

VRR Curve

2022 Quadrennial Review
March 25, 2022

IMM

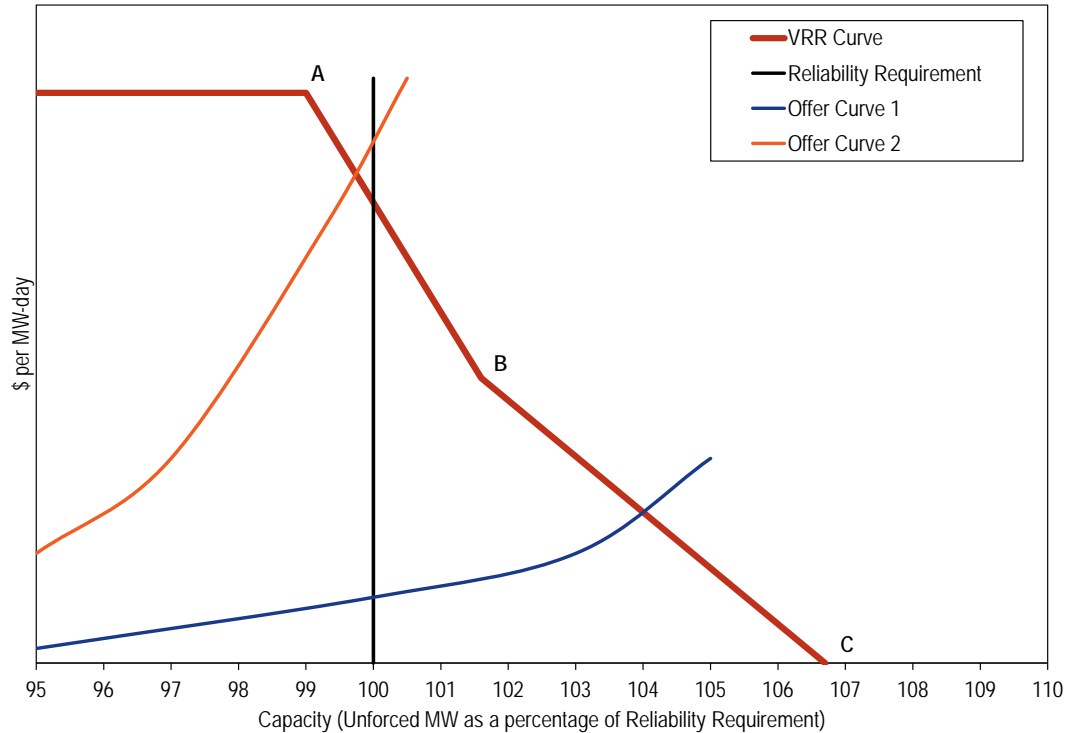


Monitoring Analytics

VRR curve issues

- **VRR curve shape and location have a significant impact on market results:**
 - **Price**
 - **MW**
 - **Total payments for capacity**
- **Vertical VRR curve versus current VRR curve:**
 - **Results in lower MW purchased**
 - **Results in lower price**
 - **Results in lower payments for capacity**
 - **When supply curve intersects demand curve to right of vertical demand curve.**

Example VRR curves and supply curves



VRR curve issues

- **For impact of vertical demand curve in 2022/2023 BRA, see results of IMM BRA Report Scenario 1**
 - **Vertical demand curve in 2022/2023 would have reduced total payments for capacity by \$1.257 billion or 32.1 percent**
 - **Downward sloping curve increased total payments for capacity by \$1.257 billion or 47.3 percent.**
- **BRA Report:**
https://www.monitoringanalytics.com/reports/Reports/2022/IMM_Analysis_of_the_20222023_RPM_BRA_20220222.pdf

VRR curve issues

- **Logic for current VRR curve shape and location is not clear.**
- **Assertions in support of current VRR curve shape and location not demonstrated:**
 - **Price volatility impacts**
 - **Value of additional capacity**
 - **Market power mitigation**

