



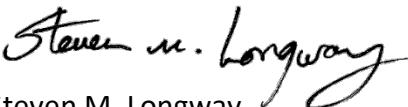
Community Power Group, LLC
5636 Connecticut Ave #42729
Washington, DC 20015

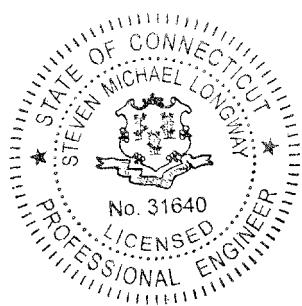
March 1, 2021

TO WHOM IT MAY CONCERN,

I, Steven M. Longway P.E. of LaBella Associates, Inc. hereby certify that the Average Annual Production for the project 24 Middle Solar, project size: 4MWac, located at 24 Middle Road, Ellington CT 06029 (Tolland County #ELLI M:053 B:47, L:0000) is true and correct to the best of my knowledge (Exhibit A). The calculations provided are based on the typical facility conditions for an average year. This letter is intended to serve as a "Connecticut Licensed Professional Engineer Certification" in regards to the 2021 SCEF RFP.

Sincerely,


Steven M. Longway
Professional Engineer,
Licensed in the State of Connecticut





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5636 Connecticut Ave #42729
Washington, DC 20015

Exhibit A

PVSyst Production Model - Variant: Ellington 550W 2.28.22 (following pages)

PVsyst - Simulation report

Grid-Connected System

Project: Ellington2021

Variant: Ellington 550W 2.28.22

Tracking system

System power: 5866 kWp

Ellington - United States

Author

Community Power Group, LLC (United states)



Project summary			
Geographical Site	Situation		Project settings
Ellington	Latitude	41.85 °N	Albedo
United States	Longitude	-72.45 °W	0.20
	Altitude	165 m	
	Time zone	UTC-5	
Meteo data			
41.89478 -72.48407			
Solar Anywhere, satellite data, SUNY model - TMY			

System summary			
Grid-Connected System		Tracking system	
PV Field Orientation		Tracking algorithm	Near Shadings
Orientation		Astronomic calculation	Linear shadings
Tracking plane, tilted axis			
Avg axis tilt	1.4 °		
Avg axis azim.	0.0 °		
System information			
PV Array		Inverters	
Nb. of modules	10665 units	Nb. of units	32 units
Pnom total	5866 kWp	Pnom total	4000 kWac
		Pnom ratio	1.466
User's needs			
Unlimited load (grid)			

Results summary				
Produced Energy	9 GWh/year	Specific production	1491 kWh/kWp/year	Perf. Ratio PR

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**PVsyst V7.2.12**

VC3, Simulation date:
28/02/22 16:06
with v7.2.12

Project: Ellington2021**Variant: Ellington 550W 2.28.22**

Community Power Group, LLC (United states)

General parameters		
Grid-Connected System	Tracking system	
PV Field Orientation		
Orientation	Tracking algorithm	Trackers configuration
Tracking plane, tilted axis	Astronomic calculation	Nb. of trackers 354 units
Avg axis tilt 1.4 °		Sizes
Avg axis azim. 0.0 °		Tracker Spacing 5.83 m
		Collector width 2.17 m
		Ground Cov. Ratio (GCR) 37.3 %
		Phi min / max. +/- 52.0 °
		Shading limit angles
		Phi limits +/- 68.0 °
Models used		
Transposition Perez		
Diffuse Imported		
Circumsolar separate		
Horizon	Near Shadings	User's needs
Free Horizon	Linear shadings	Unlimited load (grid)
Bifacial system		
Model 2D Calculation		
	unlimited trackers	
Bifacial model geometry		Bifacial model definitions
Tracker Spacing 5.83 m		Ground albedo 0.30
Tracker width 2.17 m		Bifaciality factor 70 %
GCR 37.3 %		Rear shading factor 5.0 %
Axis height above ground 2.10 m		Rear mismatch loss 10.0 %
		Shed transparent fraction 0.0 %

