Warren Park Field House

Warren Park Field House, 6601 N Western Ave Chicago, IL 60645

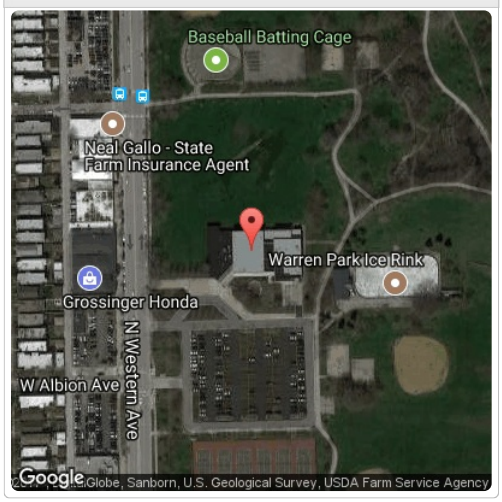
Report

Project Name	Warren Park Field House
Project Address	6601 N Western Ave Chicago, IL 60645
Prepared By	Elevate Energy bill.lyons@elevateenergy.org

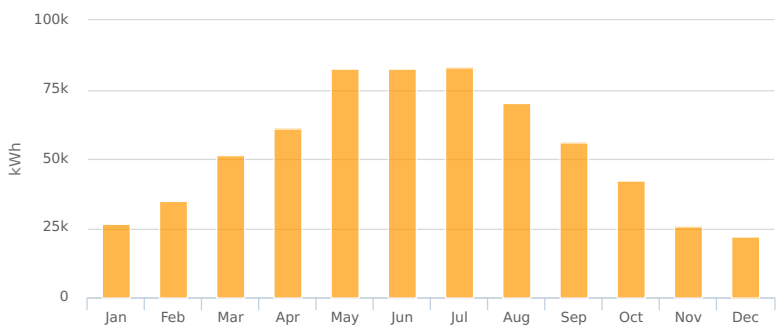
System Metrics

Design	Warren Park Field House
Module DC Nameplate	534.0 kW
Inverter AC Nameplate	468.0 kW Load Ratio: 1.14
Annual Production	638.1 MWh
Performance Ratio	84.2%
kWh/kWp	1,195.1
Weather Dataset	TMY, CHICAGO OHARE INTL AP, NSRDB (tmy3, I)
Simulator Version	9280ea5003-63654ab6a8-6a23424d70-0f982c18e7

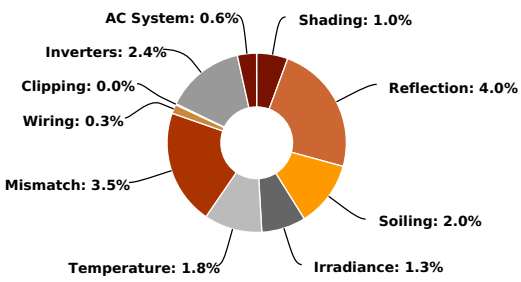
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,406.6	
	POA Irradiance	1,418.5	0.8%
	Shaded Irradiance	1,405.0	-1.0%
	Irradiance after Reflection	1,349.1	-4.0%
	Irradiance after Soiling	1,322.1	-2.0%
	Total Collector Irradiance	**1,322.1**	**0.0%**
Energy (kWh)	Nameplate	705,661.1	
	Output at Irradiance Levels	696,142.5	-1.3%
	Output at Cell Temperature Derate	683,809.3	-1.8%
	Output After Mismatch	659,853.4	-3.5%
	Optimal DC Output	658,033.2	-0.3%
	Constrained DC Output	657,808.0	0.0%
	Inverter Output	641,899.0	-2.4%
	Energy to Grid	**638,130.0**	**-0.6%**
Temperature Metrics			
	Avg. Operating Ambient Temp	13.1 °C	
	Avg. Operating Cell Temp	19.4 °C	
Simulation Metrics			
	Operating Hours	4696	
	Solved Hours	4696	

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, CHICAGO OHARE INTL AP, NSRDB (tmy3, I)											
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
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	2.00%											
Module Characterizations	Module	Characterization										
	CS6U - 325P (Canadian Solar Inc.)	CS6U-325P-AG_MIX_CSI_EXT_V6_52_1500V_2016Q4.PAN, PAN										
Component Characterizations	Device	Characterization										
	PVI 36TL 480V (Solectria)	Manufacturer										
	PVI 60TL (Solectria)	Spec Sheet										

