Appendix M: Helioscope Performance Estimate for Rooftop Solar PV

Design Pratt Institute, Pratt Institute, Brooklyn, NY

Report

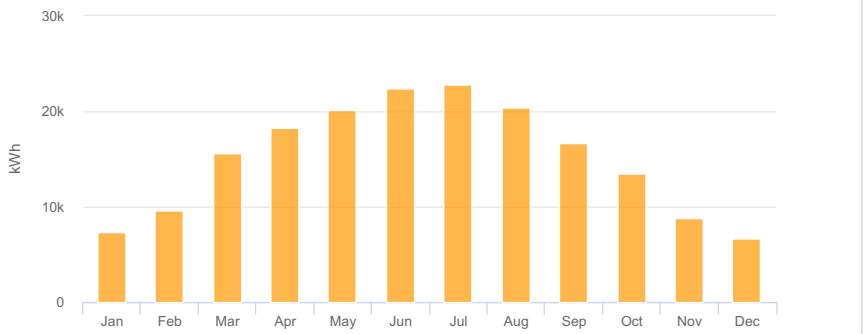
Project Name	Pratt Institute
Project Address	Pratt Institute, Brooklyn, NY
Prepared By	Pushyamitra Desai pdesai@antaresgroupinc.com

System Metrics

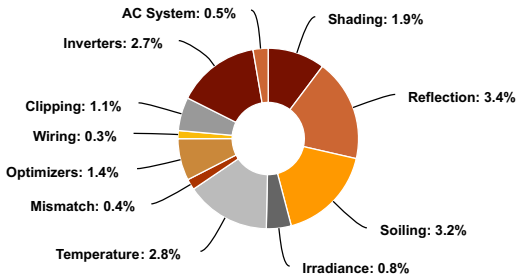
Design	Design
Module DC Nameplate	141.8 kW
Inverter AC Nameplate	113.5 kW Load Ratio: 1.25
Annual Production	182.3 MWh
Performance Ratio	83.0%
kWh/kWp	1,286.2
Weather Dataset	TMY, NEW YORK CENTRAL PRK OBS BELV, NSRDB (tmy3, III)
Simulator Version	b807a05aed-0641b4a633-894a2b6449-4ae5f462ca

Project Location

Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,472.1	
	POA Irradiance	1,548.8	5.2%
	Shaded Irradiance	1,519.5	-1.9%
	Irradiance after Reflection	1,468.2	-3.4%
	Irradiance after Soiling	1,421.3	-3.2%
	Total Collector Irradiance	**1,421.3**	**0.0%**
Energy (kWh)	Nameplate	201,642.5	
	Output at Irradiance Levels	199,984.4	-0.8%
	Output at Cell Temperature Derate	194,389.4	-2.8%
	Output After Mismatch	193,690.9	-0.4%
	Optimizer Output	191,012.5	-1.4%
	Optimal DC Output	190,503.9	-0.3%
	Constrained DC Output	188,402.2	-1.1%
	Inverter Output	183,234.6	-2.7%
	Energy to Grid	**182,318.5**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		14.7 °C
	Avg. Operating Cell Temp		22.9 °C
Simulation Metrics			
	Operating Hours		4724
	Solved Hours		4724

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, NEW YORK CENTRAL PRK OBS BELV, NSRDB (tmy3, III)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters

Rack Type	a	b	Temperature Delta
Fixed Tilt	-3.56	-0.075	3°C
Flush Mount	-2.81	-0.0455	0°C

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
14	15	8	2	1	1	0	0	1	2	2	9

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	-2.5% to 2.5%
AC System Derate	0.50%

Module Characterizations

Module	Uploaded By	Characterization
CS3W-450MS (Canadian Solar)	HelioScope	Spec Sheet Characterization, PAN

Component Characterizations

Device	Uploaded By	Characterization

Components

Component	Name	Count
Inverters	SE9KUS (SolarEdge)	3 (27.0 kW)
Inverters	SE17.3KUS (2021) (SolarEdge)	5 (86.5 kW)
Strings	10 AWG (Copper)	25 (1,746.7 ft)
Optimizers	P485 (SolarEdge)	74 (35.9 kW)
Optimizers	P1100 (SolarEdge)	124 (136.4 kW)
Module	Canadian Solar, CS3W-450MS (450W)	315 (141.8 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone 2	-	7-14	Along Racking
Wiring Zone 3	-	7-14	Along Racking
Wiring Zone 4	-	7-14	Along Racking
Wiring Zone 5	-	7-12	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 3	Fixed Tilt	Landscape (Horizontal)	10°	171.70758°	1.5 ft	1x1	50	50	22.5 kW
Field Segment 5	Fixed Tilt	Landscape (Horizontal)	10°	171.70758°	1.5 ft	1x1	63	60	27.0 kW
Field Segment 6	Fixed Tilt	Landscape (Horizontal)	10°	171.7674°	1.5 ft	1x1	91	90	40.5 kW
Field Segment 7	Fixed Tilt	Landscape (Horizontal)	10°	171.7674°	1.5 ft	1x1	44	41	18.5 kW
Flush mount E	Flush Mount	Landscape (Horizontal)	18°	81.968346°	0.0 ft	1x1	30	30	13.5 kW
Flush mount W	Flush Mount	Landscape (Horizontal)	18°	261.41638°	0.0 ft	1x1	46	44	19.8 kW

Detailed Layout