2019/2020 RPM Base Residual Auction Planning Period Parameters

Introduction

The planning parameters for the 2019/2020 RPM Base Residual Auction (BRA) that is to be conducted in May of 2016 were posted on the PJM RPM website on February 1, 2016. This document describes the posted parameters and provides a comparison to the 2018/2019 BRA planning parameters.

PJM RTO Region Reliability Requirement

The PJM RTO forecast peak load, the PJM RTO Region Reliability Requirement and the parameters used to derive the requirement for the 2019/2020 BRA are shown and compared to the 2018/2019 BRA parameters in Table 1.

The forecast peak load for the PJM RTO for the 2019/2020 Delivery Year is 157,188 MW which is 4,230 MW or about 2.6% below the forecast peak load of 161,418 MW for the 2018/2019 BRA. The PJM Load Forecast Report of January 2016 describes the peak load forecast model and provides a comparison to prior peak load forecasts[1]. The PJM RTO Reliability Requirement for the 2019/2020 Delivery Year is 171,037 MW which is 3,860 MW or about 2.2% below the 2018/2019 BRA value prior to adjustment for FRR obligation. [2]

The Installed Reserve Margin (IRM) and Forecast Pool Requirement (FPR) represent the level of capacity reserves needed to satisfy the PJM reliability criterion of a Loss of Load Expectation not exceeding one occurrence in ten years. The IRM and FPR represent the same level of required reserves but are expressed in different terms of capacity value. The IRM expresses the required reserve level in terms of installed capacity MW (ICAP) as a percent of the forecast peak load, whereas the FPR expresses the required reserve level in terms of unforced capacity MW (UCAP) as a percent of the forecast peak load. The FPR is equal to (1 + IRM) times (1 - Pool-wide Average EFORd). The PJM RTO Reliability Requirement expressed in terms of unforced capacity is used as the basis of the target reserve level to be procured in each RPM BRA and is equal to the forecast RTO peak load, multiplied by the FPR.

[1] The January 2016 Load Forecast Report is located at: http://www.pjm.com/~/media/documents/reports/2016-load-report.ashx

[2] The total UCAP Obligation of all Fixed Resource Requirement (FRR) Entities is subtracted from the PJM RTO Reliability Requirement, and any applicable LDA Reliability Requirement, when determining the target reserve levels to be procured in each RPM BRA. The posted 2019/2020 BRA planning parameters will be updated to reflect the total UCAP Obligation of FRR Entities after FRR Capacity Plans are submitted and reviewed in mid-April 2016

Table 1 – Reserve Requirement Parameters for 2018/2019 and 2019/2020 BRAs

Reserve Requirement Parameters	2018/2019 BRA	2019/2020 BRA
Installed Reserve Margin (IRM)	15.7%	16.5%
Pool Wide 5-Year Average EFORd	6.35%	6.60%
Forecast Pool Requirement (FPR)	1.0835	1.0881
Forecast Peak Load (MW)	161,418	157,188
PJM RTO Reliability Requirement (UCAP MW)	**174,897**	**171,037**
FRR Obligation (UCAP MW)*	14,289	
PJM RTO Reliability Requirement adjusted for FRR (UCAP MW)	160,607	

*The 2019/2020 BRA PJM RTO Reliability Requirement will be updated to include FRR load in mid-April 2016.

Locational Deliverability Areas

Prior to each BRA, the Capacity Emergency Transfer Objective (CETO) and Capacity Emergency Transfer Limit (CETL) are calculated for each of twenty-seven potential Locational Deliverability Areas (LDAs) that are defined in Schedule 10.1 of the PJM Reliability Assurance Agreement.[3] Pursuant to Section 5.10 of Attachment DD of the PJM Open Access Transmission Tariff (OATT), for any Delivery Year, a separate Variable Resource Requirement (VRR) Curve is established for each LDA for which (1) the CETL is less than 1.15 times its CETO; (2) the LDA had a Locational Price Adder in any one or more of the three immediately preceding BRAs; and (3) the MAAC, EMAAC and SWMAAC LDAs are modeled in a BRA regardless of the outcome of the CETL/CETO test or prior BRA results. An LDA not otherwise qualifying under the above three tests may also be modeled if PJM finds that such LDA is determined to be likely to have a Locational Price Adder based on historic offer price levels or if such LDA is required to achieve an acceptable level of reliability consistent with the Reliability Principles and Standards.

