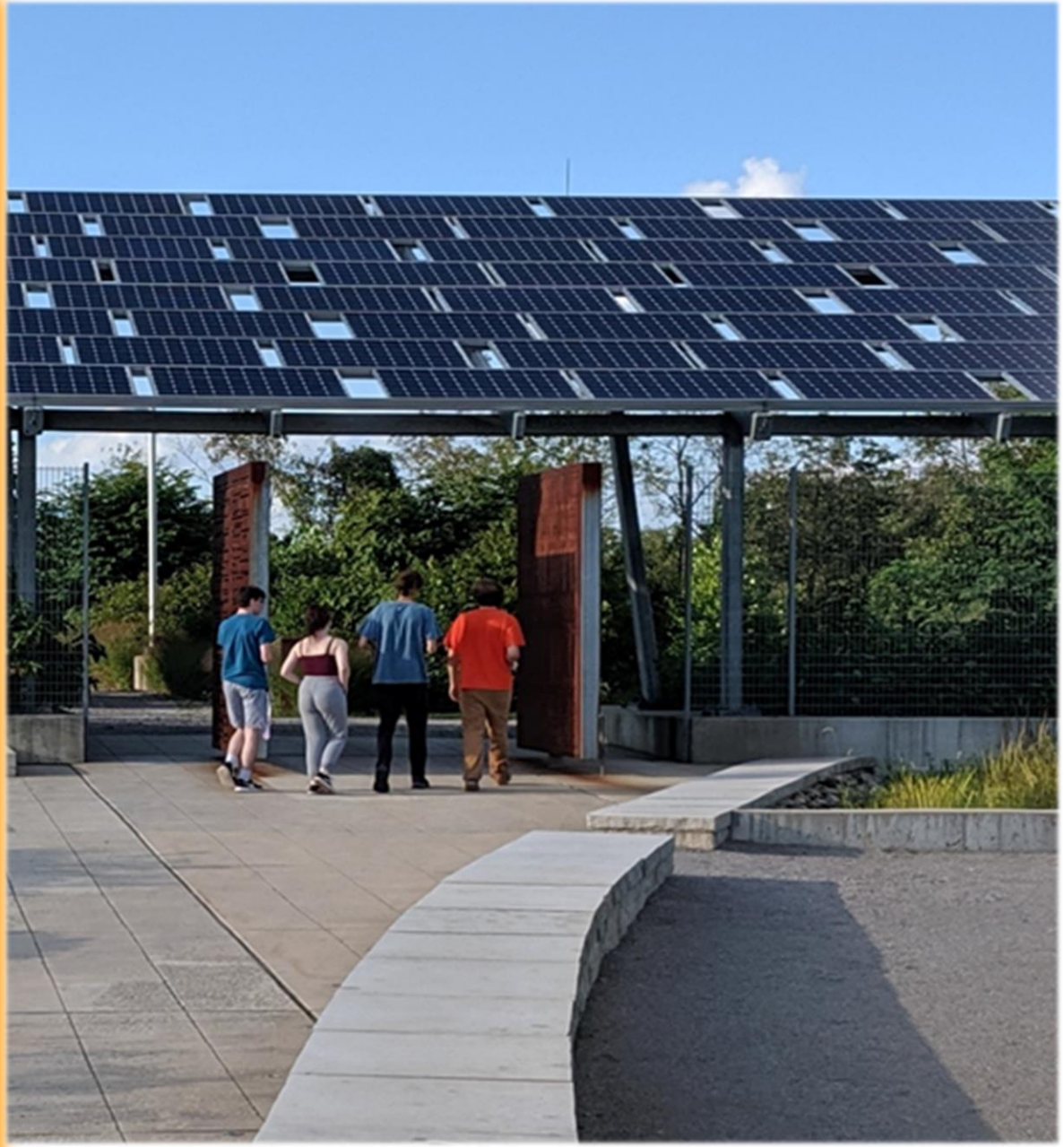


Guiding All Pennsylvanians into a Clean Energy Future

Pennsylvania Department of Environmental Protection

Citizens Advisory Council

March 11, 2025

Sharon Pillar, Founder & Executive Director
Pennsylvania Solar Center

PENNSYLVANIA
SOLAR CENTER

Our Vision

We envision a world powered by energy that is reliable, affordable, and sustainable for all.

Our Mission

We provide trusted guidance to usher *all Pennsylvanians* into the clean energy economy to reach a sustainable and resilient tomorrow.

Guiding All Pennsylvanians into a Clean Energy Future

PENNSYLVANIA SOLAR CENTER

TRANSFORM

Walking the Walk

Technical Assistance to the Commercial Sector

EDUCATE

Outreach, Public Awareness & Resources

Statewide Solar Resource Hub & Savvy Communications

ADVOCATE

Policy Education & Advocacy

Supporting Robust Solar Policies

TRANSFORM

Walking the Walk

Technical Assistance to the Commercial Sector

Galvanizing our Energy Transition through Solar (GET Solar)

