

Green Banks: Transforming Clean Energy Finance in Pennsylvania

By encouraging private-sector investment in renewable energy and energy efficiency, while reducing the need for public subsidies, green banks and other clean energy financing programs are playing an important role in the United States and other countries. Green banks have also been effective in facilitating conversations with key industry stakeholders, educating lenders on technological options, and providing underwriting support.

In these ways, a green bank could be a cost-effective tool not only for helping Pennsylvania comply with the U.S. Environmental Protection Agency's (EPA's) Clean Power Plan but also for driving investments in targeted economic sectors or communities. Based on the experiences of existing green banks and clean energy lending programs elsewhere, the Union of Concerned Scientists (UCS) has analyzed a potential green bank in Pennsylvania, finding that it would enable the state to leverage an initial capitalization of \$135 million into a \$4.2 billion investment in renewable energy and energy efficiency over the next 15 years.

By 2030, this clean energy investment could:

- Support the deployment of 780 megawatts (MW) of new wind and solar power capacity and generate or save the equivalent of more than 2 percent of Pennsylvania's 2013 electricity sales.
- Save homes and businesses \$375 million on their annual electricity bills by investing in efficiency.
- Reduce power-sector carbon dioxide emissions by more than 4.8 million tons per year—equivalent to taking 930,000 cars off the road—or 11 percent of the emissions reduction that Pennsylvania must achieve to comply with the Clean Power Plan.

A Promising pathway for clean energy finance

Green banks are state-level financial institutions that provide a suite of financial products to support clean energy project development; they also help raise the public's and the financial sector's awareness of clean energy technologies and their benefits. Green banks have been successfully implemented in New York and Connecticut to aid the transition from governmental clean energy incentives to financial products

funded primarily with private-sector capital. Many more states, such as Kentucky and Iowa, have developed locally based loan programs for efficiency and renewable energy.¹

Green banks seek to leverage a pool of public-sector funds in order to garner a larger pool of private-sector investments in renewable energy and energy efficiency. A green bank's performance in this regard is typically measured by its ratio of public-sector to private-sector funds. In Connecticut, for example, the bank has achieved a leverage ratio of 1:10 (CGC 2015). By increasing green banks' leverage ratios, policy makers aim to establish programs that eventually reduce or eliminate the need for government incentives and that create self-sustaining clean energy markets.

Green banks represent a viable strategy for helping states reduce their emissions rates substantially, comply with the Clean Power Plan, and foster economic growth and competitiveness, particularly in renewable energy and energy efficiency products and services. For example, jobs in the solar industry have eclipsed the total in coal mining (173,807 vs. 93,185, respectively, nationwide in 2014). Given the distributed nature of solar installations, these impacts tend to be local, thereby representing an opportunity for coal industry workers to transition to jobs in the clean energy economy (TSF 2014). In essence, green banks can help states achieve not only climate goals but economic development goals as well.

Building on existing clean energy programs in Pennsylvania

Pennsylvania already has a number of financing programs, often co-administered by several entities, to support renewable energy and energy efficiency investments. These programs include:

- *Keystone HELP*. The Pennsylvania Treasury Department initiated in 2005 the first capitalization of the Keystone HELP energy-efficiency loan program, which has assisted homeowners in pursuing efficiency projects. It continues to operate under a warehousing model, by which the bank aggregates loans and sells the collections as securities to fund its programs.
- *Green Energy Loan Fund*. This revolving-loan fund, specifically for energy-efficiency retrofits on

commercial properties, is operated by the Pennsylvania Department of Environmental Protection, the U.S. Department of Energy, and the Reinvestment Fund (TRF 2015). The program offers loans with terms of up to 15 years.