Based on an application of the above criteria, the LDAs listed in Table 2 will be modeled in the 2019/2020 BRA and are the same LDAs that were modeled in the 2018/2019 BRA. In RPM Auctions, a Reliability Requirement and a separate Variable Resource Requirement (VRR) Curve are established for each LDA that is modeled in the BRA and the LDA CETL acts as a maximum limit on the quantity of capacity that can be imported into the LDA. Table 2 shows the Reliability Requirement and the CETL for each LDA being modeled in the 2019/2020 BRA. For comparison purposes, the LDA Reliability Requirement and CETL values used in the 2018/2019 BRA are also shown in Table 2.

[3] CETO and CETL values were calculated for each of the twenty-seven potential LDAs defined in Schedule 10.1 of the PJM RAA and these values are shown on the detailed planning parameters spreadsheet posted on the PJM RPM website.

As shown in Table 2, LDA reliability requirements for the 2019/2020 BRA are lower than those of the 2018/2019 BRA with the exception of the PPL LDA. Changes in LDA reliability requirement are primarily driven by changes in the forecast peak load of the LDA and changes in the availability rate of capacity resources located in the LDA. The reliability requirement of an LDA will decrease for a decrease in the forecast peak load of the LDA and an increase in the availability rate of capacity resources located in the LDA. The generally lower LDA reliability requirements for the 2019/2020 BRA relative to those of the 2018/2019 BRA are primarily due to lower forecast peak load levels for 2019/2020. The increase in reliability requirement for the PPL LDA is due to an increase in the restricted winter peak load of this winter-peaking zone.

Year-over-year changes in the CETL of an LDA are primarily driven by the addition or removal of transmission facilities, the magnitude and location of generation deactivations and generation additions, and changes in load distribution profile within the LDA. LDA CETL values for the 2019/2020 BRA vary significantly in some cases from those of the 2018/2019 BRA in both the upward and downward direction but, in general, the magnitude of the changes lie within the year-to-year changes historically experienced. Changes in the CETL values for the larger regional LDAs (MAAC, EMAAC and SWMAAC) lie within the year-to-year changes historically experienced; the MAAC CETL is 498 MW lower for 2019/2020, a 6% reduction from 2018/2019 BRA CETL, the EMAAC CETL is 481 MW higher for the 2019/2020 BRA, a 6% increase from the 2018/2019 BRA CETL, and the SWMAAC CETL is 488 MW lower for the 2019/2020 BRA, a 5% decrease below the 2018/2019 BRA CETL. The PPL LDA CETL is 1,630 MW higher for the 2019/2020 BRA, the largest change from the 2018/2019 BRA CETL in both magnitude and percentage. This increase is primarily driven by the addition of a new 230/138 kV Wescosville transformer in parallel with the existing 230/138kV Wescosville transformer, which was the facility that limited additional imports in the PPL LDA in last year's CETL analysis.