Galvanizing Energy Transition

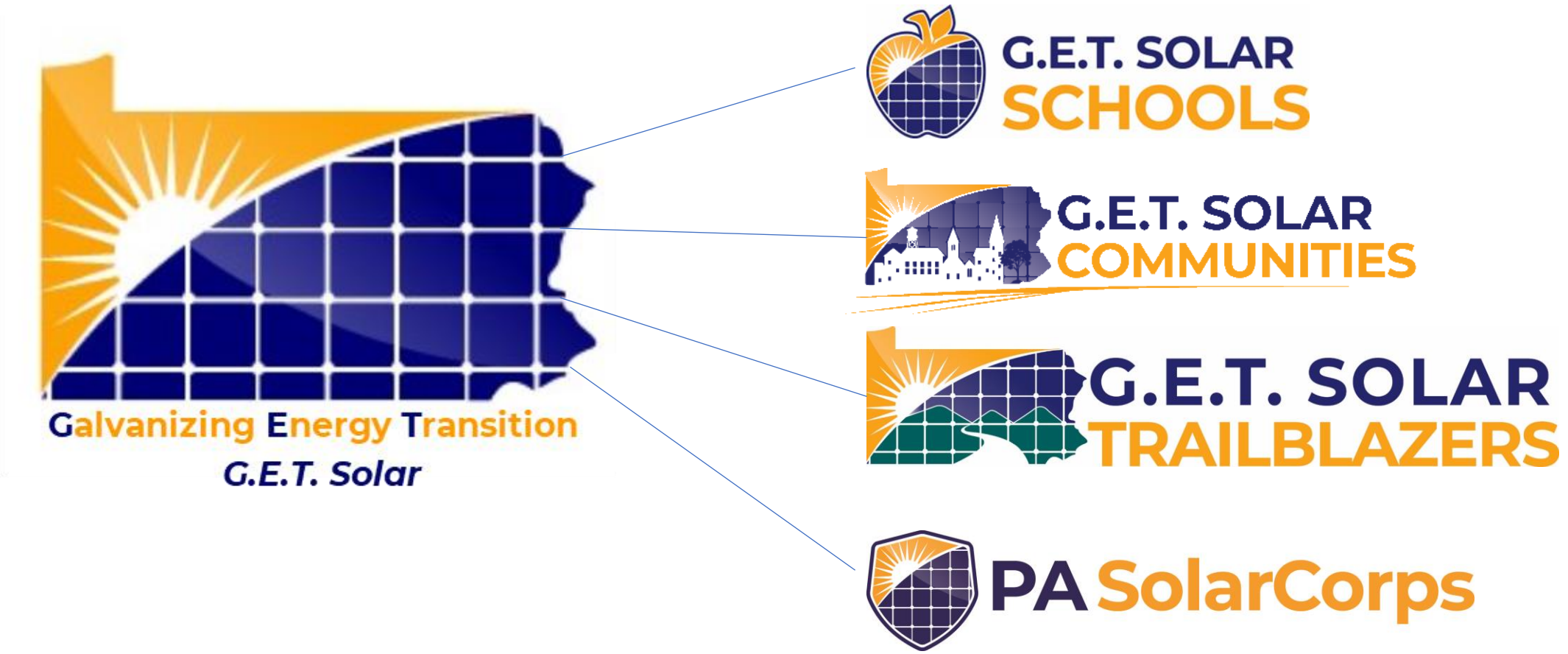
G.E.T. Solar

The ***GET Solar*** initiative is a streamlined process that instills organizations and communities with confidence in the process of going solar by using trusted tools and resources that connect organizations to qualified professionals making the process straightforward and simple.

We help you go solar!

Walking the Walk

Technical Assistance to the Commercial Sector

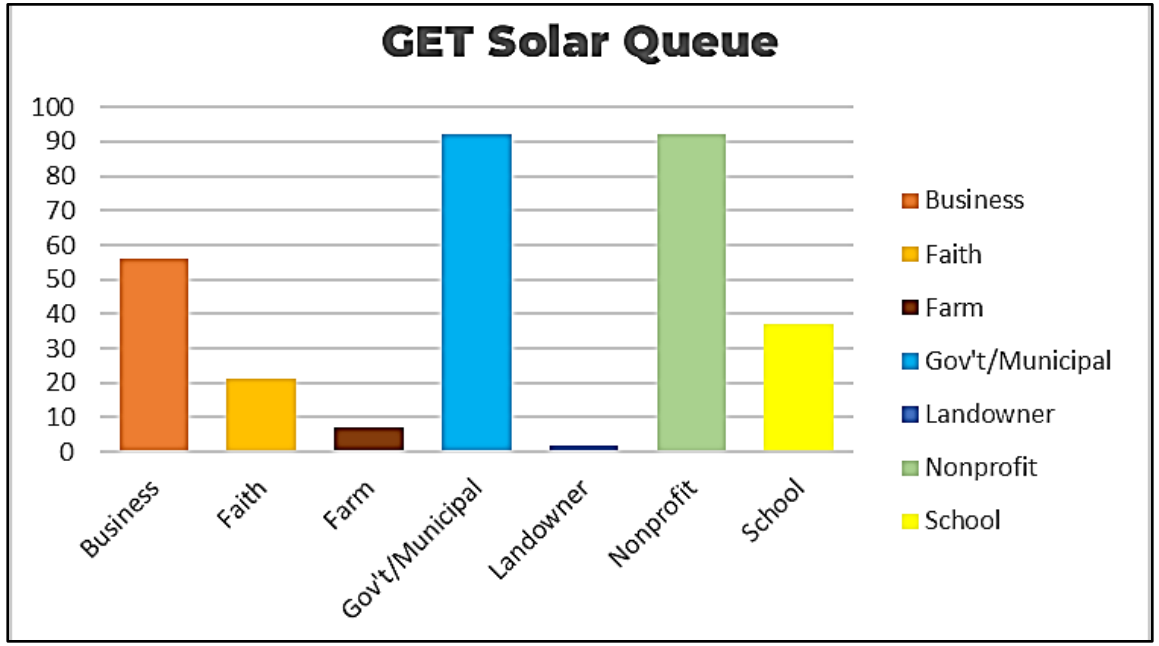


GET Solar Impact

The GET Solar Queue

- Almost 100 MW of potential solar capacity
- Estimated $217,375,023 savings over 25 years if all were to be built
- 36 counties

Installed	10
Contracted Projects	11
Funding Secured, in RFP Stage	5
Finished RFP, Finalizing Funding/Developer Selection	21
RFP	7
Feasibility	56
Inquiry	145
Total	**255**



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PA SolarCorps

55

# of communities mapped for solar potential

980

# of project sites mapped for solar potential

245

Megawatt Solar Potential

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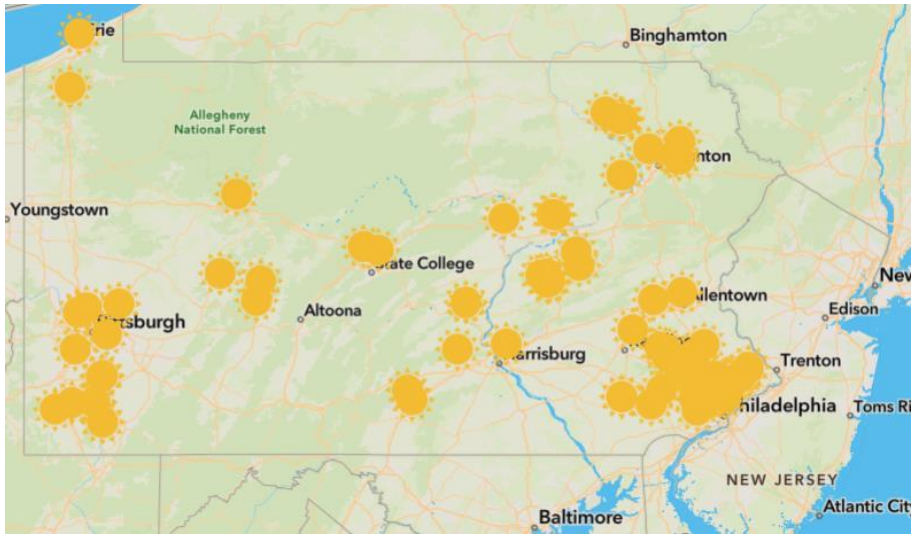
$ 715,549,000

Potential estimated savings

Pennsylvania
Department of Community & Economic Development



The Solar for Schools Grant Program resulted in 88 grant application from 25 counties in urban, rural, and suburban areas that requested a total of $88,087,001—more than triple the amount of available funding.