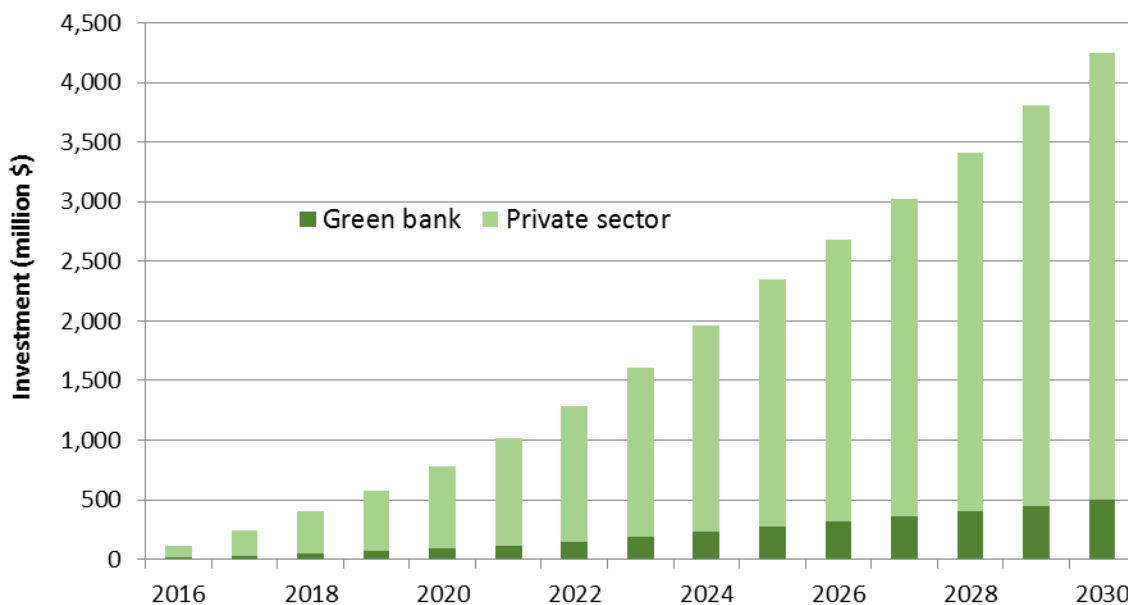
These programs could potentially be expanded or supplemented by a central green bank, which would provide programmatic consistency and sustainable funding support. The Pennsylvania Energy Development Authority, which is already chartered to finance energy projects in the state—though funding to date has been limited—might qualify to become that green bank. (A precedent is the New Jersey Economic Development Authority, which currently serves as host of New Jersey’s green bank, called the Energy Resilience Bank [EDA 2015]). The Pennsylvania Department of Environmental Protection’s experience with commercial efficiency loans could also be leveraged to host a large financing program for other sectors and technologies.

Under the Clean Power Plan, Pennsylvania has a 33 percent emissions-rate-reduction target by 2030 from 2012 levels, which would lower the state’s emissions rate from 1,642 lbs CO₂/MWh to 1,095 (E&E Publishing 2015). The EPA has given states flexibility in their approaches to achieving their

emissions rate reductions, while noting that renewables and demand-side efficiency can help achieve significant progress toward those ends. In that spirit, Pennsylvania’s options include an existing Alternative Energy Portfolio Standard (AEPS), which stipulates that 8 percent of the electricity consumed in the state come from Tier 1 resources (renewables, coal mine methane, and fuel cells) by 2020, with 0.5 percent of the total supplied by solar photovoltaics (DSIRE 2015). Demand-side efficiency programs are supported by Act 129, which requires Pennsylvania utilities to make investments in energy efficiency, and by an energy efficiency resource standard (Pennsylvania PUC 2015).

The Lawrence Berkeley National Laboratory estimates that the AEPS will result in over 12,500 GWh of renewable electricity production by 2020, but additional clean energy deployment will be needed if Pennsylvania is to reach its Clean Power Plan target (Richardson 2014). A green bank could play a role in enhancing and catalyzing such clean energy investment in the state. Projects could also potentially benefit from the EPA’s Clean Energy Incentive Program, which awards states matching emission credits under the Clean Power Plan for early reductions generated by wind, solar or low-income efficiency programs (Lynch et al. 2015).

FIGURE 1. Cumulative Clean Energy Investment Leveraged by the Pennsylvania Green Bank



The estimated 15-year investment potential demonstrates that a Pennsylvania green bank could leverage an initial capitalization of \$135 million into a \$4.2 billion investment in renewable energy and energy efficiency through 2030.

Pennsylvania green bank leverage potential

A green bank in Pennsylvania could supply a range of financial products (Rhodes, Bloustein, and Pitkin 2013), including:

- **Credit enhancements**, which assure private lenders by the bank’s offering to occupy a first loss position or by creating a loan-loss reserve fund in the case of default. Both of these actions can lower a lender’s perceived risks, allow loans to be issued to a wider variety of credit ratings, or assist with funding new or emerging technologies.
- **Warehousing and securitization services**, which aggregate loans and sell the collections as securities. Proceeds are then used to further the bank’s programs. The warehousing model has been used successfully by Connecticut, Pennsylvania, and New York, both for energy efficiency (WHEEL) and PACE loans (Belden, Clemmer, and Wright 2015). The WHEEL program could be expanded substantially through a centralized green bank structure.
- **Direct lending** involves traditional consumer or

business loans for renewable energy or energy efficiency projects. An example is the Connecticut Solar Loan program for rooftop solar.

