



2023/2024 RPM Base Residual Auction Planning Period Parameters

Introduction

The planning parameters for the 2023/2024 RPM Base Residual Auction (BRA) that is to be conducted in December of 2021 were posted on the PJM RPM website on August 23, 2021. This document describes the posted parameters and provides a comparison to the 2022/2023 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 2023/2024 BRA are shown and compared to the 2022/2023 BRA parameters in Table 1.

The forecast peak load for the PJM RTO for the 2023/2024 Delivery Year is 150,858 MW which increased by 629 MW, or 0.4% compared to the forecast peak load of 150,229 MW for the 2022/2023 BRA. The forecast PJM system peak load is that reported in Table B-10 of the January 2021 RPM update of the PJM Load Forecast Report.¹ The PJM RTO Reliability Requirement for the 2023/2024 Delivery Year is 163,887 MW which increased by 618 MW, or 0.4% compared to the 2022/2023 BRA value prior to adjustment for FRR obligation of 163,269 MW.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 $(1 + \text{IRM})$ times $(1 - \text{Pool-wide Average EFORD})$. 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 2021 RPM Forecast is located at <https://www.pjm.com/-/media/library/reports-notices/load-forecast/2021-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 2023/2024 BRA planning parameters will be updated to reflect the total UCAP Obligation of FRR Entities after FRR Capacity Plans are submitted and reviewed in November 2021.



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Table 1 – Reserve Requirement Parameters for 2022/2023 and 2023/2024 BRAs

Reserve Requirement Parameters	2022/2023 BRA	2023/2024 BRA	Change in Value	Change in Percent
Installed Reserve Margin (IRM)	14.50%	14.40%	-0.10%	-0.7%
Pool Wide 5-Year Average EFORd	5.08%	5.04%	-0.04%	-0.8%
Forecast Pool Requirement (FPR)	1.0868	1.0863	-0.0005	0.0%
Forecast Peak Load (MW)	150,229	150,858	629	0.4%
PJM RTO Reliability Requirement (UCAP MW)	163,269	163,887	618	0.4%
FRR Obligation (UCAP MW)*	31,012			
PJM RTO Reliability Requirement adjusted for FRR (UCAP MW)	132,257			

*The 2023/2024 BRA PJM RTO Reliability Requirement will be updated to reflect FRR load in November 2021.

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 2023/2024 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 2022/2023 BRA. Of the LDAs listed on Table 2, the MAAC, EMAAC, ATSI, BGE, ComEd, DEOK and PS LDAs have cleared with a Locational Price Adder in one or more of the past three BRAs. The DPL SOUTH LDA has a CETL to CETO ratio of 1.14, which is less than 1.15 for the 2023/2024 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 consistent with the Reliability Principles and

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.



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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 2023/2024 BRA. For comparison purposes, the LDA Reliability Requirement and CETL values used in the 2022/2023 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 2023/2024 BRA vary significantly in some cases from those of the 2022/2023 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.

Of those LDAs that had a Locational Price Adder in one or more of the last three BRAs, the MAAC LDA CETL had the largest increase as compared to 2022/2023 and the COMED LDA CETL had the largest decrease as compared to 2022/2023. The MAAC LDA CETL is 2,006 MW higher for the 2023/2024 BRA, a 46% increase from the 2022/2023 BRA CETL. The COMED LDA CETL is 983 MW lower for the 2023/2024 BRA, a 14% decrease from the 2022/2023 BRA CETL.

The increase in MAAC LDA CETL is primarily attributable to the deactivation of the Morgantown generating units for which deactivation notifications were submitted in June of 2021 with a requested deactivation date of May 2022. The removal of nearly 1,230 MW of Morgantown generation from the CETL model reduced the loading on the High Ridge-Sandy Spring 230 kV line which was a limiting transmission facility in the 2022/2023 BRA CETL model. The reduced loading of this circuit allowed for a higher level of imports into the MAAC LDA before this same circuit again limited the LDA CETL in the 2023/2024 CETL model.



