Philadelphia Energy Campaign (2016 – 2026) Impact Study

The Economic, Community, and Environmental Benefits of PEA's 10-Year Capital and Programmatic Investment

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economics | strategy | insight

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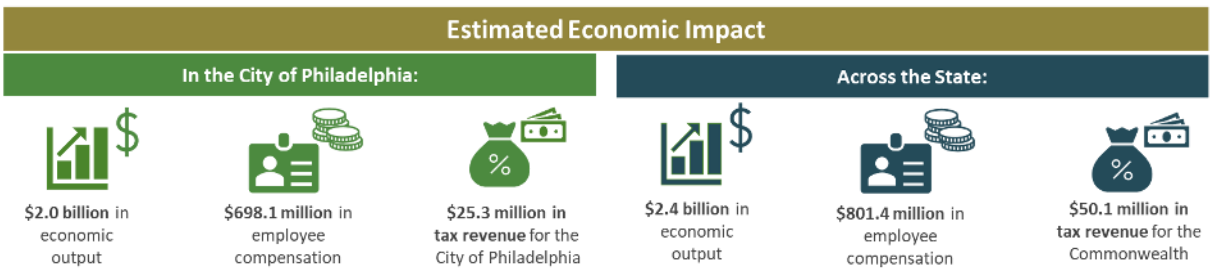
Executive Summary

Since its launch in 2016, the Philadelphia Energy Campaign (the Campaign) has served as the Philadelphia Energy Authority's (PEA) ten-year strategic initiative for advancing energy affordability, resiliency, and sustainability across Philadelphia. At the outset of the Campaign, PEA, in partnership with Philadelphia City Council, set two headline goals: mobilizing $1 billion in total investment and creating 10,000 jobs, both of which have been surpassed. At the Campaign's completion, PEA is reporting $1.3 billion invested with 11,415 jobs created in Philadelphia and 12,855 jobs created statewide. Importantly, this investment total is 90 times greater than its aggregated ten-year City of Philadelphia budget allocations.

On top of this significant investment in infrastructure and energy efficiency jobs, the Campaign has saved a net $1.4 billion in energy costs.[1] In addition to these financial cost savings, it is estimated that, taken together, these installations and improvements have avoided 562,000 metric tons in carbon emissions.[2] This report, produced by Econsult Solutions, Inc. (ESI), provides a retrospective evaluation of the cumulative economic, fiscal, and workforce impacts catalyzed by the Campaign as well as the environmental and community benefits of hallmark Campaign programs, documenting its transformative effects on Philadelphia's built environment, workforce, public health, and long-term economic competitiveness.

Economic and Fiscal Impacts from Campaign Investment

Over the course of the ten-year Campaign, $1.3 billion was invested through capital upgrades, housing improvements, and workforce development training. The investment was spent improving Philadelphia's building infrastructure through solar panel installations, LED streetlight conversions, residential retrofits, and commercial energy efficiency upgrades. This $1.3 billion of investment—130 percent of the initial goal—generated substantial economic ripple effects across both the city and state economies. In Philadelphia, the Campaign produced $2.0 billion in total economic output and generated $698.1 million in employee compensation. Across Pennsylvania, the Campaign yielded $2.4 billion in total economic output and $801.4 million in employee compensation.[3]



[1] Net energy costs savings were derived from a methodology that the American Council of Energy-Efficient Economy created for PEA, comparing project costs and debt associated with anticipated energy cost savings over the life of the investment.
[2] The carbon emissions avoided estimation was calculated using programmatic data for MWh of electric energy produced (or offset) and the EPA's Emissions and Generation Resource Integrated Database (eGRID) Subregion Output Emissions Rates.
[3] IMPLAN results (i.e., economic output and employee compensation) and tax revenue figures are only representative of the direct, indirect, and induced implementation jobs.

The Campaign's economic activity also produced meaningful fiscal returns for both levels of government. Over the ten-year period, Campaign-driven activity generated $25.3 million in cumulative income, sales, and business tax revenue for the City of Philadelphia, with income taxes representing the largest share at $16.7 million. At the Commonwealth level, the Campaign generated $50.1 million in total tax revenue, led by $21.0 million in sales tax receipts.

Energy Efficiency Workforce

PEA's $1.3 billion in Campaign investment has created 11,415 jobs in Philadelphia (12,855 jobs in Pennsylvania), surpassing the Campaign's original 10,000 job target. The Campaign has created two different types of jobs:

- **Implementation Jobs:** direct jobs held by workers in the construction, maintenance and repair, planning, and engineering sectors who are designing and installing energy efficient infrastructure, as well as multiplier jobs (indirect and induced jobs) throughout the energy efficiency supply chain and in supporting service and hospitality sectors. The Campaign created 10,090 implementation jobs in Philadelphia and 11,560 implementation jobs in Pennsylvania.
- **Savings Jobs:** jobs supported by residents and businesses spending less on their energy bills due to efficiency measures put in place, largely in service and hospitality sectors. The Campaign created 1,325 savings jobs statewide.

	PHILADELPHIA	PENNSYLVANIA
Implementation Jobs:	10,090	11,560
+		
Savings Jobs:	1,325	1,325
=		
Total Jobs:	11,415	12,855

To deepen the pipeline of qualified workers entering the green economy, PEA invested $6.5 million toward innovative workforce development programs throughout the Campaign. Programs include: Green Residential Construction Immersive Training (GRIT), an 18-week earn-to-learn program preparing young adults for careers in green building and electrical trades; Bright Solar Futures (BSF), a training program serving both high school students and adult residents seeking careers in the solar energy field; and the Good Jobs Challenge's Southeastern PA Workforce Development System, a federally supported, tuition-free program offering practical experience, certifications, and job placement support. The workforce training directly supported Campaign implementation, and further, Campaign installation jobs did not require a four-year degree, and nearly all the roles paid a living wage in Philadelphia. This investment and the sector's growth reflect PEA's commitment to accessible, family-sustaining employment.

PEA Programs and Campaign Benefits

Not only did the Campaign generate significant economic output and job figures, the Campaign delivered meaningful community, environmental, and financial benefits to Philadelphia residents, businesses, and the City government. The Campaign involved major City of Philadelphia public

infrastructure investments as well as flagship programs, such as Commercial Property Assessed Clean Energy (C-PACE), Solarize Greater Philadelphia, and Built to Last. Each program demonstrates PEA's ability to leverage targeted public investment to generate community-wide returns.

C-PACE, launched in 2020, has been among the most impactful programs in the Campaign's portfolio. Approximately $400 million in C-PACE financing, facilitated by PEA, has supported 22 projects ranging from multifamily developments to healthcare buildings and industrial facilities. The total economic output from these investments has produced $29.9 million in municipal tax revenue.

Solarize Greater Philadelphia has executed over 4,300 contracts and generated 25 megawatts of solar capacity, with more than half of program participants identified as low-income households. The program has facilitated $80 million in regional investment from 2017-2025.

The City of Philadelphia's largest project throughout the Campaign is the Philly Streetlight Improvement Project. The widescale LED replacement project upgraded more than 130,000 streetlights citywide and improved public safety across historically underserved neighborhoods. Combined with other efficiency measures completed during the Campaign, it is anticipated that the City will have avoided $264 million in operating costs over the lifespan of the installed equipment, with savings expected to grow as additional projects reach completion.

Built to Last has completed energy efficiency and structural improvements for more than 400 low-income homeowners, delivering an estimated average savings of $300-$1,000 per household annually.

Beyond direct financial benefits, the Campaign has generated positive public health and environmental outcomes. Healthier indoor environments have reduced exposure to asthma triggers, in-home hazards, and temperature extremes, all of which disproportionately affect lower-income and vulnerable populations. On the environmental front, the Campaign has contributed to a 49 percent decrease in Philadelphia's municipal carbon emissions, advancing the city's climate commitments while improving air quality for future generations.[4] In addition to reducing the carbon footprint of municipal operations, the Philadelphia C-PACE Program and Solarize have reduced pollution from the residential and commercial built environment. Altogether, 562,000 metric tons of carbon emissions have been avoided.