- **Structured products and other financing tools.** Examples include PACE financing, state-backed leasing programs for renewables, and performance-based incentives, grants, or other support mechanisms.

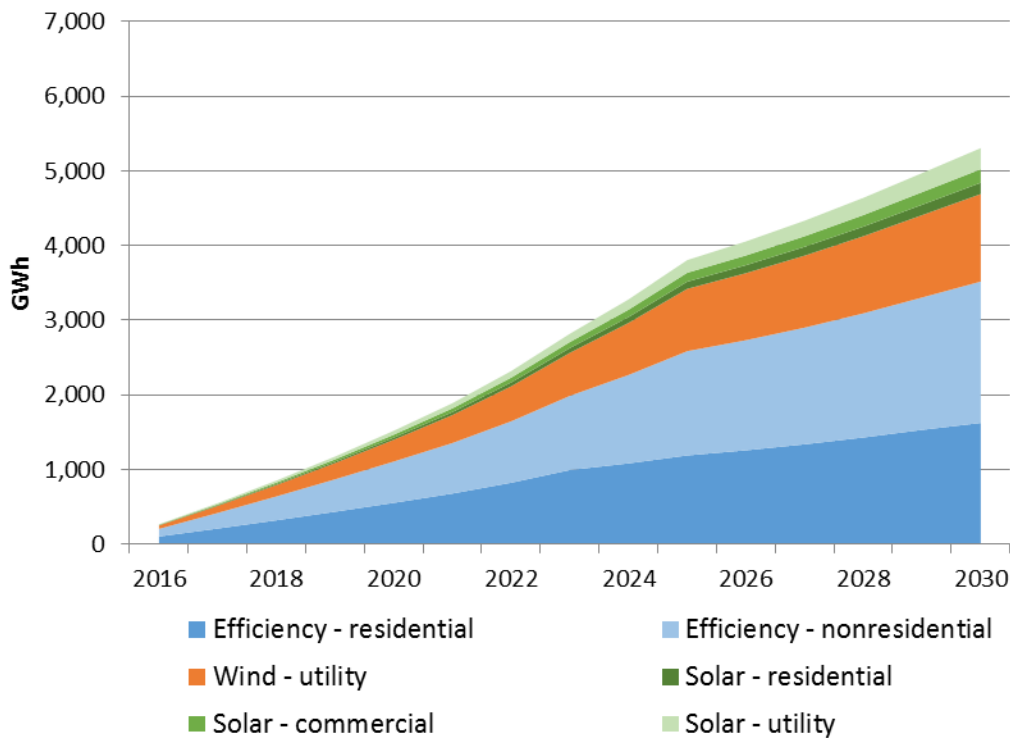
Each of the above products has its own risk and benefit profile, and an effective green bank may support different clean-energy market segments through different means of financing. In addition to offering financing products, green banks can help provide technical expertise, such as underwriting support, to traditional lenders in order to lower the risks and improve their knowledge of new technology investments.

Potential investments and emissions reductions under the Pennsylvania green bank

In this analysis, we have assumed:

- That a hypothetical Pennsylvania green bank would provide direct-lending products for solar, wind, and

FIGURE 2. Cumulative Energy-Efficiency Savings and Wind and Solar Generation Added Under the Pennsylvania Green Bank



Over a 15 year period, investments from a state green bank would generate or save 5,300 GWh of electricity through renewable energy and energy efficiency projects. This is equivalent to 2 percent of Pennsylvania’s 2013 electricity sales.

consumer energy-efficiency programs.

- An initial capitalization for the Pennsylvania green bank of \$135 million, which was derived by applying a per-capita investment ratio similar to that of New York’s comprehensive green bank.
- Loan terms of seven years for energy efficiency and 10 years for renewable energy, with interest rates of 5 percent.
- That each dollar of green bank public funding would leverage 7.5 dollars of private-sector funding for energy efficiency and renewable energy projects.

All of these inputs were based on the experiences of existing state green banks and clean-energy lending programs elsewhere. (For a more detailed discussion, please see the companion document *Quantitative Methodology Description*.)

