Docket 26-06-04 Implementation of Clean Energy Successor Programs

Attachment to Written Comments due Oct 2, 2026 (Postponed from September 23, 2026)

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Introduction

An analysis of solar production compared to actual Connecticut Locational Marginal Prices (LMP) was conducted to produce a view of the monetary value of solar generation during peak periods. The methodology was to produce mock solar generation values using the well-known PVWatts tool, which has been updated recently to support modeling of bifacial panels. The size of the arrays was set arbitrarily to 10 kW DC (nameplate).

Based on a specified location (centrally located Bristol, in this case) PVWatts will access historical solar irradiance satellite data, plus temperature and albedo data from weather archives, to produce projections, at the hour level, of solar generation. Figures 1 and 2 show the input parameters and the high-level calculated production values.

The use of projected PVWatts projected production data was dictated by two facts. First, any single site's real production data would not be representative, and no collection of sites in Connecticut was available. Second – there are few sites at all today fed entirely with Vertical Solar.

In the subsequent pages, Figures 1 and 2 represent the output of PVWatts, including the input parameters. These show, as expected, the advantage of rooftop in production of kilowatt hours overall. The detail solar production spreadsheets that are optionally generated in PVWatts are granular to one hour, with a zero origin (so hour 0 represents from midnight to 1AM). It is the hourly data that leads into the hypothesis that generation in the late afternoon is more valuable with Vertical Solar.

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The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NLR report: The Error Report.

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The energy output range is based on analysis of 30 years of historical weather data, and is intended to provide an indication of the possible interannual variability in generation for a fixed (open rack) PV system at this location.

RESULTS

13,603 kWh/Year*

System output may range from 13,309 to 14,229 kWh per year near this location.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	3.78	949
February	5.31	1,189
March	5.23	1,250
April	5.59	1,258
May	5.35	1,206
June	5.40	1,159
July	5.73	1,247
August	5.85	1,267
September	5.72	1,230
October	4.81	1,110
November	3.95	933
	3.21	805
	4.99	13,603

Location and Station Identification

Requested Location	501 Wolcott Rd, Bristol, CT 06010
Solar Resource Data Location	NSRDB Lat/Lng: 41.65, -72.98
Latitude	41.65° N
Longitude	72.98° W

PV System Specifications

DC System Size	10 kW
Module Type	Premium
Array Type	Fixed (roof mount)
System Losses	14.08%
Array Tilt	41°
Array Azimuth	180°
DC to AC Size Ratio	1.2
Inverter Efficiency	96%
Ground Coverage Ratio	0.4
Albedo	*From weather file*

Figure 1and 2: output report of PVWatts

Figure 1: PVWatts projection for a rooftop, South-oriented solar array

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The energy output range is based on analysis of 30 years of historical weather data, and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

RESULTS

10,534 kWh/Year*

System output may range from 10,307 to 11,019 kWh per year near this location.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	2.21	572
February	3.70	870
March	3.67	935
April	4.29	1,034
May	4.66	1,123
June	5.02	1,153
July	4.97	1,172
August	4.71	1,099
September	4.08	939
October	2.94	720
November	2.03	495
December	1.65	422
Annual	3.66	10,534

Location and Station Identification

Requested Location	501 Wolcott Rd, Bristol, CT 06010
Solar Resource Data Location	NSRDB Lat/Lng: 41.65, -72.98
Latitude	41.65° N
Longitude	72.98° W

PV System Specifications

DC System Size	10 kW
Module Type	Premium
Array Type	Fixed (open rack)
System Losses	14.08%
Array Tilt	90°
Array Azimuth	270°
DC to AC Size Ratio	1.2
Inverter Efficiency	96%
Ground Coverage Ratio	0.4
Albedo	*From weather file*
Bifacial	Yes (0.7)

Figure 2: PVWatts output for a Vertical Solar Array, or Solar Fence

Figure 3 is a sample of the Excel page combining the two production datasets, so that each day/hour line contains the respective production values. The PVWatts values are in watt-hours, but the LMP prices are dollars per megawatt hour. The Excel formulas convert the extended prices back into watt-hour increments.