DCED accepted applications for its initial $25 million appropriation through Jan. 31, 2025.

https://storymaps.arcgis.com/stories/e9cce74f032d4e61b1c0e086ef78625e

SOLAR for SCHOOLS

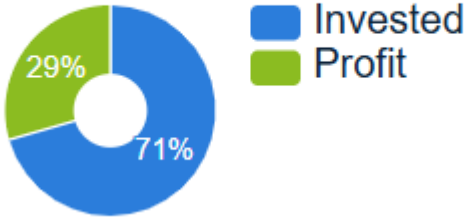
PENNSYLVANIA SOLAR CENTER

G.E.T. SOLAR SCHOOLS

- PA Solar Center prepared feasibility studies for 23 sites (and an additional five from Philadelphia).
- The 23 sites with 18 MW of solar would save an estimated $40,261,515 over the next 25 years.
- Total investment of $28,402,154 that includes 30%-40% federal direct pay, 30-50% coverage from the state grant program, 30% from federal direct pay, and the remainder from additional financing.

Result save

Investment Gain	$11,859,361.00
ROI	41.76%
Annualized ROI	1.41%
Investment Length	25.000 years



Solar Energy Financing

Inflation Reduction Act

Increased benefits to go solar:

- **30% base tax credit**
- 10% Energy Community Bonus Credit
- 10% Domestic Content Bonus Credit
- Elective Payments **– Tax-exempt organizations can receive a Direct Payment** from the federal government equal to tax credit a business would receive.

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Act 129 Solar Rebate

UTILITY	REBATE
Duquesne Light	$0.05
First Energy Met Ed Penelec Penn Power West Penn Power	$0.05
PECO	$0.10
PPL	$0.03

- Available through all public utilities in Pennsylvania
- One time payment based on estimated year one production
- Not guaranteed – applications can be rejected
- For a $100,000 solar installation before tax incentives this could be up to $5,000

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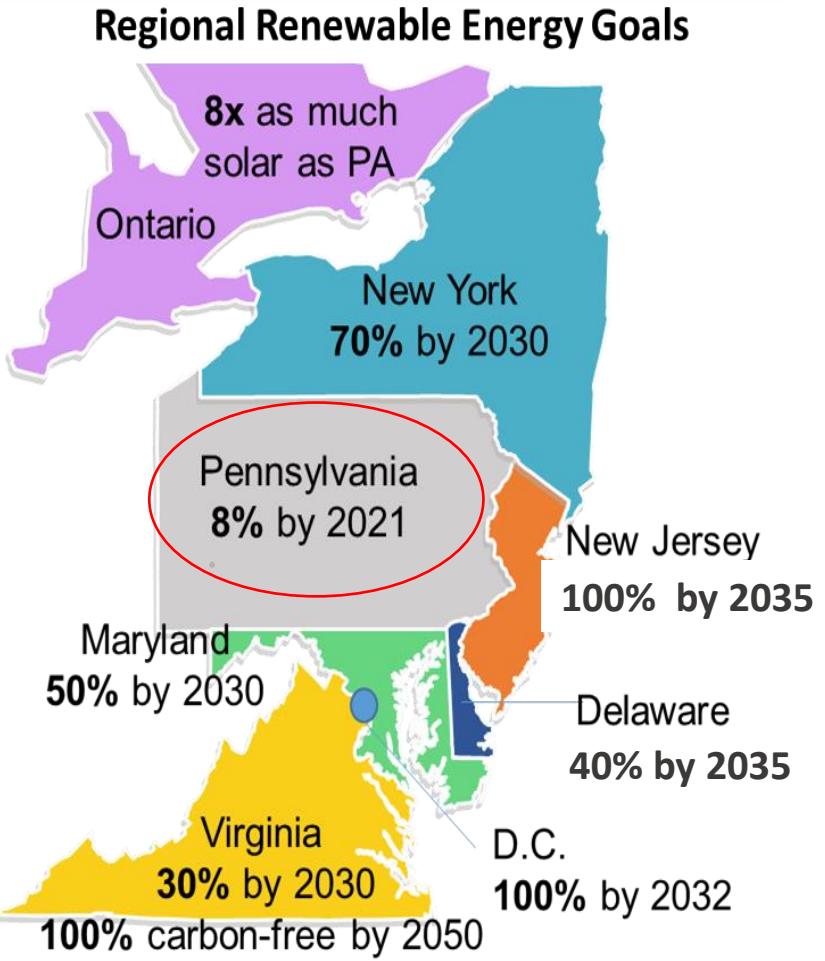
Alternative Energy Portfolio Standards (AEPS)

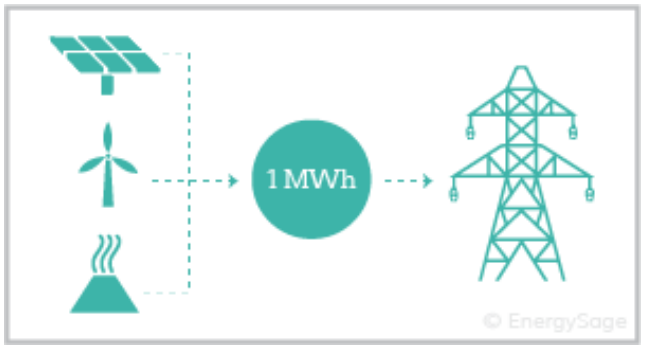
- **Signed into law November 2004**
- **Requires Pennsylvania utilities obtain 18% retail electricity from alternative resources by May 2021**

  - **Tier I - 8% -** Solar photovoltaics and solar thermal, wind, low-impact hydropower, geothermal, biomass, fuel cells
    - **0.5% of the 8% to come from in-state solar photovoltaics (PV)**

  - **Tier II - 10 % -** Large-scale hydropower, waste coal, energy efficiency, municipal solid waste, byproducts of wood processing, etc.



What is an AEC or an SREC?



= 1 Alternative Energy Credit (AEC) or Solar Alternative Energy Credit (SAEC)

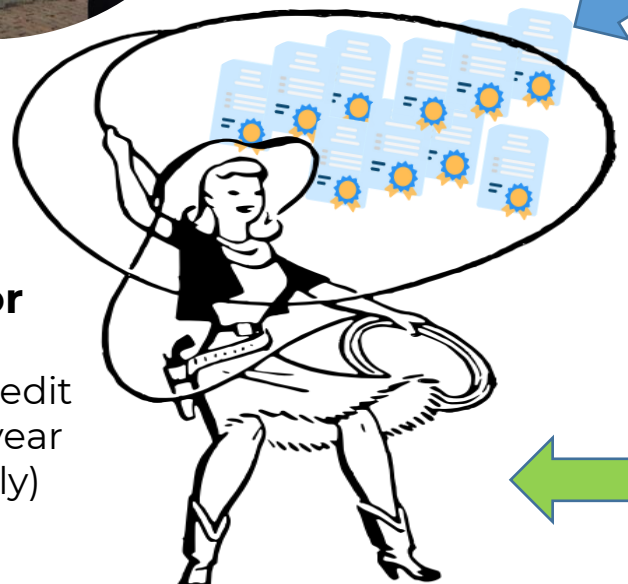
=

= 3-kilowatt solar system (3 kW) = 3.6 MWh of energy or ~3.6 credits per year

=

The credits can be "banked" or saved for three years before they expire.

