



PHILADELPHIA ENERGY CAMPAIGN

UPDATE & PATH FORWARD



DECEMBER 2016



ABOUT THE PHILADELPHIA ENERGY AUTHORITY

The Philadelphia Energy Authority (PEA) was chartered under the PA Municipal Authorities Act in 2010, driven by City Council President Darrell Clarke and then-Mayor Michael Nutter. PEA was formed to bring expertise, support and focus to the city's efforts to reduce energy consumption and expense.

PEA serves five major functions:

- Serving as financial agent for capital energy projects and legally able to hold long term contracts (over 4 years) on behalf of the City, adding value with energy expertise and oversight;
- Identifying, supporting, and facilitating the most cost effective and environmentally sound opportunities for the City to reduce energy use and expense;
- Promoting and assisting the development of alternative sources of energy and energy efficiency benefiting the development and retention of local workforce;
- Educating the broader public, decision makers and leaders on energy related issues; and
- Convening city stakeholders to explore opportunities for: enhancing energy efficiency, obtaining clean, renewable and affordable energy supply, and reducing energy consumption.

VISION

Philadelphia will serve as a national model for implementing energy strategies which improve the health of the community and local economy.

MISSION

Drive and support the development of long term energy projects, policy and educational programs in Philadelphia.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
INTRODUCTION	6
The Campaign's Four Goals	
The Campaign's Four Sectors	
Goals and Metrics	
Job Creation	
Getting to Scale	
MUNICIPAL BUILDINGS	12
Key Principles	
Key Work Underway	
Energy Master Plan for the Built Environment	
Greenworks	
Rebuilding Community Infrastructure (Rebuild)	
LED Streetlighting	
Renewable Energy for City Government	
Philadelphia Museum of Art Energy Efficiency Project	
SCHOOLS	14
Key Principles	
Key Work Underway	
Benchmarking of all School Buildings	
Solar Installation Training Program	
Solar Pilot	
Efficiency Pilot	
LOW & MODERATE INCOME (LMI) RESIDENTIAL	16
Key Principles	
Key Work Underway	
Philadelphia Housing Authority ESCO Project	
City Council Housing Preservation Initiative	
Multi Family Housing Pilot	
Event: Bridging the Gap: Public Health, Energy Efficiency & Poverty	
PECO Solar Stakeholder Collaborative & PEA PUC Briefing	
SMALL BUSINESS.....	20
Key Principles	
Key Work Underway	
Penn State/PEA Small Business Pilot	
BUILDING THE CAMPAIGN TO SCALE.....	22
Collaboration	
Information and Technical Assistance	
Service Providers	
Finance	
Public Policies	

EXECUTIVE SUMMARY

The Philadelphia Energy Authority, through the leadership and support of City Council President Darrell Clarke launched the Philadelphia Energy Campaign in February 2016, to create jobs, strengthen communities, cut energy bills and reduce Philadelphia’s carbon footprint. The Campaign will leverage \$1 billion in public and private financing to invest in clean energy and energy efficiency projects in four key sectors: City buildings, Schools, low and moderate income residential housing and small businesses.

WHY THIS CAMPAIGN

Poverty Reduction.

A recent report from the Center for Neighborhood Technology showed that a 25% reduction in poverty was possible in Philadelphia through a combination of household expense reduction and job creation. With Philadelphia’s 10+ year waitlist for public housing, 4+ year waitlist for home repair assistance and the extremely high cost of building new affordable housing, we must preserve our existing affordable housing stock.

Neighborhood-Driven Economic Development.

A recent Penn State/Food Trust study showed that corner stores often pay more in utilities monthly than they do in rent in Philadelphia. Energy is a key driver of neighborhood resources and opportunity, and by focusing on neighborhoods first, we can identify cost-effective, market-driven models that create jobs and stabilize businesses exactly where they’re needed most.

Bringing in Outside Investor Groups.

Energy lenders and environmental investors from across the country are looking for projects that move the needle on carbon reduction and other social impacts. By driving project development, we attract those investors to Philadelphia, many for the first time.

Health, Cost Reduction and Sustainability.

In our schools, homes and in the air we breathe, energy efficiency and clean energy can be a vehicle for improving public health. We expect more than \$200 million in energy savings to go back into our local economy. The Campaign will also help the City and School District meet their sustainability goals.

SAVINGS



\$200M
IN SAVINGS
FOR THE
LOCAL
ECONOMY

JOB



CREATE
10,000 JOBS

INVESTMENT



\$1B
LEVERAGE
PUBLIC AND
PRIVATE
FINANCING

PROGRESS HIGHLIGHTS TO DATE

PEA has completed its 6-month planning period for the Energy Campaign and is currently developing, modeling and testing pilot projects. These pilots will be evaluated, refined and then scaled up over the next 9 years. These initial pilots, which, once scaled up, will generate more than half of the total jobs projected by the Campaign over the next 5 years.