Return on Investment

Lastly, the Campaign has a strong return on public investment. Over the ten-year period, municipal General Fund allocations to PEA totaled $14.7 million, and these allocations served as the foundation for leveraging over $1.3 billion in total investment, a multiplier of approximately 90 times the public dollars committed. In aggregate, the $25.3 million in cumulative tax revenues generated by the Campaign represents nearly 1.7 times the total amount allocated by the City over the same period. Through the Campaign, PEA has attracted over $130 million in capital investment on an annual basis demonstrating that strategic, targeted public investment in energy efficiency and infrastructure yields durable, measurable returns for the City of Philadelphia and the communities it serves.

[4] City of Philadelphia Office of Sustainability, "Municipal Energy Master Plan for the Built Environment", 2025, https://www.phila.gov/media/20170927092513/MunicipalEnergyMasterPlan.pdf.

As such, the Campaign has proven to be successful. Beyond surpassing its two initial goals, the Campaign has saved millions in utility bills for the City of Philadelphia, homeowners, and commercial property owners, and generated significant tax revenues while cutting emissions and improving the health of buildings and tenants across the entire city.

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1. Introduction

Purpose of the Report

The Philadelphia Energy Authority (PEA) commissioned this report to evaluate the cumulative economic, fiscal, and workforce impacts of its signature Philadelphia Energy Campaign (the Campaign) as it reaches its completion. Building on PEA's strategic investments within the green energy sector, its associated infrastructure, and workforce development initiatives, this analysis quantifies the Campaign's impacts in terms of economic output, job creation, and public tax revenue generation in Philadelphia and the Commonwealth of Pennsylvania. The primary focus areas of this report are as follows:



Goal #1: Economic and Fiscal Impacts

The study quantifies the total economic output, employment supported, and tax revenues generated from the Campaign's direct investment and its associated indirect and induced activity.



Goal #2: Job Creation

In PEA's efforts to grow the green economy workforce and opportunities presented to potential talent, the analyses detail direct positions created and other jobs supported across a wide range of industry sectors and job occupations.



Goal #3: Return on Investment

The report evaluates the fiscal return on public investment by aligning municipal budget allocations to the tax revenues generated from economic activity driven by Campaign-endorsed projects.

Profile of Philadelphia Energy Authority

In 2010, under the leadership of the Nutter administration and City Council, the municipal government established the PEA to advance energy affordability, resiliency, and sustainability for Philadelphia residents, households, and the city's critical built infrastructure.

Philadelphia Energy Authority (PEA) *is an independent municipal authority advancing projects and programs that deliver on the City of Philadelphia's most urgent priorities–lower bills, stronger infrastructure, safer neighborhoods, and quality jobs.*

Specifically, this quasi-governmental entity has exercised its capacity to mobilize both public funds and private investment to drive its energy goals and priority areas forward. Under its authorizing legislation, PEA is empowered to issue bonds; administer grant programs from federal, state, and local sources; and establish public-private partnerships to finance and implement energy projects across the city. This performance-driven framework has proven successful in the strategic deployment of public resources to attract and secure both private sector investment and philanthropic contributions necessary to deliver major projects for the city's institutions and its residents.

Since its inception, this independent agency has carried out its mission with a targeted focus on its guiding principle of energy justice extended to all Philadelphians. Through its programs, PEA has marked achievements in reducing financial burdens on households, improving environmental conditions, and pushing for positive public health outcomes, while moving the regional energy sector forward and strengthening Philadelphia's overall economic competitiveness.

Philadelphia Energy Campaign

In its efforts to translate its mission and vision into action, in 2016, PEA worked with then Council President Darrell Clarke to develop a comprehensive, strategic ten-year framework called the Philadelphia Energy Campaign (the Campaign). The Campaign outlined key initiatives and programs while setting measurable outcomes centered on two main targets: $1 billion in total investment and the creation of 10,000 jobs.[5]

Through its diverse, yet complementary mix of projects and strategic partnerships with public and private sector stakeholders alike, PEA has exceeded the goals it set for itself at the outset of the Campaign. PEA plans to build upon the success of the Campaign, further scaling its programs to support the goals of the Mayor Cherelle L. Parker administration:

- Build, preserve, and restore 30,000 units of housing in Philadelphia and invest $2 billion in Philadelphia's neighborhoods to deliver access to housing for all Philadelphians.
- Prioritize workforce development support for small and local businesses to drive inclusive economic growth, so that Philadelphians can access jobs, build skills, and achieve financial sustainability.

[5] Philadelphia Energy Authority, "The Philadelphia Energy Campaign Roadmap," 2016, https://philaenergy.org/wp-content/uploads/2016/12/CampaignRoadmap-121316-2-2.pdf.

- Generate or purchase 100 percent of all electricity for the municipal built environment from renewable resources by 2030.
- Maintain or reduce the municipal built environment cost of energy, while lowering energy use 20 percent and reducing greenhouse gas emissions 50 percent by 2030.

These achievements position Philadelphia and the Campaign as a national model for metropolitan areas prioritizing climate action. The Campaign stands out as an exemplar, not only for meeting the outlined goals, but for its significant and positive economic, fiscal, and workforce impacts.

About this Analysis

This analysis provides a retrospective evaluation of the realized impacts and benefits catalyzed by the ten-year Campaign, while also pointing to the lasting positive effects and potential sustained path forward for this initiative. The methodology and technical processes implemented are detailed in the report's appendix.

Outline of the Report

This report is structured as follows:

- Section 2 - **Economic and Fiscal Impacts:** quantifies economic output, employment supported, and tax revenues generated by Campaign investment and its related economic activity.
- Section 3 - **Energy Efficiency Workforce Analysis:** examines the Campaign's impact on job creation and career opportunities within the clean energy economy.
- Section 4 - **Community and Environmental Benefits:** highlights improved public health outcomes, societal cost reductions and increased affordability for property homeowners, and the benefits of emissions reductions.
- Section 5 - **Case Studies:** features four flagship PEA programs and describes their positive effects on individuals and the city at large.
- Section 6 - **Return on Investment:** shows the multiplicative impacts of each dollar of public funding dedicated to PEA by comparing total investment leveraged and tax revenues generated.

This report serves as an assessment of PEA's realization of the goals that it announced at the start of the Philadelphia Energy Campaign in 2016. As the analyses and impacts detail in the sections that follow, PEA has not only delivered on its headline target metrics, but has **surpassed the pledges of $1 billion dollars invested and 10,000 jobs created.**

2. Economic and Fiscal Impacts

Over the course of the ten-year Campaign, PEA catalyzed approximately $1.3 billion in direct investment across the city's building infrastructure. Spanning from solar panel installations and LED streetlight conversions to building weatherization and commercial energy efficiency upgrades, these investments have generated significant economic output, job-based impacts, and tax revenues within Philadelphia and across Pennsylvania.[6] Cumulatively, the Campaign's investment has spurred:

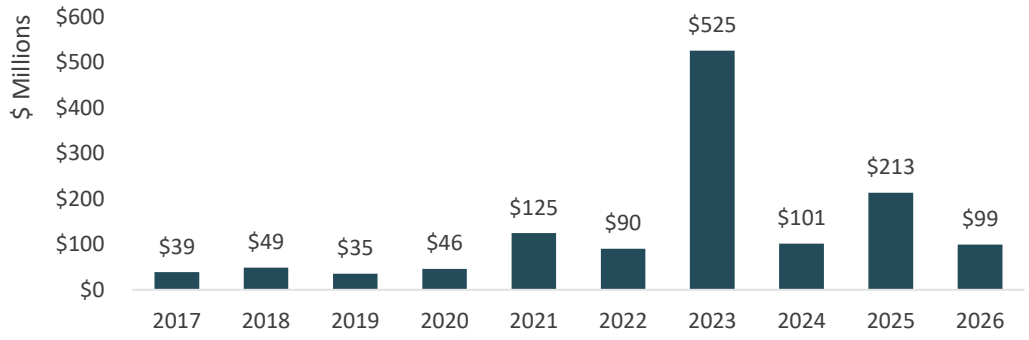
- **$2.0 billion in total economic output for Philadelphia**, supporting 10,090 full-time implementation jobs—largely in the construction industry—and $698.1 million in employee compensation as well as $25.3 million in tax revenue. Further, utility cost savings spent across other sectors of the economy created an additional 1,325 savings jobs.
- **$2.4 billion in total economic output for Pennsylvania**, supporting 11,560 full-time implementation jobs and $801.4 million in employee compensation as well as $50.1 million in tax revenue. Pennsylvania also captured the 1,325 savings jobs created from utility cost savings.