1



2

AEC/SREC Aggregator bundles credits from multiple solar generators and sells to the utilities via a marketplace

3

$

Utility buys # of AECs required by the AEPS law each year to demonstrate compliance with AEPS law

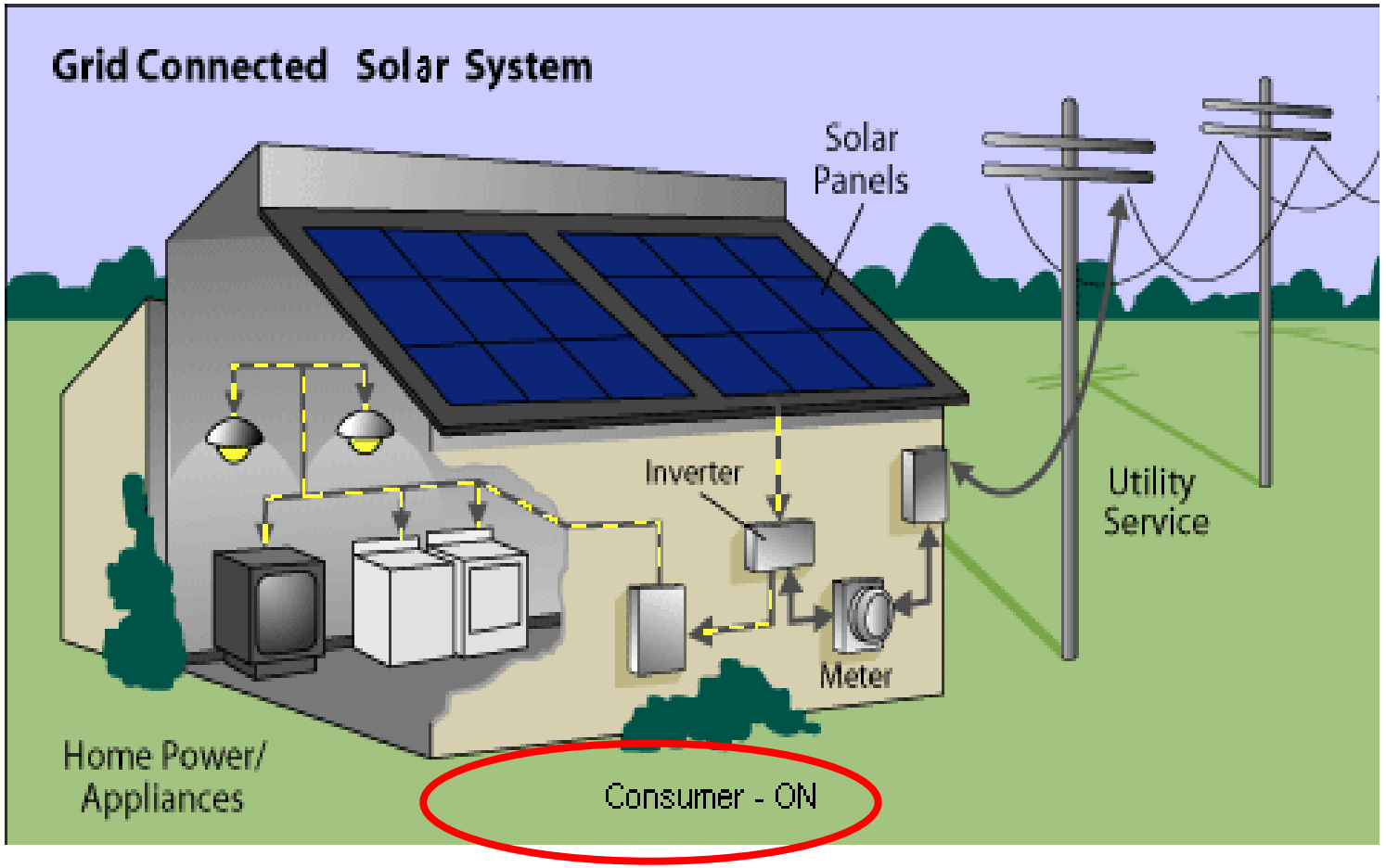
4

$

Aggregator pays Randy about $35/credit or $105 this year (example only)

Net Metering

“The means of measuring the difference between the electricity supplied by an electric utility and the electricity generated by a customer-generator when any portion of the electricity generated by the alternative energy generating system is used to offset part or all of the customer-generator's requirements for electricity.”



Financing for Solar

Cash Purchase

Solar paid for with reserve funds

ROI can be as low as 4 years depending on electricity prices and IRA benefits

Maximum financial benefit from solar over life of system

Financing

Many banks and nonprofit lenders have experience with solar loans

30-60% of the loan is paid off with IRA benefits

Loans are structured so solar savings are greater than cost of loan **from the first payment**

Power Purchase Agreement (PPA)

- Not available for every project (typically medium to large commercial)
- Three-party agreement with you, solar developer, and investor, who owns and operates the system)
- You lease your property and buy solar electricity at discounted price

