Springfield Township Board of Commissioners Mtg

Solar Assessment of TWP Properties– Feasibility Report

7/8/2024

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Current Net Metering in PA

Net metering is a billing mechanism that credits solar PV system customer-generators for the electricity (kWh) they export to the grid

System Capacity Limit:

- 50 kW for Residential
- 3 MW for Non-residential
- 5 MW for micro-grid and emergency systems

- No Aggregate Capacity Limit

- Net Excess Generation: Credited to customer's next bill at full retail rate; generation above usage reconciled annually at "price-to-compare“

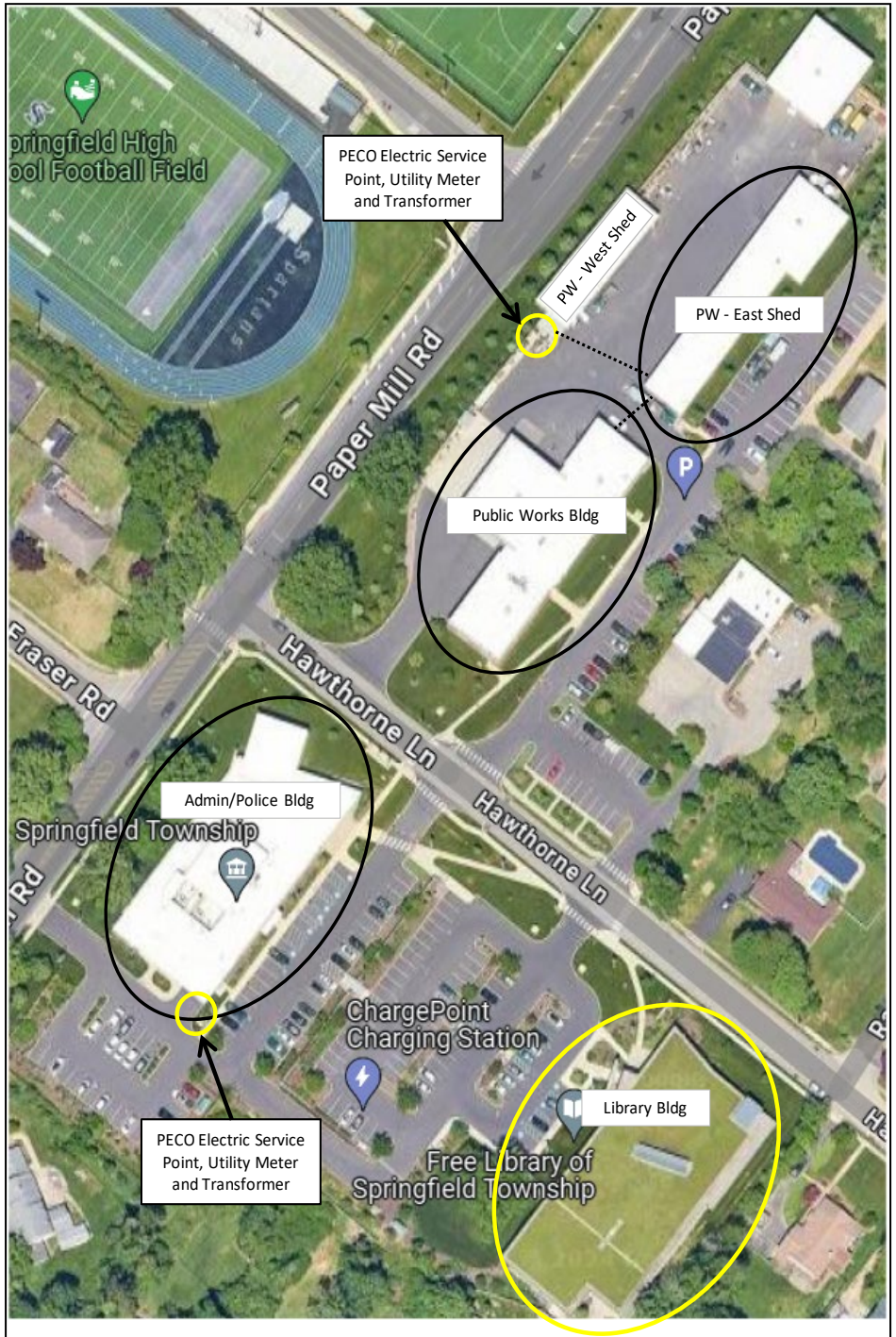
- Virtual Meter Aggregation Allowed

Summary Solar Assessment Prepared For: Springfield Township Administration (MontCo)