This section further breaks down the economic and fiscal impacts of the Campaign:

Estimated Economic Impacts

Annual direct investment in Campaign projects ranged from $34.7 million in 2019 to $524.3 million in 2023, reflecting the increased scale of project activity across different categories, such as municipal, residential, school, and commercial projects. In addition to capital investments, the Campaign spent approximately $6.5 million over the course of the decade to develop, administer, and deliver workforce development programming and training key to ensuring successful outcomes for commercial and resident participants. For modeling purposes, ESI assumed these costs to be evenly distributed as an annual expense of $650,000 across the decade.

Figure 2.1: Direct Campaign Investment by Year, ($M)



Source: PEA (2026)

[6] IMPLAN results (i.e., economic output and employee compensation) and tax revenue figures are only representative of the direct, indirect, and induced implementation jobs.

Most Campaign spending, approximately 84 percent, was concentrated in the construction and maintenance and repair industries, consistent with the nature of the Campaign's core activities, namely building retrofits, energy efficiency upgrades, and clean energy installations.



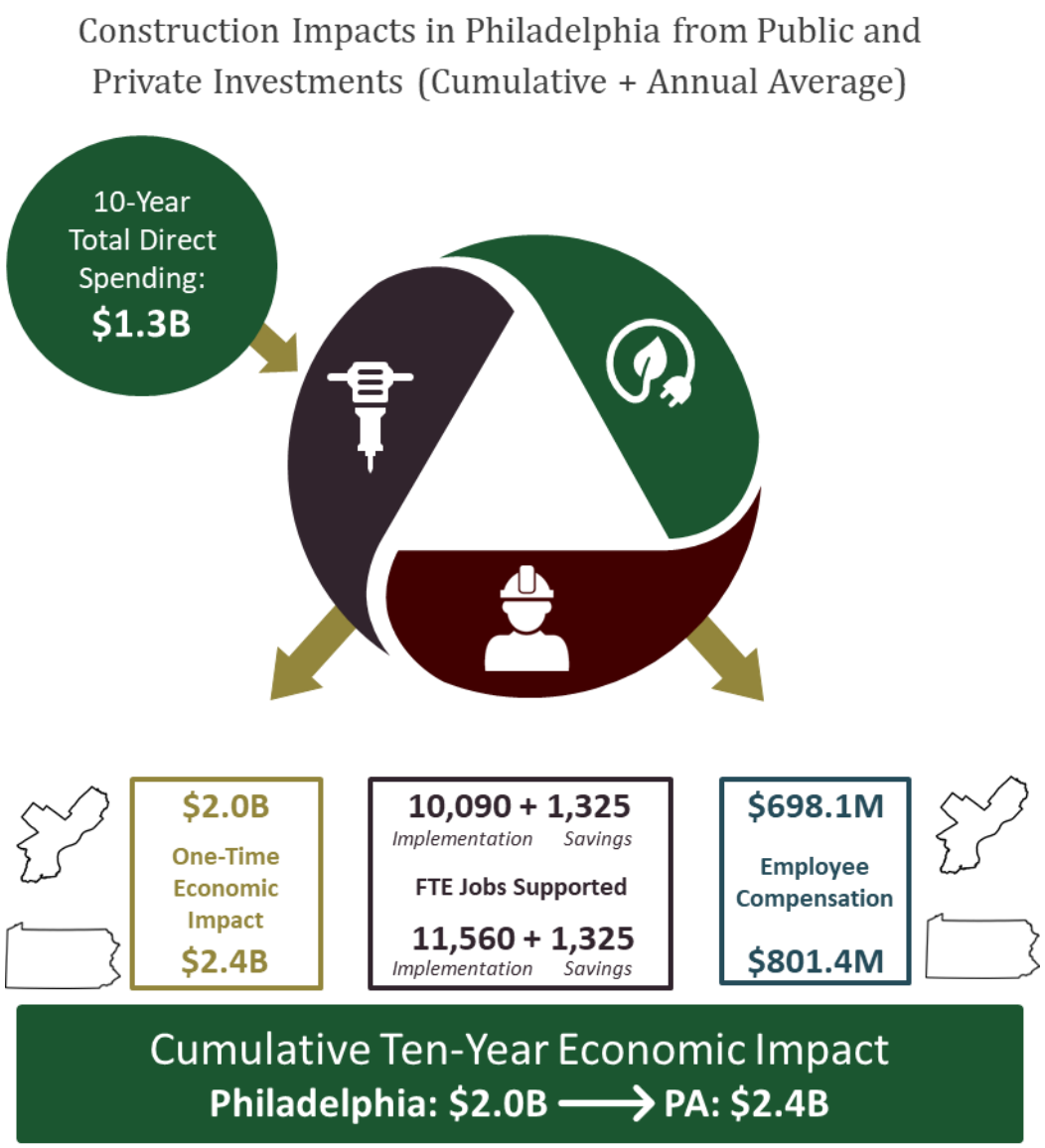
PEA's direct investment of approximately $1.3 billion is not inflation adjusted, reflecting the cumulative capital deployed across the Campaign's portfolio of energy programs and projects in the year it was spent over the 10-year period. Because program spending occurred across multiple years, each year's investment was modeled using year-specific IMPLAN multipliers to account for that year's economic conditions and changes in regional economic structure. All direct output figures presented below are inflation-adjusted to 2026 dollars.

Figure 2.3: Estimated Economic Impacts (Cumulative)

Economic Impact	Philadelphia	Pennsylvania
Direct Output ($M)	$1,441.4	$1,441.4
Indirect and Induced Output ($M)	$565.5	$959.0
Total Output ($M)	**$2,006.8**	**$2,400.3**
Total Implementation Employment (FTE)	10,090	11,560
Total Savings Employment (FTE)	1,325	1,325
Total Employment (FTE)	**11,415**	**12,855**
Employee Compensation ($M)	$698.1	$801.4

Source: ESI (2026); IMPLAN (2026)

The Campaign's direct investment has generated significant ripple effects across the Philadelphia and state economies. In Philadelphia alone, the indirect and induced effects amounted to an additional $565.5 million in economic output, bringing the total impact within the city to over $2.0 billion. Across Pennsylvania, the broader capture of supply chain and associated household spending resulted in $959.0 million in indirect and induced output, yielding a total statewide economic impact of $2.4 billion.



Source: ESI (2026); IMPLAN (2026)

Fiscal Impacts

The economic activity generated by the Campaign also produced significant tax revenues for the City of Philadelphia and the Commonwealth of Pennsylvania. Over the ten-year Campaign, the cumulative investment is estimated to have generated:

- **$25.3 million in income, sales, and business tax revenue** to the City of Philadelphia.
- **$50.1 million in income, sales, and business tax revenue** to the Commonwealth of Pennsylvania.

At the City level, income taxes represent the largest source of fiscal impact, accounting for $16.7 million of the $25.3 million total (66 percent). For the Commonwealth, the broader sales tax base is the primary driver, generating $21.0 million of the $50.1 million total (42 percent).

Figure 2.4: Estimated Fiscal Impacts (Cumulative)

Tax Revenue ($M)	City of Philadelphia	Commonwealth of PA
Income	$16.7	$19.6
Sales	$2.6	$21.0
Business	$6.0	$9.5
Total	**$25.3**	**$50.1**

Source: ESI (2026)

3. Energy Efficiency Workforce Analysis

As a result of PEA's $1.3 billion in capital investment and $6.5 million in workforce training throughout the Campaign, PEA has created a total of 11,415 jobs in Philadelphia–12,855 jobs across Pennsylvania–**surpassing its 10,000 jobs goal**.[7] Further, PEA has also supported the development of the green economy through best-practice workforce training programs that place underrepresented Philadelphians in family-sustaining trades. The following section further details the job impacts of PEA's Campaign.

Job Creation

PEA's large-scale capital and operational investments have yielded notable job outcomes, bolstering the green and energy workforce ecosystem in greater Philadelphia with spinoff jobs supporting the broader statewide economy. Campaign spending on improving residential and commercial buildings has resulted in the creation of **two different job types**:

- **Implementation Jobs:** direct jobs held by workers in the construction, maintenance and repair, planning, and engineering sectors who are designing and installing energy efficient infrastructure, as well as multiplier jobs (indirect and induced) throughout the supply chain and in supporting service and hospitality sectors.
- **Savings Jobs:** jobs supported by residents and businesses spending less on their energy bills due to efficiency measures put in place.