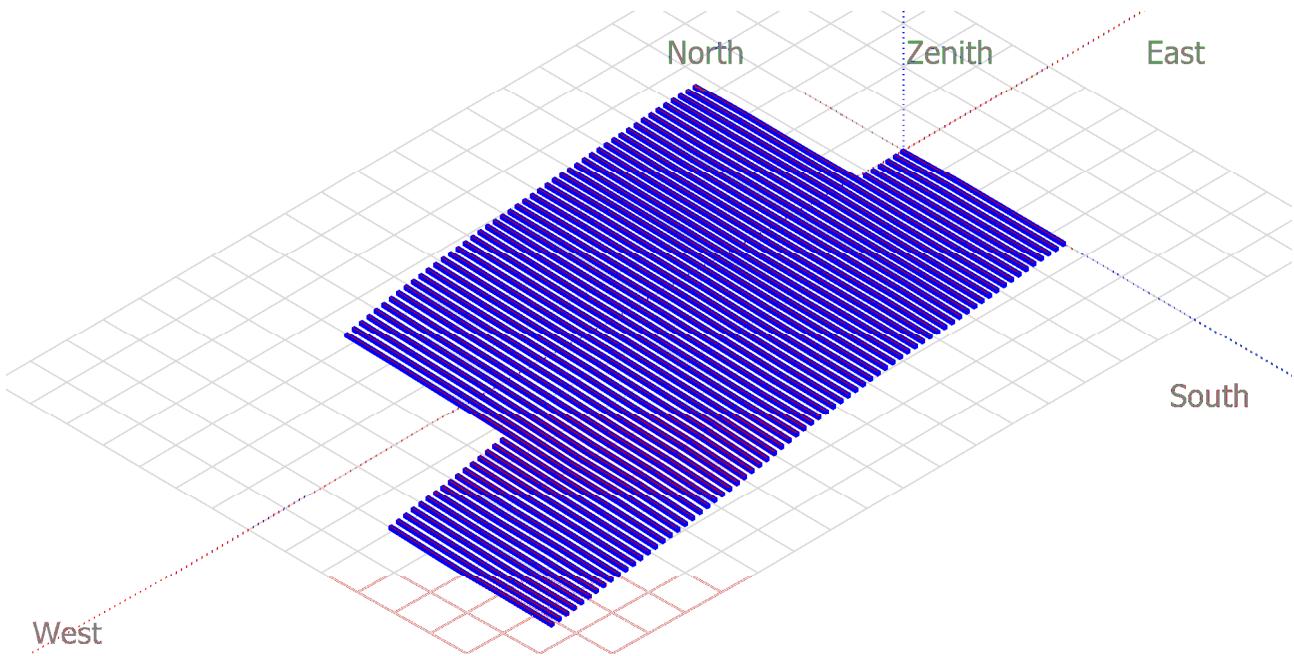
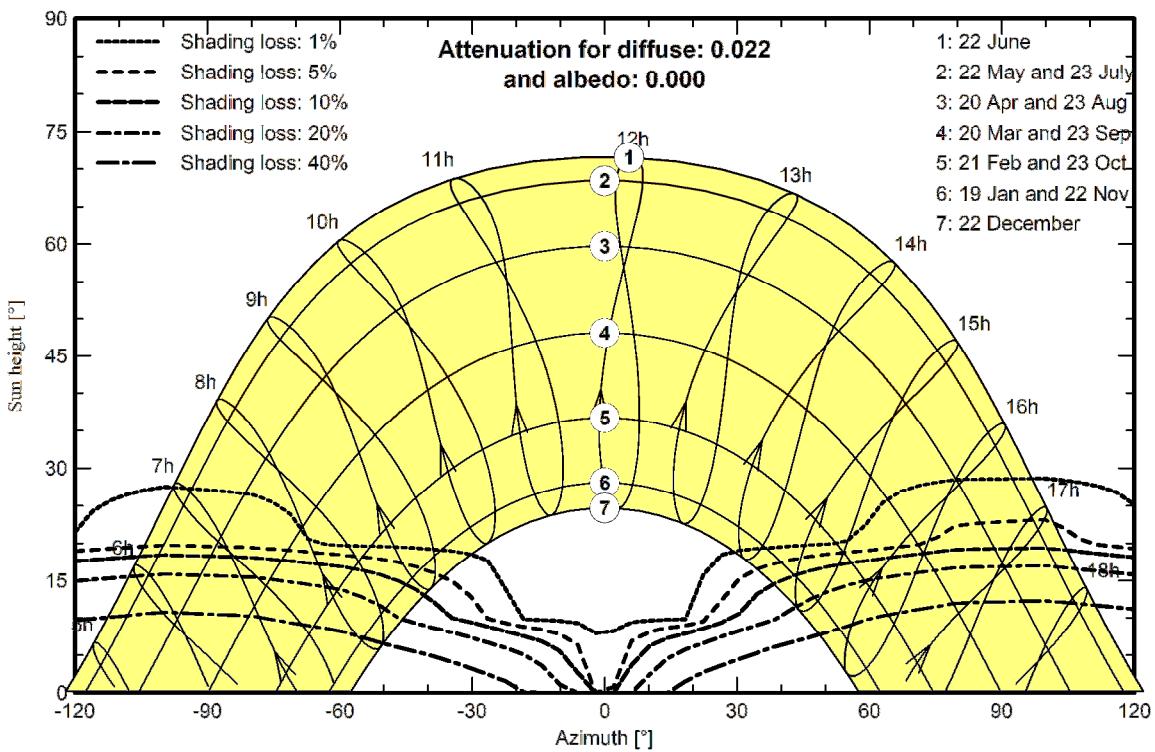
PV Array Characteristics		
PV module		Inverter
Manufacturer Centro Energy		Manufacturer Chint Power Systems
Model M550 Wp 144 cells Bifacial (Original PVsyst database)		Model CPS SCA125KTL-DO/US-600 (Custom parameters definition)
Unit Nom. Power 550 Wp		Unit Nom. Power 125 kWac
Number of PV modules 10665 units		Number of inverters 32 units
Nominal (STC) 5866 kWp		Total power 4000 kWac
Modules 395 Strings x 27 In series		Operating voltage 870-1300 V
At operating cond. (50°C)		Pnom ratio (DC:AC) 1.47
Pmpp 5362 kWp		
U mpp 1016 V		
I mpp 5276 A		
Total PV power		Total inverter power
Nominal (STC) 5866 kWp		Total power 4000 kWac
Total 10665 modules		Number of inverters 32 units
Module area 27562 m²		Pnom ratio 1.47
Cell area 25494 m²		

