Neighborly Energy, Inc.
SOLAR RESOURCE REPORT

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For: _____

Site: _____, NJ

System Description:

|	
Module:	Siliken 235W SLK60P6L - Power Tolerance +3%/-0%
Inverter:	Solectria SGI 500 & SGI 250 - CEC Efficiency: 97.0% & 97.5%
Tilt:	25 degrees
Azimuth:	180 degrees (due South)

This solar resource study was performed using the Wiley Acme Solar Site Evaluation Tool, "ASSET". The ASSET is a patent pending system for evaluating shading. The ASSET allows the user to efficiently analyze and document installation sites. In use, the ASSET is positioned to take a series of pictures at the intended site. The software assembles the pictures into a panorama. With the path of the sun superimposed, the ASSET constructs an intuitive and easily understood projection of the sun's path throughout the year. The Wiley Sunpath demonstrates when direct sun will be obstructed from the solar array and the system will experience a loss of energy production. The software incorporates the PVWatts program, written by Bill Marion of the National Renewal Energy Laboratory (NREL) under contract to the Department of Energy (DOE). The program uses hourly historical data from the TMY2 data set to calculate energy captured by the array.

This evaluation is for a 787kW solar photovoltaic energy system in a fixed-tilt ground array application. The system will operate "grid-tied" through an interconnection to the local utility service provided by Atlantic City Electric, compliant with UL 1741. The production factors of the major components of the array and the array orientation are listed above.

A 210 degree panorama of the Southern horizon was constructed from photos taken at the South end of the array site. The horizon is relatively free of direct obstructions. Lateral obstructions from trees present towards the East of the array will obstruct the sun during early morning hours and in the Winter months.

SOUTHERN HORIZON

EAST   DUE SOUTH   WEST
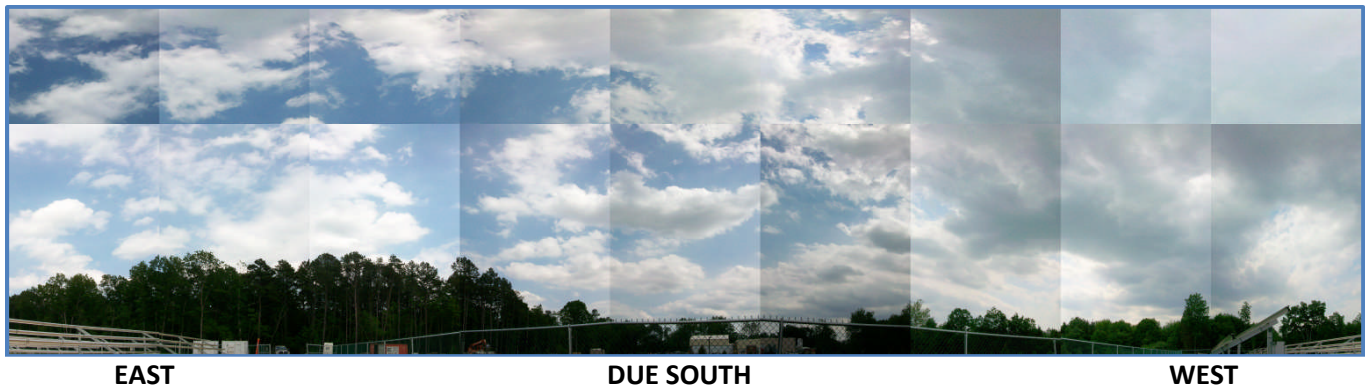
In the following panorama, the red grid has horizontal lines which correspond to 5 degree increments from the horizon, and vertical lines which correspond to 30 degree increments from Due South.   The trees to the East rise to a height of 20 degrees from the horizon. However, due to their location, the trees do not present an obstruction to meaningful full-intensity sun from which the system will generate most of its energy. The trees could be trimmed to a horizon angle of 15 degrees, if further energy production is desired