By structuring a green bank as a revolving-loan fund, we estimate that the bank’s annual impact will increase each year. Over a 15-year period, a green bank in Pennsylvania with an initial capitalization of \$135 million in public funds could lend out \$500 million, while strategically leveraging \$3.7 billion in private-sector funding, for a total investment of more than \$4.2 billion (Figure 1).

The increase in clean energy enterprises supported by Pennsylvania green bank funding would be substantial. By

2030, the bank’s investments would have escalated to the point that 700 gigawatt-hours (GWh) of new energy-efficiency savings and renewable energy generation would be added *each year* (Figure 2). Over a 15-year period, the cumulative impact of these clean energy investments would be to generate or save 5,300 GWh of electricity, equivalent to more than 2 percent of Pennsylvania’s 2013 electricity sales. The 3,500 GWh of efficiency savings from these investments would lower homes’ and businesses’ electricity bills by an estimated \$375 million annually by 2030, based on 2014 electricity prices.

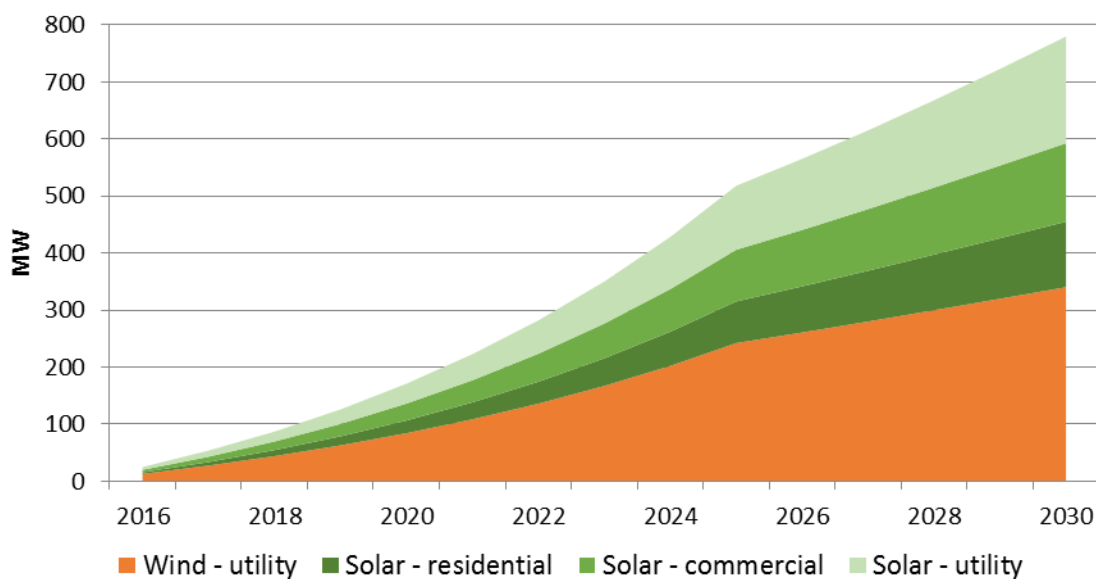
After 15 years of green bank lending, 102 MW of new wind and solar resources would be developed with the bank’s funds *each year*, resulting in a cumulative impact of 780 MW by 2030 (Figure 3).

By displacing fossil fuels, these energy efficiency and renewable energy investments in Pennsylvania would eliminate by 2030 nearly 4.8 million tons of carbon dioxide emissions *each year*—equivalent to taking 930,000 cars off the road—or 11 percent of the emissions reduction that Pennsylvania must achieve to comply with the Clean Power Plan.

Conclusions

Reorienting the existing Pennsylvania Energy Development Authority toward a more robust clean-energy-financing mission

FIGURE 3. Wind and Solar Power Capacity Added Under the Pennsylvania Green Bank



By providing a suite of financial products for clean energy projects, a Virginia green bank would support the deployment of 780 MW of wind and solar power capacity in the state by 2030.

is one strategy, among several, for establishing a green bank in the state. The new institution's financing could be applied in Pennsylvania to: widen public-sector funds' impacts on developing a clean energy economy; significantly reduce the need for subsidies; help ensure compliance with the EPA's Clean Power Plan; and accelerate the state's cost-effective achievement of its renewable energy, energy efficiency, and carbon-emissions reduction targets. But before any of this can happen, a dialogue—between key stakeholders such as utilities, existing-program managers, and local lenders—must take place to set goals and priorities for the bank's programs.

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ENDNOTES

- 1 For more details, please see this fact sheet's companion report, which profiles financing programs in the United States and Europe (Belden, Clemmer, and Wright 2015).

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