Combined, these two job categorizations have resulted in:

- **11,415 full-time equivalent jobs created in Philadelphia** (10,090 implementation jobs and 1,325 savings jobs), and
- **12,855 full-time equivalent jobs created in Pennsylvania** (11,560 implementation jobs and 1,325 savings jobs), inclusive of all jobs created in Philadelphia, as well as an additional 1,470 multiplier jobs.

Figure 3.2: Estimated Total Jobs Created from Campaign Investment (2016-2026)

Total Jobs Created	Philadelphia	Pennsylvania
Direct Implementation Jobs	7,860	7,860
Indirect and Induced Implementation Jobs	2,230	3,700
Savings Jobs	1,325	1,325
Total	11,415	12,855

Source: ESI (2026); IMPLAN (2026)

[7] Job figures throughout this study are reported as "job-years," meaning one job for one year. Throughout the duration of the Campaign, PEA has previously reported job figures in "job-years".

Implementation Jobs

As described above, the $1.3 billion invested by PEA in the Campaign created 10,090 full-time implementation jobs in Philadelphia and 11,560 in Pennsylvania.

Largely concentrated in the construction, maintenance, and repair sectors, direct implementation jobs (7,860 full-time equivalent jobs in both Philadelphia and Pennsylvania) are critical to the installation of energy efficient infrastructure. From energy auditors who conduct home energy assessments and weatherization technicians installing new seals on doors and windows in residential homes to contractors replacing building envelopes and overhead lighting in large commercial office buildings, the roles are often site-specific and require deep expertise in how appliances and buildings work and age.[8]

For every $1 million spent created 7 full-time equivalent implementation jobs.

Figure 3.2: Estimated Implementation Jobs from Campaign Investment (2016-2026)

Implementation Jobs	Philadelphia	Pennsylvania
Direct Jobs	7,860	7,860
Indirect and Induced Jobs	2,230	3,700
Total	10,090	11,560

Source: ESI (2026); IMPLAN (2026)

In addition to direct implementation jobs, the Campaign also spurred 2,230 multiplier (indirect and induced) jobs in Philadelphia and 3,700 across the state. The multiplier jobs, a further spinoff effect as result of direct implementation spending, span many industries:

- Indirect jobs (jobs created from spending on the energy efficient supply-chain) fuel transportation and warehousing, wholesale trade, manufacturing, and professional services roles.
- Induced jobs (jobs created from direct employee spending) represent support sectors, including retail trade, healthcare and social assistance, and accommodation and food service.

Savings Jobs

Estimating savings jobs is a core method for quantifying the economic case for energy efficiency policy. Recognized as an industry-standard calculation, savings jobs refer to jobs created as consumers, businesses, and institutions re-spend the money freed up by lower energy bills due to energy retrofits and energy efficiency improvements.[9] Savings jobs also have a multiplier effect, meaning the money is spent directly and then further recirculated through the supply chain and employee spending. The estimated savings jobs reported in this study include multiplier jobs.

[8] ACEEE, "People Who Save Energy: The Energy Efficiency Workforce," https://www.aceee.org/people-who-save-energy-energy-efficiency-workforce.
[9] ACEEE, "True, Energy Efficiency Investment Creates Jobs. But How Many?," 2015, https://www.aceee.org/blog/2015/09/true-energy-efficiency-investment.

Energy efficiency advocates have developed methodologies to quantify these savings jobs, including a leading methodology from the American Council for an Energy-Efficient Economy (ACEEE). For the purposes of this study, ESI employs ACEEE's methodology that also leverages input-output modeling principles.[10]

Both dollar savings and savings jobs extend beyond the life of the campaign until the end of the life of the improvements made. After accounting for initial project costs and debt service, the Campaign is estimated to have saved a **net $1.4 billion in energy costs** (not inflation-adjusted) over the life of the upgrades, **translating into 1,325 full-time equivalent savings jobs** in Philadelphia, and therefore, Pennsylvania as part of the statewide workforce.

Workforce Training Investment

As job creation is outlined as one of the Campaign's foundational goals, PEA has been working to build an equitable clean energy economy workforce. PEA empowers participants from underrepresented communities with the knowledge, experience, and certifications needed to access stable, future-proof jobs in fields like solar, weatherization, green construction, and the building trades. In doing so, PEA is creating a pipeline of qualified workers for the growing clean energy economy and, at the same time, boosting the supply of local workers for PEA programs such as Built to Last.

Throughout the Campaign, the Authority has **invested $6.5 million in workforce development training**, developing on-the-ground technical programs with wraparound services to support participants. PEA's workforce programs focus on accessibility, mentorship, and skill building, and are designed to empower underrepresented residents to enter family-sustaining trade occupations. One out of five participants in PEA's workforce training programs have secured roles in weatherization, solar, residential construction, energy auditing, or other fields essential to scaling the clean energy industry.

In the last decade, PEA has chiefly supported three workforce development programs, including:

- **Green Residential Construction Immersive Training (GRIT):** GRIT is an earn-and-learn workforce development program designed to prepare young adults for careers in green building and construction trades. The training program runs for 18 weeks, and participants not only gain hands-on experience with green building techniques but also have access to career support and wraparound services to aid their program experience. The program offers participants the opportunity to earn five industry-recognized certifications, including OSHA 10 & 30, EPA Lead Renovation, Repair & Painting (RRP), BPI Air Leakage Control Installer (ALCI), NCCER Level 1 Certification, and S/P2 Safety & Pollution Prevention. Since the inaugural cohort in 2021, GRIT has served over 120 participants.[11]

[10] ACEEE, "State Policy Toolkit: Guidance on Measuring the Economic Development Benefits of Energy Efficiency," https://www.aceee.org/sites/default/files/Jobs%20Toolkit%203-8-19.pdf.
[11] Philadelphia Energy Authority, "Green Residential Construction Immersive Training," https://philaenergy.org/green-retrofit-immersive-training-grit/.

- **Bright Solar Futures (BSF):** BSF is a multi-format and dynamic workforce training program that prepares students and young adults for careers in the growing solar energy field. With two sub-programs, PEA offers the program to both high school students and opportunity youth ages 18-30 (OppY). Geared toward young adults, the BSF OppY Program is a paid, eight-week training program for un- and under-employed individuals between 18 and 30 years of age. Participants earn two industry-recognized certifications, OSHA 10 and solar certification. Upon graduation, PEA supports participants in accessing employment opportunities. Further, the BSF High School Career and Technical Education (CTE) program is a three-year educational high school track that provides students with hands-on training in solar energy, electrical safety, and energy efficiency careers. In addition to in-school learning, the program also includes paid summer enrichment components.[12]

The BSF High School Program launched in 2020 and was the first of its kind program in the nation.

- **Good Jobs Challenge:** PEA serves as the energy sector lead for the Good Jobs Challenge's Coordinated Southeastern PA Workforce Development System. In partnership with PhilaWorks, leading workforce training organizations in Philadelphia, PEA is a subrecipient of funds from Southeastern PA's Good Jobs Challenge, a grant program designed by the U.S. Economic Development Administration to support workforce development. The Good Jobs Challenge has enabled PEA to expand workforce development programs across the region. Together, these programs prepare motivated job seekers to enter the workforce with practical experience, certifications, and placement support.

In addition to the Good Jobs Challenge, PEA serves as a convener between employers and participants across all its programs—a best practice for workforce development providers. PEA connects participants with employers and markets jobs to give all graduates a chance of securing employment in the field upon program completion.[13]

Occupational Characteristics and Benefits

The clean energy economy, and therefore its workforce, is growing. This is because, as more efficient appliances and construction techniques are developed and both residential and commercial property owners understand the benefits of weatherization for the longevity of their buildings and for reduced operating costs, demand for the workforce, particularly the trades roles, has increased. Occupations in the clean energy economy offer family-sustaining wages and lower barriers to accessibility, as most trade roles do not require a four-year degree and only require short-term on-the-job training.

PEA's direct implementation jobs (7,860 full-time jobs) make up 10 percent of the Commonwealth of Pennsylvania's clean energy economy (76,290 jobs).