EAST   **DUE SOUTH**   **WEST**
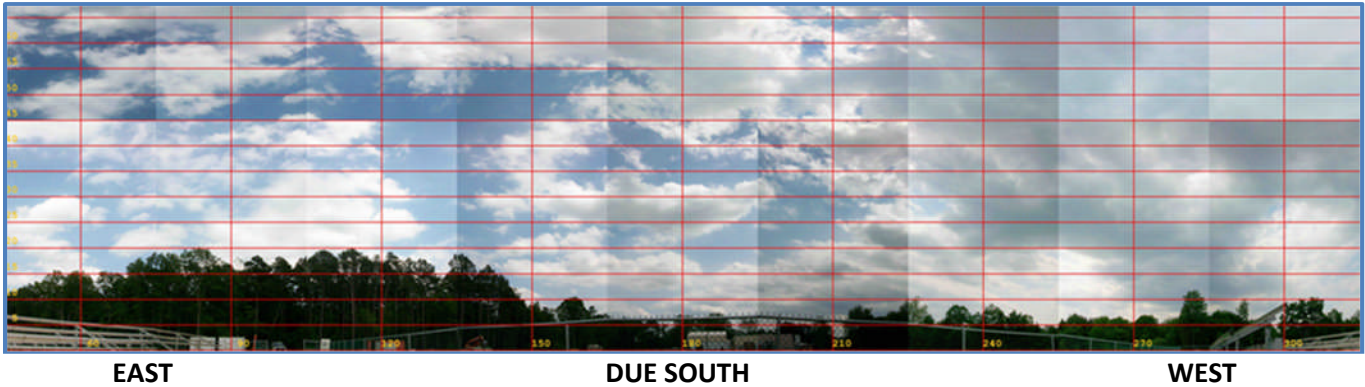
The ASSET software projects the path of the sun throughout the year and calculates the shading factor as **96.8%**, adjusted for deciduous trees. Thus on an annual basis, the array will experience **3.2%** energy production losses due to shading, on average. The simple average of monthly shading is 3.5%, but the highest shading losses occur during low energy production months.

EAST   **DUE SOUTH**   **WEST**
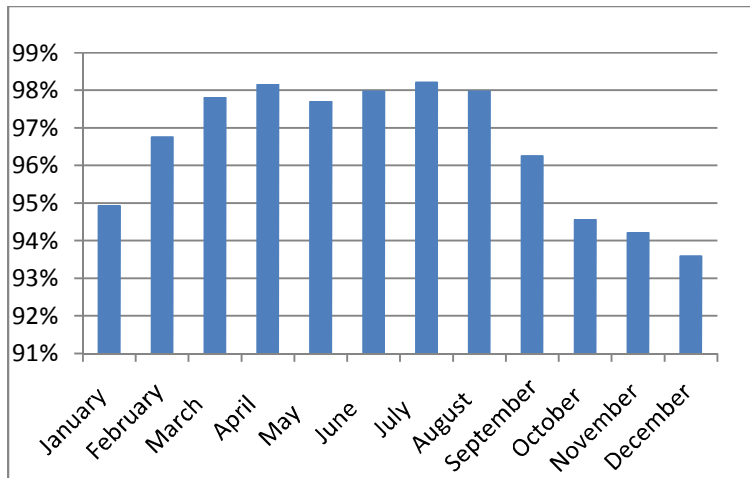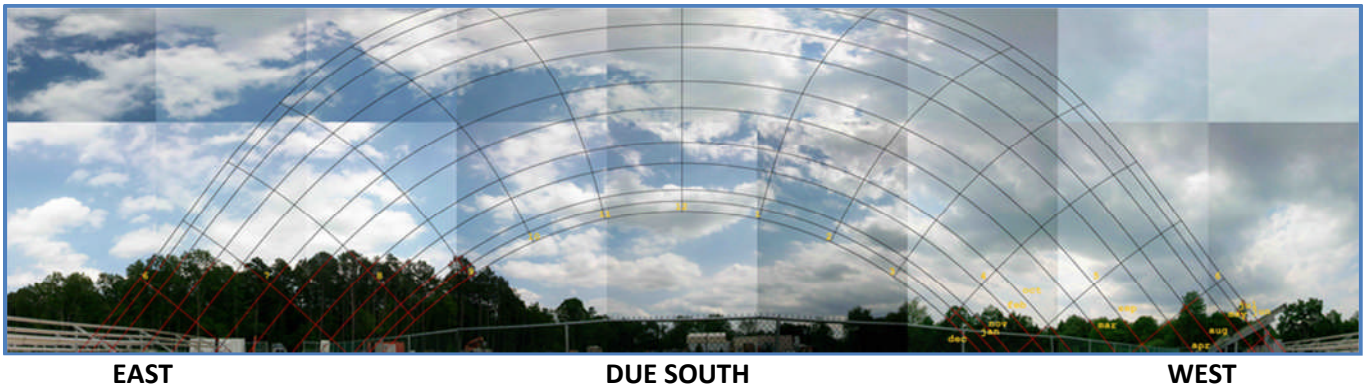
Monthly Shading Factor Averages	
May-Oct:	97.1%
Nov-Apr:	95.9%
Total Shading Factor:	96.8%