Key activities include:

- Multi-family affordable housing pilot
 - » Includes 4 multi-family buildings totaling roughly 200 units
- Small business pilot with Penn State
 - » Assessments completed for more than 30 small businesses as of December 2016
- PHA energy + resiliency ESCO program in audit phase, assessing feasibility for 20,000 units
- School District of Philadelphia evaluating solar and efficiency pilots for Spring 2017
- City Council Housing Preservation Initiative will clear the existing 4-year waitlist for low-income home repair
- Administration energy projects (Rebuild, recreation centers, libraries, police & fire stations, Art Museum and citywide renewables)

HELPING RESIDENTS



CUT ENERGY
BILLS FOR
25K+ HOMES

TARGET SECTORS

PUBLIC
SCHOOLS



SMALL
BUSINESSES



MUNICIPAL
BUILDINGS



LOW INCOME
RESIDENTIAL



SMALL BUSINESS



2500
SMALL BUSINESSES
REDUCE RISK & SAVE MONEY

INTRODUCTION

The Philadelphia Energy Campaign was developed by the Philadelphia Energy Authority (“PEA”) through the leadership of City Council President Darrell Clarke, investing in clean energy and energy efficiency to drive job creation in Philadelphia. The Campaign provides a variety of other public benefits, from job training to social equity, housing preservation to carbon reduction, improved public health and neighborhood stabilization. The Campaign was announced by Council President Clarke and PEA on February 8, 2016, with support from Mayor Jim Kenney, the Philadelphia Housing Authority (“PHA”), Philadelphia Federation of Teachers (“PFT”), Service Employees International Union (“SEIU”), the CEOs of PECO and the Philadelphia Gas Works (“PGW”), nearly all members of City Council and dozens of stakeholders from housing, solar, energy efficiency, education, public health and low-income advocacy organizations.

The Campaign is a bold, neighborhood-driven plan to invest \$1 billion in energy efficiency and clean energy over the next 10 years, leveraging both public and private dollars. **We are creating scalable pilots to develop program models that work, bringing on key partners, and then will implement initiatives in each sector at scale to create real, lasting impact for Philadelphia and its citizens.**

Our implementation process has 3 steps: Plan, Pilot and Scale.

PEA began implementation of the Campaign with an initial 6-month planning period and this document shares the results of that work, as well as identifies the path forward in each category. We are now in pilot phase for multiple programs, and will work on modeling and testing those programs over the course of the next year. Once we have established effective models, we will focus on scaling up the programs to achieve our longer-term goals.

Since the Campaign was announced in February, the PEA staff has conducted meetings with over 200 stakeholders, experts and advocates. We developed key partnerships for initial pilots including utilities, lenders (including many that are new to Philadelphia), energy services companies, property owners, city programs, businesses and non-profits. *We have already created and supported pilot programs that, once fully developed and implemented at scale, will create more than 5,100 of the Campaign’s jobs.*

This report illustrates the work done to date and the path forward in each category to develop and deploy scalable models to reach our goals in a way that reduces poverty, stimulates the local economy and protects our environment both locally and globally. Over the next 12 months, we expect to complete pilot projects and evaluations, and this time next year hope to begin to scale these programs up quickly.

THE CAMPAIGN'S FOUR GOALS

CREATE JOBS.

The Campaign's \$1 billion investment will create 10,000 jobs over 10 years, and support job training and local hiring. Energy efficiency and clean energy projects employ more local workers per dollar of expenditure than traditional electricity, natural gas, coal and oil industries, and the number of clean energy jobs already in Pennsylvania outpaces the number of fossil fuel jobs. These are living wage jobs in a booming industry that will need skilled employees for decades to come.

STRENGTHEN COMMUNITIES.

The Campaign seeks to improve the lives of Philadelphians by preserving existing affordable housing infrastructure, reducing household expenses for low and moderate-income residents, helping small businesses keep their doors open and reduce their largest monthly expense (utilities), and supporting the City and School District to reduce costs, address deferred maintenance and invest in buildings across our city. We are focused on critical long-term home repair in 25,000 low and moderate income single and multifamily homes, energy and building improvements for 2,500 small food and grocery businesses, and supporting improvements to government and school infrastructure across the city. The Energy Campaign will include those buildings that provide neighborhood services, such as schools, recreation centers, libraries, police and fire stations, health centers, corner stores and restaurants and more.

CUT ENERGY BILLS.

The Campaign will drive energy efficiency projects that will reduce building energy use by over 20%, collectively saving over \$200 million citywide. These are savings that accrue year after year for the life of the energy measures – dollars that residents, businesses, schools and government can use to reinvest in our local economy and meet basic needs.

REDUCE AIR AND WATER POLLUTION.

By reducing the consumption of fossil fuels through energy efficiency and clean energy, the Campaign will reduce carbon emissions and other environmental pollutants, which will have both immediate and long-term impacts on public health and the environment in Philadelphia. Our goal is to remove 790,000 metric tons of carbon dioxide from our air over the course of the Campaign.

THE CAMPAIGN'S FOUR SECTORS



MUNICIPAL BUILDINGS

This sector includes buildings which have their energy bills paid by the City of Philadelphia. This includes large buildings such as City administrative buildings, the Art Museum and correctional facilities. It also includes the numerous smaller City facilities, maintenance sheds, health centers and others that are spread throughout our neighborhoods. Many of our libraries and recreation centers could be improved through the Mayor's Rebuilding Community Infrastructure (Rebuild) initiative launched recently, and these renovations will incorporate energy improvements.



LOW & MODERATE INCOME (LMI) RESIDENTIAL HOUSING

Included in this sector are several very different housing types, including large multi-family buildings, small apartment buildings and single-family houses. These residential buildings may be owned by PHA, private landlords, multi-family affordable housing developers and individual homeowners. In Philadelphia, 42% of homeowners are generational, meaning their home was inherited, sometimes without a mortgage and with significant deferred maintenance. There are robust waitlists for public housing and homelessness prevention/home repair programs, and healthy home intervention programs are dramatically underfunded.



PUBLIC SCHOOLS

The School District of Philadelphia (SDP) has approximately 218 schools and related facilities and spends approximately \$45 million a year for energy. The District also has over \$5 billion in deferred maintenance – capital improvements to building conditions that have not been made due to budget constraints. Energy efficiency projects under state law allow for inclusion of some non-energy measures to be included in a bundled project, making energy efficiency a helpful vehicle for addressing this maintenance backlog. Though we have not excluded charter schools from the Campaign, our initial focus will be on non-charter buildings.