Table 2 – LDA Reliability Requirements and Capacity Import Limits for 2018/2019 and 2019/2020 BRAs

	2018/2019 BRA		2019/2020 BRA		Delta	
LDA	Reliability Requirement (UCAP MW)	CETL (MW)	Reliability Requirement (UCAP MW)	CETL (MW)	Reliability Requirement (UCAP MW)	CETL (MW)
MAAC	69,854	7,883	67,662	7,385	-2,192	-498
EMAAC	38,535	8,375	37,633	8,856	-902	481
SWMAAC	16,212	9,888	15,883	9,400	-329	-488
PS	12,416	7,926	12,174	7,856	-242	-70
PSNORTH	6,379	3,761	6,375	3,827	-4	66
DPLSOUTH	3,150	1,702	3,060	1,898	-90	196
PEPCO	8,181	7,045	8,074	6,985	-107	-60
ATSI	16,048	9,240	15,742	9,212	-306	-28
Cleveland	6,030	4,557	5,979	5,501	-51	944
COMED	28,046	5,227	26,509	5,160	-1,537	-67
BGE	8,707	6,527	8,401	6,169	-306	-358
PL	10,040	4,538	10,565	6,168	525	1,630

Variable Resource Requirement Curves

A Variable Resource Requirement (VRR) curve is established for the RTO and for each LDA modeled in the BRA. The VRR curve is a downward-sloping demand curve used in the clearing of the BRA that defines the price for a given level of capacity resource commitment relative to the applicable reliability requirement. The VRR curves for the PJM Region and each LDA are based on a target level of capacity and the Net Cost of New Entry (Net CONE).

Target Level of Capacity

In the development of the VRR curve, the target level of capacity to be procured for the PJM RTO Region is the PJM RTO Region Reliability Requirement, and the target level of capacity for each LDA is the LDA Reliability Requirement.

Net Cost of New Entry (CONE)

The Net CONE (in UCAP terms) is used in the development of the RTO VRR Curve and the VRR Curve for each modeled LDA. Table 3 shows the Net CONE values, and the components used to determine the Net CONE, for the PJM RTO and each LDA to be modeled in the 2019/2020 BRA. For comparison purposes, the CONE values used in the 2018/2019 BRA are also shown in Table 3.

The Net CONE for the RTO and each LDA is equal to the gross CONE applicable to the RTO and each LDA minus the applicable net energy and ancillary services (E&AS) revenue offset. The gross CONE values for the 2019/2020 BRA are based on the gross CONE values used in the 2018/2019 BRA adjusted by the year-over-year change in the Bureau of Labor Statistics (BLS) Composite Index[4]. The Net E&AS revenue offset is the annual average of the revenues that would have been received by the reference combustion turbine over a period of the three most recent calendar years. The 2019/2020 net E&AS values are based on LMPs from calendar years 2013 through 2015 whereas the 2018/2019 values were based on LMPs from calendar years 2012 through 2014.

Table 3 – Net CONE for PJM RTO and LDAs for 2018/2019 and 2019/2020 BRAs

	2018/2019 BRA				2019/2020 BRA				Change in Net CONE	
Location	Gross CONE ICAP Terms ($/MW-Year)	E&AS Offset ICAP Terms ($/MW-Year)	Net CONE ICAP Terms ($/MW-Year)	Net CONE UCAP Terms ($/MW-Day)	Gross CONE ICAP Terms ($/MW-Year)	E&AS Offset ICAP Terms ($/MW-Year)	Net CONE ICAP Terms ($/MW-Year)	Net CONE UCAP Terms ($/MW-Day)	Net CONE UCAP Terms ($/MW-Day)	Net CONE UCAP Terms (%)
RTO	130,425	27,683	102,742	$300.57	133,652	31,337	102,315	$299.30	-1.27	-0.4%
MAAC	131,336	38,474	92,862	$271.67	133,775	44,204	89,571	$262.02	-9.65	-3.6%
EMAAC	132,200	34,842	97,358	$284.82	133,332	36,376	96,957	$283.63	-1.19	-0.4%
SWMAAC	130,300	47,180	83,120	$243.17	134,299	55,700	78,600	$229.93	-13.24	-5.4%
PS, PSNORTH	132,200	30,339	101,861	$297.99	133,332	29,652	103,680	$303.30	5.31	1.8%
DPLSOUTH	132,200	43,900	88,300	$258.32	133,332	43,678	89,654	$262.27	3.95	1.5%
PEPCO	130,300	44,590	85,710	$250.74	134,299	50,810	83,489	$244.23	-6.51	-2.6%
ATSI, Cleveland	128,900	36,019	92,881	$271.72	132,665	42,399	90,266	$264.06	-7.66	-2.8%
COMED	128,900	19,419	109,481	$320.29	132,665	20,388	112,277	$328.44	8.15	2.5%
BGE	130,300	49,770	80,530	$235.59	134,299	60,589	73,710	$215.62	-19.97	-8.5%
PL	130,300	32,951	97,349	$284.79	134,311	39,368	94,943	$277.74	-7.05	-2.5%

