10, the minimum estimated net impact of the RPM implementation on the availability of capacity in the 2017/2018 compared to what would have happened absent this implementation is 62,464.2 MW.

Table 10 shows the details on RPM's impact to date in ICAP terms.

Table 10 – RPM's Impact to Date

Change in Capacity Availability	Installed Capacity MW
New Generation	25,839.4
Generation Upgrades (not including reactivations)	7,641.2
Generation Reactivation	1,559.7
Forward Demand and Energy Efficiency Resources	12,582.0
Cleared ICAP from Withdrawn or Cancelled Retirements	7,148.2
Net increase in Capacity Imports	7,693.7
Total Impact on Capacity Availability in 2017/2018 Delivery Year	**62,464.2**

Discussion of Factors Impacting the RPM Clearing Prices

The main factors impacting 2017/2018 RPM BRA clearing prices relative to 2016/2017 BRA clearing prices are provided below, separated out by significant changes to the market design and effects on the demand-side and supply-side of the market.

Significant Changes to RPM Design for the 2017/2018 Base Residual Auction

On April 22, 2014, in Docket Nos. ER14-503-000 and ER14-503-001, the Commission issued an order accepting PJM's November 29, 2013 filing of revisions to the RAA and the PJM Tariff to recognize limits on the amount of capacity from external generation resources that can be reliably committed in the PJM forward capacity auctions effective January 31, 2014. Capacity Import Limits (CILs) are established on the amount of external generation capacity that can be reliably committed to PJM. A separate CIL is established for each of five external source-zones and a single total CIL is established for the overall RTO. External generation resources may seek exception to the CIL by meeting all three of the following conditions prior to the start of the auction: (i) they are committed to being pseudo-tied generation resources prior to the start of the Delivery Year; that is, they will be treated like internal generation, subject to redispatch and locational pricing, and are not subject to TLR-5 curtailments; (ii) they have long-term firm transmission service confirmed on the complete transmission path from such resource into PJM; and (iii) they agree to be subject to the same capacity must-offer requirement as PJM's internal resources. The implementation of capacity import limits tended to reduce the amount of total imports offered and cleared in the 2017/2018 auction.

As a result of implemented maximum limits for limited Demand Response and Extended Summer Demand Response, there was a significant shift to the types of demand resources that have more operational flexibility and a greater contribution to reliability. There were significantly more "annual" and "extended summer" demand resources clearing in this auction than "summer-only" demand resources. This shift gives system operators more year-round flexibility in drawing on demand response when needed.

Changes that impacted the Demand Curve:

- The target reliability requirement for the 2017/2018 BRA is approximately 1,092 MW lower than the value used in the 2016/2017 BRA. This represents a decrease of 0.7% year-over-year.

- The Net CONE values for the 2017/2018 BRA are higher than values used in last year's BRA by 3.1% to 13.0% depending on the LDA. The 2017/2018 E&AS Offset values differ from those used last year due to an update of the 3-year period for which the reference resource E&AS revenues were determined (the 2017/2018 values are based on LMPs from calendar years 2011 through 2013 whereas the 2016/2017 values were based on LMPs from calendar years 2010 through 2012).[1]

Changes that impacted the Supply Curve:

- The implementation of Capacity Import Limits in this auction as discussed throughout the body of this report resulted in a decrease in cleared imports of capacity from outside the RTO. The reduction in supply of imports from outside the RTO placed upward pressure on the resulting Capacity prices.

- The implementation of limits on the Limited and Extended Summer demand resource products in the 2017/2018 auction had a significant impact on the way these resources cleared. The quantity of Demand Resources offered declined substantially by 3,213.5 MW UCAP or 22.1% from the DR resources offered last year. Accordingly, the quantity of Demand Resources clearing fell 1,433.3 MW UCAP or about 11.6%. The reduced pool of supply from Demand Resources, all else equal, places upward pressure on prices. Further, a significant shift occurred in the distribution of cleared Demand Resources from the more limited products to the less limited products, providing greater flexibility for operations to utilize these resources.

- In contrast to the trend in Demand Response, Energy Efficiency Resources offered increased by 183.2 MW or 15.8% and cleared Energy Efficiency increased 221.6 MW or 19.8% offsetting a part of the decrease in Demand Resources.

- The 2017/2018 BRA attracted offers from 6,587.3 MW of new generation capacity in the form of new facilities and uprates at existing facilities. This quantity also includes facilities that were previously slated for deactivation, but were reactivated and are switching fuel types. The location of these offers of new supply in typically transmission constrained areas was a major factor causing the auction to clear with the majority of the RTO at a single clearing price.

- Expected net energy market revenues would go toward offsetting fixed, going forward costs including the costs of new investment in new resources as well as investments in existing resources such as environmental retrofits. Reduced demand and low natural gas and therefore energy market prices have largely led to lower net energy market revenues across the PJM

[1] Refer to 2017/2018 RPM BRA Planning Period Parameters Report and the 2016/2017 RPM Planning Period Report

system. This increases the capacity market price needed to cover fixed, going forward costs, and consequently puts upward pressure on capacity prices to the extent these increased costs were included in submitted RPM offers.

Overall Effects on Market Outcomes

On balance, with only a small reduction in the demand for capacity as represented by VRR Curve and an offsetting increase in Net CONE values, the results of the 2017/2018 BRA have been driven by supply-side effects. Overall, the increased supply through new entry, including uprates, was offset by a significant decrease in imports as well as a decrease in cleared Demand Resources leading to the $60.63/MW-day increase in price for Annual Resources in the rest of RTO. The clearing price for Annual Resources in MAAC was relatively unchanged, as was the clearing price for these resources in the PS LDA. The location of the cleared new entry resources in areas that have historically been transmission constrained led to the absence of binding transmission constraints in the auction, and the largely homogenous price across the majority of the RTO.

Revision History

5/23/2014: Original Version Posted
6/17/2014: Updated typos found in original version:

- Table 2B: an Offered MW (UCAP) row was added.
- Figure 1: the Committed/Cleared DR was corrected for Delivery Years prior to 2014/2015.
- Table 7: the Increase and Decrease in Generation Capacity rows for the 2016/2017 column were corrected along with the table totals.
- Table 8: Combined Cycle and Steam in the New Capacity Units section were corrected for the 2016/2017 row and corrected in the Uprates section for the 2017/2018 row.
- Figure 4: updated to account for Table 8 corrections.