Components

Component	Name	Count
Inverters	PVI 36TL 480V (Solectria)	3 (108.0 kW)
Inverters	PVI 60TL (Solectria)	6 (360.0 kW)
Transformers	Primary Side: Medium Voltage (12.47kV) , Secondary: 480Y/277V	1
AC Panels	3 input AC Panel	1
AC Panels	6 input AC Panel	1
AC Home Runs	10 AWG (Copper)	1 (734.6 ft)
AC Home Runs	1/0 AWG (Copper)	3 (1,311.6 ft)
AC Home Runs	1 AWG (Copper)	6 (3,209.7 ft)
AC Home Runs	1000 MCM (Copper)	1 (623.6 ft)
Strings	10 AWG (Copper)	94 (18,755.3 ft)
Modules	Canadian Solar Inc., CS6U - 325P (325W)	1,643 (534.0 kW)

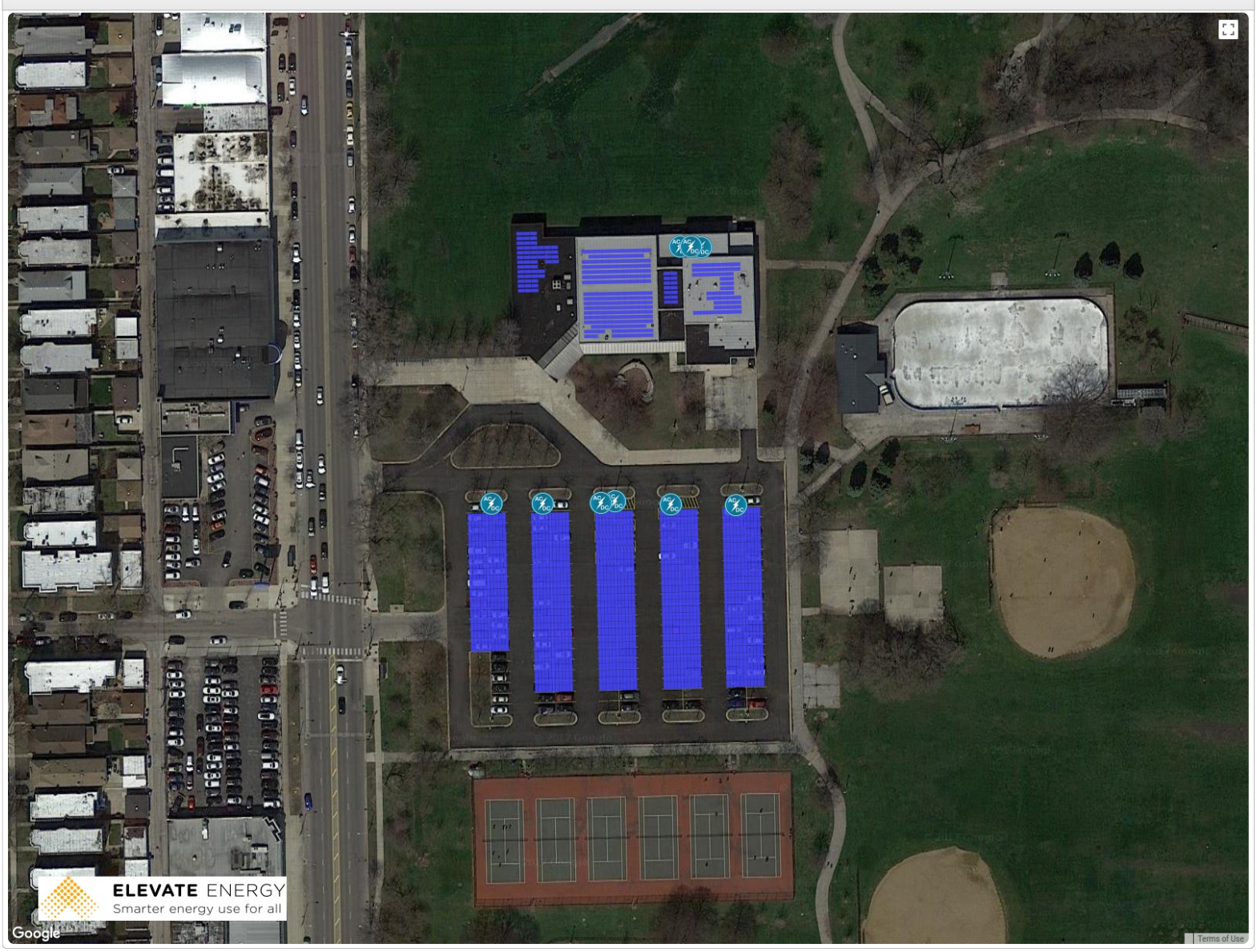
Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
roof	12	16-18	Along Racking
carports	12	16-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Roof CS	Fixed Tilt	Horizontal (Landscape)	15°	178.964°	1.3 ft	1x1	96	95	30.9 kW
Roof CN	Fixed Tilt	Horizontal (Landscape)	10°	178.825°	1.6 ft	1x1	68	68	22.1 kW
Roof E	Fixed Tilt	Horizontal (Landscape)	10°	178.483°	1.3 ft	1x1	55	50	16.3 kW
roof W	Fixed Tilt	Horizontal (Landscape)	10°	179°	1.3 ft	1x1	114	52	16.9 kW
roof ES	Fixed Tilt	Horizontal (Landscape)	10°	179°	1.3 ft	1x1	11	0	0
roof CN	Fixed Tilt	Horizontal (Landscape)	10°	179°	1.3 ft	1x1	0	0	0
Roof CE	Fixed Tilt	Horizontal (Landscape)	10°	179°	1.3 ft	1x1	14	14	4.55 kW
roof CS	Fixed Tilt	Horizontal (Landscape)	10°	179°	1.3 ft	1x1	3	0	0
Carport E	Carport	Horizontal (Landscape)	10°	268.664°	0.0 ft	1x1	286	286	93.0 kW
Carport CE	Carport	Horizontal (Landscape)	10°	268.664°	0.0 ft	1x1	286	286	93.0 kW
Carport C	Carport	Horizontal (Landscape)	10°	268.664°	0.0 ft	1x1	286	286	93.0 kW
Carport CW	Carport	Horizontal (Landscape)	10°	268.664°	0.0 ft	1x1	286	286	93.0 kW
Carport W	Carport	Horizontal (Landscape)	10°	268.664°	0.0 ft	1x1	220	220	71.5 kW