[4] The BLS Composite Index is described in section 3.3.1 of PJM Manual 18: PJM Capacity Market.

Base Capacity Demand Resource Constraints and Base Capacity Resource Constraints

A Base Capacity Demand Resource Constraint and a Base Capacity Resource Constraint are established for the RTO and each modeled LDA. The Base Capacity Demand Resource Constraint represents the maximum quantity of Base Capacity DR and Base Capacity EE that may be procured in the BRA and the Base Capacity Resource Constraint represents the maximum quantity of the sum of Base Capacity DR and EE, and generation resources that clear as Base Capacity that may be procured in the BRA. The Base Capacity Demand Resource Constraints and the Base Capacity Resource Constraints are determined for each RPM Auction using the procedures and formulae described in sections 2.2B and 2.2F of Attachment DD of the PJM OATT and further detailed in section 6 of PJM Manual 20: PJM Resource Adequacy Analysis.

Tables 4a and 4b show the Base Capacity Demand Resource Constraint and the Base Capacity Resource Constraint, respectively, for the RTO and each modeled LDA for the 2019/2020 BRA and 2018/2019 BRA. The constraint values are expressed as a percentage of the forecast peak load of the RTO or LDA. In the case of the Base Capacity Demand Resource Constraint, this percentage is multiplied by the forecasted peak load of the PJM RTO and each LDA and multiplied by the Forecast Pool Requirement to determine the value of the constraint in UCAP MW for use in the clearing of the auction. In the case of the Base Capacity Resource Constraint, the percentage is multiplied by the forecasted peak load of the PJM RTO and each LDA and multiplied by (1.0 – Pool-Wide Average EFORd) to determine the value of the constraint in UCAP MW for use in the clearing of the auction. For purposes of providing a more direct comparison, the constraint values shown in Tables 4a and 4b for the 2018/2019 BRA are based on RTO and LDA peak load values prior to adjustment for FRR load.

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Table 4a – Base Capacity Demand Resource Constraints for 2018/2019 and 2019/2020 BRAs

	2018/2019 BRA		2019/2020 BRA	
Location	(% of Peak)	(UCAP MW)	(% of Peak)	(UCAP MW)
RTO	8.3%	14,516	8.7%	14,880
MAAC	18.4%	11,751	18.8%	11,688
EMAAC	16.2%	5,654	16.4%	5,534
SWMAAC	7.4%	1,087	6.7%	958
PS	11.7%	1,286	10.8%	1,160
PSNORTH	4.5%	242	4.1%	220
DPLSOUTH	10.4%	270	8.2%	203
PEPCO	7.1%	500	6.7%	466
ATSI	15.2%	2,128	14.7%	2,018
Cleveland	15.5%	746	26.4%	1,213
COMED	13.3%	3,309	13.6%	3,234
BGE	8.8%	673	6.3%	463
PL	13.0%	1,026	21.7%	1,716