**PVsyst V7.2.12**VC3, Simulation date:
28/02/22 16:06
with v7.2.12**Project: Ellington2021****Variant: Ellington 550W 2.28.22**

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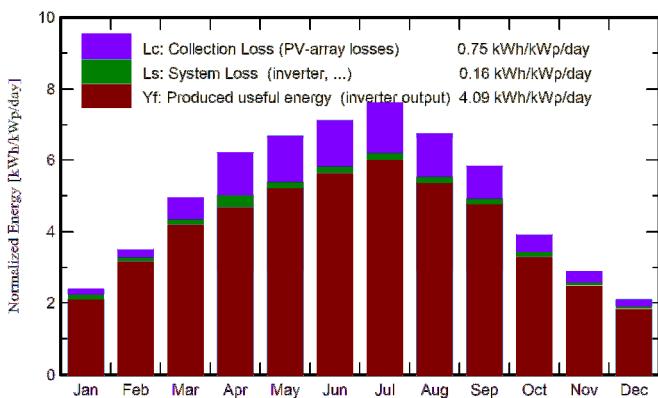
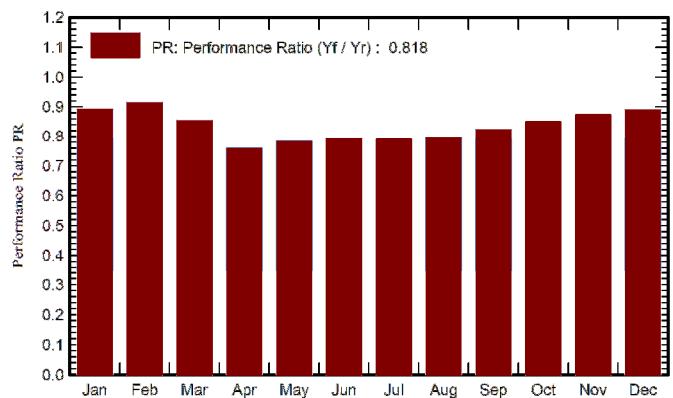
Array losses								
Array Soiling Losses			Thermal Loss factor			DC wiring losses		
Loss Fraction	3.0 %		Module temperature according to irradiance			Global array res.	3.2 mΩ	
			Uc (const)	20.0 W/m²K		Loss Fraction	1.5 % at STC	
			Uv (wind)	0.0 W/m²K/m/s				
LID - Light Induced Degradation			Module Quality Loss			Module mismatch losses		
Loss Fraction	2.0 %		Loss Fraction	-0.8 %		Loss Fraction	1.0 % at MPP	
Strings Mismatch loss								
Loss Fraction	0.1 %							
IAM loss factor								
Incidence effect (IAM): Fresnel AR coating, n(glass)=1.526, n(AR)=1.290								
0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.999	0.987	0.962	0.892	0.816	0.681	0.440	0.000