- **Administration/Police Building** – Roof mounted solar PV system
- **Public Works Building & Structures** – Roof mounted solar PV system
- **Library** – Solar generation from Admin/Police and Public Works solar PV systems via Virtual Meter Aggregation (VMA)

Virtual Meter Aggregation is a limited form of virtual net metering allowed in Pennsylvania, whereby excess solar generation from an on-site solar PV installation can be used to offset electric bills on other properties – however, all participating meters (accounts) must be in the same customer name; all meters and the solar PV system must be located within two miles of each other, and the customer must own or lease the properties with the related accounts.

Note: The *Public Works Equipment Shed* is referred to as the "PW East Shed", and the *Public Works Exterior Storage Shed* is referred to as the "PW West Shed".



Summary of Results – Direct Ownership

Total Solar PV Capacity (kW)	453
Full Installation Cost	$1,041,348
Price per Watt Installed ($/watt)	2.30
IRA/ITC Elective Payment (30%)	$312,404
Act 129 Incentive ($0.10/kWh - Year 1)	$57,561
Adjusted Net Installation Cost	$671,383

Solar Generation (kWh) - Year One	575,605
Electricity Usage Offset	112%
Electricity Bill Savings - Year One	$45,832
SREC Revenue - Year One	$21,585
Estimated Total Revenue – 30 Years	$2,403,516
Estimated Total Expenses – 30 Years	$1,700,227

Positive Cashflow Payback (Years)	9.2
Net Present Value (NPV)	$217,902
Internal Rate of Return (IRR)	13.5%
TOTAL NET SAVINGS OVER 30 YEARS	$703,289
Total Levelized Cost of Electricity ($/kWh)	$0.07399
Value of Energy Generated ($/kWh)	$0.07005

