

# Pennsylvania's Solar Future Plan

Strategies to increase electricity generation from in-state solar energy



**pennsylvania**  
DEPARTMENT OF ENVIRONMENTAL  
PROTECTION



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Read the complete plan: <https://www.dep.pa.gov/PASolarFuture/plan>

To learn more: <https://www.dep.pa.gov/PASolarFuture>

## COVER PHOTOS

**Top:** Sunset in Spring Grove, York County

**Middle:** Farm in Cogan Station, Lycoming County; Tom Ridge Environmental Center, Presque Isle, Erie County; farm in Germansville, Lehigh County

**Bottom:** Estes Trucking, West Middlesex, Mercer County; Community Energy's Keystone Solar Project, Radnor, Lancaster County; residence in Schuylkill County

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## Message from Secretary Patrick McDonnell



Electricity generation creates about 33 percent of greenhouse gas emissions in Pennsylvania, making it a key area for renewable energy innovations to reduce these pollutants and the challenges they create for public health and our environment.

Solar energy is growing in Pennsylvania, but significant potential remains for solar energy development to transform our electricity generation sector. While the number of states that get at least 5 percent or even 10 percent of electricity from solar continues to climb, Pennsylvania still gets less than 1 percent of its electricity from this clean, reliable, renewable energy.

What are the best ways for Pennsylvania to realize this potential? The Department of Environmental Protection Energy Programs Office assembled a statewide partnership of experts who collaborated for more than a year to identify strategies, including grid-scale solar and smaller distributed systems (such as rooftop installations), that can achieve a 10 percent increase in solar-powered electricity. They also detailed the associated benefits and required investments, to create a set of strategy recommendations ready for implementation.

Our hope is that *Pennsylvania's Solar Future* helps transition discussion of solar energy to developing strategies that fill policy gaps, provide signals to solar job creators, and further align economic opportunities with the benefits of emissions-free energy generation. The measure of our success lies in educating and encouraging those who can help accelerate the recognition and adoption of the benefits of solar in a manner that transforms the energy marketplace to improve quality of life for all Pennsylvanians.

If you'd like to see a viable future of cleaner energy in Pennsylvania, I invite you to turn the page. Further, I encourage you to consider how this valuable work might inform your energy decisions.



## Teaming Up for a Bright Energy Future in Pennsylvania



*June 14, 2018, stakeholder meeting in Philadelphia*

Led by the Pennsylvania Department of Environmental Protection, the “Finding Pennsylvania’s Solar Future” brought together about 550 community, industry, government, economic, academic, and policy stakeholders from across the state.

Participants served on the project facilitation team, on work groups, and as committed partners, and provided input through public comment and other feedback opportunities.

While supplying knowledge and perspectives based on their experience, everyone also brought a willingness to consider the interests of others. For this reason, *Pennsylvania’s Solar Future* is a strongly ground-truthed plan.

The group conducted a detailed modeling process to determine what solar energy in Pennsylvania can look like in 2030 if strategies are developed and implemented to increase this renewable energy source and what a business-as-usual approach to solar will look like. They also examined associated benefits and investments required. Vermont Energy Investment Corporation, a national expert in solar energy modeling, led the group through the modeling process.

“Finding Pennsylvania’s Solar Future” was funded by a \$550,000 award from the U.S. Department of Energy.

Read the complete plan: <https://www.dep.pa.gov/PASolarFuture/plan>

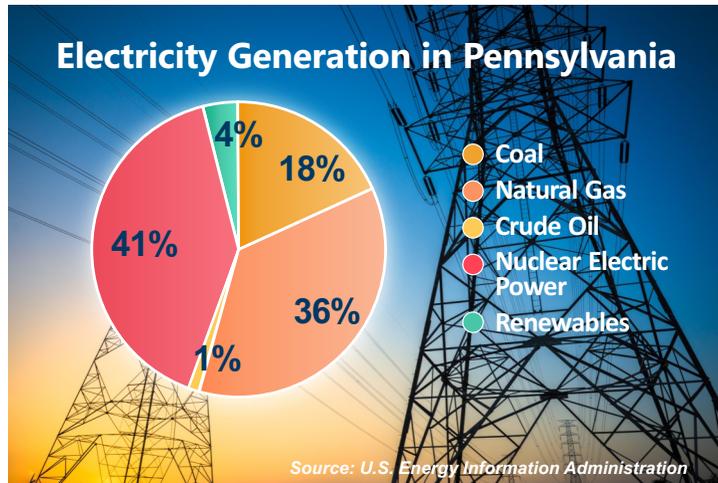
Learn more about the project process: <https://www.dep.pa.gov/PASolarFuture>