System losses**Unavailability of the system**Time fraction 0.3 %
1.0 days,
3 periods**AC wiring losses****Inv. output line up to MV transfo**Inverter voltage 600 Vac tri
Loss Fraction 0.47 % at STC**Inverter: CPS SCA125KTL-DO/US-600**Wire section (32 Inv.) Copper 32 x 3 x 150 mm²
Average wires length 75 m**AC losses in transformers****MV transfo**Grid voltage 20 kV
Operating losses at STC
Nominal power at STC 5732 kVA
Iron loss (24/24 Connexion) 5.73 kW
Loss Fraction 0.10 % at STC
Coils equivalent resistance 3 x 0.63 mΩ
Loss Fraction 1.00 % at STC

**Near shadings parameter****Perspective of the PV-field and surrounding shading scene****Iso-shadings diagram****Orientation #1**

**Main results****System Production**

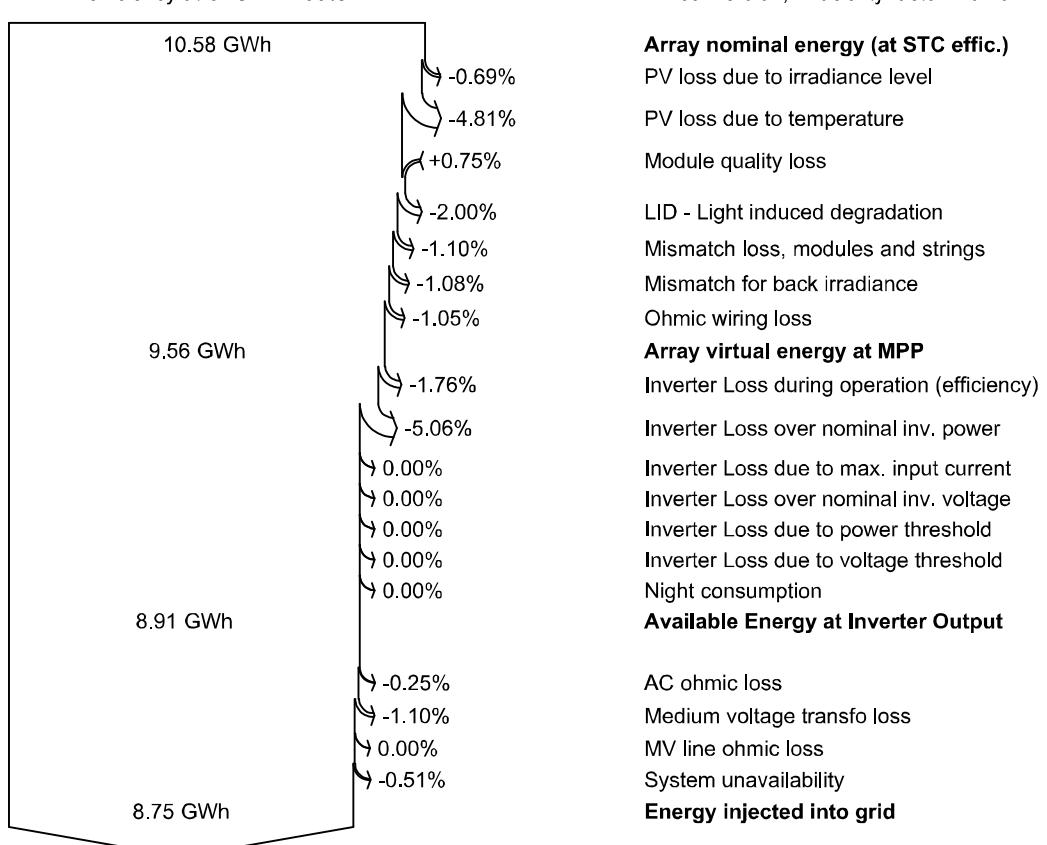
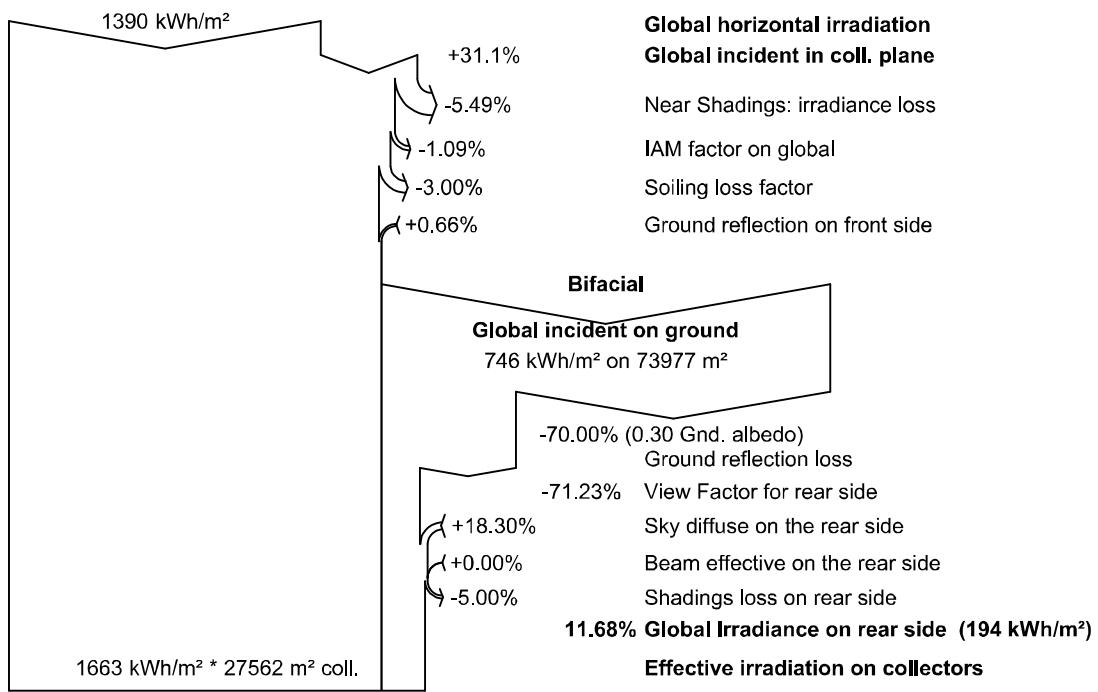
Produced Energy 9 GWh/year

Specific production 1491 kWh/kWp/year
Performance Ratio PR 81.84 %**Normalized productions (per installed kWp)****Performance Ratio PR****Balances and main results**