SMALL BUSINESS

The Campaign recognizes the importance of Philadelphia's neighborhood businesses as critical community infrastructure, and focuses on food retail and restaurants. According to a recent Penn State/Food Trust study, these businesses often pay more in utilities than they do in rent in Philadelphia. They have high energy bills due mostly to commercial refrigeration, leaky building envelope, inefficient HVAC and long operating hours. We will also provide some support for small manufacturers and houses of worship, particularly those who may not be able to take advantage of other programs to make energy improvements.

GOALS AND METRICS

PEA recognizes the importance of transparency and accountability, and the Campaign will track a variety of metrics to measure progress. All metrics and calculation methodologies will be publicly reported. Some of the metrics that will be tracked include:

COMPLETED PROJECTS. The Campaign will track the number of completed pilots and projects and the square footage of the buildings receiving energy retrofits in each sector and each building type.

CAPITAL INVESTED. The Campaign will track the dollars invested in energy efficiency and clean energy and the sources of those different dollars.

ENERGY SAVINGS. The Campaign will track the energy saved by the completed projects by fuel type (electricity, natural gas, heating oil, purchased steam, etc.). The Campaign will also track the energy produced by clean distributed energy generation projects.

ENERGY COST SAVINGS. The Campaign will calculate the dollar reduction in energy bills from the energy savings by fuel type. Since energy projects save energy for many years, the dollar savings should be expressed both to date and for the life of the energy measures, showing different assumptions for the future escalation of energy prices.

STRENGTHEN COMMUNITIES. The key question we need to answer for this goal is whether residents see or experience any improvements in their neighborhoods. Though anecdotal evidence will be a valuable tool for storytelling, concrete, measurable metrics must be identified for the programs in each of the four sectors to track the impacts the Campaign is having on neighborhoods. We will continue to engage with stakeholders to identify these metrics.

ENVIRONMENTAL & HEALTH BENEFITS. By tracking how much of which fuels were saved or offset, the Campaign will calculate the pollutants that were avoided. Key pollutants to track include carbon, sulfur dioxide, mercury, nitrous oxide, particulates. Other health metrics as appropriate will be included.

JOB CREATION

A fundamental goal of the Campaign is the creation of 10,000 jobs through the investment of \$1 billion in energy improvements across the four sectors. The Campaign’s February 8, 2016 launch report used an employment estimation methodology developed by the American Council for an Energy Efficient Economy (“ACEEE”). This methodology used 2011 national data (which was, at the time, more conservative than Pennsylvania-specific data) and looked at both implementation jobs and savings jobs, with each category having direct, indirect and induced jobs. Using this methodology, PEA’s estimates of jobs from the three primary programs that are currently being deployed during both the pilot phase in 2017 and with full-scale implementation are shown on the following table.

CURRENT ACTIVE PROGRAMS

PILOT PROGRAM	JOBS DURING PILOT PHASE	JOBS WITH FULL SCALE PROGRAM
Multi-Family	5	1,105
PHA	29	1,984
Small Business	2	2,014
	36	5,103

The Campaign will be half way towards its employment goal with the full implementation of these three initiatives alone.

GETTING TO SCALE

During this planning period, PEA has been laying a foundation for two aspects of this employment goal that are critical to the success of the Campaign:

1. Developing a sound methodology for tracking the job impacts of the Campaign.

The ACEEE methodology provided a good starting point to estimate total job creation, but going forward the Campaign will refine this approach. In September, 2016 PEA established a contract with ACEEE to develop a Philadelphia-specific job creation tracking mechanism using real, current data specific to our region and the Campaign's projects. ACEEE's new work will build upon local data and create an easy-to-use worksheet and process for future tracking employment impacts. We will create a methodology for tracking direct jobs and a plan for updating the labor numbers periodically over the course of the Campaign.

2. Seeking opportunities to increase local and Disadvantaged Business Enterprise participation.

PEA wants the jobs to be filled with local workers and to give minorities, women, people with disabilities and other disadvantaged groups an opportunity to participate. PEA is working with the American Association of Blacks in Energy ("AABE"), PHA, the Commerce Department and many others to ensure diversity in hiring. We are also working with the Energy Coordinating Agency, the School District of Philadelphia and other employment training programs to incorporate existing energy job training and expand training where needed to ensure a skilled workforce is available.

Scaling up is the most important theme of the Energy Campaign. There have been many smaller-scale programs in each of these sectors both locally and nationally, but success will rely on the ability of our teams to make these initiatives available widely across Philadelphia. This requires leveraging private sector dollars and expertise, building sustainable models that work at a larger scale and connecting with existing city agencies, programs and the non-governmental ecosystem of community support in our city.

The final section of this report addresses some of the challenges of getting to scale, including shaping public policies, improving collaboration between programs, improving information and technical assistance, making it easier to find qualified service providers and identifying financing with favorable terms.

SECTOR: MUNICIPAL BUILDINGS

KEY PRINCIPLES

- 1** All cost-effective energy efficiency improvements should be implemented expediently. The City has already completed a large, successful energy efficiency pilot, and with support should be able to implement energy efficiency measures at a larger scale across City buildings.
- 2** The City should evaluate and compare the costs and benefits of a variety of financing mechanisms to fund building energy improvements, including public bonds, private bonds and energy savings agreements.
- 3** To expand the use of bond financing to smaller buildings, the City should aggregate small projects into larger portfolios that allow for cost-effective bond financing, and in particular, bundle them with larger buildings to allow for more cost-effective implementation.
- 4** Given the realities of climate change and its projected negative impact on our way of life in Philadelphia, the City should urgently prioritize climate mitigation and resiliency. This will require deeper energy retrofits and broad-based energy efficiency programs.