To conduct a deep dive into occupational characteristics, ESI compiled a list of 18 occupations, leveraging Department of Energy (DOE) data and PEA program descriptions, that represent the direct implementation

[12] Philadelphia Energy Authority, "Bright Solar Futures," https://philaenergy.org/programs-initiatives/bright-solar-futures-curriculum/.
[13] Philadelphia Energy Authority, "Workforce," https://philaenergy.org/programs-initiatives/workforce/.

jobs from the Campaign (Figure 3.3). The occupations are largely in the trades, coupled with some professional services roles that support planning, funding and financing, and implementation. Key attributes of the occupations include:

- **Low Barriers to Entry:** Most roles, 83 percent, do not require a four-year degree, and all non-planning jobs (i.e., non-managerial or engineering positions) do not require a four-year degree.
- **Sustaining Wages:** All roles pay more than Philadelphia's minimum wage of $15 per hour and most (all except one) roles pay more than $23.34, the reported living wage required for an adult in Philadelphia.[14] Further, on municipal contracts, these workers receive a prevailing wage, which is often more than the reported median hourly wage and carries another premium with fringe benefits.

Figure 3.3: Occupations Associated with the Campaign in the Green Economy, 2026

Job Title	Median Hourly Wage	Educational Attainment
Roofers	$24.87	No formal educational credential
Insulation Workers, Floor, Ceiling, and Wall	$24.87	No formal educational credential
Construction Laborers	$25.93	No formal educational credential
Solar Photovoltaic Installers	$26.21	High school diploma or equivalent
Electricians	$36.07	High school diploma or equivalent
Insulation Workers, Mechanical	$43.70	High school diploma or equivalent
Plumbers, Pipefitters, and Steamfitters	$40.81	High school diploma or equivalent
Construction and Building Inspectors	$30.88	High school diploma or equivalent
Weatherization Installers	$24.87	High school diploma or equivalent
Helpers: Electricians	$20.72	High school diploma or equivalent
Helpers: Plumbers	$25.16	High school diploma or equivalent
First-Line Supervisors of Construction Trades	$44.56	High school diploma or equivalent
Community Health Workers	$25.29	High school diploma or equivalent
Installation, Maintenance & Repair Workers	$24.87	High school diploma or equivalent
HVAC Mechanics & Installers	$34.96	Postsecondary nondegree award
Construction Managers	$54.13	Bachelor's degree
Electrical Engineers	$59.90	Bachelor's degree
Civil Engineers	$47.34	Bachelor's degree

Source: ESI (2026); Lightcast (2026)

[14] MIT Living Wage Calculator, "Philadelphia County," https://livingwage.mit.edu/counties/42101#:~:text=Living%20Wage%20Calculation%20for%20Philadelphia%20County%2C%20Pennsylvania%20.

Further, aligning with PEA's dedication to making these roles accessible to underserved Philadelphians, many of the implementation jobs are held by minority groups. Using DOE national estimates applied to PEA's direct implementation workforce, PEA's implementation labor force is made up of:[15]

- 26 percent of direct implementation jobs, or 2,040 jobs, are held by **women**.
- 25 percent of direct implementation jobs, or 2,000 jobs, are held by **people of color**.
- 9 percent of direct implementation jobs, or 690 jobs, are held by **veterans**.
- 30 percent of direct implementation jobs, or 2,380 jobs, are held by **young professionals (18-29 years of age).**
- 2 percent of direct implementation jobs, or 135 jobs, are held by those who were **formerly incarcerated.**

Reaching 130 percent of its initial goal, PEA's workforce development commitment is a national model for leveraging public and private investment dollars to build a growing sector.

[15] Department of Energy, "U.S. Energy & Employment Report: 2025 Public Data," https://www.energy.gov/policy/us-energy-employment-jobs-report-useer.

4. Environmental and Community Benefits

Outdated buildings can cause major challenges related to emissions, public health, and financial investment. The Campaign not only seeks to retrofit and upgrade buildings, so they are better suited for modern life, but also to help mitigate these adverse effects. The following section details how the Campaign, and broader energy efficiency work, have positive impacts on the environment, community health, and building operating costs.

Environmental Benefits

In line with national trends, more than half of Philadelphia's carbon emissions are attributable to buildings' energy use. Further, nearly 30 percent of energy used in buildings is also classified as "energy waste," meaning energy escapes through inefficient appliances or building design, such as drafty windows, incandescent light bulbs, or obsolete heating systems.[16] As such, the Department of Energy has deemed building efficiency as one of the highest-impact areas for emissions reductions to address climate change.

PEA programs have been instrumental in a 49 percent reduction in municipal greenhouse gas emissions over the past decade.[17] Cutting emissions is critical to cleaner air with fewer pollutants and bolstering climate stability, especially in efforts to decrease the frequency of severe weather events. In particular, reducing greenhouse gas emissions can slow rising temperatures that drive more frequent and intense weather events, such as heat waves and extreme storms.[18] PEA's impact on Philadelphia's climate and air quality makes the city healthier and more resilient for generations to come.

Health Benefits

Energy upgrades can help transform homes and commercial buildings from harmful to safe. Poor insulation, aging appliances, and leaking building envelopes (or facades) expose residents or tenants, especially children, the elderly, and those with chronic illnesses, to a range of preventable health hazards. Further, buildings that could benefit from energy-efficiency upgrades, such as new windows or sealing, often have other major systemic problems, like mold or leaky roofs. Whole-home upgrades, especially those done in programs like PEA's Built to Last, can support:

- **Reducing asthma and respiratory illness:** Building upgrades can enhance indoor air quality and mitigate the growth or infiltration of allergens like mold, which are all common asthma or respiratory illness triggers.

[16] City of Philadelphia Office of Sustainability, "See How Much Energy Philly Buildings Use," https://www.phila.gov/2017-11-29-explore-the-data-see-how-much-energy-philly-buildings-use/.
[17] MEMP
[18] City of Philadelphia Office of Sustainability and ICF International, "Growing Stronger: Toward a Climate-Ready Philadelphia", 2015, https://www.phila.gov/media/20160504162056/Growing-Stronger-Toward-a-Climate-Ready-Philadelphia.pdf.

- **Eliminating in-home hazards:** Weatherization and energy upgrades can remediate dangerous risks like carbon monoxide exposure from unsafe heating surfaces, leaky furnaces, or old hot water heaters, which disproportionately affect lower-income households.[19]
- **Decreasing exposure to temperature extremes:** Exposure to extreme heat and cold can result in life-threatening conditions, like heat stroke or frostbite, or even death. In the summer of 2025, the City of Philadelphia Department of Public Health reported there were five health-related deaths.[20] Properly insulating and sealing homes can help avoid those tragic incidents.

Many academic studies also prove the benefits of energy upgrades and more modern appliances—linking health benefits, including decreased prevalence of asthma and acute myocarditis and even improved school productivity, to electrifying homes and reliable HVAC systems. Further, not only can these building improvements keep residents healthier, but they can also be positioned to reduce healthcare costs.[21] The Campaign has helped make residential homes and commercial buildings more comfortable and safer for the public.

Financial Benefits

Energy efficiency upgrades also help reduce annual utility and maintenance bills. In particular, the Campaign has had success in reducing costs for the City of Philadelphia (and therefore taxpayers) and residential homeowners.

Regarding municipal cost savings, at the launch of the Campaign in 2016, the City authorized the activation of the Guaranteed Energy Savings Act (GESA) for the dual-purpose of incorporating modern green energy innovations and establishing cost efficiencies in its building portfolio. Effectively, these critical infrastructure improvements are self-funded, providing a direct return on investment as their aggregated future cost savings exceed their upfront development and delivery costs. At present, completed efficiency measures and other enhancements to municipal structures save the City over $264 million over the installed equipment's lifespan. Importantly, these cost savings are shared across the city's population base. Absent the successful execution of these energy efficiency improvements, the City would have been required to cover the substantial expenses with General Fund allocations. Further costs could have increased as the buildings became older. In effect, these realized and future cost savings are returned to taxpayers in the form of increased resources for critical city services. As additional projects reach completion, cost savings will continue to grow.