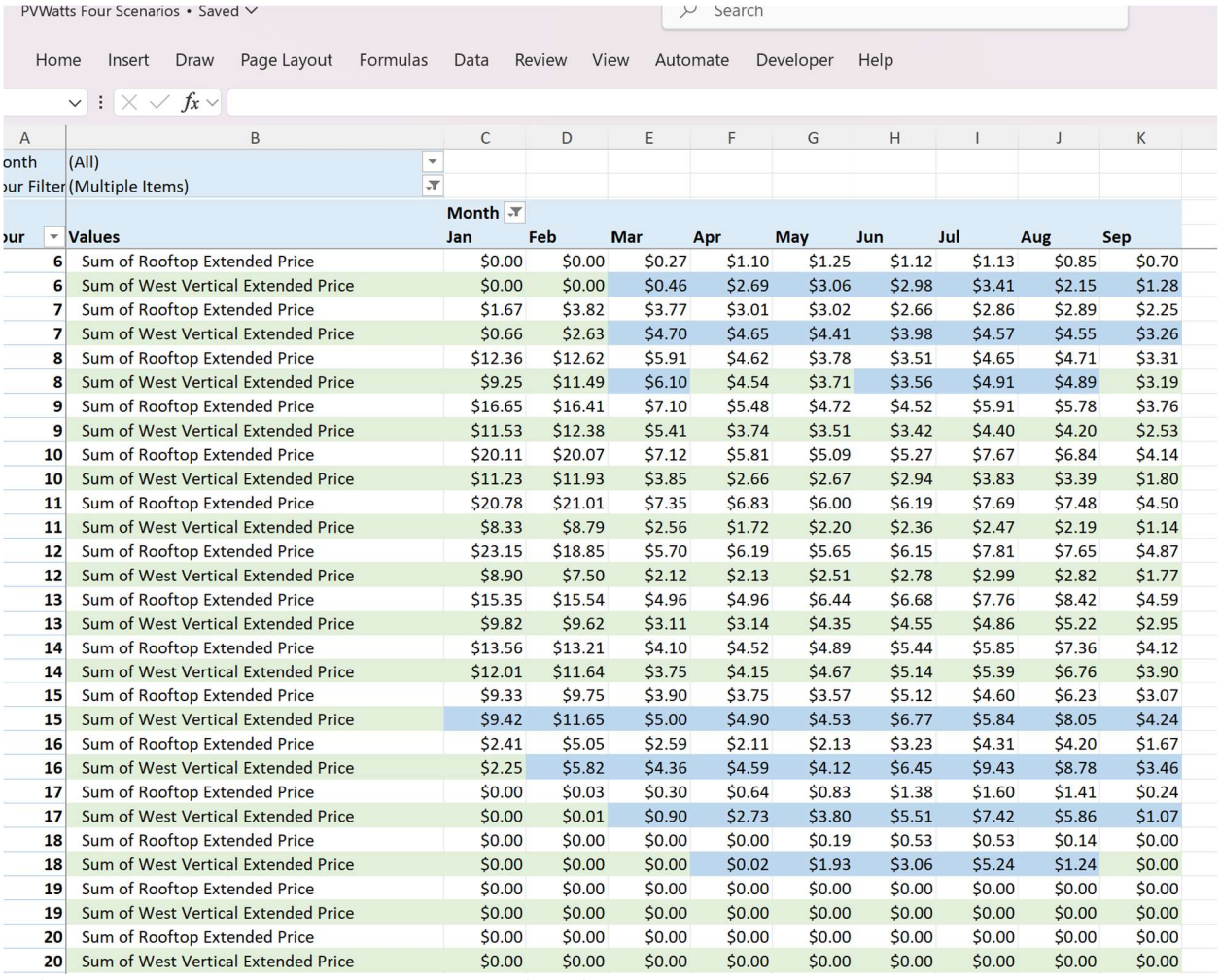
Date:Hour	Month	Month Name	Hour	Realtime LMP Zone 4004 CT Hourly	Rooftop AC Wh	Rooftop Sum of Daily Extended Price (Wh * LMP)	Vertical West Wh	West Vertical Sum of Daily Extended Price (Wh * LMP)
2026-7-2:0	7	Jul	0	$54.66	0.00	$0.00	0.00	0.0000
2026-7-2:1	7	Jul	1	$57.77	0.00	$0.00	0.00	0.0000
2026-7-2:2	7	Jul	2	$41.90	0.00	$0.00	0.00	0.0000
2026-7-2:3	7	Jul	3	$36.33	0.00	$0.00	0.00	0.0000
2026-7-2:4	7	Jul	4	$36.13	0.00	$0.00	0.00	0.0000
2026-7-2:5	7	Jul	5	$36.80	211.74	$0.01	1907.36	0.0702
2026-7-2:6	7	Jul	6	$36.96	939.71	$0.03	4797.55	0.1773
2026-7-2:7	7	Jul	7	$39.63	2909.66	$0.12	5154.30	0.2043
2026-7-2:8	7	Jul	8	$39.56	4608.39	$0.18	4903.20	0.1940
2026-7-2:9	7	Jul	9	$39.08	5761.81	$0.23	4076.11	0.1593