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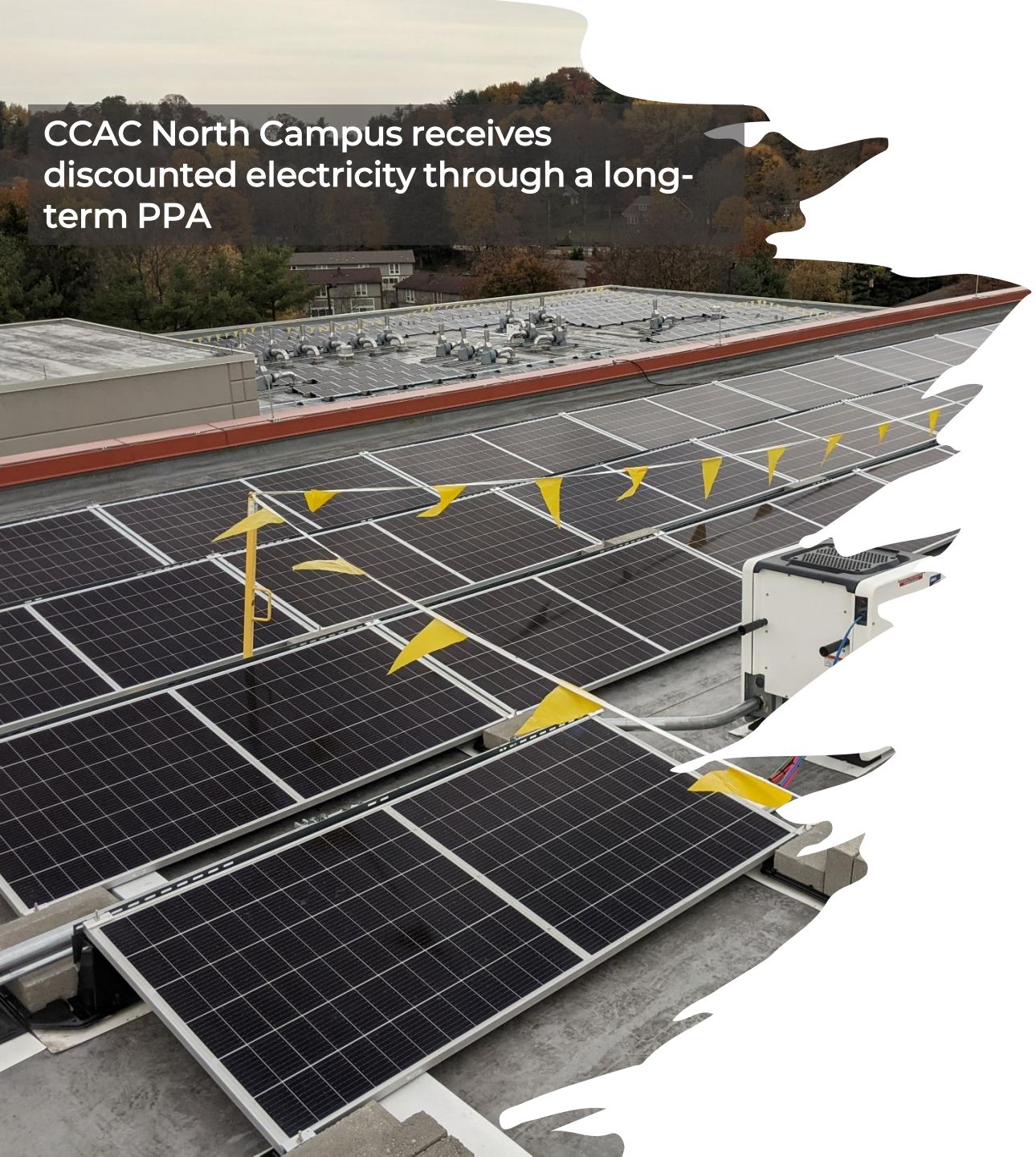
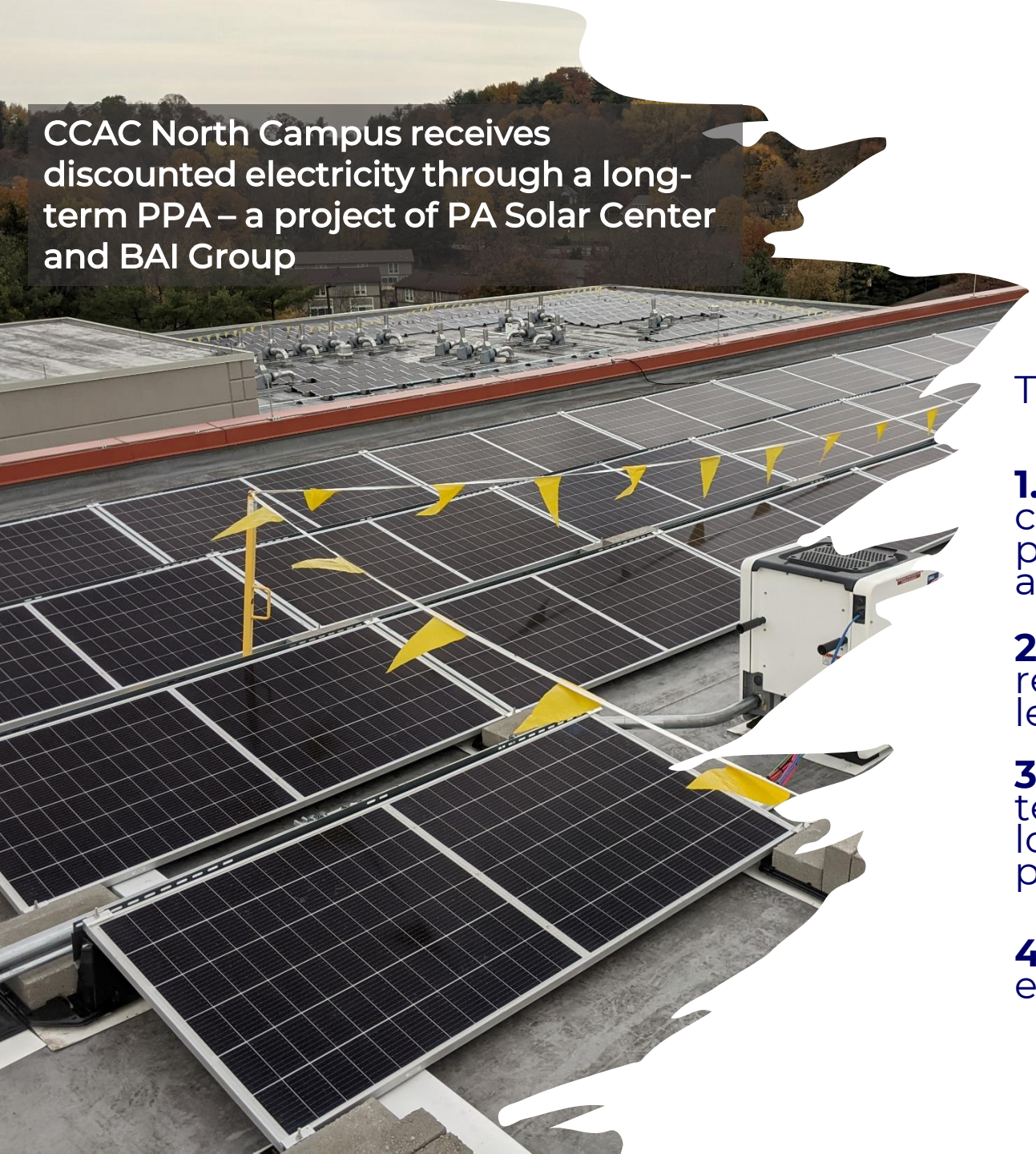


CCAC North Campus receives discounted electricity through a long-term PPA

Long-term Power Purchase Agreements

- In lieu of paying an up-front cost for a solar installation, a third party investor owns the solar and the nonprofit purchases the electricity provided by the solar at a discounted rate
- A long-term PPA can extend as far as 30 years.
- Over this term, the investor (owner of the solar installation) is responsible for operations & maintenance.
- The nonprofit often has the option to buy out the PPA contract or may become the owner at the end of the PPA term.
- This is most commonly available for systems > 500kW.