KEY WORK UNDERWAY

Philadelphia's Office of Sustainability ("OOS") and Energy Office will take the leadership role in driving energy projects for City buildings. PEA will play a supporting role in project planning by providing resources, expertise, procurement support and advisory services. Listed below are the six initiatives that the Campaign will support in the Municipal Buildings sector.

Energy Master Plan for the Built Environment

Progress to date

OOS is developing a comprehensive energy master plan to increase energy efficiency, renewable energy generation and resiliency in municipal and private buildings throughout Philadelphia. Resiliency is the ability of the built environment to recover quickly and continue operating even when there has been an equipment failure, power outage or other disruption caused by extreme weather events or other problems. When complete, the document will serve as a business plan for the City's energy work and provide a data-driven carbon reduction strategy.

The plan will include strategies for all categories of buildings and facilities in the built environment, energy procurement, energy management, financing, resiliency, and sustainability including the social, economic and environmental co-benefits to the City of energy systems change. OOS expects to complete both a government and a community energy master plan by early to mid-2017.

Role of PEA

PEA will act as a key reviewer and provide feedback and input as requested by OOS. The Energy Master Plan will support the goals of the Energy Campaign and the job creation in the Plan will use PEA's job creation tracking methodology.

Greenworks

Progress to date

OOS released the updated Greenworks sustainability plan on November 3, 2016. Greenworks sets the vision and priorities for OOS and other City departments. It envisions a sustainable city where all Philadelphians:

- Have access to healthy, affordable, and sustainable food and drinking water.
- Breathe healthy air inside and outside.
- Efficiently use clean energy that they can afford.

- Are prepared for climate change and reduce carbon pollution.
- Benefit from parks, trees, stormwater management, and healthy waterways.
- Have access to safe, affordable, and low-carbon transportation.
- Waste less, and keep our neighborhoods clean.
- Benefit from sustainability education, employment, and business opportunities.

Rebuilding Community Infrastructure (Rebuild)

Progress to date

Rebuild is one of Mayor Kenney's primary initiatives, designed to invest hundreds of millions of dollars in parks and recreation infrastructure, including in libraries and recreation centers citywide. The City's Energy Office is providing the Rebuild planners with building standards and guidelines to incorporate energy efficiency, and continues to work closely with that team to ensure all renovations include energy improvements.

LED Streetlighting

Progress to date

Though not strictly a "building," a complete LED streetlighting conversion would have a dramatic effect on public safety across Philadelphia, in addition to reducing our energy costs and governmental carbon footprint by up to 9%. The Streets Department has been conducting LED streetlighting pilots over the last five years, finding positive impacts on energy and maintenance costs. Anecdotally, the pilots have also resulted in a reduction in crime and littering, as well as an increase in revenue to businesses along upgraded commercial corridors.

There are also positive public safety benefits associated with converting all of Philadelphia's 110,000+ streetlights to energy-efficient LEDs. The Energy Office and Streets Departments are developing a concept for the retrofit initiative.

Role of PEA

As of December 2016, we are awaiting further detail from the Rebuild planners as to timeline, project pipeline and ways in which we can add value. We will support the Energy Office's efforts as needed.

Role of PEA

In the next six months, the Energy Office and PEA will continue to work with the Streets Department and PECO to facilitate the release of a Request for Information ("RFI") to be followed by a Request for Proposals ("RFP") for full conversion. We recommend including "dark sky compliant" fixtures and an advanced controls system that would allow for complex programming, dimming by individual fixture, and two-way communication. We encourage the Energy Office, Streets and PECO to seek an acceptable rate tariff and metering solution to optimize savings from controls.

We are working with Dr. Donald McEachron and Dr. Gena Ellis of the dLUX Light Lab at Drexel University to develop recommendations for lighting control solutions that would support public health while optimizing efficiency, light quality and safety. PEA's Ellie Horner is developing case studies and public impact data to support the conversion.

Renewable Energy for City Government

Progress to date

The Energy Office developed a RFI that was released jointly by PEA and the City on November 28, 2016 to solicit ideas and recommendations for installing solar photovoltaic systems ("PV") on all municipal building roofs and available City property. The Energy Office is reviewing a broad range of renewable energy options for City government. Following receipt of the RFI responses, the City and PEA will work to pursue attractive opportunities for development.

Renewable energy could be an important part of Philadelphia's long-term energy procurement hedging strategy, in addition to supporting carbon reduction.

Role of PEA

PEA partnered with the Energy Office to release the RFI, assess responses and move forward with solutions. PEA will ultimately hold the contracts on any renewable energy agreements.

Philadelphia Museum of Art

Progress to date

The City is evaluating an energy efficiency project at the Philadelphia Museum of Art, the largest gross energy user of all City-owned buildings. Led by the Energy Office and the facility staff of the Philadelphia Museum of Art ("PMA"), the project is still in the early stages of development and scoping and will be implemented in 2017.

Role of PEA

PEA will partner with the Energy Office and PMA to support project scope development as needed and will offer procurement, financing and contractual support as requested.

SECTOR: SCHOOLS

KEY PRINCIPLES

- 1** Energy efficiency and clean distributed energy support the School District of Philadelphia's ("SDP") mission of providing safe and healthy facilities that are conducive to learning. Maintenance of school facilities should be affordable and incorporate reliable energy efficiency measures. Energy improvements create operating savings and provide financing mechanisms that allow for other capital improvements.
- 2** By the end of the 10-year Campaign, all cost-effective energy efficiency improvements should be implemented to reduce SDP energy use by 30%.
- 3** The SDP should evaluate a variety of alternatives for financing facility upgrades, since energy projects represent one of the few ways to expand capital investment without budget increases. It is not possible to scale up energy projects using only existing capital budgets. Financing options to be examined should include public bonds, private bonds, energy savings agreements or performance contracts, power purchase agreements and others to determine the best fit.
- 4** SDP's new sustainability program, GreenFutures, prioritizes energy improvements and Education for Sustainability ("EFS"). The Energy Campaign is designed to support SDP as it works towards its goals.