Table 4b – Base Capacity Resource Constraints for 2018/2019 and 2019/2020 BRAs

	2018/2019 BRA		2019/2020 BRA	
Location	(% of Peak)	(UCAP MW)	(% of Peak)	(UCAP MW)
RTO	18.9%	28,571	19.9%	29,216
MAAC	30.3%	16,726	30.9%	16,490
EMAAC	44.4%	13,394	44.9%	13,005
SWMAAC	22.2%	2,820	20.2%	2,480
PS	50.7%	4,817	46.8%	4,313
PSNORTH	38.8%	1,804	36.1%	1,659
DPLSOUTH	19.5%	438	15.4%	328
PEPCO	23.5%	1,431	22.2%	1,324
ATSI	28.7%	3,474	27.8%	3,276
Cleveland	24.6%	1,024	33.7%	1,329
COMED	52.5%	11,288	53.5%	10,921
BGE	22.1%	1,462	15.8%	997
PL	16.8%	1,146	24.1%	1,636

Capacity Import Limits

Effective with the 2017/2018 BRA, PJM implemented limits that recognize the amount of capacity from external resources that PJM can reliably import into the PJM Region. For each BRA, a simultaneous PJM Region Capacity Import Limit and non-simultaneous Capacity Import Limits for five external source-zones are determined and posted with the BRA planning parameters. The CIL used in the auction is determined in a manner that ensures that the sum of the granted CIL exceptions plus the CIL used in the auction does not exceed either the reserved, firm Network External Designated (NED) transmission service minus the Capacity Benefit Margin (CBM), or the First Contingency Total Transfer Capability (FCTTC) minus the CBM.[5] As a result, for the 2019/2020 BRA and consistent with the 2018/2019 BRA, no imports will be cleared in the BRA other than those for which a CIL exception is granted because the simultaneous PJM Region import limit is zero. As of 2/1/16, granted CIL exceptions totaled 4,977 MW. Because CIL exceptions can continue to be granted up until the BRA, PJM will post the final quantity of granted CIL exceptions prior to the opening of the auction window.

Table 5 – Capacity Import Limits for 2019/2020 BRA

	Simultaneous PJM Region	External Source Zone				
		North	West 1	West 2	South 1	South 2
Preliminary CIL for 2019/2020 BRA	0	29	0	267	0	86
Final CIL for 2018/2019 BRA	0	92	0	0	0	0

[5] The posted 2019/2020 planning parameters contain additional information and detail on the CIL determination.

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Summary

- The forecast peak load for the PJM RTO for the 2019/2020 Delivery Year is 157,188 MW which is 4,230 MW or about 2.6% below the forecast peak load of 161,418 MW for the 2018/2019 BRA.

- The PJM RTO Reliability Requirement for the 2019/2020 Delivery Year is 171,037 MW which is 3,860 MW or about 2.2% below the 2018/2019 BRA value prior to adjustment for FRR obligation.

- As described in the PJM Load Forecast Report of January 2016, PJM has significantly revised several aspects of its load forecast model since the 2015 report including the introduction of variables that account for energy efficiency measures. With energy efficiency now explicitly reflected in the peak load forecast, the Reliability Requirement of the RTO and each affected LDA will be increased by the total UCAP value of all EE Resources for which PJM accepts an Measurement and Verification Plan for the BRA. PJM will post updated planning parameters to reflect these quantities prior to the opening of the auction window.

- The MAAC, EMAAC, SWMAAC, PS, PSNORTH, PEPCO, DPLSOUTH, ATSI, Cleveland, ComEd, BGE and PPL LDAs will be modeled in the 2019/2020 BRA. These are the same LDAs that were modeled in the 2017/2018 and 2018/2019 BRAs.

- LDA Reliability Requirements for the 2019/2020 BRA are lower than those of the 2018/2019 BRA primarily due to lower forecast peak load levels for 2019/2020 with the exception of the PPL LDA. The increase in reliability requirement for the PPL LDA is due to an increase in the restricted winter peak load of this winter-peaking zone.

- For the 2019/2020 BRA, similar to 2018/2019 BRA, no imports will be cleared in the BRA other than those for which a CIL exception is granted because the simultaneous import limit is zero. As of 2/1/16, granted CIL exceptions totaled 4,977 MW, however, CIL exceptions can continue to be granted up until the BRA and PJM will post the final quantity of granted CIL exceptions prior to the opening of the auction window.