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The decrease in COMED LDA CETL is primarily attributable to the deactivation of the Waukegan, Will County, and Byron generating units for which deactivation notifications were submitted in June of 2021 with requested deactivation dates of May 2022 for the Waukegan and Will County units and September 2021 for the Byron units. The removal of these generation resources totaling about 3,500 MW from the CETL model resulted in a significantly different flow pattern and different set of transmission facilities that limited imports into the ComEd LDA at a lower CETL level than that of the 2022/2023 BRA CETL.

Table 2 – LDA Reliability Requirements and Capacity Import Limits for 2022/2023 and 2023/2024 BRAs

LDA	2022/2023 BRA		2023/2024 BRA		Delta			
	Reliability Requirement (UCAP MW)	CETL (MW)	Reliability Requirement (UCAP MW)	CETL (MW)	Reliability Requirement (UCAP MW)	CETL (MW)	Reliability Requirement (Percent)	CETL (Percent)
MAAC	64,514.0	4,375.0	64,910.0	6,381.0	396.0	2,006.0	1%	46%
EMAAC	35,884.0	9,173.0	36,125.0	8,704.0	241.0	-469.0	1%	-5%
SWMAAC	14,934.0	8,310.0	14,746.0	8,249.0	-188.0	-61.0	-1%	-1%
PS	11,686.0	8,626.0	11,716.0	8,991.0	30.0	365.0	0%	4%
PS NORTH	6,180.0	4,360.0	6,194.0	4,360.0	14.0	0.0	0%	0%
DPL SOUTH	3,155.0	2,053.0	3,191.0	2,025.0	36.0	-28.0	1%	-1%
PEPCO	7,701.0	6,781.0	7,179.0	7,160.0	-522.0	379.0	-7%	6%
ATSI	15,011.0	9,119.0	15,105.0	9,602.0	94.0	483.0	1%	5%
ATSI-Cleveland	5,761.0	5,229.0	5,620.0	4,962.0	-141.0	-267.0	-2%	-5%
COMED	23,931.0	6,839.0	23,816.0	5,856.0	-115.0	-983.0	0%	-14%
BGE	7,828.0	5,683.0	7,891.0	5,662.0	63.0	-21.0	1%	0%
PL	10,244.0	4,850.0	10,334.0	4,767.0	90.0	-83.0	1%	-2%
DAYTON	3,950.0	3,941.0	4,069.0	4,022.0	119.0	81.0	3%	2%
DEOK	7,407.0	5,465.0	7,528.0	5,641.0	121.0	176.0	2%	3%

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



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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 2023/2024 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 2023/2024 BRA. For comparison purposes, the CONE values used in the 2022/2023 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 (“EAS”) revenue offset or forward net energy and ancillary services revenue offset for the 2023/2024 Delivery Year. The Net CONE increased for the RTO and for all of the modeled LDAs. The Net CONE of the RTO increased by 1.2% and the increase in LDA Net CONE values ranged from 1.2% for the RTO LDA to 13.8% for the DAYTON LDA. The increase in Net CONE across all LDAs is due to the escalation in Gross CONE values determined as part of the quadrennial review update and the forward EAS values increasing slightly or decreasing for some LDAs. The Gross CONE values increased in all LDAs, while the calculated Forward Net EAS increased in all LDAs except for the ATSI-CLEVELAND, COMED, PL, DAYTON, and DEOK LDAs. The Net EAS values for the 2023/2024 are shaped using the 2023/2024 forward LMP data on LMPs from calendar years 2018 through 2020 for historical data, whereas the Net EAS values for the 2022/2023 are shaped using the 2022/2023 forward LMP data on LMPs from calendar years 2018 through 2020 for historical data.



