2021/2022 RPM Base Residual Auction Planning Period Parameters

Introduction

The planning parameters for the 2021/2022 RPM Base Residual Auction (BRA) that is to be conducted in May of 2018 were posted on the PJM RPM website on February 1, 2018. This document describes the posted parameters and provides a comparison to the 2020/2021 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 2021/2022 BRA are shown and compared to the 2020/2021 BRA parameters in Table 1.

The forecast peak load for the PJM RTO for the 2021/2022 Delivery Year is 152,667MW which is 1,248 MW or about 0.8% below the forecast peak load of 153,915 MW for the 2020/2021 BRA. The PJM Load Forecast Report of January 2018 describes the peak load forecast model and provides a comparison to prior peak load forecasts[1]. The PJM RTO Reliability Requirement for the 2021/2022 Delivery Year is 166,377 MW which is 1,267 MW or about 0.8% below the 2020/2021 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 2018 Load Forecast Report is located at: http://www.pjm.com/-/media/library/reports-notices/load-forecast/2018-load-forecast-report.ashx?la=en

[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 2021/2022 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 2018.

Table 1 – Reserve Requirement Parameters for 2020/2021 and 2021/2022 BRAs

Reserve Requirement Parameters	2020/2021 BRA	2021/2022 BRA
Installed Reserve Margin (IRM)	16.6%	15.8%
Pool Wide 5-Year Average EFORd	6.59%	5.89%
Forecast Pool Requirement (FPR)	1.0892	1.0898
Forecast Peak Load (MW)	153,915	152,667
PJM RTO Reliability Requirement (UCAP MW)	**167,644**	**166,377**
FRR Obligation (UCAP MW)*	13,289	
PJM RTO Reliability Requirement adjusted for FRR (UCAP MW)	154,355	

*The 2021/2022 BRA PJM RTO Reliability Requirement will be updated to include FRR load in mid-April 2018.

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, a separate VRR Curve will be established for the 2021/2022 BRA for each of the LDAs listed in Table 2. The list includes the same LDAs that were modeled with a separate VRR Curve in the 2020/2021 BRA. Of the LDAs listed on Table 2, the MAAC, EMAAC, ComEd and DEOK LDAs had a Locational Price Adder in last year's 2020/2021 BRA. The EMAAC and ComEd LDAs have cleared with a Locational Price Adder in the past three BRAs and the BGE LDA cleared with a Locational Price Adder in the 2019/2020 BRA. While none of the other listed LDAs had a Locational Price Adder in any of the last three BRAs or had a CETL to CETO ratio less than 1.15, they will be modeled in order to maintain an acceptable level of reliability

[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.

consistent with the Reliability Principles and Standards. Establishing a separate VRR Curve for an LDA does not predestine the LDA to clear the BRA with a Locational Price Adder; an LDA will only clear at a higher clearing price if reliability constraints are reached when attempting to import capacity into the LDA in the auction clearing.

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 2021/2022 BRA. For comparison purposes, the LDA Reliability Requirement and CETL values used in the 2020/2021 BRA are also shown in Table 2.

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 reliability requirement of an LDA will increase for an increase in the forecast peak load of the LDA and a decrease in the availability rate of capacity resources located in the LDA.

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 2021/2022 BRA vary significantly in some cases from those of the 2020/2021 BRA in both the upward and downward direction but, in general, the magnitude of the changes for most regions lies within the year-to-year changes historically experienced. The COMED LDA CETL had the largest increase in terms of magnitude and percentage as compared to 2020/2021, while the PS and PS-NORTH LDA CETL had the largest decreases in terms of magnitude and percentage as compared to 2020/2021. The COMED CETL is 1,510 MW higher for the 2021/2022 BRA, a 37% increase from the 2020/2021 BRA CETL. The increase in COMED CETL is primarily due to two baseline 345 kV transmission re-conductoring projects in AEP (b2776 and b2777) as well as two baseline 345 kV transmission upgrades in COMED (b2930 and b2931) that were not included in the 2020/2021 BRA CETL power flow study. These four upgrades are shown in the list of Key Expected Facilities that is posted along with the planning parameters. The PS CETL is 1,099 MW lower for the 2021/2022 BRA, a 14% decrease from the 2020/2021 BRA CETL. The PS-NORTH CETL is 1,084 MW lower for the 2021/2022 BRA, a 25% decrease from the 2020/2021 BRA CETL. Several factors contributed to the PSEG and PS-NORTH LDA CETL decrease. New load deliverability rules approved by the PJM Markets & Reliability Committee in the fall of 2017 were the primary factors contributing to the decrease in the CETL. This decrease however was partially offset by the conversion of the HTP merchant transmission project's Firm Transmission Withdrawal Rights to Non-firm Firm Transmission Withdrawal Rights. In the case of the PSEG LDA the decrease was further offset by the suspension of the Poseidon merchant transmission project's ISA.