ENERGY PRODUCTION ESTIMATE

The DC to AC derate values for PV Watts have been calculated to reflect the operating parameters of the actual system components. Versus the default PVWatts settings, these parameters have been adjusted in the following way. For the PV modules which have a +3%/-0% power tolerance, we have conservatively assumed a -2% rating error. For the two inverters that will operate with the system, we have selected the lower CEC efficiency rating of 97.0%. Soiling losses have been adjusted from 5% to 3% in consideration of the significant 25 degree tilt. All other parameters remain at the default values. The system derate value is 85.5%.

Calculator for Overall DC to AC Derate Factor	
Component Derate Factors Component	**Derate Values**
PV module nameplate DC rating	0.980
Inverter and Transformer	0.970
Mismatch	0.980
Diodes and connections	0.995
DC wiring	0.980
AC wiring	0.990
Soiling	0.970
System availabilty	0.980
Sun-tracking	1.000
Age	1.000
Overall DC to AC derate factor	*0.855*

Based on all of the factors of the system design: DC/AC derate value, tilt, orientation *and* shading, the total annual energy production in year 1 is estimated to be 1,062,507 kWh.

system DC rating	(W)	787485		
DC to AC derate factor		0.855		
system AC rating	(W)	673207		
NREL station	ATLANTIC CITY	NJ	USA	
latitude	(degrees)	39.45		
array type	fixed array tilt (degrees)	25		
azimuth	(degrees)	180		
Correct for deciduous trees?	TRUE			
Month	**light shaded (%)**	**sunlight/day (hours)**	**available sunlight (hours)**	**Monthly Solar Access**
January	5.08	3.19	3.03	95%
February	3.25	3.87	3.74	97%
March	2.19	4.67	4.57	98%
April	1.85	5.35	5.25	98%
May	2.30	5.78	5.65	98%
June	2.03	5.94	5.82	98%
July	1.79	5.94	5.83	98%
August	2.03	5.62	5.51	98%
September	3.75	5.18	4.99	96%
October	5.44	4.30	4.07	95%
November	5.79	3.21	3.02	94%
December	6.42	2.79	2.61	94%
average	3.49	4.66	**4.51**	97%
	SF	Shading Factor	0.968	
	x TOF	Tilt and Orientation Factor	0.990	
	= TSRF	Total Solar Resource Fraction	0.959	
system energy capture per year	**(kWh)**	1062507		
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Shading Data and NREL Time/Day/Month Insolation Data Tables

shading data

	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00
January	---	---		97.3	87.9	9	0	0	0	0	0	6.3	89.5	---	---	---
February	---	---	88.1	99.5	42.2	0	0	0	0	0	0	0	39.4	94.9	---	---
March	---	---	93.1	73.9	2.5	0	0	0	0	0	0	0	0	61.5	99.3	---
April	---	88	89.2	8.2	0	0	0	0	0	0	0	0	0	10.7	98.8	---
May	69	92.4	59.6	0	0	0	0	0	0	0	0	0	0	3.4	65.9	---
June	64.7	97.3	36.6	0	0	0	0	0	0	0	0	0	0	0	32.3	97.6
July	65.5	94.6	44.6	0	0	0	0	0	0	0	0	0	0	0	45.7	99.4
August	---	92.9	77.3	0.1	0	0	0	0	0	0	0	0	0	4.9	90.6	---
September	---	66.3	93.9	41.7	0	0	0	0	0	0	0	0	0	38.7	99.6	---
October	---		94.3	97.4	21.4	0	0	0	0	0	0	0	12.6	85.5	---	---
November	---	---	98.2	99.3	73.7	5.8	0	0	0	0	0	3.1	79	---	---	---
December	---	---		90.1	98.6	14.7	0	0	0	0	0	6.9	95.5	---	---	---

weighting: radiation (kW-hr/m2/day)