2026-7-2:10	7	Jul	10	$58.36	6493.65	$0.38	2836.38	0.1655
2026-7-2:11	7	Jul	11	$90.51	6856.36	$0.62	1481.98	0.1341
2026-7-2:12	7	Jul	12	$147.77	6796.04	$1.00	1846.34	0.2728
2026-7-2:13	7	Jul	13	$147.92	6345.59	$0.94	3697.58	0.5469
2026-7-2:14	7	Jul	14	$115.98	2780.01	$0.32	2629.79	0.3050
2026-7-2:15	7	Jul	15	$98.83	3096.08	$0.31	3867.62	0.3822
2026-7-2:16	7	Jul	16	$469.17	2575.84	$1.21	6191.33	2.9048
2026-7-2:17	7	Jul	17	$331.52	712.04	$0.24	5525.10	1.8317
2026-7-2:18	7	Jul	18	$301.57	207.65	$0.06	3748.92	1.1306
2026-7-2:19	7	Jul	19	$166.49	0.00	$0.00	0.00	0.0000
2026-7-2:20	7	Jul	20	$170.84	0.00	$0.00	0.00	0.0000
2026-7-2:21	7	Jul	21	$239.72	0.00	$0.00	0.00	0.0000
2026-7-2:22	7	Jul	22	$216.70	0.00	$0.00	0.00	0.0000
2026-7-2:23	7	Jul	23	$49.23	0.00	$0.00	0.00	0.0000