Table 2 – LDA Reliability Requirements and Capacity Import Limits for 2020/2021 and 2021/2022 BRAs

	2020/2021 BRA		2021/2022 BRA		Delta	
LDA	Reliability Requirement (UCAP MW)	CETL (MW)	Reliability Requirement (UCAP MW)	CETL (MW)	Reliability Requirement (UCAP MW)	CETL (MW)
MAAC	66,385.0	4,218.0	64,919.0	4,019.0	-1,466.0	-199.0
EMAAC	36,921.0	8,800.0	35,997.0	9,150.0	-924.0	350.0
SWMAAC	15,486.0	9,802.0	15,259.0	9,082.0	-227.0	-720.0
PS	11,797.0	8,001.0	11,501.0	6,902.0	-296.0	-1,099.0
PS NORTH	6,023.0	4,264.0	5,810.0	3,180.0	-213.0	-1,084.0
DPL SOUTH	2,999.0	1,872.0	2,907.0	1,624.0	-92.0	-248.0
PEPCO	7,978.0	7,625.0	8,073.0	6,915.0	95.0	-710.0
ATSI	15,610.0	9,814.0	15,730.0	9,705.0	120.0	-109.0
ATSI-Cleveland	5,865.0	5,605.0	5,869.0	5,346.0	4.0	-259.0
COMED	26,224.0	4,064.0	26,112.0	5,574.0	-112.0	1,510.0
BGE	8,132.0	6,244.0	7,910.0	6,005.0	-222.0	-239.0
PL	9,829.0	7,084.0	9,974.0	6,609.0	145.0	-475.0
DAYTON	4,027.0	3,401.0	3,979.0	3,502.0	-48.0	101.0
DEOK	7,500.0	5,072.0	7,557.0	4,959.0	57.0	-113.0

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). As shown on the posted planning parameters and as discussed in the Price Responsive Demand (PRD) section of this report , the VRR curve of the RTO and each affected LDA is shifted leftward along the horizontal axis to reflect any PRD that has elected to participate in the 2021/2022 Delivery Year BRA.

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 2021/2022 BRA. For comparison purposes, the CONE values used in the 2020/2021 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 2021/2022 BRA are based on the gross CONE values used in the 2020/2021 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 2021/2022 net E&AS values are based on LMPs from calendar years 2015 through 2017 whereas the 2020/2021 values were based on LMPs from calendar years 2014 through 2016.

The Net CONE increased for the RTO and for all of the modeled LDAs. The Net CONE of the RTO increased by 9.8% and the increase in LDA Net CONE values ranged from 4.4% for the ComEd LDA to 37% for the BGE LDA. The increase in Net CONE values is driven by a decrease in the Net E&AS for the RTO and all LDAs. The Net E&AS values for the 2021/2022 BRA relative to the 2020/2021 BRA reflect replacement of the 2014 calendar year values with 2017 calendar year values in the determination of the updated three-year rolling average, with the 2014 calendar year Net E&AS values being significantly greater than the 2017 calendar year Net E&AS values.