KEY WORK UNDERWAY

PEA is grateful for the participation and engagement from staff at the School District of Philadelphia. The SDP's recent release of the GreenFutures five-year sustainability plan is a major step forward. PEA's goal is to help SDP achieve their GreenFutures energy and education goals as quickly as possible, utilizing our resources and expertise to help shape programs that work. The campaign has four initiatives in the school sector.

Benchmarking of all School Buildings

SDP is required by City benchmarking rules to input utility data into EPA's Portfolio Manager tool only for buildings over 50,000 square feet, but it has already moved forward with benchmarking all school buildings regardless of size, which will make addressing energy issues much easier.

SDP has a contract with Eric Ryan Corporation to develop and maintain a database of the energy consumption of all school buildings. The database shows the Energy Usage Intensity ("EUI") — the amount of energy used per square foot per year — of each building, so SDP can easily identify the "energy hogs" to direct its energy efficiency work.

Solar Installation Training Program

Working with a variety of partners, PEA is urging the School District to release a new solar installer training program that would meet SDP's Career and Technical Education ("CTE") requirements. The Clean Air Council, Solar States, Youthbuild Charter School, Penn State and the Energy Coordinating Agency have all designed comprehensive curricula that can be leveraged. Youthbuild is already teaching this course and Penn State at the Navy Yard has developed training on wheels which could be used.

PEA plans to submit a suitable proposal to SDP's CTE group to make the program available to high school students district-wide.

Solar Pilot

SDP has expressed an interest in developing a pilot project to test the feasibility of larger-scale solar at the district. PEA has been working closely with district management in Capital, Facilities, Maintenance, EHS and Sustainability to evaluate feasibility and put together a pilot. Interest in solar stemmed largely from an initial report provided by PennEnvironment in April 2016 which included back-of-the-envelope calculations for solar potential at the School District. Later that month, City Council held a hearing on solar schools led by Councilwoman (and Environment Committee Chair) Blondell Reynolds-Brown and Councilman Derek Green.

PEA then hired intern Laura Rigell, a graduate student at the University of Pennsylvania, to conduct research in the summer of 2016 to assess actual costs and potential scope. Rigell used rooftop surveys from SDP and data from eight different solar aggregators, investors and installers to assess more than 18 schools for solar feasibility. She also reached out to all Pennsylvania school districts that have completed a solar project, providing lessons learned from their experiences, as well as contacts to reach out to from across the state.

The PEA report selected a middle-of-the-road location (in terms of utility cost and roof size), and identified two feasible ways to finance a solar pilot using real cost numbers in a 25-year cash flow projection.

Energy Efficiency/Energy Performance Contract Pilot

As part of SDP's GreenFutures plan, a commitment has been made to reduce energy consumption by 20% across the entire district through energy projects by 2020. In order to achieve that target, the District knows it must move forward with a pilot program now to be ready to scale up by 2020. PEA is working closely with EHS and Sustainability staff at SDP to put together an effective pilot that demonstrates real energy savings, establishes a scalable model that fits with SDP's goals, processes and preferences, and is easy to replicate across the district once completed. PEA is providing consulting and process support, in particular to share best practices and help SDP overcome any hurdles throughout the pilot.

We encouraged SDP to look at solar with either a roof lease (with fixed monthly payments) or a 25-year Power Purchase Agreement ("PPA"). PEA utilized extremely conservative escalators both on existing electric costs and solar prices. PEA found that both models would allow for a 750 kW solar array at no up-front cost to the school district, but did not produce any short-term savings without a subsidy. PEA has requested support from the Commonwealth's Solar Energy Program. We are also seeking a philanthropic partner that is a PJM Load Serving Entity that could purchase solar renewable energy credits ("SRECs") from SDP at an above-market-rate price over 15 years (rather than in shorter term contracts) to support the project, which would ensure the project results in electric savings to SDP, and could provide public benefit that would be desirable to the partner. The project would provide significant educational value to students, could potentially be co-located with the solar installation training program, and would be scalable across all medium to large rooftops in the District with the right partnerships.

PEA presented the solar report on August 24, 2016 to District officials and is continuing to work with appropriate decision-makers to move forward with implementation. We are preparing a pilot of three or more schools that can be ready for implementation in Summer 2017. The PEA solar schools report will be made publicly available on PEA's website in January 2017.

We hope to see SDP agree to move forward in 2016 and are targeting a 3-school efficiency pilot to be implemented in Summer 2017. If possible, we will work to combine the solar and efficiency programs.

For the last two years, SDP has been participating in a U.S. Department of Energy accelerator program focused on energy performance contracting. Budget and credit concerns have made it difficult to explore a financed energy project in the past, and these are still issues that remain a roadblock to financing. All energy efficiency measures to date have been completed using existing capital budgets, so progress is slow and generally shallow unless grant money has become available for specific projects (like Kensington School for Creative and Performing Arts, a LEED Platinum new building).

SECTOR: LOW & MODERATE INCOME (LMI)

KEY PRINCIPLES

- 1** An affordable home is one that will be safe, warm, healthy and affordable (including utility costs) for the next 20 years. Preserving our existing affordable housing stock is critical and preservation is dramatically less expensive than new construction. Home repair, energy efficiency and healthy homes interventions must be inextricably linked in order to solve the problem for the long term.
- 2** A hybrid model of grants and loans will allow us to fundamentally solve housing problems, rather than just band-aid symptoms. While developing these financing mechanisms, our commitment is to aid low and moderate-income residents with home retention while creating positive cash flow, where the monthly savings are greater than the monthly loan payments. Grant and loan alternatives should make consumer education a priority, and place focus on long-term housing stability, rather than short term implementation savings.
- 3** Programs should target those in deep poverty as well as other low and moderate-income residents in multi-family and single family homes. All innovative tools available to other sectors and households should also be available to low-income residents. All programs should be administered with dignity, with as few restrictions and requirements as possible. Leveraging existing community support organizations and private companies to streamline the eligibility screening and service delivery process is critical. Cross-sector and cross-program collaboration will be key.



