New Jersey Solar Performance – Supplemental Analysis

Prepared at the Request of the New Jersey Clean Energy Program

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Environmental Information Services

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Background

This supplemental analysis was performed by PJM Environmental Information Services, Inc. ("PJM EIS") at the request of the New Jersey Board of Public Utilities ("NJ BPU").

On May 23, 2018, New Jersey Governor Phil Murphy signed the Clean Energy Act, which directs the BPU to adopt rules and regulations to close the Solar Renewable Energy Certificate (SREC) program to new applications upon the attainment of 5.1 percent of the kilowatt-hours sold in the State. In January 2019, the NJBPU requested that PJM EIS prepare a report of the solar performance (in kWh per kW installed or MWh/MW installed) by year for the last 5 years for NJ solar facilities up to 10 kW, up to 100 kW, up to 1 MW and over 1 MW. The information in that report, published on February 1, 2019, provided insights in support of the process for developing the Solar Transition and Successor Program, as required by the Clean Energy Act.

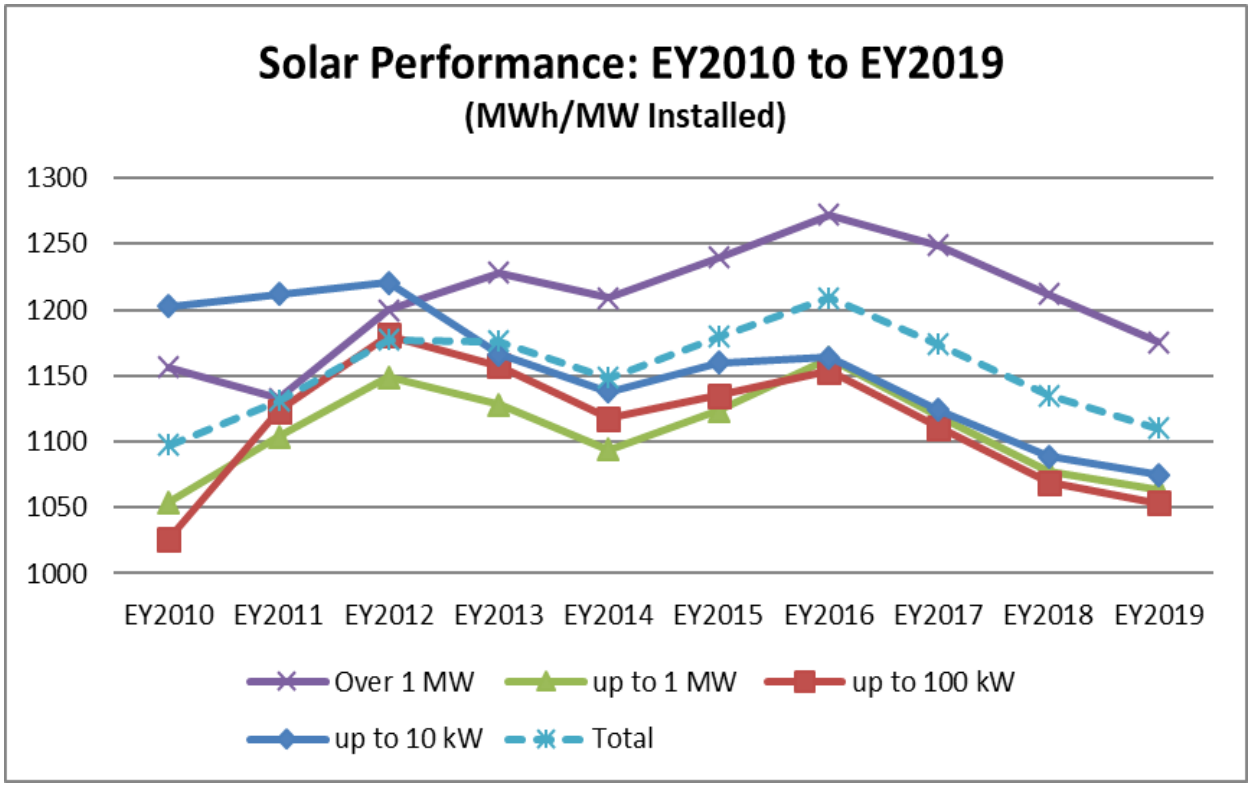
NJ BPU staff subsequently requested PJM EIS to update its analysis to include Energy Years back to 2010, and more recently Energy Year 2019. This report summarizes the solar performance analysis for the ten Energy Years ranging from 2010 to 2019.