Figure 3: Combined ISO-NE LMP with PVWatts hourly projected production. Realtime LMP data was downloaded from https://www.iso-ne.com/isoexpress/web/reports/pricing/-/tree/final-lmp-by-node using report type *Selectable Final Real-Time Hourly LMPs* for Location '4004' (Z.CONNNECTICUT)

Figure 4 represents a cross-tab of all of the days, starting with January 1 to the end of September. The dollar amounts represent the summation of each months' worth of the Extended prices (daily Wh * associated LMP price, divided by 10^6). Two rows are 'stacked' to show data from the two datasets, Rooftop vs. Vertical. Blue highlighting flags hours, on a given month and hour, where Vertical solar is producing more value than rooftop. Sometimes the delta is small, but sometimes quite large.

Please note that Figure 3 shows single-day and single hour final (not day-ahead) LMP values, whereas Figure 4 averages the LMP across an entire month. So Figure 4 shows less variation in the LMP metric.

As expected, the periods of higher production for Vertical Solar cluster in the and late hours of the day, and this pattern is more pronounced in Summer.



onth	(All)									
ur Filter	(Multiple Items)									
		Month								
ur	Values	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
6	Sum of Rooftop Extended Price	$0.00	$0.00	$0.27	$1.10	$1.25	$1.12	$1.13	$0.85	$0.70
6	Sum of West Vertical Extended Price	$0.00	$0.00	$0.46	$2.69	$3.06	$2.98	$3.41	$2.15	$1.28
7	Sum of Rooftop Extended Price	$1.67	$3.82	$3.77	$3.01	$3.02	$2.66	$2.86	$2.89	$2.25
7	Sum of West Vertical Extended Price	$0.66	$2.63	$4.70	$4.65	$4.41	$3.98	$4.57	$4.55	$3.26
8	Sum of Rooftop Extended Price	$12.36	$12.62	$5.91	$4.62	$3.78	$3.51	$4.65	$4.71	$3.31
8	Sum of West Vertical Extended Price	$9.25	$11.49	$6.10	$4.54	$3.71	$3.56	$4.91	$4.89	$3.19
9	Sum of Rooftop Extended Price	$16.65	$16.41	$7.10	$5.48	$4.72	$4.52	$5.91	$5.78	$3.76
9	Sum of West Vertical Extended Price	$11.53	$12.38	$5.41	$3.74	$3.51	$3.42	$4.40	$4.20	$2.53
10	Sum of Rooftop Extended Price	$20.11	$20.07	$7.12	$5.81	$5.09	$5.27	$7.67	$6.84	$4.14
10	Sum of West Vertical Extended Price	$11.23	$11.93	$3.85	$2.66	$2.67	$2.94	$3.83	$3.39	$1.80
11	Sum of Rooftop Extended Price	$20.78	$21.01	$7.35	$6.83	$6.00	$6.19	$7.69	$7.48	$4.50
11	Sum of West Vertical Extended Price	$8.33	$8.79	$2.56	$1.72	$2.20	$2.36	$2.47	$2.19	$1.14
12	Sum of Rooftop Extended Price	$23.15	$18.85	$5.70	$6.19	$5.65	$6.15	$7.81	$7.65	$4.87
12	Sum of West Vertical Extended Price	$8.90	$7.50	$2.12	$2.13	$2.51	$2.78	$2.99	$2.82	$1.77
13	Sum of Rooftop Extended Price	$15.35	$15.54	$4.96	$4.96	$6.44	$6.68	$7.76	$8.42	$4.59
13	Sum of West Vertical Extended Price	$9.82	$9.62	$3.11	$3.14	$4.35	$4.55	$4.86	$5.22	$2.95
14	Sum of Rooftop Extended Price	$13.56	$13.21	$4.10	$4.52	$4.89	$5.44	$5.85	$7.36	$4.12
14	Sum of West Vertical Extended Price	$12.01	$11.64	$3.75	$4.15	$4.67	$5.14	$5.39	$6.76	$3.90
15	Sum of Rooftop Extended Price	$9.33	$9.75	$3.90	$3.75	$3.57	$5.12	$4.60	$6.23	$3.07
15	Sum of West Vertical Extended Price	$9.42	$11.65	$5.00	$4.90	$4.53	$6.77	$5.84	$8.05	$4.24
16	Sum of Rooftop Extended Price	$2.41	$5.05	$2.59	$2.11	$2.13	$3.23	$4.31	$4.20	$1.67
16	Sum of West Vertical Extended Price	$2.25	$5.82	$4.36	$4.59	$4.12	$6.45	$9.43	$8.78	$3.46
17	Sum of Rooftop Extended Price	$0.00	$0.03	$0.30	$0.64	$0.83	$1.38	$1.60	$1.41	$0.24
17	Sum of West Vertical Extended Price	$0.00	$0.01	$0.90	$2.73	$3.80	$5.51	$7.42	$5.86	$1.07
18	Sum of Rooftop Extended Price	$0.00	$0.00	$0.00	$0.00	$0.19	$0.53	$0.53	$0.14	$0.00
18	Sum of West Vertical Extended Price	$0.00	$0.00	$0.00	$0.02	$1.93	$3.06	$5.24	$1.24	$0.00
19	Sum of Rooftop Extended Price	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
19	Sum of West Vertical Extended Price	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
20	Sum of Rooftop Extended Price	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
20	Sum of West Vertical Extended Price	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Figure 4: Crosstab of computed extended generation prices by Month and hour

Summary:

This tabletop exercise demonstrates that Connecticut solar installations can contribute to lowering peak generation in Summer evenings, but this would require a different type of solar panel deployment. The term 'solar fence', here referred to as Vertical Solar, when deployed in West-East orientations, produces power in the Summer consistently into the 6pm to 7pm hour and provides cost avoidance at the wholesale level.