	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00
January	0	0	0	0.045	0.194	0.34	0.466	0.529	0.505	0.481	0.345	0.214	0.069	0	0	0
February	0	0	0.003	0.079	0.237	0.379	0.516	0.592	0.603	0.573	0.44	0.287	0.143	0.021	0	0
March	0	0	0.034	0.166	0.326	0.473	0.614	0.647	0.669	0.623	0.504	0.351	0.204	0.054	0.001	0
April	0	0.012	0.087	0.244	0.42	0.547	0.656	0.691	0.677	0.685	0.565	0.419	0.247	0.086	0.012	0
May	0.002	0.032	0.135	0.289	0.445	0.541	0.695	0.771	0.727	0.692	0.589	0.438	0.278	0.12	0.025	0
June	0.007	0.041	0.158	0.306	0.465	0.578	0.672	0.725	0.724	0.709	0.612	0.448	0.306	0.145	0.038	0.005
July	0.002	0.031	0.126	0.282	0.446	0.573	0.695	0.738	0.753	0.704	0.622	0.465	0.311	0.153	0.036	0.005
August	0	0.017	0.09	0.245	0.43	0.56	0.7	0.754	0.748	0.671	0.58	0.429	0.267	0.104	0.019	0
September	0	0.005	0.072	0.237	0.417	0.546	0.68	0.712	0.713	0.65	0.523	0.372	0.199	0.048	0.002	0
October	0	0	0.039	0.19	0.358	0.529	0.618	0.678	0.612	0.545	0.395	0.237	0.095	0.008	0	0
November	0	0	0.006	0.112	0.276	0.42	0.504	0.528	0.468	0.396	0.306	0.16	0.038	0	0	0
December	0	0	0	0.056	0.206	0.335	0.435	0.448	0.43	0.391	0.294	0.155	0.034	0	0	0

weighting: energy capture (kW-hr)

	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00
January	0	0	0	0.12	4.33	8.55	12.07	13.6	12.88	12.35	8.82	4.91	0.6	0	0	0
February	0	0	0	0.7	5.1	8.68	11.87	13.49	13.69	13.11	10.14	6.35	2.5	0	0	0
March	0	0	0.02	3.27	7.92	11.66	14.96	15.65	16.05	15.07	12.32	8.49	4.51	0.09	0	0
April	0	0	0.75	5.45	9.84	12.65	15.01	15.74	15.33	15.56	12.94	9.54	5.36	0.46	0	0
May	0	0.01	2.2	6.61	10.52	12.62	16.1	17.74	16.69	15.98	13.73	10.18	6.13	1.6	0	0
June	0	0.03	2.91	6.51	10.24	12.57	14.38	15.43	15.45	15.19	13.21	9.7	6.37	2.41	0.02	0
July	0	0.01	1.88	6.07	9.95	12.63	15.17	16.06	16.28	15.39	13.78	10.39	6.72	2.73	0.02	0
August	0	0	0.67	5.21	9.69	12.48	15.43	16.46	16.27	14.83	12.96	9.61	5.73	1.13	0	0
September	0	0	0.26	4.88	9.29	11.99	14.79	15.39	15.35	14.17	11.53	8.07	3.84	0.06	0	0
October	0	0	0.03	3.93	8.3	12.45	14.31	15.56	14.05	12.57	9.15	5.12	1.09	0	0	0
November	0	0	0	1.7	6.34	9.96	11.99	12.51	11.06	9.4	7.18	3.02	0.04	0	0	0
December	0	0	0	0.41	4.56	8.27	11.01	11.27	10.77	9.79	7.2	3.15	0.05	0	0	0