CCAC North Campus receives discounted electricity through a long-term PPA – a project of PA Solar Center and BAI Group

Long-term Power Purchase Agreements

To create a viable PPA developers need:

1. Power Purchase Agreement (PPA): Long term contract (10 years or more) with an offtaker, good price for electricity that is favorable to developer and offtaker

2. Creditworthy Offtaker – ensures a stable revenue stream for the project (important for lenders) (such as a school or municipality)

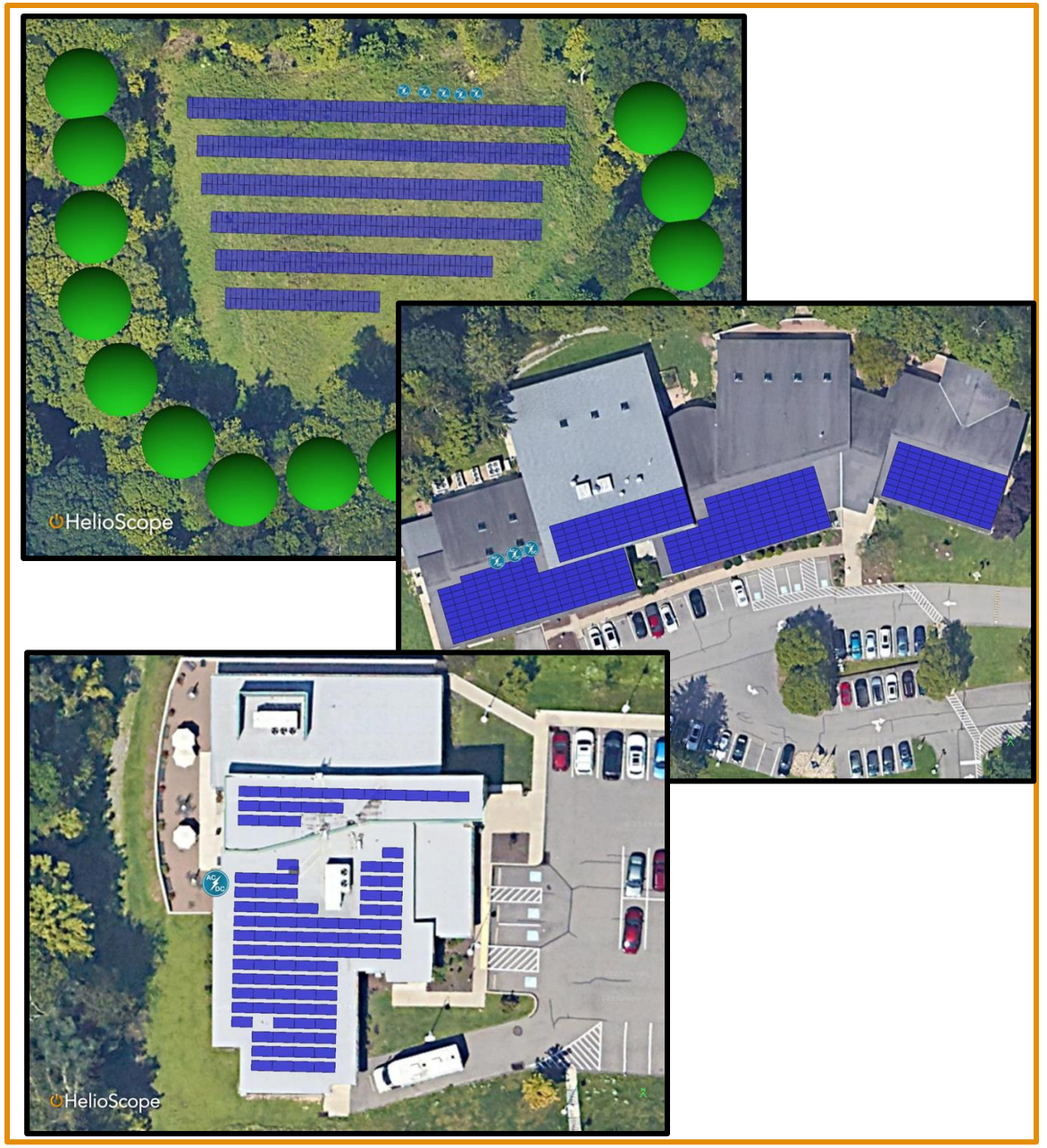
3. Debt Financing – including construction loans, term loans when project is operational. Access to low-cost capital is very important to making projects work in Pennsylvania.

4. Equity Financing – early state funding and tax equity partners to take the federal tax credits

PENNSYLVANIA SOLAR CENTER

COMBINED PV SYSTEMS

- 681-kilowatt photovoltaic system
- Produces 800,300 kWh of clean energy in Year 1
- Offsets approximately 101.7% of annual electric consumption for both buildings



Feasibility Study – Example Cashflow Analysis

Direct Purchase Model

High-level Savings Estimate

The numbers below are based on market rates and comparable project data. This estimate is for educational purposes only.

Solar Energy System Cost and Production		PA Solar Center Estimate
Electricity Bill Savings Year One	This is the value of the electricity produced by your proposed solar installation versus the cost of paying for your electricity.	$69,888
Estimated 25 Year Savings	Total savings ($) provided over 25 years factoring in up-front costs.	$1,309,585
Full Purchase Price	The full purchase price is the cash value of the system if paid for outright.	$2,146,000
IRA Tax Benefits	The cost recovered through the federal solar tax credit and depreciation	$1,073,000
Adjusted Net Price	Full purchase price minus estimated cost recovered through direct pay and other funds	$1,073,000
System Size	Solar installations are measured by how many kilowatts (kW) of electricity can be produced under perfect conditions.	1,160
Electricity Production	The total electricity expected to be produced by this installation in year one expressed in kilowatt hours (kWh).	1,536,000
Price per Watt Installed	Solar installations are commonly measured by the dollar cost ($) per Watt installed.	$1.85
Estimate Year One Utility Supply Rate	Your estimated supply rate in year one after contract renewal (40% increase from current rate).	$0.0455
Electricity Usage Offset by Solar	The percentage of your current electricity usage offset by the installed solar.	124%