Detailed Layout



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Shading Heatmap

Shading by Field Segment

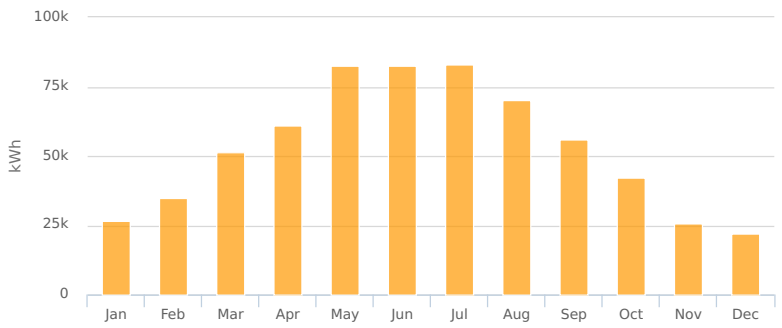
Description	Tilt	Azimuth	Modules	Nameplate	Shaded Irradiance	AC Energy	TOF[2]	Solar Access	TSRF [2]
Roof CS	15.0°	179.0°	95	30.9 kWp	1,484.8kWh/m^2	39.3 MWh[1]	95.7%	95.9%	91.8%
Roof CN	10.0°	178.8°	68	22.1 kWp	1,492.3kWh/m^2	28.2 MWh[1]	93.3%	98.9%	92.3%
Roof E	10.0°	178.5°	50	16.3 kWp	1,465.5kWh/m^2	20.4 MWh[1]	93.3%	97.2%	90.6%
roof W	10.0°	179.0°	52	16.9 kWp	1,436.8kWh/m^2	20.8 MWh[1]	93.3%	95.3%	88.8%
Roof CE	10.0°	179.0°	14	4.55 kWp	1,473.9kWh/m^2	5.74 MWh[1]	93.3%	97.7%	91.1%
Carport E	10.0°	268.7°	286	93.0 kWp	1,391.6kWh/m^2	109.9 MWh[1]	86.4%	99.6%	86.0%
Carport CE	10.0°	268.7°	286	93.0 kWp	1,392.2kWh/m^2	109.9 MWh[1]	86.4%	99.6%	86.1%
Carport C	10.0°	268.7°	286	93.0 kWp	1,392.0kWh/m^2	109.9 MWh[1]	86.4%	99.6%	86.1%
Carport CW	10.0°	268.7°	286	93.0 kWp	1,392.1kWh/m^2	109.9 MWh[1]	86.4%	99.6%	86.1%
Carport W	10.0°	268.7°	220	71.5 kWp	1,386.0kWh/m^2	84.2 MWh[1]	86.4%	99.2%	85.7%
Totals, weighted by kWp			**1,643**	**534.0 kWp**	**1,405.0kWh/m^2**	**638.1 MWh**	**87.7%**	**99.0%**	**86.9%**