KEY WORK UNDERWAY

Philadelphia Housing Authority's Energy + Resiliency ESCO project

In April 2016 the Philadelphia Housing Authority ("PHA") Board of Commissioners passed a resolution to engage Johnson Controls Inc. ("JCI") for energy, water and other audit services and for the implementation of energy performance contracts. The implementation contract was awarded in May 2016, and JCI is currently in the auditing phase to develop appropriate scope. They have focused on hiring PHA residents and emphasized Minority and Women's Business Enterprises ("M/WBE") participation. PHA's project is targeting 20,000 public housing units, including both multi-family and scattered sites. This is one of the most innovative energy projects attempted by any housing agency nationwide, incorporating climate resiliency in addition to energy efficiency.

Role of PEA

Our priorities for this project are: to support JCI and PHA's hiring process to ensure that both JCI and their subcontractors are utilizing local, skilled labor with an emphasis on minority involvement; to support PHA's efforts to integrate with existing utility programs; to encourage and support PHA to add solar wherever feasible; and to provide support services in any other aspect as desired by PHA.

With regard to local and M/WBE hiring, both PHA and JCI are deeply committed to this process and have already hired PHA residents to participate in auditing and organizing. PEA has been working closely to connect our local, skilled, minority workforce with JCI and other large ESCOs. PEA will advocate for the PHA subcontractors to exceed the minimum M/WBE requirements.

In June 2016, PEA arranged a tour for JCI of the Energy Coordinating Agency's training facility, where more than 4,000 local residents have been trained in home repair and weatherization skills. We hope that the conversation between ECA and JCI will yield selection of a diverse, local workforce in communities that previously may have been excluded from this type of work.

RESIDENTIAL HOUSING

City Council Housing Preservation Initiative

City Council recently passed an increase to the Realty Transfer Tax of 0.1% which will take effect January 1, 2017 and will generate enough revenue to support Council's Housing Preservation priorities. Council introduced a bond in November 2016, focused on \$60 million to be used to eliminate the significant waiting list for the Basic Systems Repair Program ("BSRP"), the Weatherization Assistance Program ("WAP"), and the Adaptive Modification Program ("AMP"). PEA is encouraging Council to take another step further and add \$40 million additional for a loan program to address fundamental home repair issues for those just above the income limits for the existing grant programs and fill in the gaps in existing repair services.

Role of PEA

PEA participated on three Housing Preservation committees: Grants (chaired by Stefanie Seldin of Rebuilding Together Philadelphia), Loans co-chaired by Jill Roberts of the Healthy Rowhouse Project and Andy Frishkoff of LISC and Repairs (chaired by Liz Robinson of the Energy Coordinating Agency). Our priority is to support development of programs that leave residents with safe, warm, healthy, affordable housing for the next 20 years, and to apply this one-time infusion (via municipal bond) of unrestricted funds in a way that substantively impacts poverty and affordable housing in Philadelphia.

In particular, PEA is advocating for a program that would allow for a hybrid of grants and loans on a sliding scale, and that would re-define repair measures to include high efficiency HVAC and water-heating equipment, building insulation and energy-efficient windows, in addition to the air and water sealing currently provided via WAP. We believe that the loan programs should address all measures that are available through existing grant programs. Existing grant programs should incorporate efficiency whenever they touch a home.

We expect this loan program will address some issues but not all. We will need to develop an additional pilot for single family homes that allows for a more comprehensive approach, similar to the Energy Coordinating Agency's EnergyFit program, while incorporating rebates, existing program grants and financing where appropriate. PEA is also collaborating with the Philadelphia Housing Development Corporation ("PHDC"), which administers BSRP, WAP and AMP to analyze the existing waitlist and generate recommendations to manage the backlog quickly and efficiently.

SECTOR: LOW & MODERATE-INCOME (LMI) HOUSING

Multi-Family Housing Pilot

One of the key target groups for the Energy Campaign is multi-family affordable housing developers. Multi-family buildings have unique features, financing structures, opportunities and requirements when it comes to energy efficiency. We have put together a team to launch our initial multi-family pilot, which will serve as the model for scaling up across Philadelphia. Our current developer partners for the pilot will be Mission First Housing Group (“MFHG”), a non-profit affordable housing developer and property manager with over 1,400 units in Philadelphia, and Friends Rehabilitation Program (“FRP”), a non-profit organization with nearly 500 units in Philadelphia.

Our implementation partners include: BlocPower, an innovative startup firm which is implementing a similar model in New York City; PECO, whose Act 129 programs under Phase III provide rebates for energy conservation measures in multi-family and commercial properties; CMC Energy Services, a subcontractor working with both PECO and PGW; PGW, whose multi-family rebate program pilot is just getting started; Johnson Controls, which is working with PHA to establish a template for construction management, measurement and verification; and a number of financing partners experienced in innovative energy financing.

MFHG has identified four buildings that are coming close to the end of their Low-Income Housing Tax Credit (“LIHTC”) timeline and would likely be refinanced soon, or are currently about to go through a renovation process. Prior to refinance (or re-syndication of LIHTCs), most building owners typically do some renovation to increase building equity. We are piggybacking on that timing to implement building-wide energy initiatives. FRP has identified a unique financing opportunity in their pilot building as well.