Individuals and families also benefit from sizable reductions on monthly utility bills and decreased frequency of maintenance and repair activity from these building upgrades. Nationally, Philadelphia ranks as one of the most energy burdened cities. Notably, one in seven city residents spend at least 10 percent of their income on utilities, making them prime candidates and worthy beneficiaries of cost

[19] ACEEE, "The Health Impacts of Energy Efficiency," https://www.aceee.org/blog/2017/12/our-new-three-part-video-series.
[20] Philadelphia Inquirer, "The number of heat deaths in Philly is dropping even as temperatures keep rising," 2025, https://www.inquirer.com/weather/heat-deaths-philadelphia-summer-climate-20250812.html.
[21] Walter Johnsen, "Addressing Energy Insecurity in Philadelphia's Affordable Multi-Family Housing with C-PACE Financing," 2023, https://kleinmanenergy.upenn.edu/research/publications/addressing-energy-insecurity-in-philadelphias-affordable-multi-family-housing-with-c-pace-financing/.

reduction services.[22] Signature programs of the Campaign, such as Built to Last and Solarize Greater Philadelphia, deliver important and lasting savings to homeowners. Key quantifiable impacts of this and related PEA programs include, but are not limited to:

- As a result of program-funded structural repairs, replacements, and clean energy upgrades, over 400 **Built to Last** participating homeowners save an estimated $300 to $1,000 annually.
- The 88,000 recipients of services through the **Water and Sewage Line Protection** program have benefited from an estimated average savings of $850.

Overall, dedicated public funding through budget allocations and other capital secured work in tandem to deliver better financial outcomes for the city government and that communities that it serves.

[22] Walter Johnsen, "Addressing Energy Insecurity in Philadelphia's Affordable Multi-Family Housing with C-PACE Financing," 2023.

5. Case Studies

C-PACE: Unlocking Capital Dollars for Building Enhancements through Strategic Financing

Distributing funding through the Commercial Property Assessed Clean Energy (C-PACE) is one of PEA's most impactful programs. In less than six years, as the program started in 2020, approximately $400 million in C-PACE funding has been the driving force behind nearly $1.6 billion of total investment in both new commercial development and major upgrades to existing structures across the city. The network of buildings receiving major upgrades and modern energy efficiency installations ranges from entertainment venues and healthcare and manufacturing facilities to multifamily properties, labs, and office space. This direct investment has delivered considerable benefits to Philadelphia and state economies. To date, this $1.6 billion in total investment has resulted in:

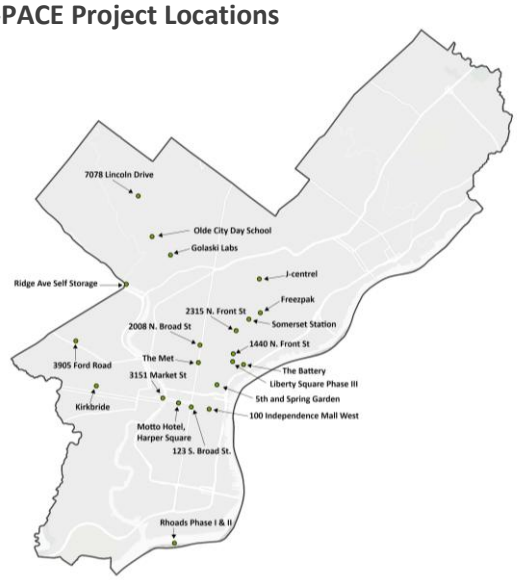
The C-PACE program has exceeded expectations, leveraging nearly $1.6 billion dollars for commercial retrofits and other cost-savings installations in less than six years.

- **$2.4 billion in total economic output for Philadelphia,** further supporting 11,430 full-time jobs, $802.9 million in employee compensation, and $29.9 million in tax revenue.
- **$2.9 billion in total economic output for Pennsylvania,** further supporting 13,280 full-time jobs, $932.6 million in employee compensation, and $58.7 million in tax revenue.

These projects are not merely concentrated in the urban core of Center City, but are distributed across much of the city landscape from the Rhoads shipyard campus in South Philadelphia's Navy Yard to Golaski Labs in Germantown to Fishtown's Battery redevelopment on the Delaware River Waterfront.

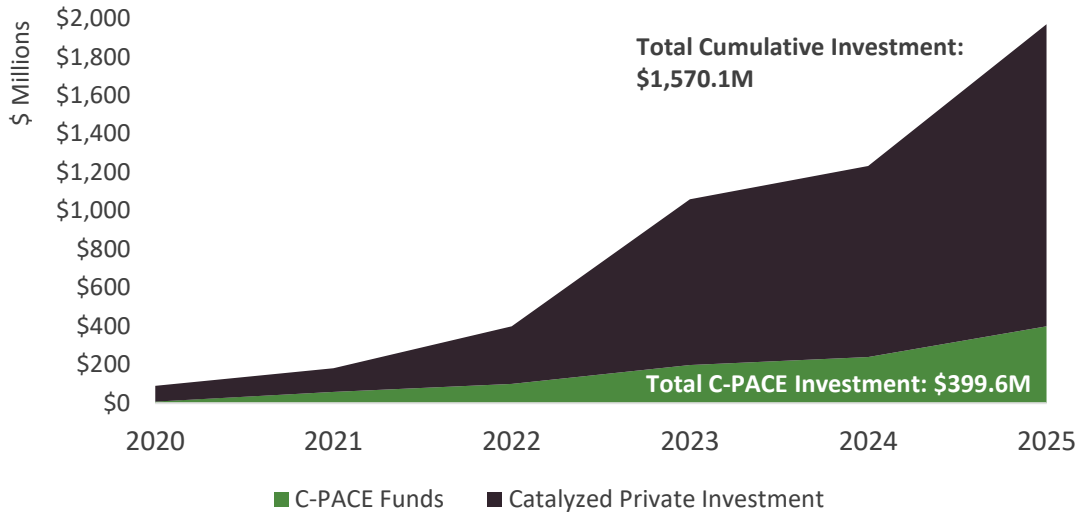
As shown on the next page, investment has grown exponentially over the life of the program. In its first two years, C-PACE investment totaled less than $125 million and grew to more than $360 million on average for each of the four subsequent years of the Campaign.

C-PACE Project Locations



Source: ArcGIS (2026); ESI (2026)

Figure 5.1: Cumulative C-PACE Investment



Source: PEA (2026)

Figure 5.2: C-PACE Project Site Locations

Project Name	Year	Neighborhood	Development Cost ($M)
The Met	2020	North Philly	$63.7
J-Centrel	2020	Feltonville	$23.4
Olde City Day School	2020	Germantown	$0.6
100 Independence Mall West	2021	Old City	$25.6
123 South Broad Street	2021	Center City	$3.7
Golaski Labs	2021	Germantown	$8.4
Kirkbride	2021	West Philly	$4.3
Freezpak	2022	Kensington	$94.0
Motto Hotel	2022	Rittenhouse	$61.0
Ridge Avenue Self Storage	2022	East Falls	$21.3
2008 North Broad Street	2023	North Philly	$17.1
2315 North Front Street	2023	West Kensington	$15.1
5th and Spring Garden	2023	Northern Liberties	$161.4
Liberty Square Phase 111	2023	Old Kensington	$67.5
Somerset Station	2023	Kensington	$58.1
The Battery	2023	Fishtown	$242.6
1440 North Front Street	2024	Kensington	$31.5
Rhoads Phase 1 & 2	2024	Navy Yard	$99.9
3151 Market Street	2025	University City	$317.0
3905 Ford Road	2025	Wynnefield	$51.8
7078 Lincoln Drive	2025	West Mount Airy	$8.1
Harper Square	2025	Rittenhouse	$200.0
Total Investment ($M)	-	-	**$1,570**

Source: ESI (2026); IMPLAN (2026)

Estimated Economic Impacts

Since the program's inception in 2020, direct investment has reached nearly $1.6 billion, serving to finance an array of new constructions, critical efficiency enhancements, and needed upgrades. These aggregated capital expenditures are estimated to have triggered a total economic impact of $2.4 billion in the city. Further, within Philadelphia, it is estimated that C-PACE funded activity supported approximately 1,900 jobs on a yearly basis over the construction periods.

Figure 5.3: Estimated Economic Impacts (Cumulative)

Economic Impact	Philadelphia	Pennsylvania
Direct Output ($M)	$1,671.2	$1,671.2
Indirect and Induced Output ($M)	$696.5	$1,183.8
Total Output ($M)	**$2,367.7**	**$2,855.0**
Total Employment (FTE)	11,430	13,280
Employee Compensation ($M)	$802.9	$932.6

Source: ESI (2026); IMPLAN (2026)

Estimated Fiscal Impacts

This direct and spillover economic activity also supports the tax bases of the City of Philadelphia and the Commonwealth of Pennsylvania. Over the six-year period, it is estimated that C-PACE project activity has generated over $29 million and $58 million in tax revenues to the City and Commonwealth, respectively.