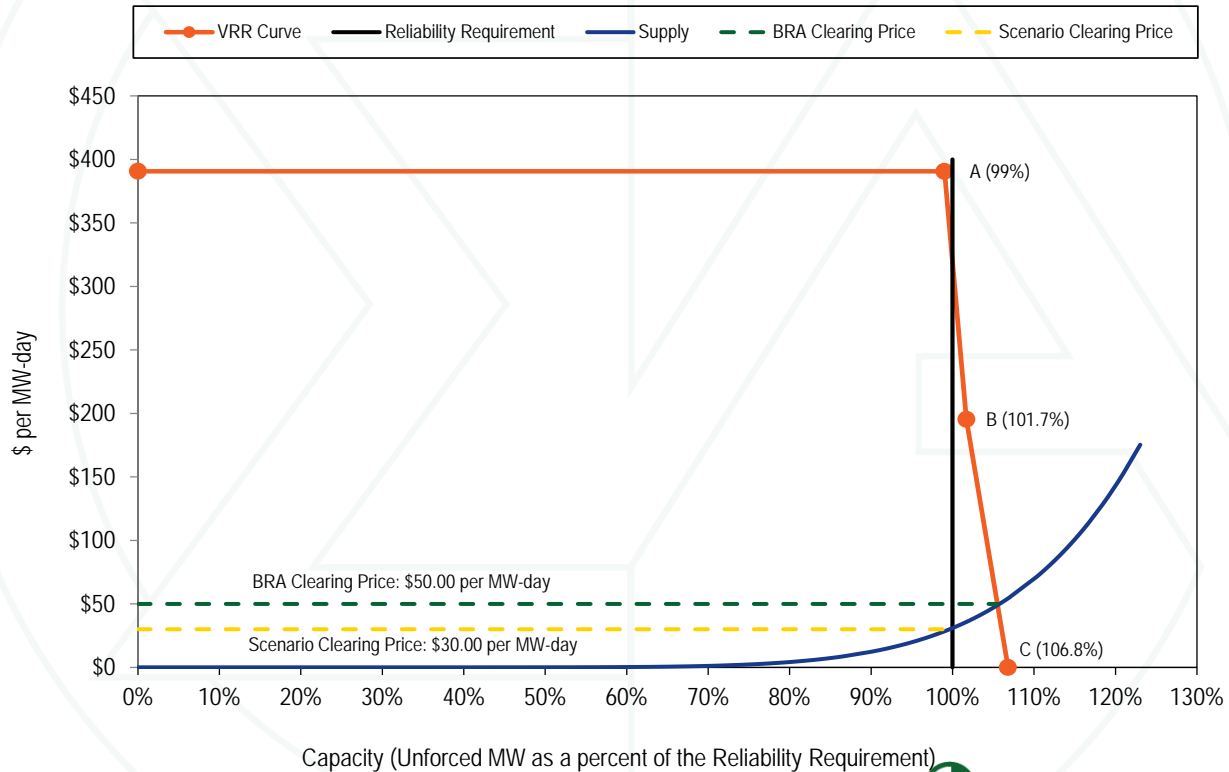
2022/2023 RPM Base Residual Auction

Scenario	Scenario Description	RPM Revenue	Scenario Impact	Percent
		(\$ per Delivery Year)	RPM Revenue (\$ per Delivery Year)	
0	Actual Results	\$3,916,990,303	NA	NA
1	Impact of Downward Sloping VRR Curve	\$2,659,527,128	\$1,257,463,175	47.3%
2	Impact of Forecast Peak Load	\$3,038,859,236	\$878,131,066	28.9%
3	Impact of ComEd CETL	\$4,045,468,797	(\$128,478,494)	(3.2%)
4	Impact of Dominion FRR	\$4,009,821,399	(\$92,831,097)	(2.3%)
5	Impact of Intermittent Capacity	\$4,209,145,809	(\$292,155,506)	(6.9%)
6	Inclusion of Demand Resources	\$4,667,530,509	(\$750,540,206)	(16.1%)
7	Inclusion of EE Offers and EE Addback	\$3,723,175,053	\$193,815,249	5.2%
8	Impact of Incorrect EE Addback	\$3,860,997,114	\$55,993,189	1.5%
9	Inclusion of PRD	\$3,971,098,221	(\$54,107,919)	(1.4%)
10	Inclusion of Seasonal Products	\$4,088,669,913	(\$171,679,610)	(4.2%)
11	Inclusion of Seasonal Matching Across LDAs	\$4,007,550,697	(\$90,560,395)	(2.3%)
12	Inclusion of Offers from External Generation	\$4,227,125,093	(\$310,134,790)	(7.3%)
13	Impact of DR, EE, PRD, Seasonal Resources, Capacity Imports, and Intermittent Capacity Overstatement	\$6,657,417,211	(\$2,740,426,908)	(41.2%)
14	Impact of Low MOPR Offers	\$4,078,113,024	(\$161,122,722)	(4.0%)
15	Inclusion of Nuclear Offers	\$3,480,464,207	\$436,526,096	12.5%
16	Impact of Noncompetitive Offers	\$3,694,010,658	\$222,979,644	6.0%

2022/2023 RPM Base Residual Auction

Scenario	Scenario Description	Scenario Impact		
		Cleared UCAP (MW)	Cleared UCAP (MW)	Percent
0	Actual Results	144,477.3	NA	NA
1	Impact of Downward Sloping VRR Curve	132,006.7	12,470.6	9.4%
2	Impact of Forecast Peak Load	138,811.6	5,665.7	4.1%
3	Impact of ComEd CETL	144,581.9	(104.6)	(0.1%)
4	Impact of Dominion FRR	143,140.5	1,336.8	0.9%