Solar Performance Analysis

PJM EIS performed an analysis of solar performance for those facilities registered in the Generation Attribute Tracking System ("GATS") that were approved by the NJ Clean Energy Office to produce Solar Renewable Energy Credits (SRECs). Monthly generation data in kWh was retrieved by energy year for all registered facilities. Importantly, generators that had not reported generation for all twelve months in the energy year were excluded from the solar performance calculations. For example, those solar facilities that came online partway through the energy year, and those facilities that had yet to report generation for the complete energy year were excluded. Failing to exclude generators that had only partially reported their annual production would result in understating system average performance.

Solar energy production can be impacted by many variables, such as system size, tilt and orientation, DC to AC size ratio, fixed mount or tracking, shading, age, geographic location, and weather. Some of these parameters are known with certainty or can be easily estimated. For example, solar panel efficiency can be expected to degrade at a rate of approximately 0.8-1.0% per year.

Results of the solar performance analysis are shown below. The average solar performance for all NJ systems and all ten energy years analyzed was **1154** MWhs/MW of installed capacity. Over the ten-year period of this analysis, overall solar performance (teal dashed line) ranged from a low of 1097 in EY2010 to a high of 1209 in EY2016. Large systems (over 1 MW) produced better than smaller systems, averaging **1207** MWhs/MW over the ten-year period.



Capacity		Solar Performance (MWh/MW Installed)											
		EY2010	EY2011	EY2012	EY2013	EY2014	EY2015	EY2016	EY2017	EY2018	EY2019	Six-Year Average	Ten-Year Average
up to 10 kW	MWh	18,689	31,501	54,067	79,082	112,764	149,327	201,228	283,544	380,205	427,099		
	MW Installed	15.5	26.0	44.3	67.8	99.1	128.8	172.9	252.2	349.2	397.3		
	Performance	1,202	1,212	1,221	1,166	1,138	1,160	1,164	1,124	1,089	1,075	1,125	1,155
up to 100 kW	MWh	9,379	27,049	57,258	101,755	128,592	153,265	191,062	246,539	326,704	374,526		
	MW Installed	9.1	24.1	48.5	87.9	115.0	135.0	165.6	222.0	305.5	355.5		
	Performance	1,026	1,124	1,180	1,158	1,118	1,135	1,154	1,111	1,069	1,053	1,107	1,113
up to 1 MW	MWh	36,084	80,748	191,663	368,130	462,112	501,921	577,943	586,492	611,514	672,097		
	MW Installed	34.2	73.2	166.9	326.3	422.4	446.7	496.9	524.2	567.8	631.7		
	Performance	1,054	1,104	1,149	1,128	1,094	1,124	1,163	1,119	1,077	1,064	1,107	1,107
Over 1 MW	MWh	9,826	37,893	150,291	426,881	551,148	691,448	796,822	914,641	1,091,384	1,128,338		
	MW Installed	8.5	33.4	125.3	347.6	455.8	557.7	626.4	732.4	900.6	959.9		
	Performance	1,157	1,133	1,200	1,228	1,209	1,240	1,272	1,249	1,212	1,175	1,226	1,207
Total	MWh	73,978	177,191	453,279	975,848	1,254,616	1,495,961	1,767,055	2,031,216	2,409,807	2,602,060		
	MW Installed	67.4	156.7	385.0	829.7	1,092.4	1,268.2	1,461.9	1,730.8	2,123.2	2,344.5		
	Performance	**1,097**	**1,131**	**1,177**	**1,176**	**1,149**	**1,180**	**1,209**	**1,174**	**1,135**	**1,110**	**1,159**	**1,154**