Figure 5.4: Estimated Fiscal Impacts (Cumulative)

Tax Revenue ($M)	City of Philadelphia	Commonwealth of PA
Income	$19.2	$22.8
Sales	$3.1	$24.8
Business	$7.0	$11.1
Total	**$29.2**	**$58.7**

Source: ESI (2026)

Figure 5.5: Summary of Impacts from C-PACE Program Investment in Philadelphia



Source: ESI (2026)

Other Program Spotlights

Solarize Greater Philadelphia: Advancing Energy Equity through Accessible Solar and Lower Household Utility Costs

Solarize Greater Philadelphia has made rooftop solar energy accessible for homeowners across the city. By establishing a well-vetted network of installers committed to affordable pricing for consumer households, the program has served over 4,100 recipients. The program benefits marginalized households by reducing upfront costs and providing other supportive measures in the transition to solar energy. Since its launch as Solarize Philly in 2017, the program has expanded across the region, signing up 4,300 households that have combined to generate 25 megawatts of solar energy, all while stimulating the local economy with nearly $80 million of investment.

Importantly, Solarize Greater Philadelphia has prioritized equitable access to this renewable energy source. More than half of program participants are located in low-income census tracts. To offset prohibitive costs, Solarize Greater Philadelphia offers flexible financing options, including limited grant-funded repairs and solar lease subsidies, to enable solar installations for low-income households. These installations enable households to reduce their monthly electricity bills and stabilize long-term housing costs.

PEA has also supported the region's commercial property owners, in partnership with the Pennsylvania Solar Center, by providing solar installation assessments and a menu of financing options. PEA's Commercial Solarize program has enabled over $5 million of investments, representing 2 MW of renewable energy capacity.

Beyond cost savings delivered to residential and commercial property owners and the infusion of millions of dollars into the local economy, Solarize has supported the growth of accessible, high-quality employment opportunities to the local workforce. In less than a decade, the program has seen hundreds of Philadelphians enter into and advance along career pathways to family-sustaining jobs in the solar energy sector.

TAPPING THE LOCAL TALENT POOL

Solarize Greater Philadelphia serves as a critical driver of workforce development in Philadelphia's growing clean energy sector. The program is closely aligned with training initiatives, such as Bright Solar Futures and the Green Retrofit Immersive Training Program, which prepare local talent for careers in solar installation and related, in-demand trades.

By directly connecting workforce training programs to active projects and future work, Solarize Philly ensures that Philadelphians themselves benefit from the city's transition to a clean energy economy.

Select Solar-Related Occupations:

Solar Photovoltaic Installers: Assemble and install solar infrastructure.
Construction Laborers: Prepare solar infrastructure sites for installation.
Building Inspectors: Ensure structures and solar infrastructure meet engineering and regulation standards.
Weatherization Technicians: Installs weatherization materials (insulation, windows, HVAC) to improve energy efficiency.

Philly Streetlight Improvement Project: Improving Neighborhood Safety and Lowering City Costs through Smart Energy Infrastructure

Established as a collaborative effort of PEA, the City of Philadelphia Department of Streets, and City of Philadelphia Office of Sustainability, the Philly Streetlight Improvement Project (PSIP) was designed to modernize the City's public lighting system through the installation of energy efficient LED technology. Completed over the course of just two years, the project replaced nearly 130,000 streetlights across every Philadelphia neighborhood. The project has resulted in brighter streets, lowered energy use, and measurable improvements in public safety. The program's accomplishments are highlighted as follows:

- Installation of 130,000 streetlights within the city limits,
- Reduced outdoor street crime at night by 15%, including a 21% decrease in outdoor nighttime gun violence in affected neighborhoods during the 10-month upgrade period, and[23]
- Infused over $90 million in direct spending into the Philadelphia economy, 100 percent of which will be offset by energy cost savings over the life of the project.

PSIP prioritized sections of the city with the greatest public safety needs, ensuring that neighborhoods facing the highest levels of safety risks received upgrades at the program's outset. Upgrades extended beyond main corridors to include alleyway fixtures and clearing of vegetation and debris from alleyways, an additional quality of life improvement. PSIP is among the first large-scale municipal streetlight replacement projects to track and demonstrate measurable safety benefits, most notably a 16 percent decrease in property crimes.

By leveraging future cost savings to finance critical capital enhancements, PSIP effectively delivered critical infrastructure upgrades without burdening taxpayers. Furthermore, the project is a testament to interagency collaboration, bringing together leadership across agencies to realize concrete citywide benefits.

The Philly Streetlight Improvement Project demonstrates how strategic infrastructure investments can drive positive public safety outcomes. In 2025, a study conducted by University of Pennsylvania's Crime and Justice Policy Lab found that neighborhoods with upgraded LED streetlighting experienced considerable declines in criminal activity, headlined by a 21 percent reduction in nighttime gun violence. The data-driven analysis of the PSIP shows that investment in physical infrastructure improvements delivers multi-faceted benefits to communities and the city at large.

[23] MacDonald J. M, Chalfin A, Moritz M et al., "Can Enhanced Street Lighting Improve Public Safety at Scale." *Criminology & Public Policy,* 2025, https://onlinelibrary.wiley.com/doi/10.1111/1745-9133.70006.

Built to Last: Strengthening Households through Cost Reduction and Resilience Building Measures

Initiated in 2019, the Built to Last program is designed to enhance housing quality, reduce utility costs, and drive long-term affordability for homeowners. The program serves low-income households, providing needed repairs and other energy efficiency measures that are otherwise infeasible for homeowners with constrained budgets. The program has completed critical repair and restoration projects for more than 400 homeowners. The program's energy efficiency installations and other improvements have saved household budgets $300 to $1,000 per year.

ALIGNMENT WITH MAYORAL PRIORITY AREAS

In its proposed FY2027 budget, the Parker administration highlights investment in housing and its Housing Opportunities Made Easy (H.O.M.E.) initiative as a priority area.

Built to Last bolsters the quality of existing housing stock, promoting housing as a foundation for health and energy resilience. This activation of its core values shows that PEA and its partners are key players in making the current administration's priority of access to affordable housing a reality for all city residents.

Built to Last serves as an administration backbone that layers up to ten services from external programs, offering an array of improvement services to homeowners in need, generally captured within the following four categories: basic systems, energy efficiency, health and safety, and other measures.

Built to Last addresses critical health risks and safety needs, such as mold remediation, structural hazard repairs, and other air quality improvements, while also reducing energy costs through efficiency upgrades and electrification. The enhancement of living environments helps to prevent asthma and other chronic conditions, reducing preventable healthcare costs.

Figure 5.5: Top 10 Built to Last Repairs in Scopes of Work

Home Repair Categories	% in Scopes
Carpentry	89%
Plumbing Repair	78%
Electric Repair	67%
Roofing or Building Envelope	56%
HVAC	40%
Masonry Repair	40%
Specialized Health and Safety	35%
Energy Efficiency	33%
Weatherization	31%
General Health & Safety	11%

Source: PEA (2026)

The EPA's ENERGY STAR designation of Built to Last as a Home Upgrade Partner is a recognition of the program's efforts to prioritize clean energy upgrades wherever feasible. Built to Last adopts elements of an ENERGY STAR Home Upgrade—a set of six high-impact improvements that work together to deliver significant energy cost savings by addressing the biggest energy users in most homes—such as installation of ENERGY STAR certified heat pumps, high-efficiency water heaters, smart thermostats, and other weatherization improvements.