5	Impact of Intermittent Capacity	144,184.3	293.0	0.2%
6	Inclusion of Demand Resources	138,083.6	6,393.7	4.6%
7	Inclusion of EE Offers and EE Addback	139,272.3	5,205.0	3.7%
8	Impact of Incorrect EE Addback	144,068.6	408.7	0.3%
9	Inclusion of PRD	144,727.2	(249.9)	(0.2%)
10	Inclusion of Seasonal Products	144,052.8	424.5	0.3%
11	Inclusion of Seasonal Matching Across LDAs	144,363.9	113.4	0.1%
12	Inclusion of Offers from External Generation	143,951.3	526.0	0.4%
13	Impact of DR, EE, PRD, Seasonal Resources, Capacity Imports, and Intermittent Capacity Overstatement	136,610.7	7,866.6	5.8%
14	Impact of Low MOPR Offers	144,310.2	167.1	0.1%
15	Inclusion of Nuclear Offers	144,581.9	(104.6)	(0.1%)
16	Impact of Noncompetitive Offers	144,477.3	0.0	0.0%

VRR curve impact: 2022/2023 BRA



VRR curve issues

- **The initial VRR curve, introduced in 2007, had a maximum price equal to 1.5 times the Net Cost of New Entry (Net CONE).**
- **The initial VRR curve resulted in maximum auction clearing prices equal to the 1.5 times Net CONE when the amount of capacity cleared was less than 99 percent of the target reserve margin.**

VRR curve issues

- **PJM revised the VRR curve effective for the 2018/2019 delivery year.**
- **The new VRR curve has a higher maximum price when Gross CONE > 1.5 times Net CONE.**
- **The new VRR curve results in maximum auction clearing prices equal to the greater of Gross CONE or 1.5 times Net CONE when the amount of capacity cleared is less than 99 percent of the target reserve margin.**

VRR curve recommendations

- **Consider options for a VRR curve between vertical and current shape.**
- **Restore maximum price equal to 1.5 times Net CONE when the amount of capacity cleared is less than 99 percent of the target reserve margin.**

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