The pilot will mirror a concept tested in New York which takes a two-phased approach. Phase 1 will focus on the basic energy conservation measures that PECO offers in its current multi-family program under Act 129, which will be at no cost to the owner. We will utilize PECO’s existing auditing capabilities, and will work with CMC Energy Services, the prime contractor for PECO’s residential energy efficiency program, to expand the auditing list to include some additional pieces of data collection required to put together the implementation plan.

In Phase 1 of the pilot, PEA will add to PECO’s program by including additional measures such as smart thermostats, smart water pumps, boiler management systems and general “healthy homes” measures (including mold remediation and air and water sealing where required). All additional measures beyond what PECO and PGW will provide in rebates will be financed.

We will use data from Phase 1 to shape Phase 2 which will integrate energy conservation measures related to deeper energy retrofits like new heating, ventilation and air conditioning (“HVAC”) systems, hot water heaters and building insulation. We anticipate savings of 20-30% in Phase I of the pilot and another 20% in Phase II of the pilot. These projections are based on data from over 150 multi-family buildings already completed by BlocPower in New York.

Role of PEA

PEA is designing the pilot, enlisting partners and leading implementation, planning and execution. We are currently selecting the pilot buildings and expect auditing to move forward in late 2016, with implementation continuing through 2017. PEA is also working closely with Herb Wetzel, Executive Director for Housing and Community Development for the Council President, to develop shared resources for affordable housing developers to facilitate energy efficiency financing and technical support. This effort will help bring multi-family efficiency to scale.

Event: Bridging the Gap: Public Health, Energy Efficiency and Poverty

Deteriorating housing conditions are inextricably linked to a number of health conditions, and in Philadelphia, the consequences, especially for children, are dire. The 2014 Healthy Homes Healthy Kids pilot program between the Philadelphia Department of Public Health and St. Christopher's Hospital conducted healthy homes interventions at a cost of \$3,500 per home and lowered children's emergency room visits for asthma by nearly 70%.

Bundling efforts to address healthy homes, deferred maintenance and efficiency has proven to be cost effective and important for stabilizing housing long-term. There are examples of where this has worked nationwide and here in Philadelphia.

PECO Solar Stakeholder Collaborative & PEA PUC Briefing

In April 2016 PECO launched a community outreach initiative to bring together environmental and social equity advocates with private industry, government and PECO executives to expand the use of solar energy in the PECO service territory. During the second session held in September 2016, PECO shared proposed alternatives for engaging low and moderate income consumers in solar installation projects and related green jobs.

PEA supports PECO's efforts to develop solar energy for low-income communities, and in particular, lauds PECO's approach to stakeholder engagement.

PEA worked with a student team from Wharton's Management 100 undergraduate class to design an event to highlight the correlation between public health and energy efficiency. The event was held on November 30, 2016 at the PECO Energy Hall, and was sponsored by Wharton's Initiative for Global Environmental Leadership. Speakers included Nan Feyler, Stoneleigh Fellow and former Deputy Commissioner for Public Health in Philadelphia, Wes Stewart, Senior Director of Technical Assistance and Legal Services for the Green & Healthy Homes Initiative, and Liz Robinson, Executive Director of the Energy Coordinating Agency.

Role of PEA

PEA is working with PECO to advocate for solar sites in low-income communities, and possibly even schools across Philadelphia. In light of possible regulatory and legislative changes that could pave the way for additional clean energy in low-income communities, in November 2016, PEA provided a briefing for the Pennsylvania Public Utility Commission and key legislative stakeholders on our priorities.

Additionally, PEA and PECO presented jointly in October 2016 on a Department of Energy webinar about collaboration between government and utilities on clean energy for low income communities.

SECTOR: SMALL BUSINESS

KEY PRINCIPLES

1 Corner stores, food take-out, restaurants and bars are critical to neighborhoods for both basic food/goods and for social infrastructure.

2 Food service establishments typically are high energy consumers due to refrigeration and other equipment that operate 24/7. In Philadelphia, utilities are often their highest monthly expense, even more than rent. Energy efficiency is a critical tool for business stability, job creation, and continuity of neighborhood services.

3 It is critically important to reach these businesses that exist in neighborhoods throughout Philadelphia, in particular in our poorest communities. These business owners are often de facto excluded from existing programs due to credit limitations, language barriers and lack of technical assistance.

4 Aggregating small projects allows for better financing arrangements, the opportunity to provide credit enhancements and backstops, and optimizes costs associated with assessments and engineering. We believe we must keep costs for business owners as low as possible. All assessments should be at no cost to the business. Better integration needs to occur between financing, PECO's Act 129 rebates and PGW's EnergySense rebates.



KEY WORK UNDERWAY

Penn State/PEA Small Business Pilot

This program will test the assessment, engineering, implementation, financing and outreach model needed to scale up a small business program across the city, and can serve as a national model for neighborhood-driven energy investment. Corner stores and small restaurants are the most energy intensive type of commercial building, with energy use per square foot three to five times higher than office buildings. Our key partner for this pilot is the Pennsylvania State University at the Navy Yard, who previously led the Consortium for Building Energy Innovation and recently released a report detailing energy consumption and intervention opportunities for corner stores in Philadelphia.

In partnership with PEA, the National Electrical Contractors Association and Private Energy Partners, Penn State received a grant in FY2017 from the Pennsylvania Department of Environmental Protection ("PADEP") to pilot the Energy Outreach and Assessment Center ("EOAC"). The EOAC is designing and demonstrating a scalable approach to conduct building energy assessments that will lead to energy retrofits in small- and medium-sized facilities.