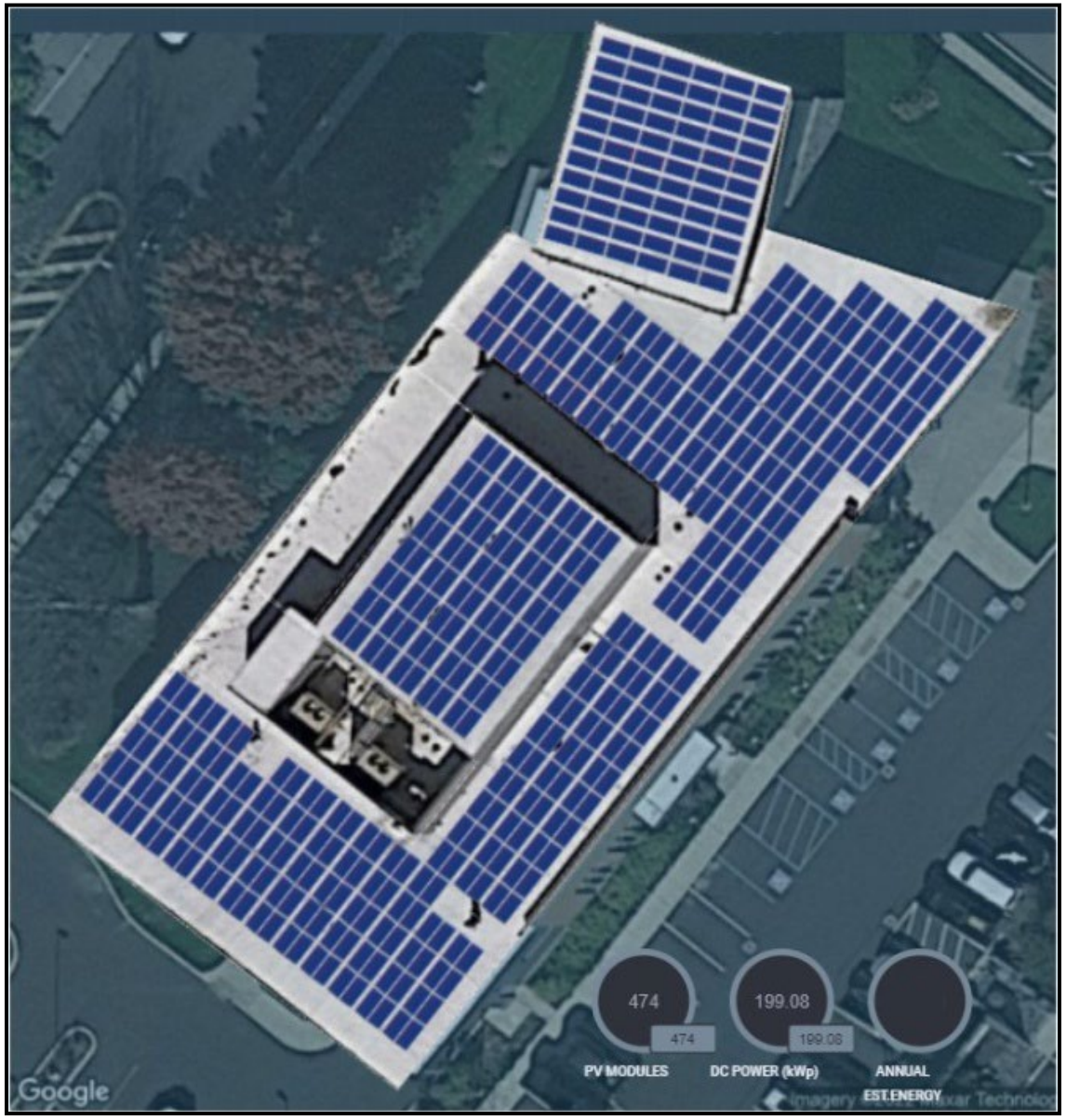
Energy Efficiency and Conservation Block Grant (EECBG) not considered

Site 1: Springfield TWP Admin/Police Building

1510 Paper Mill Road
Wyndmoor, PA 19038

System Design/Performance Details

System Size (DC) : 200 kW
Generation (1st year) : 251,384 kWh
2023 Usage : 177,840 kWh
Electricity Offset : 95%
Excess to Library : 82,758 kWh