[1] approximate, varies based on inverter performance
[2] based on location Optimal POA Irradiance of 1,617.2kWh/m^2 at 34.3° tilt and 179.3° azimuth

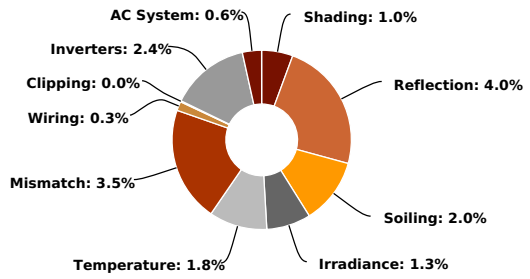
Solar Access by Month

Description	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
Roof CS	85%	93%	98%	98%	98%	98%	98%	98%	98%	95%	89%	82%
Roof CN	97%	99%	99%	99%	99%	99%	99%	99%	99%	99%	98%	96%
Roof E	90%	95%	98%	99%	99%	98%	99%	99%	99%	96%	94%	87%
roof W	83%	92%	96%	98%	98%	98%	98%	98%	97%	92%	88%	79%
Roof CE	96%	96%	98%	98%	99%	98%	98%	99%	98%	96%	97%	94%
Carport E	99%	99%	100%	100%	100%	100%	100%	100%	100%	99%	100%	99%
Carport CE	99%	99%	100%	100%	100%	100%	100%	100%	99%	100%	100%	99%
Carport C	99%	99%	100%	100%	100%	100%	100%	100%	99%	100%	100%	99%
Carport CW	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%
Carport W	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	100%	99%
Solar Access, weighted by kWp	**97.1%**	**98.5%**	**99.2%**	**99.3%**	**99.4%**	**99.5%**	**99.5%**	**99.3%**	**99.3%**	**98.7%**	**98.1%**	**96.4%**
AC Power (kWh)	**26,721.9**	**34,696.5**	**51,160.7**	**60,978.2**	**82,653.3**	**82,595.7**	**83,251.3**	**70,139.0**	**55,954.8**	**42,120.0**	**25,744.8**	**22,113.7**

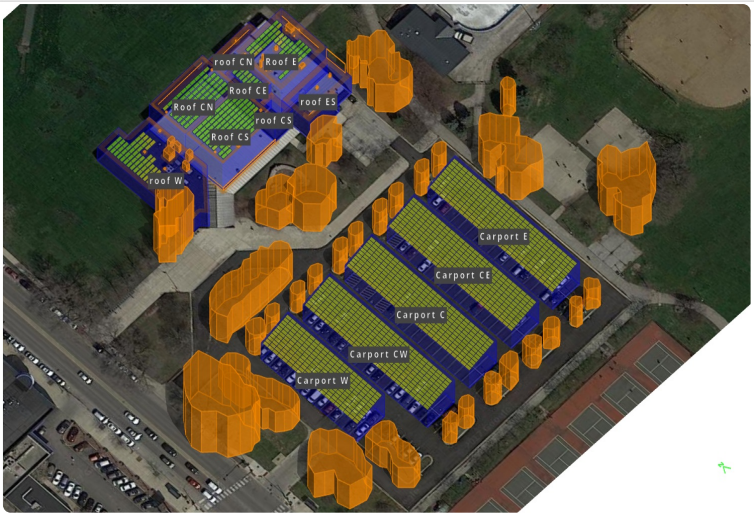
Monthly Production



Sources of System Loss



Southwestern Angle



Southeastern Angle