The pilot is focused on:

- i) Lowering the cost of energy retrofit customer acquisition through low cost energy assessments, and innovative, community-based marketing and outreach efforts.
- ii) Developing a unique approach to engineering and project scoping to assess and recommend energy conservation measures appropriate for both owner- and tenant-occupied businesses, and driving project costs down through strategic partnerships with suppliers, manufacturers and service delivery companies. In partnership with PEA, the National Electrical Contractors Association and Private Energy Partners, Penn State received a grant in FY2017 from the Pennsylvania Department of Environmental Protection ("PADEP") to pilot the Energy Outreach and Assessment Center ("EOAC"). The EOAC is designing and demonstrating a scalable approach to conduct building energy assessments that will lead to energy retrofits in small- and medium-sized facilities.

- iii) Providing training for both college and community members in building energy assessment methods specific to this building segment, supporting local job creation.
- iv) Structuring scalable, low-cost financing mechanisms, evaluating ideas like aggregation of small projects into portfolios, and developing institutionalized subsidies that could also be scaled, similar to the PADEP grants.
- v) Building upon existing programs, including the Philadelphia Commerce Department's current small business support programs and PECO's and PGW's current rebate and direct installation programs.

The pilot will result in the completion of at least 60 facility assessments, with at least 15 stores then moving through the retrofit process by June 2017.

Work to date

- PADEP's grant program allots \$95,000 for energy retrofits exclusively for projects identified by this program. The money is available as matching grants — up to \$9,500 per project with modeled savings of at least 25% annually.
- 5 students were trained (taking a Penn State engineering class on building energy efficiency) at the Navy Yard in Summer 2016 to conduct small commercial building energy assessments.
 - » 3 of the students were hired by Private Energy Partners as summer interns to conduct energy assessments
 - » 2 students were employed by Penn State
- A template for collecting data and generating Assessment Reports sharing low cost and no cost energy saving opportunities for business owners was developed and completed in early September, and continues to be refined using best practices from the industry.
- Penn State will run an additional training course in January 2017, which will include both students and contractors.
- Students conducted 30 energy assessment walk-throughs of small food stores and restaurants as of September 30, 2016.

Path Forward

Process refinement

PEA, Penn State and Private Energy Partners are working to identify process improvements to continue to drive down costs, qualify more stores and streamline technology and partnerships to better serve small business owners in Philadelphia.

Recruitment

In the pilot's first iteration, Penn State identified challenges with building strong relationships with business owners to build enough trust to encourage participation. Rather than assuming their assessors will be able to recruit businesses themselves, they moved forward with a new process focused on community-based organizations that already have strong relationships in neighborhoods. PEA and Penn State are developing relationships with community development corporations, civic associations, commercial corridor development managers, business improvement districts, trade associations, geographical and ethnic chambers, government constituent services representatives, neighborhood advisory committees, service providers and many others. Through these organizations which have trusted relationships with businesses, recruitment picked up significantly in September. We have not yet finalized financing, contracting partners, or suppliers, all of which are in process.

Value Chain Mapping and Key Partnership Development

PEA and Penn State are working with PECO, PGW, a variety of financial institutions, the Commerce Department, ECA and other key partners throughout the value chain to reduce customer acquisition, financing, and labor and materials costs in order to be able to serve these customers at scale.

BUILDING THE CAMPAIGN TO SCALE

The path forward for the Campaign is to develop (or promote existing) models that address the problems we are trying to solve and that can then be implemented at a larger scale in subsequent years. As the initial projects are implemented, the Campaign will focus on how they can be scaled up.

Issues we continue to explore include:

- **INFORMATION & TECHNICAL ASSISTANCE**

One of the biggest barriers to energy efficiency project implementation is knowing how to scope the project, include the latest technology, and determine which measures should be included to develop the desired payback. PEA will build a high degree of technical assistance into pilot program design for all sectors to ensure that Philadelphia has a robust support network of energy auditors, engineers and analysts.

- **SERVICE PROVIDERS**

In order to scale up, it must be easy for building owners to find qualified contractors and energy professionals who will deliver helpful service at a reasonable price. The Campaign will help building owners, homeowners and tenants find qualified, reliable contractors, engineers, and auditors needed to get the work done well using lessons from successful programs like PHFA's and EnergyWorks. We will seek to develop bulk purchasing agreements that drive costs down and support local manufacturers. We will work with existing City and NGO resources to identify whether additional training programs are needed and will help the graduates of those programs find energy-related employment in Philadelphia. We will develop scalable ways to connect energy employers such as ESCOs, solar companies and other contractors to local, skilled, diverse labor.

- **FINANCE**

Many building owners say they would make energy improvements except they cannot afford the investment. Energy efficiency improvements can pay for themselves when structured properly. The Campaign will need to make available the options for financing energy projects. Financing questions to be answered include: How can existing and new grant programs be more effective? How do we expand the capital available for energy projects in the four sectors? How do we facilitate the use of private bond finance at affordable rates and at terms that match the life of the energy measures?

- **PUBLIC POLICIES**

A building owner's decision to invest in energy efficiency is influenced by a range of public policies and regulations. To be successful, the Campaign will advocate for policies at the federal, state and local levels that promote energy efficiency. Campaign initiatives will produce information on public policy effectiveness and identify regulatory changes that would make it easier for owners and tenants to implement energy-efficiency improvements.

PEA is looking forward to the coming year and will continue to provide regular reports to the community at large as we develop programs, learn lessons, refine our metrics and move forward at scale. Philadelphia has the opportunity to take a national leadership role in a neighborhood-driven approach to creating jobs, reducing poverty, mitigating climate change, eliminating wasted energy dollars and reinvesting in local communities. We are grateful for the leadership and vision of City Council President Darrell Clarke and Mayor Jim Kenney, for recognizing this opportunity and for supporting PEA's efforts.



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