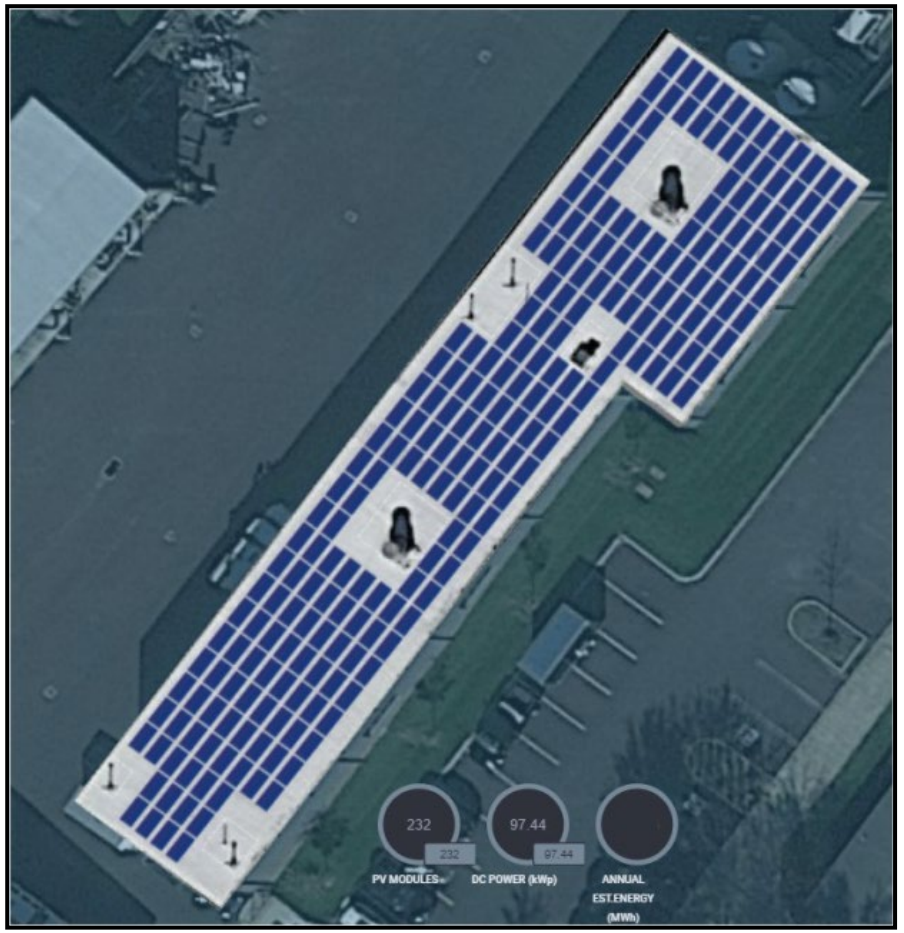
Site 2: Springfield TWP Public Works

1600 Paper Mill Road
Wyndmoor, PA 19038

PW Main Building – 156.24 kW_{DC}

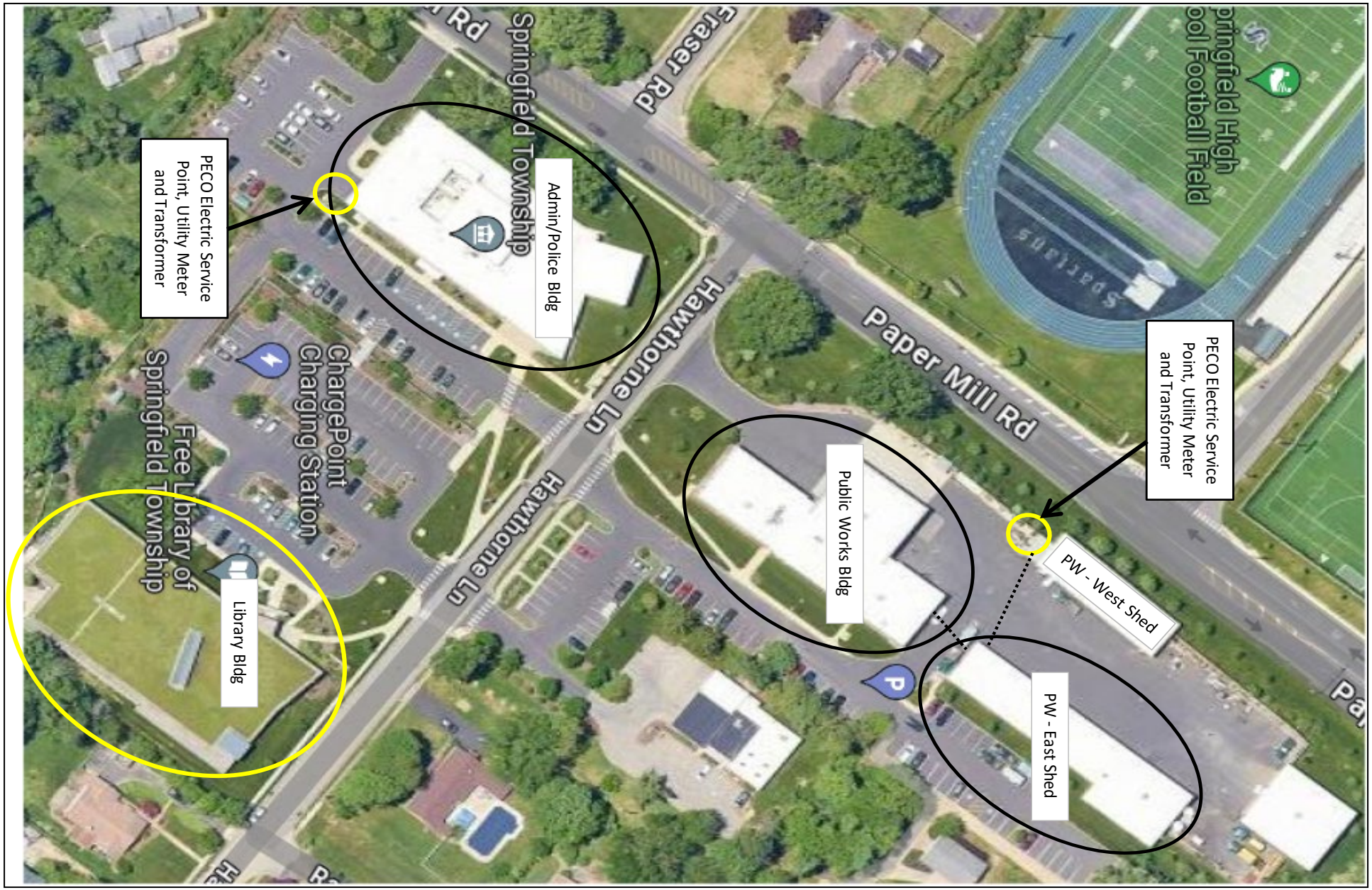
System Design/Performance Details

System Size (DC) :	254 kW (Combined)
Generation (1st year) :	324,222 kWh
2023 Usage :	177,840 kWh
Electricity Offset :	100%
Excess to Library :	235,102 kWh



PW Equipment Shed – 97.44 kW_{DC}

Closer View of Points of Interconnection



Summary of Solar Generation vs Electric Usage

	Admin/Police			Public Works			Library		
Month	Solar kWh	2023 Usage kWh	Net kWh	Solar kWh	2023 Usage kWh	Net kWh	VMA Solar kWh	2023 Usage kWh	Net kWh
Jan	11,809	14,640	2,831	15,535	8,160	-7,375	7,375	16,890	9,515
Feb	15,636	13,200	-2,436	20,348	6,560	-13,788	16,224	16,126	-98
Mar	23,248	14,240	-9,008	30,053	6,960	-23,093	32,102	17,371	-14,731
Apr	26,439	12,240	-14,199	33,969	6,240	-27,729	41,928	17,161	-24,767
May	28,592	13,760	-14,832	36,417	6,400	-30,017	44,849	18,869	-25,980
June	29,571	17,840	-11,731	37,759	8,080	-29,679	41,409	22,354	-19,055
July	30,812	18,960	-11,852	39,483	8,320	-31,163	43,015	25,385	-17,630
Aug	25,298	17,200	-8,098	32,536	8,320	-24,216	32,314	28,358	-3,956
Sept	21,603	14,960	-6,643	27,845	7,680	-20,165	26,808	23,101	-3,707
Oct	16,759	12,800	-3,959	21,816	6,960	-14,856	18,815	19,469	654
Nov	11,953	12,400	447	15,715	7,120	-8,595	8,595	18,888	10,293
Dec	9,663	15,600	5,937	12,746	8,320	-4,426	4,426	23,505	19,079
Annual	251,384	177,840	-73,544	324,222	89,120	-235,102	317,860	247,477	-70,383

Monthly Solar Generation vs. Electric Usage and Carry-Over to the Library Account

Example of Bill Savings From Solar for the Admin/Police Bldg

PECO
An Exelon Company

Account Number 32071-33161 SPRINGFIELD TWP COMM NEW 1510 PAPER MILL RD WYNDMOOR
Acct ID:

9861-01-0000006-0005-0000049

Meter Information

Read Date	Meter Number	Load Type	Reading Type	Meter Reading Previous	Present	Diff	Mult X	Usage
08/08	120014376	General Service	Total Ccf	541 ACT	655 ACT	114	1.14	130
08/09	019440257	General Service	Tot kWh	17659 ACT	17896 ACT	237	80	18960
08/09	019440257	General Service	Pk kW	0.00 ACT	0.70 ACT	0.70	80	56.16

Total Ccf Used.....130
Total kWh Used.....18,960
Distribution kW - Measured.....56.2
Generation kW - Measured.....56.2
Transmission kW - Measured.....56.2

Current Period

Electric Commercial Service 0-100kW Service 07/10/2023 to 08/09/2023 - 30 Days

Customer Charge				$57.94
Generation Charges	18,960 kWh	X	$0.08784	1,665.45
Transmission Charges	56.20 kW	X	2.29000	128.70
Distribution Charges	56.20 kW	X	9.03000	507.49
Distribution Charges	18,960 kWh	X	-0.00060	-11.38
Distribution System Improvement				1.50
Energy Efficiency Charge	18,960 kWh	X	0.00458	86.84
State Tax Adjustment				-0.71
Total current charges				$2,435.83

Solar Will Not Offset

Solar WILL Offset (savings)

Solar MAY Partially Offset

Solar Will Partially Offset

Solar Will Reduce the Electric Bill to $770.83, but Possibly As Low As $500 or less.

$770.38

Springfield Township – Combined Solar Projects for Admin/Police, Public Works and Library Buildings