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Table 3 – Net CONE for PJM RTO and LDAs for 2022/2023 and 2023/2024 BRAs

Location	2022/2023 BRA				2023/2024 BRA				Change in Net CONE	
	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	\$107,175	\$16,924	\$90,251	\$260.50	\$113,866	\$22,205	\$91,661	\$263.73	\$3.23	1.2%
MAAC	\$107,627	\$22,703	\$84,925	\$245.12	\$111,814	\$23,288	\$91,306	\$262.71	\$17.59	7.2%
EMAAC	\$108,000	\$18,144	\$89,856	\$259.36	\$115,314	\$19,791	\$95,522	\$274.84	\$15.48	6.0%
SWMAAC	\$109,700	\$25,530	\$84,173	\$242.95	\$116,598	\$29,517	\$87,082	\$250.56	\$7.61	3.1%
PS, PS NORTH	\$108,000	\$14,997	\$93,003	\$268.44	\$115,314	\$17,275	\$98,039	\$282.08	\$13.64	5.1%
DPL SOUTH	\$108,000	\$26,173	\$81,827	\$236.18	\$115,314	\$29,989	\$85,324	\$245.50	\$9.32	3.9%
PEPCO	\$109,700	\$19,786	\$89,914	\$259.52	\$116,598	\$22,991	\$93,607	\$269.33	\$9.81	3.8%
ATSI, Cleveland	\$105,500	\$25,642	\$79,858	\$230.50	\$111,737	\$21,279	\$90,458	\$260.27	\$29.77	12.9%
COMED	\$105,500	\$19,626	\$85,874	\$247.86	\$111,737	\$15,467	\$96,270	\$276.99	\$29.13	11.8%
BGE	\$109,700	\$31,273	\$78,427	\$226.37	\$116,598	\$36,043	\$80,555	\$231.78	\$5.41	2.4%
PL	\$105,500	\$18,744	\$86,756	\$250.41	\$111,814	\$16,586	\$95,228	\$273.99	\$23.58	9.4%
DAYTON	\$105,500	\$27,090	\$78,410	\$226.32	\$111,737	\$22,212	\$89,525	\$257.59	\$31.27	13.8%
DEOK	\$105,500	\$28,023	\$77,477	\$223.63	\$111,737	\$23,965	\$87,772	\$252.54	\$28.91	12.9%

Price Responsive Demand (PRD)

Price Responsive Demand is provided by a PJM Member that represents retail customers having the ability to automatically 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 August 6th 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.⁴ A PRD Provider that is committing PRD in a BRA must also submit a PRD election in the Capacity Exchange 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. Once committed in a BRA, a PRD

⁴ PRD Providers must submit a PRD Plan by January 15th preceding the BRA for such Delivery Year during normal BRA scheduled auctions.



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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.

As shown in the 2023/2024 Planning Parameters, 235 MW of PRD across the RTO has elected to participate in the 2022/2023 BRA: 87 MW in the BGE LDA, 110 MW in the PEPCO LDA, and 38 MW in the EMAAC LDA (with 15.4 MW located in the DPL-South LDA). By comparison, 230 MW of PRD elected to participate in the 2022/2023 BRA: 80 MW in the BGE LDA, 110 MW in the PEPCO LDA, and 40 MW in the EMAAC LDA (with 19.6 MW located in the DPL-South LDA).

Summary

- The forecast peak load for the PJM RTO for the 2023/2024 Delivery Year is 150,504 MW which is 275 MW, or 0.2%, above the forecast peak load of 150,229 MW for the 2022/2023 BRA.
- The PJM RTO Reliability Requirement for the 2023/2024 Delivery Year is 163,493 MW which is 224 MW, or 0.1%, above the 2022/2023 BRA value prior to adjustment for FRR obligation. The Reliability Requirement will be updated to include FRR load in November 2021.
- The MAAC, EMAAC, SWMAAC, PS, PSNORTH, PEPCO, DPLSOUTH, ATSI, Cleveland, ComEd, BGE, PPL, DAYTON, and DEOK LDAs will be modeled in the 2023/2024 BRA. These are the same LDAs that were modeled in the 2022/2023 BRA.
- 235 MW of PRD across the RTO has elected to participate in the 2023/2024 BRA: 87 MW in the BGE LDA, 110 MW in the PEPCO LDA, and 38 MW in the EMAAC LDA (with 15.4 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.