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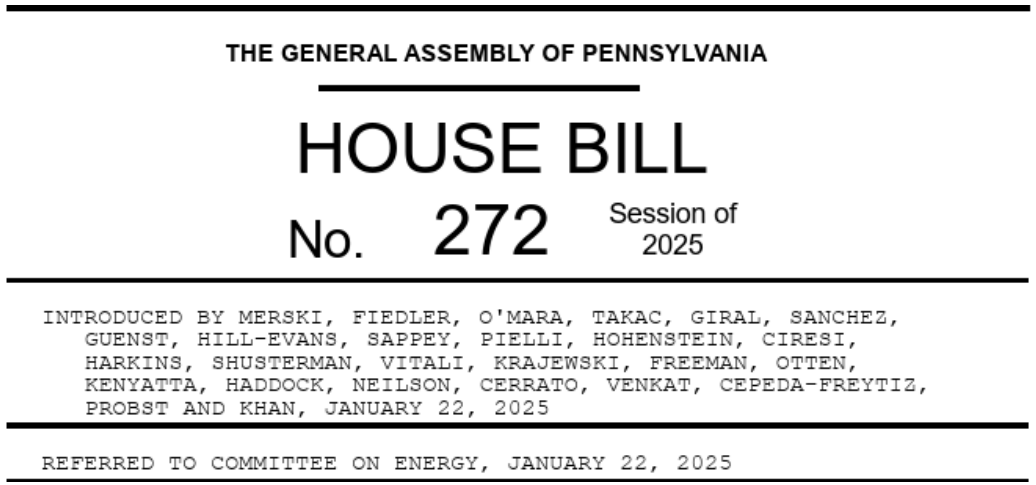
Municipal and Emergency Responder Solar Act



THE GENERAL ASSEMBLY OF PENNSYLVANIA

HOUSE BILL

No. 272 Session of 2025

INTRODUCED BY MERSKI, FIEDLER, O'MARA, TAKAC, GIRAL, SANCHEZ, GUENST, HILL-EVANS, SAPPEY, PIELLI, HOHENSTEIN, CIRESI, HARKINS, SHUSTERMAN, VITALI, KRAJEWSKI, FREEMAN, OTTEN, KENYATTA, HADDOCK, NEILSON, CERRATO, VENKAT, CEPEDA-FREYTIZ, PROBST AND KHAN, JANUARY 22, 2025

REFERRED TO COMMITTEE ON ENERGY, JANUARY 22, 2025

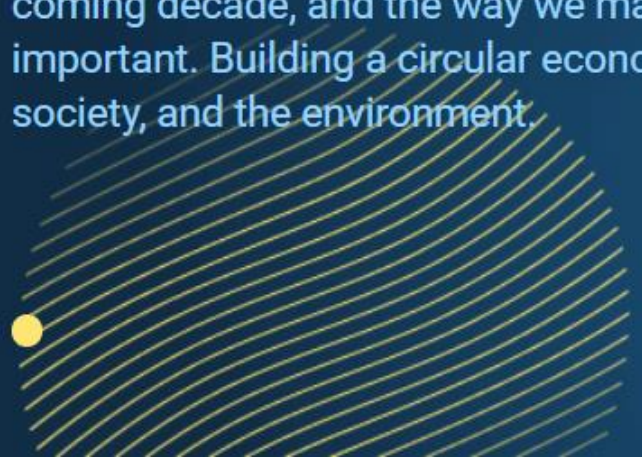
- Provides grants up to 50% of the cost of solar electric or solar thermal to a political subdivision or emergency service facility eligible to receive money under this act to the purchase and installation of equipment, including prepayment in whole or in part of a solar lease or power purchase agreement, permit fees, energy storage, utility interconnection and any other costs approved by the department.
- Requires prevailing wage
- Must purchase solar system via Separations Act, via Power Purchase Agreement, or via GESA
- Preference in award decisions to eligible applicants within 50 miles of a coal-powered electric generation plant that has closed or will close within one year of the effective date of this paragraph.
- Must be produced or manufactured in the United States with at least 75% of the articles, materials and supplies are produced or manufactured in the United States, if available.

SEIA Solar Energy Industries Association®

MANAGING GROWTH

Circular Economy

Clean energy industries like solar are set to grow exponentially in the coming decade, and the way we manage that growth is critically important. Building a circular economy can benefit businesses, society, and the environment.



SEIA Solar Energy Industries Association®

With more than **1.6 TWdc (or 1600 GWdc) PV modules installed globally through the end of 2023 (including over 200 GWdc in the U.S., through Q1 2024)**, end-of-life management is important for all PV technologies to ensure clean energy solutions are sustainable.

Current Recycling Regulations

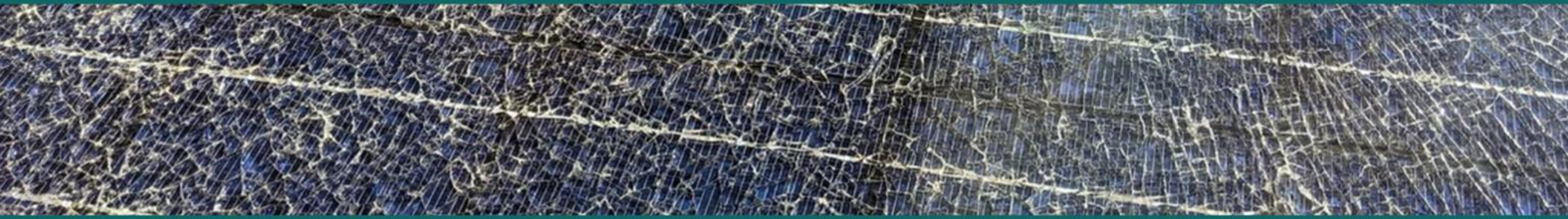
- End-of-life disposal of solar products in the US is governed by the Federal Resource Conservation and Recovery Act (RCRA) and state policies that govern waste disposal or other disposition. SEIA works collaboratively with regulators to reasonably develop implementable regulations and manageable processes for compliance.
- The majority of solar panels that cannot be reused or repaired at end-of-life are considered solid waste. If any of those panels have materials that exceed Federal RCRA thresholds for toxicity, they may be characterized as hazardous waste. Some states allow those hazardous panels to be treated as universal waste like batteries, LED bulbs, and aerosol cans.
- Most states have policies in place that establish minimum requirements for solar projects, often including decommissioning plans and funds. As of 2024, only a few had enacted policies that require recycling or reuse of components at the time of decommissioning or end of life. Some states have enacted legislation relative to waste characterization for solar panels to be recycled. Other states have varying requirements such as Maine, which requires any recyclable solar components to be recycled by an authorized facility, and North Carolina, which requires reuse or recycling of any components where practicable.

SEIA Solar Energy Industries Association®

National PV Recycling Program, founded in 2016, is a network of recycling and refurbishment providers with end-of-life management services for solar and storage installers, project and system owners, developers, distributors and other parties. Participants can repair, refurbish, resell, and recycle PV modules, inverters and other equipment.

SolarRecycle.org

SolarRecycle.org was born out of a recognition that the industry lacks accessible information on recycling processes, standards, and commercial vendors. The goal of the website is to promote alternatives to landfilling by enabling engagement with vendors who facilitate resale, donation, and recycling for solar equipment in pursuit of a circular economy for the solar industry. To do this, we aggregate and centralize information to educate stakeholders about current end-use options.