30-Year Pro Forma

			REVENUE					EXPENSES					CASH FLOW		
Year	Solar Generation (kWh)	Electricity Price ($/kWh)	Electricity Bill Savings ($)	SREC Revenue ($)	IRA/ITC Elective Payment ($)	Act 129 Incentive ($)	Total Revenue ($)	Cash Contributions & Construction Financing Interest ($)	Bridge & Permanent Financing P&I & Debt Srvcs ($)	Operating & Maintenance ($)	Contract Srvcs, Insurance & Other Fees ($)	Total Expenses ($)	Net Annual Cash Flow ($)	Net Annual Discounted Cash Flow ($)	Cumulative Cash Flow ($)
0	0	–	$0	$0	$0	$0	$0	$102,710	$0	$0	$0	$102,710	($102,710)	($102,696)	($102,710)
1	575,605	0.07962	$45,832	$21,585	$312,404	$57,561	$437,382	$0	$436,781	$3,622	$0	$440,403	($3,021)	($2,877)	($105,731)
2	572,727	0.08082	$46,286	$21,907	$0	$0	$68,193	$0	$53,358	$3,695	$0	$57,052	$11,141	$10,104	($94,590)
3	569,864	0.08203	$46,746	$22,233	$0	$0	$68,979	$0	$53,358	$3,768	$0	$57,126	$11,853	$10,238	($82,737)
4	567,014	0.08326	$47,210	$22,565	$0	$0	$69,774	$0	$53,358	$3,844	$0	$57,201	$12,573	$10,342	($70,164)
5	564,179	0.08451	$47,678	$22,901	$0	$0	$70,579	$0	$53,358	$3,921	$0	$57,278	$13,301	$10,420	($56,863)
6	561,359	0.08578	$48,152	$23,242	$0	$0	$71,394	$0	$53,358	$3,999	$0	$57,357	$14,037	$10,473	($42,827)
7	558,552	0.08706	$48,629	$23,588	$0	$0	$72,218	$0	$53,358	$4,079	$0	$57,437	$14,781	$10,503	($28,046)
8	555,759	0.08837	$49,112	$23,940	$0	$0	$73,052	$0	$53,358	$4,161	$0	$57,518	$15,534	$10,512	($12,512)
9	552,980	0.08970	$49,600	$24,296	$0	$0	$73,896	$0	$53,358	$4,244	$0	$57,602	$16,294	$10,502	$3,782
10	550,215	0.09104	$50,092	$24,658	$0	$0	$74,750	$0	$53,358	$4,329	$0	$57,686	$17,064	$10,474	$20,846
11	547,464	0.09195	$50,340	$25,026	$0	$0	$75,366	$0	$53,358	$4,415	$0	$57,773	$17,593	$10,285	$38,439
12	544,727	0.09287	$50,589	$25,399	$0	$0	$75,988	$0	$53,358	$4,504	$0	$57,861	$18,126	$10,092	$56,565
13	542,003	0.09380	$50,839	$25,777	$0	$0	$76,617	$0	$53,358	$4,594	$0	$57,951	$18,665	$9,897	$75,231
14	539,293	0.09474	$51,091	$26,161	$0	$0	$77,252	$0	$53,358	$4,686	$0	$58,043	$19,209	$9,701	$94,440
15	536,597	0.09568	$51,344	$26,551	$0	$0	$77,895	$0	$53,358	$4,779	$0	$58,137	$19,758	$9,503	$114,198
16	533,914	0.09664	$51,598	$26,947	$0	$0	$78,545	$0	$53,358	$4,875	$0	$58,233	$20,312	$9,304	$134,510
17	531,244	0.09761	$51,854	$27,348	$0	$0	$79,202	$0	$53,358	$4,972	$0	$58,330	$20,872	$9,105	$155,382
18	528,588	0.09858	$52,110	$27,756	$0	$0	$79,866	$0	$53,358	$5,072	$0	$58,429	$21,436	$8,906	$176,818
19	525,945	0.09957	$52,368	$28,169	$0	$0	$80,537	$0	$53,358	$5,173	$0	$58,531	$22,006	$8,708	$198,825
20	523,315	0.10057	$52,627	$28,589	$0	$0	$81,216	$0	$53,358	$5,277	$0	$58,634	$22,582	$8,510	$221,407
21	520,699	0.10157	$52,888	$0	$0	$0	$52,888	$0	$0	$5,382	$0	$5,382	$47,506	$17,049	$268,912
22	518,095	0.10259	$53,150	$0	$0	$0	$53,150	$0	$0	$5,490	$0	$5,490	$47,660	$16,290	$316,572
23	515,505	0.10361	$53,413	$0	$0	$0	$53,413	$0	$0	$5,600	$0	$5,600	$47,813	$15,564	$364,385
24	512,927	0.10465	$53,677	$0	$0	$0	$53,677	$0	$0	$5,712	$0	$5,712	$47,965	$14,871	$412,351
25	510,363	0.10570	$53,943	$0	$0	$0	$53,943	$0	$0	$5,826	$0	$5,826	$48,117	$14,207	$460,467
26	507,811	0.10675	$54,210	$0	$0	$0	$54,210	$0	$0	$5,942	$0	$5,942	$48,267	$13,573	$508,735
27	505,272	0.10782	$54,478	$0	$0	$0	$54,478	$0	$0	$6,061	$0	$6,061	$48,417	$12,967	$557,152
28	502,745	0.10890	$54,748	$0	$0	$0	$54,748	$0	$0	$6,182	$0	$6,182	$48,565	$12,387	$605,717
29	500,232	0.10999	$55,019	$0	$0	$0	$55,019	$0	$0	$6,306	$0	$6,306	$48,713	$11,833	$654,430
30	497,731	0.11109	$55,291	$0	$0	$0	$55,291	$0	$0	$6,432	$0	$6,432	$48,859	$11,303	$703,289
	16,072,725		$1,534,913	$498,638			$2,403,516		$1,450,576	$146,941	$0	$1,700,227	$703,289		

Examples of Ballasted Racking Systems

ROOFMOUNT | RMDT

UNIRAC
BETTER SOLAR STARTS HERE

MAXIMUM ENERGY DENSITY

- Up to 33% more modules on the roof.
- 8 Degree Dual Tilt.
- G235 steel, double the corrosion protection of other racking products.

FASTER INSTALLATION

- Place panel, then clamp for single person module installation .
- Integrated bonding with single tool, hassle-free installation.
- Elimination of wind deflectors and fire skirts streamlines system installation.
- Ship up to 1 MW per truck with compact packaging.