	GlobHor kWh/m ²	DiffHor kWh/m ²	T_Amb °C	GlobInc kWh/m ²	GlobEff kWh/m ²	EArray GWh	E_Grid GWh	PR ratio
January	54.0	28.92	-0.86	73.5	64.9	0.409	0.385	0.892
February	73.6	38.12	-0.56	97.8	87.6	0.542	0.525	0.915
March	115.6	55.75	2.84	153.2	138.7	0.793	0.767	0.854
April	143.2	60.71	10.54	185.8	171.1	0.887	0.828	0.760
May	165.2	74.60	15.93	207.2	191.5	0.983	0.952	0.783
June	173.5	80.00	19.33	213.6	199.2	1.026	0.995	0.794
July	186.5	80.22	23.25	236.0	219.4	1.129	1.095	0.791
August	158.1	65.22	22.24	209.1	192.6	1.009	0.978	0.797
September	129.0	50.89	18.98	174.4	159.3	0.869	0.842	0.823
October	85.4	36.61	10.36	121.2	107.9	0.629	0.605	0.851
November	60.0	27.14	7.30	85.7	75.4	0.454	0.439	0.874
December	46.0	25.19	0.75	64.5	55.6	0.349	0.337	0.889
Year	1390.0	623.37	10.90	1822.2	1663.2	9.080	8.747	0.818

Legends

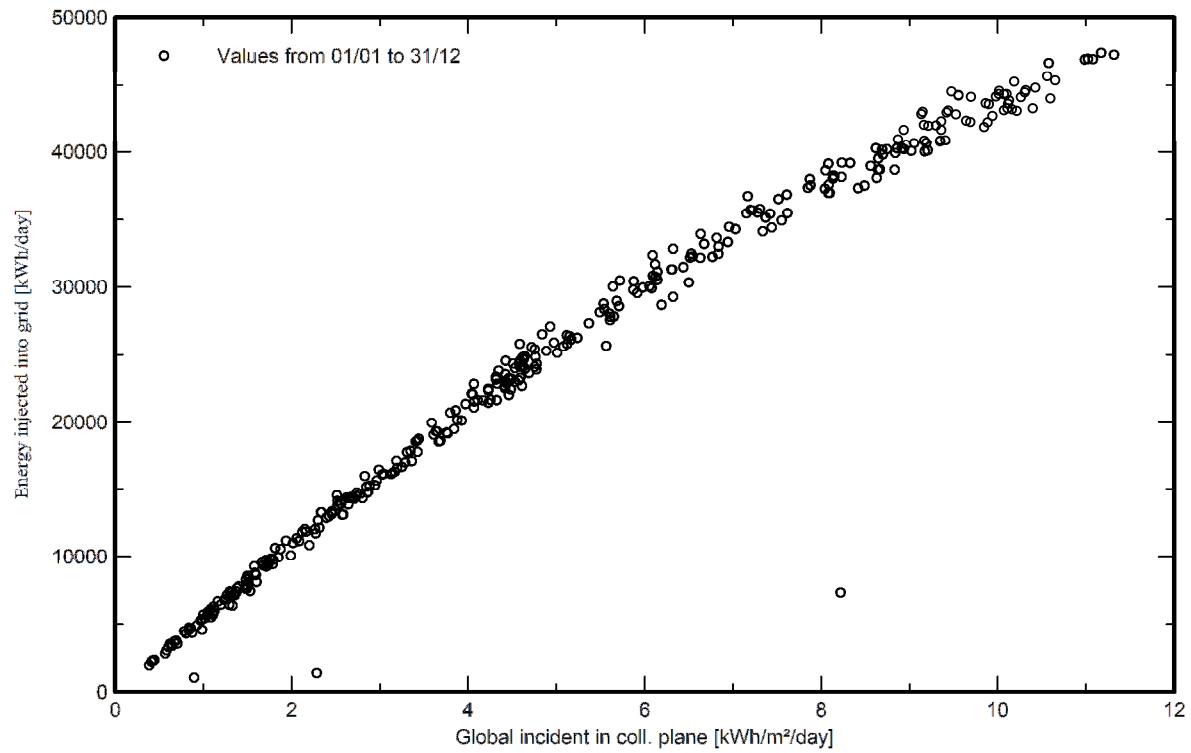
GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_Grid	Energy injected into grid
T_Amb	Ambient Temperature	PR	Performance Ratio
GlobInc	Global incident in coll. plane		
GlobEff	Effective Global, corr. for IAM and shadings		

**Loss diagram**



Special graphs

Daily Input/Output diagram



System Output Power Distribution