## Target: 10 Percent Electricity from In-State Solar by 2030

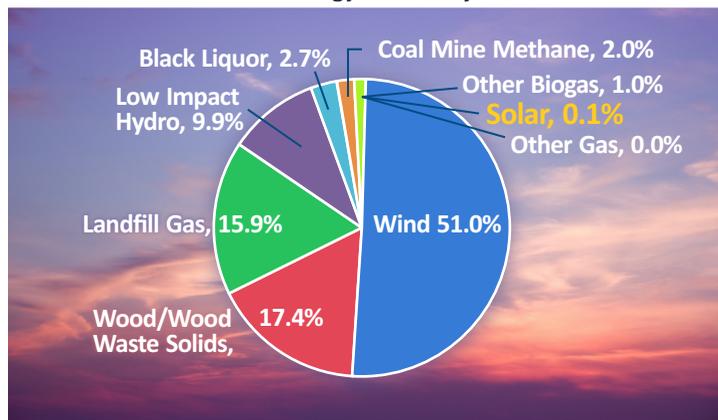
Just 4 percent of net electricity generation in Pennsylvania currently comes from renewable energy sources, and only a fraction of that is from solar.

If no changes are made to increase new solar energy development, Pennsylvania is on track to get .5 percent of its electricity from solar energy by 2021. This is the amount required by Act 213 of 2004. In the absence of any changes to increase solar, Pennsylvania may stay at .5 percent.

Compare this with other Northeast states: Massachusetts: 8.5 percent, New Jersey: 3.8 percent, New York: 1 percent



Solar supplies a tiny fraction (.1 percent) of electricity that comes from renewable energy in Pennsylvania:



**Target:**  
**Identify specific strategies to increase in-state solar-powered electricity generation by 10 percent by 2030.**

## **Top Line Finding: Accelerate Grid-Scale Solar**

Solar energy comes from two types of systems:

- Smaller, distributed systems--the panels you see on some homes, barns, businesses, and organization buildings;
- Larger, grid-scale systems connected directly to the transmission system.



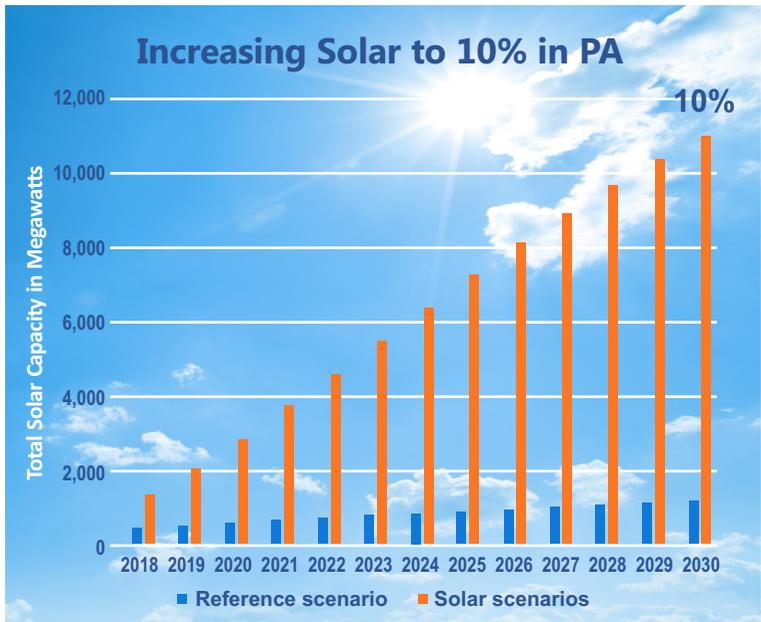
***Distributed system: Farm in Germansville, Lehigh County***



***Grid-scale system: Community Energy, Radnor, Lancaster County***

Pennsylvania will need about 11 Gigawatts (GW) of solar to get 10 percent of electricity from solar energy by 2030. This will require:

- Sustaining the current growth rate of distributed systems for about 1-4 GW, and
- Accelerating the growth of grid-scale solar from less than 1 GW to about 7-10 GW.



The planning group evaluated two possible scenarios:

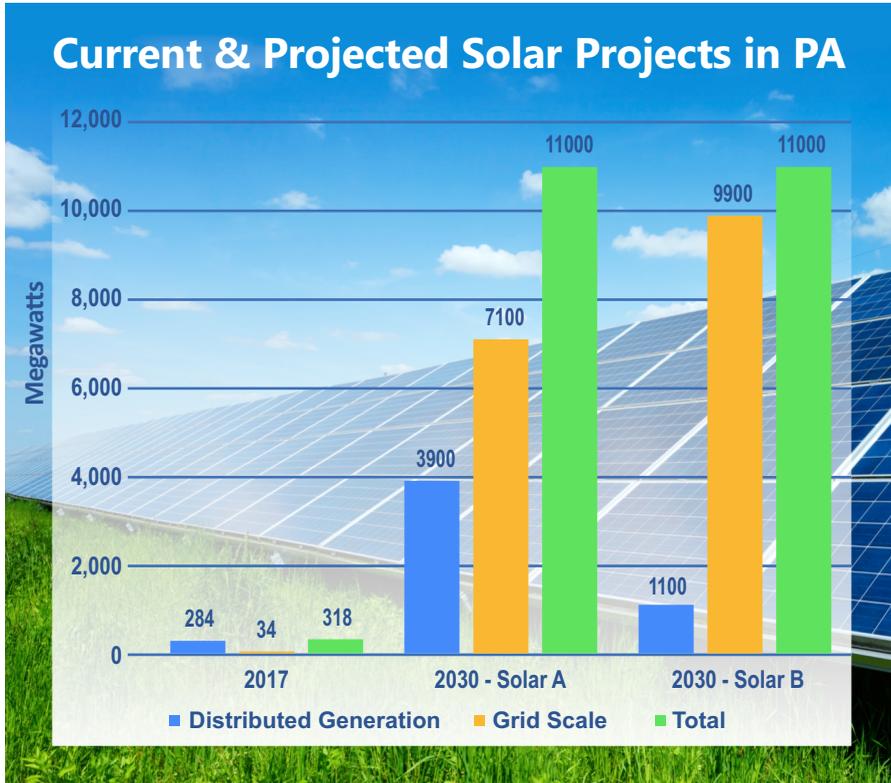
**Scenario A:** Grid-scale solar will supply 65 percent of the 10 percent electricity generation.

**Scenario B:** Grid-scale solar will supply 90 percent of the 10 percent electricity generation.

What's the difference?

- Installing many smaller systems, mostly on rooftops, will likely be costlier, but will offer more jobs.
- Installing larger systems will be less expensive, but will require more land installations and won't offer quite as many jobs.





## Solar Powered Electricity = Significant Benefits to Pennsylvania

**More jobs:** 60,000 to 100,000+ jobs, depending on the ratio of smaller systems to larger systems. From installers to system designers, these solar jobs have median wages of \$20–\$38 per hour, and will be available in rural, urban, and suburban areas.

**Reduction in greenhouse gas emissions:** Emissions from the electricity generation sector will likely decrease up to 9.3 percent, which will help reduce health problems and negative environmental impacts of these pollutants.

**Economic development opportunities:** There are opportunities to site solar development in ways that complement the working landscape and rural economy, such as using solar on buffer zones, disturbed lands, and in conjunction with grazing or pollinator friendly perennials.

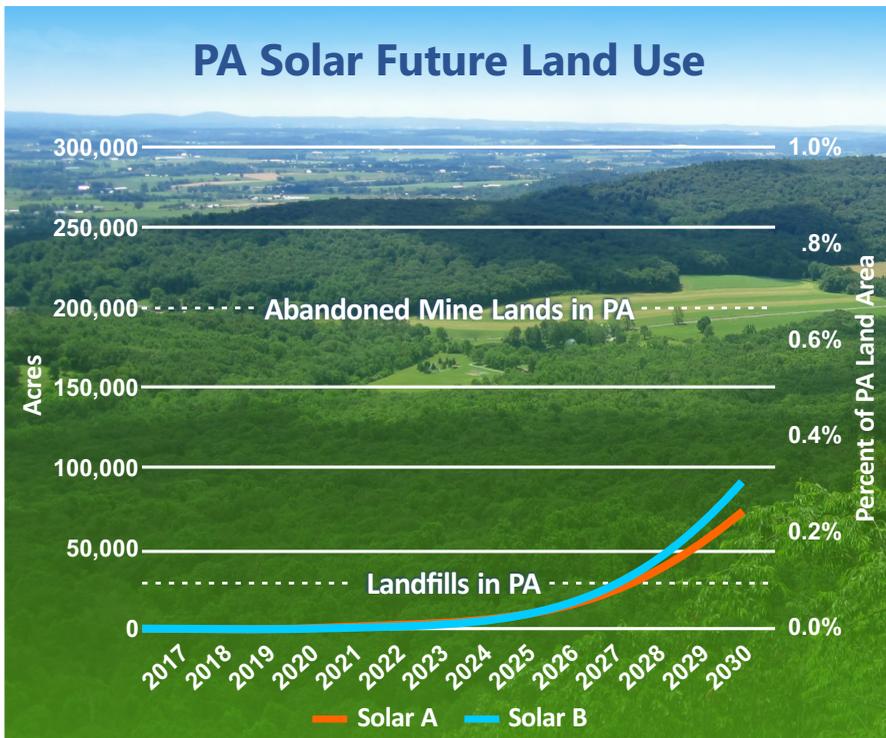
**Net benefit of free fuel and cost savings:** The combination of fuel savings (free sunlight) and anticipated cost savings (avoided public health and environmental damages) could result in a *net benefit of over \$1.6 billion annually* from 2018 to 2030.