WHY ROOFMOUNT RMDT?

Maximize energy density and minimize cost with RMDT, UNIRAC's ballasted dual tilt flat roof mounting system. Fewer components, single tool installation, snap-in hardware, and integrated bonding ensure high speed installation, while optional roof attachment, MLPE mount, and wire management provide a complete solution. UNIRAC's unmatched commercial project support makes construction easy, from permitting through installation, and RMDT is supported by North America's largest distribution network. Plus, enjoy peace of mind with UNIRAC's industry-leading 25-year warranty.

FOR QUESTIONS OR CUSTOMER SERVICE CONTACT:
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CONFORMS TO UL2703

ISO 9001:2015 14001:2015 CERTIFIED

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Now you can build more powerful rooftop solar systems faster and easier than ever before with the new high density EcoFoot5D™ Racking System.

Built on the Industry-Preferred EcoFoot® Platform, with More than 200MW Installed.

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Small 7"x16.7" roof-friendly modular Base and dense 9.9" inter-row spacing enables a tightly packed solar array that delivers 18.4% more power than 10° systems. Whether your roof is small or large, EcoFoot5D provides more power, lowering cost-per-watt.

Elegantly Simple Installation

EcoFoot5D delivers preassembled parts and an out-of-the-box, ready-to-go installation that is unlike any other flat-roof racking. The result is a seamless installation process from start to finish, saving on time and minimizing job-site impact.

Cost-Saving Logistics & Support

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Optimal yields, whatever the weather with excellent low-light and temperature behavior.

ENDURING HIGH PERFORMANCE
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Double glass module design enables extended lifetime with 12-year product warranty and improved 30-year performance warranty[2].

[1] APT test conditions according to IEC/TS 62804-1:2015 method B (-1500V, 168 h) including post treatment according to IEC 61215-1-1 Ed. 2.0 (CD)
[2] See data sheet on rear for further information

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Ground-mounted solar power plants

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For the 277/480V Grid for North America
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- Independent operation of each Synergy unit enables higher uptime and easy serviceability
- Built-in thermal sensors detect faulty wiring, ensuring enhanced protection and safety
- Built-in arc fault protection and rapid shutdown
- Built-in PID mitigation for maximized system performance
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- Built-in module-level monitoring with Ethernet or cellular communication for full system visibility

*Applicable only for DC and AC SPDs

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For North America
P1100

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- Fast installation with a single bolt
- Advanced maintenance with module-level monitoring
- Module-level voltage shutdown for installer and firefighter safety
- Use with parallel PV modules connected in series

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Next Steps

1. Structural Analysis

Assuming Springfield TWP wants to further explore installing solar PV arrays on the Admin/Police and the Public Works Main and East Shed buildings, and possibly on the PW West Shed roof, then it would make sense to have a structural analysis conducted for these roofs. The range of the installed weight for solar modules on a ballasted racking system is about 3 PSF to 8 PSF.

2. Identify Other Funding/Grant Options

In particular, look into the Energy Efficiency and Conservation Block Grant (EECBG) option. The deadline to apply for EECBG Program formula grants and vouchers has been extended. For local governments, it is now October 31, 2024.
https://www.energy.gov/scep/energy-efficiency-and-conservation-block-grant-program

3. Request for Proposal Guidance

After structural analysis is completed and there are no load issues with installing ballasted solar on the given building rooftops, and the TWP is still interested in going forward with a solar project, then CES can help the TWP consider a couple of options, such as, **1)** traditional pathway – hire an engineering firm to design-bid-build the whole project, then separately bid out and hire the solar contractor to install the engineered system; or, **2)** hire an engineering firm or alternative to oversee the bidding, and contract oversight of a design/build contract.

4. Tax-exempt Financing (consideration)

Should the TWP decide to finance the solar project, the TWP's lender should perform a cash flow analysis with tax-exempt and conventional financing. The federal incentive for conventional financing is 30% of the total project cost, while the incentive will decrease to 15% if the project is financed with tax-exempt bonds.

Thank You!