6. Return on Investment

As detailed throughout this report, the Campaign has delivered measurable economic impacts as well as several more qualitative societal benefits over the past decade. PEA has surpassed its initial goals, developed alongside City Council, and further, has reached these milestones while returning revenues greater than amounts received in municipal budget allocations, detailed below:

- Municipal budget allocations have ranged from lows of just over $500,000 in 2017 and 2021 to **highs of $2.05 and $6.05 million in 2024 and 2025**, respectively.
- Approximately **$15 million in budget allocations has been leveraged to over $1.3 billion** in total investment over the life of the Campaign.
- Estimated at more than $25 million, aggregated tax revenues generated by Campaign projects are **nearly 1.7 times greater than the combined allocation amount.**

Figure 6.1: General Fund Budget Allocations to Philadelphia Energy Authority

Fiscal Year	Budget Allocation
2017	$518,460
2018	$743,000
2019	$843,000
2020	$735,274
2021	$518,000
2022	$938,000
2023	$1,000,000
2024	$2,050,000
2025	$6,050,000
2026	$1,300,000
Total	**$14,695,734**

Source: PEA (2026)

Over the life of the program, each City dollar invested in PEA has yielded a 90X return on investment

Cumulatively, Campaign project activity has generated municipal tax revenues greater than its total ten-year budgeted allocation. In essence, these allocated dollars have been returned to the public, flowing back into the General Fund where they support and bridge funding gaps for core municipal services such as public safety, infrastructure maintenance, and other essential operations that benefit Philadelphia residents. Through the framework of its Campaign, PEA has maximized foundational City funding, attracting **over $130 million in capital investment on an annual basis.**

Figure 6.2: Return on Investment in Terms of Tax Revenues Generated and Dollars Invested

		Tax Revenues		*Total Investment*	
Fiscal Year	**Allocation ($M)**	**Estimated ($M)**	**Multiplier**	**Investment ($M)**	**Multiplier**
2017	$0.5	$0.7	1.4	$38.6	74
2018	$0.7	$0.9	1.2	$48.3	65
2019	$0.8	$0.7	0.8	$34.7	41
2020	$0.7	$0.9	1.2	$45.6	62
2021	$0.5	$2.4	4.6	$123.9	239
2022	$0.9	$1.7	1.8	$89.6	96
2023	$1.0	$10.1	10.1	$524.3	524
2024	$2.1	$1.9	0.9	$100.4	49
2025	$6.1	$4.1	0.7	$212.6	35
2026	$1.3	$1.9	1.5	$98.6	76
Total	**$14.7**	**$25.4**	**1.7**	**$1,316.6**	**90**

Source: PEA (2026); ESI (2026)

7. Appendix

About Econsult Solutions, Inc.

This report was produced by Econsult Solutions, Inc. (ESI). ESI is a boutique consultancy providing businesses and public policymakers with consulting and thought leadership services in urban economics, real estate, transportation, public infrastructure, economic development, public policy and finance, strategic planning, as well as expert witness services for litigation support.

ESI combines robust quantitative analysis with trusted expert insights to create sustainable solutions. ESI has deep expertise in urban economics and the interrelated issues of equitable economic development, human capital, infrastructure, and land use in cities and metropolitan regions. Our clients include government and quasi-government organizations, private sector businesses, economic development agencies, and research organizations. Based in Philadelphia, the firm supports clients nationwide.

Methodology

Economic impact estimates are generated by utilizing input-output models to translate an initial amount of direct economic activity into the total amount of economic activity that it supports, which includes multiple waves of spillover impacts generated by spending on goods and services and by spending of labor income by employees. This section summarizes the methodologies and tools used to construct, use, and interpret the input-output models needed to estimate this project's economic impact.

Input-Output Methodology

In an interconnected economy, every direct dollar spent generates two spillover impacts:

- First, some amount of the proportion of direct expenditure that goes to the purchase of goods and services gets circulated back into an economy when those goods and services are purchased from local vendors. This represents what is called the "**indirect effect**," and reflects the fact that local purchases of goods and services support local vendors, who in turn require additional purchasing with their own set of vendors.
- Second, some amount of the proportion of direct expenditure that goes to labor income gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This represents what is called the "**induced effect**," and reflects the fact that some of those goods and services will be purchased from local vendors, further stimulating a local economy.

The role of input-output models is to determine the linkages across industries to model the magnitude and composition of spillover impacts on all industries from a dollar spent in any one industry. Thus, the total economic impact is the sum of its own direct economic footprint plus the indirect and induced effects generated by that direct footprint.

Data Collection and Cleaning

ESI obtained 10 years of Campaign investment data (2016-2026) by project item from PEA. After cleaning and standardizing the data, ESI matched specific line items to IMPLAN industry codes using

descriptions, notes, and client reports, enabling investments to be aggregated into the appropriate industries. ESI also obtained and cleaned data on PEA's job-creation estimates, for both implementation and savings jobs, based on a model initially developed by ACEEE.

In parallel, ESI compiled information from annual city budget allocations and past PEA annual reports to provide context for the report.

Input-Output Model Mechanics

To model the impacts of Campaign expenditures (including both capital and programmatic spend), ESI developed a customized economic impact model using the IMpact analysis for PLANning (IMPLAN) input/output modeling system. IMPLAN is both an industry standard approach and software tool to assess the economic and job creation impacts of economic development projects within a specified geographic area and its surroundings.

IMPLAN has developed a social accounting matrix (SAM) that accounts for the flow of commodities through economics. From this matrix, IMPLAN also determines the regional purchase coefficient (RPC), the proportion of local supply that satisfies local demand. These values not only establish the types of goods and services supported by an industry or institution, but also the level in which they are acquired locally. This assessment determines the multiplier basis for the local and regional models created in the IMPLAN modeling system. IMPLAN applies the multipliers to 528 industry categories in accordance with the North American Industry Classification System (NAICS) codes.

The product of IMPLAN modeling is the (direct, indirect, and induced) economic output, the number of jobs supported in identified industries, and employee compensation and wages. IMPLAN results are only inclusive of implementation jobs.

Because program spending occurred across multiple years, each year's investment was modeled using year-specific IMPLAN multipliers to account for that year's economic conditions and changes in regional economic structure. All direct output figures presented are inflation-adjusted to 2026 dollars.

Employment and Wages Supported

The study calculates two types of jobs (implementation jobs and savings jobs) by blending ESI's standard methodology with previous PEA reporting that leveraged ACEEE job reporting methodology.

Implementation Jobs: Implementation jobs are defined as direct jobs held by workers in the construction, maintenance and repair, planning, and engineering sectors who are designing and installing energy efficient infrastructure as well as multiplier jobs (indirect and induced) jobs throughout the supply chain and in supporting sectors. IMPLAN results are only inclusive of implementation jobs.

IMPLAN generates job estimates based on the term "job-years", or how many jobs will be supported each year. Since ESI modeled the entirety of the Campaign investment, job impacts were reported for the full duration of the 10-year Campaign in job-years. Additionally, IMPLAN produces job results as a mix of full and part-time employment. Consequently, job creation could feature more part-time jobs than full-time jobs. To account for this, ESI converts annual jobs to full-time equivalent jobs using an IMPLAN multiplier.

Income to direct, indirect, and induced implementation jobs is calculated as employee compensation. This includes wages and salaries, all benefits (e.g., health and retirement), and payroll taxes (both sides of Social Security, unemployment taxes, etc.). Therefore, IMPLAN's measure of income estimates gross pay (reported above), as opposed to just strictly wages.

Savings Jobs: Savings jobs are defined as jobs supported by residents and businesses spending less on their energy bills due to efficiency measures put in place. Savings jobs are calculated using a methodology developed by ACEEE that leverages IMPLAN multipliers and are also reported in job-years. Savings jobs are only reported in aggregate (summing direct, indirect, and induced jobs), and as such, a full breakdown (i.e., direct, indirect, induced jobs) is unavailable.

Workforce Analysis

With PEA's guidance, ESI developed a list of 18 occupations that represent the direct implementation jobs. The 18 occupations match with Bureau of Labor Statistics Standard Occupation Classification (SOC) codes, which enables the ability to access wage and educational requirement data. Wage and educational requirement data were sourced from Lightcast, an industry-leading source providing comprehensive labor market analytics.

Workforce analysis was further bolstered by the Department of Energy's reporting on energy jobs, including information on the number of energy jobs in the state and national breakdown of role demographics.

Tax Revenue Impact and Return on Investment

Lastly, the economic impacts, in turn, produce one-time or ongoing tax revenues for geographies that support organizational operations. To estimate tax revenue, ESI developed a bespoke tax revenue impact model to translate total economic impacts into their commensurate tax revenue. Modeling is based on the observed relationship between economic activity types and tax revenue collections (i.e. effective tax rates).

Further, ESI compiled the city's annual PEA allocation and matched it with PEA tax revenues (generated from the above described model) and total investment supported to calculate the Campaign's return on public investment in multiplier terms.

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