Click the icons below if you're interested in learning more about.....

Solar Lifecycle Management

WE RECYCLE SOLAR

WE RECYCLE SOLAR

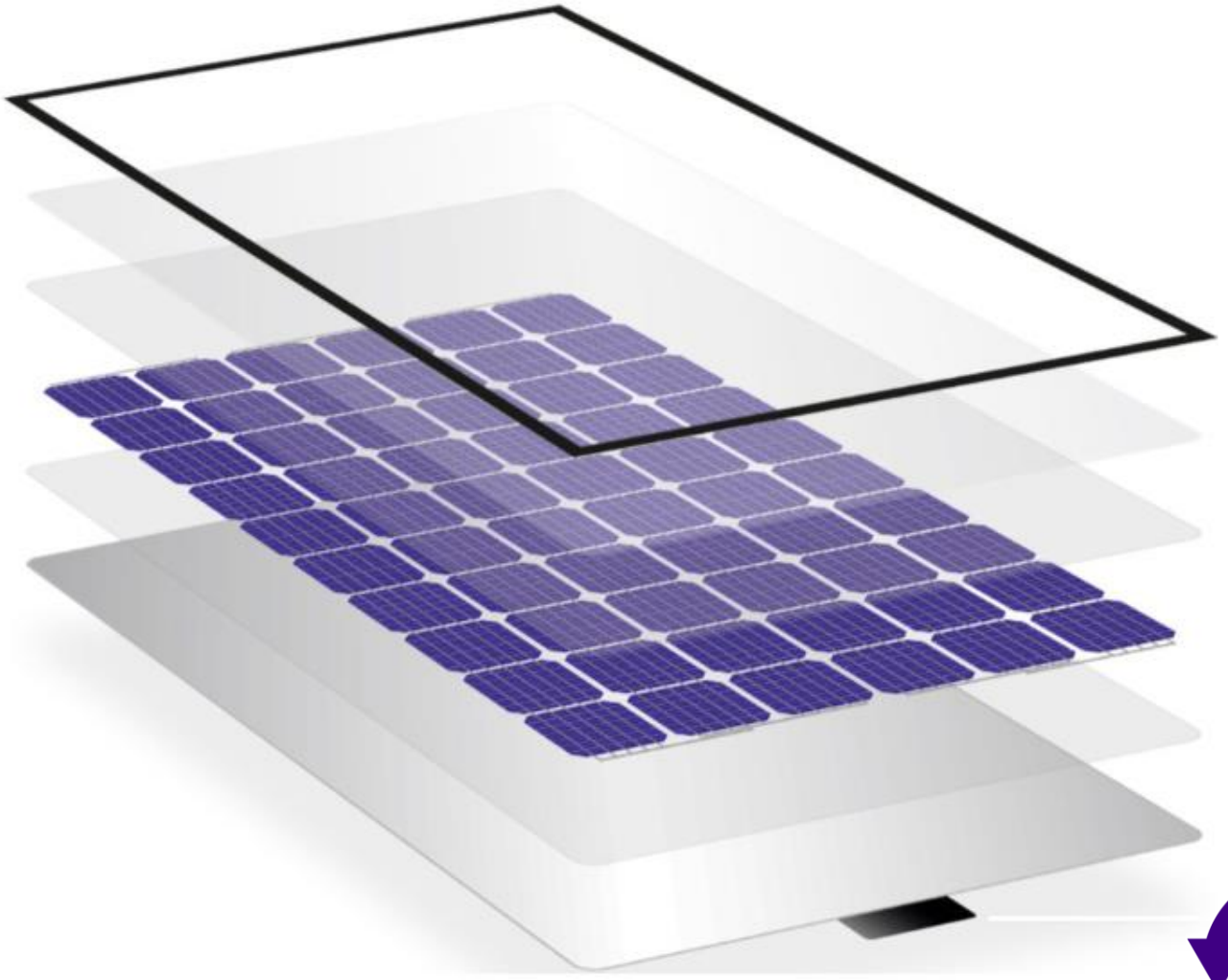
Your dedicated, single-source disposal provider for excess, damaged, and end-of-life solar equipment

Formed by veterans of the hazardous waste disposal, waste management, electronics and metals recycling, and reverse logistics industries

werecyclesolar.com

What's in a Solar Panel?

WE RECYCLE SOLAR



Aluminum Frame

Tempered Glass

Encapsulant (EVA)

Solar Cells

Encapsulant (EVA)

Backsheet (PVF)

Junction Box

WE RECYCLE SOLAR

Recovered Materials

Aluminum, Copper, Lead, Silver and Tin

Glass

Silicon

Our impact: by the numbers

495 tons	10,400 tons	147 tons	651,130 Co2
of processed aluminum	of processed glass	of processed copper	emissions voided

WE RECYCLE SOLAR

Sycamore
Sustainable Electronics Recycling

Founded in 2010 in West Grove, PA, Sycamore is an R2v3 and NAID-AAA certified leader in IT Asset Disposition (ITAD), empowering schools, healthcare organizations, and enterprises to securely reclaim value from laptops, desktops, phones, tablets, servers, networking equipment, and solar panels.

With an annual processing capacity of 20 million pounds and approximately 40,000 devices monthly, we ensure zero waste while maintaining the highest data security standards.

Our secure facility operates with a 100% carbon-neutral process, powered entirely by our innovative solar microgrid with Iron Flow ESS Energy Warehouse™ technology, demonstrating our commitment to environmental responsibility and sustainable business practices since day one.

431 W. Baltimore Pike
West Grove, PA 19390
info@sycamoreinternational.com

Sycamore
Sustainable Electronics Recycling

Every panel that enters their facility undergoes an evaluation process:

- **Refurbishment for Second Life Applications:** Panels that still generate adequate power are refurbished and certified for secondary use cases—often extending their lifespan well beyond the typical 25-30 years.
- **Responsible Material Recovery:** Obsolete or damaged panels are processed through our vetted downstream domestic recycling partners, adhering to the industry's highest environmental and regulatory standards.
- **Material Capture Excellence:** Specialized processes recover up to 95% of materials—including glass, aluminum, copper, silver, and silicon—which are then reintroduced into the supply chain.

Equipment Sycamore Recycles

- PV Modules (monocrystalline, polycrystalline, shingle type, etc.)
- Inverters and microinverters
- Racking equipment and trackers

Sycamore
Sustainable Electronics Recycling

Facility holds the following certifications:

- R2v3 for electronics recycling (including the new Appendix G in 2026)
- ISO 9001: 2015 for Quality Management
- ISO 14001:2015 for Environmental Management
- ISO 45001:2018 for Occupational Health and Safety Management

Initial cost = $0.40/lb. for solar modules and inverters and transformers at zero charge at this point.