## Modest Investments and Land Required

Growing solar in Pennsylvania is cheaper than ever: Only a small (<1.5 percent) increase in overall annual energy spending (private generation investments) will be required, whether grid scale provides 65 or 90 percent of the 10 percent electricity generation.

Accelerating grid scale solar will require minimal land. Only 124 square miles (79,200 acres) of land will be needed to increase grid solar sufficiently to generate 10 percent of electricity. This is less than three-tenths of 1 percent of Pennsylvania's total land area of 46,055 square miles.

In addition, land that is already in use, such as landfills and abandoned mine land, could also host grid scale solar installations.



# 15 Strategies to Get to 10 Percent of Electricity from Solar

The "Finding Pennsylvania's Solar Future" project group identified 15 strategies that, if implemented, will enable Pennsylvania to get 10 percent of its electricity from in-state solar energy.

- Seven strategies incorporate development of both grid-scale and distributed systems.
- Eight strategies are specific to either distributed or grid-scale solar development.

The list isn't meant to be exhaustive, and strategies can be combined to create many pathways to 10 percent.

## Cross-Cutting Strategies: Grid-scale and Distributed

<b>Alternative Energy Portfolio Standards</b>	<b>1.</b> Increase the AEPS solar photovoltaic (PV) carve-out to between 4 and 8 percent by 2030, and ensure creditable Solar Renewable Energy Credits are limited to those generated in Pennsylvania wherever possible.
<b>Access to Capital</b>	<b>2.</b> Increase access to capital by expanding availability of solar lending products to residential and commercial projects to enable solar ownership. <b>3.</b> Provide loan guarantees to lower interest rates and incentivize deployment of solar generation.
<b>Carbon Pricing</b>	<b>4.</b> Implement a carbon pricing program and invest the proceeds in renewable energy and energy efficiency measures.
<b>Siting and Land Use</b>	<b>5.</b> Support the creation and adoption of uniform policies to streamline siting and land-use issues while encouraging conservation.
<b>Tax Incentives</b>	<b>6.</b> Evaluate the state tax policy and consider exemptions that encourage the development of solar PV systems. <b>7.</b> Assist solar project sponsors in identifying investors and/or companies that have sufficient tax equity appetite to take full advantage of the federal solar Investment Tax Credit and Modified Accelerated Cost Recovery System depreciation, if sponsors can't do so themselves.

## Grid Scale Strategies

<b>Long-Term Contracts</b>	<ol style="list-style-type: none"><li>1. Develop guidelines for limited use of long term contracts (LTCs) for a period of 10 or more years to ensure Pennsylvania benefits from grid scale solar energy.</li><li>2. Evaluate and consider utility ownership of solar generation especially in cases where market-driven deployment may be insufficient to achieve public goals and/or reliability concerns. This may include solar for low income and Customer Assistance Programs in particular.</li></ol>
<b>Grid Modernization</b>	<ol style="list-style-type: none"><li>3. Investigate opportunities for grid modernization to enable increased solar generation.</li></ol>

## Distributed Generation Strategies

<b>Virtual Net Metering</b>	<ol style="list-style-type: none"><li>1. Expand customers' ability to use net metering.</li></ol>
<b>Community Solar</b>	<ol style="list-style-type: none"><li>2. Identify and remove the barriers to the deployment of community solar systems in Pennsylvania.</li></ol>
<b>Alternative Ratemaking</b>	<ol style="list-style-type: none"><li>3. Ensure alternative ratemaking is addressed in a manner that does not create a disincentive for solar deployment.</li></ol>
<b>Property Assessed Clean Energy (PACE)</b>	<ol style="list-style-type: none"><li>4. Enable and encourage municipalities to offer PACE programs that include solar projects.</li></ol>
<b>Addressing Interconnection Issues</b>	<ol style="list-style-type: none"><li>5. Accelerate use of smart inverters to manage over-voltage concerns on low voltage distribution lines and avoid unnecessarily adding costs on small solar distributed generation projects.</li></ol>

## Next Steps

Over the next few months, the "Finding Pennsylvania's Solar Future" project group will develop a Strategy Support Guide. Action items will be identified to facilitate implementation of the strategies presented in *Pennsylvania's Solar Future* and determine what additional information is needed to continue to deploy solar to meet the 10 percent target—and possibly beyond.

Learn more about development of the Strategy Support Guide at <https://www.dep.pa.gov/PASolarFuture>



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