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

Table 3 – Net CONE for PJM RTO and LDAs for 2020/2021 and 2021/2022 BRAs

	2020/2021 BRA				2021/2022 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	134,480	34,601	99,879	$ 292.95	135,309	24,851	110,459	$ 321.57	28.62	9.8%
MAAC	134,520	48,466	86,054	$ 252.40	134,831	34,293	100,538	$ 292.69	40.29	16.0%
EMAAC	134,310	37,788	96,522	$ 283.10	133,144	25,365	107,779	$ 313.77	30.67	10.8%
SWMAAC	136,733	67,715	69,019	$ 202.43	140,953	49,968	90,985	$ 264.88	62.45	30.8%
PS, PS NORTH	134,310	29,668	104,642	$ 306.92	133,144	19,580	113,564	$ 330.61	23.69	7.7%
DPL SOUTH	134,310	47,378	86,932	$ 254.97	133,144	30,032	103,112	$ 300.18	45.21	17.7%
PEPCO	136,733	59,498	77,235	$ 226.53	140,953	42,911	98,043	$ 285.42	58.89	26.0%
ATSI, Cleveland	133,413	44,367	89,046	$ 261.17	133,016	27,607	105,409	$ 306.87	45.70	17.5%
COMED	133,413	20,967	112,446	$ 329.81	133,016	14,728	118,289	$ 344.36	14.55	4.4%
BGE	136,733	75,931	60,802	$ 178.33	140,953	57,026	83,928	$ 244.33	66.00	37.0%
PL	133,465	42,320	91,145	$ 267.33	134,124	30,826	103,298	$ 300.72	33.39	12.5%
DAYTON	133,413	40,287	93,126	$ 273.14	133,016	25,650	107,366	$ 312.56	39.42	14.4%
DEOK	133,413	37,109	96,304	$ 282.46	133,016	25,567	107,449	$ 312.80	30.34	10.7%

Price Responsive Demand (PRD)

Price Responsive Demand is provided by a PJM Member that represents retail customers having the ability to predictably reduce consumption in response to changing wholesale prices. In the PJM Capacity Market, a PRD Provider may voluntarily make a firm commitment of the quantity of PRD that will reduce its consumption in response to real time energy price during a Delivery Year.

In order to commit PRD for a Delivery Year, a PRD Provider must submit a PRD Plan by the January 15th preceding the BRA for such Delivery Year that demonstrates to PJM's satisfaction that the nominated amount of PRD will be available by the start of the Delivery Year and that the Plan satisfies all requirements as described in section 3A of PJM Manual18: PJM Capacity Market. A PRD Provider that is committing PRD in a BRA must also submit a PRD election in the eRPM system which indicates the Nominal PRD Value in MWs that the PRD Provider is willing to commit at different reservation prices ($/MW-day). The VRR curve of the RTO and each affected LDA is shifted leftward along the horizontal axis by the UCAP MW quantity of elected PRD where the leftward shift occurs only for the portion of the VRR Curve at or above the PRD Reservation price.

2021/2022 RPM Base Residual Auction Planning Period Parameters

As shown in the 2021/2022 Planning Parameters, 510 MW of PRD across the RTO has elected to participate in the 2021/2022 BRA: 240 MW in the BGE LDA, 195 MW in the PEPCO LDA, and 75 MW in the EMAAC LDA (with 35.7 MW located in the DPL-South LDA). The VRR Curve of the RTO and each affected LDA is shifted leftward along the horizontal axis by the UCAP MW value of these quantities at the PRD Reservation Price. Once committed in a BRA, a PRD commitment cannot be replaced; the commitment can only be satisfied through the registration of price response load in the DR Hub system prior to or during the Delivery Year.

By comparison, in the 2020/2021 BRA 558 MW of PRD elected to participate: 330 MW in the BGE LDA, 170 MW in the PEPCO LDA, and 58 MW in the EMAAC LDA (with 23 MW located in the DPL-South LDA).

Summary

- The forecast peak load for the PJM RTO for the 2021/2022 Delivery Year is 152,667MW which is 1,248 MW or about 0.8% below the forecast peak load of 153,915 MW for the 2020/2021 BRA.

- The PJM RTO Reliability Requirement for the 2021/2022 Delivery Year is 166,377 MW which is 1,267 MW or about 0.8% below the 2020/2021 BRA value prior to adjustment for FRR obligation. The Reliability Requirement will be updated to include FRR load in mid-April 2018.

- The MAAC, EMAAC, SWMAAC, PS, PSNORTH, PEPCO, DPLSOUTH, ATSI, Cleveland, ComEd, BGE, PPL, DAYTON and DEOK LDAs will be modeled in the 2021/2022 BRA. These are the same LDAs that were modeled in the 2020/2021 BRA.

- 510 MW of PRD across the RTO has elected to participate in the 2021/2022 BRA: 240 MW in the BGE LDA, 195 MW in the PEPCO LDA, and 75 MW in the EMAAC LDA (with 35.7 MW located in the DPL-South LDA).

- 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.