

Building Energy Efficiency in Philadelphia: Current Landscape and Recommendations for Increasing Energy Efficiency in Philadelphia's Housing Stock



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INTRODUCTION

This report is the result of the City of Philadelphia Mayor's Office of Sustainability and the Sustainable Business Network of Greater Philadelphia resolving to better understand how to spur additional investments in local building energy efficiency and, as a result, local green jobs. Because energy efficiency investments have multiple benefits including job creation, energy savings, and environmental, national security, and financial advantages, this is an important area of focus in *Greenworks Philadelphia*, the City's comprehensive sustainability plan, particularly in the current economic environment.

Nationwide, buildings are responsible for 36% of total energy use and 65% of electricity consumption.¹ Affordable, proven technologies exist for dramatically increasing the efficiency of existing buildings, yet building owners are investing relatively little in these technologies given the scale of the opportunities for improvement. Efforts to overcome this market inertia have been in place for decades, previously in the form of programs targeted at low income households and more recently, programs targeted at all income brackets as well as mandates placed on the electricity utilities in Pennsylvania.

¹ EPA Green Buildings, <http://www.epa.gov/oaintrnt/projects/>

“Driving Demand” Key Marketing and Outreach Lessons

It is not enough to provide information; programs must sell something people want—High home energy use is not currently a pressing issue for many people; find a more appealing draw such as health, comfort, energy security, competition, or community engagement to attract interest.

Time spent studying the target population is important—A blanket marketing campaign to reach everyone will likely be ineffective and expensive, especially at the start of a program. Find and target early adopters. Tailor messages to this audience. Demographics can help segment the market and select optimal strategies, but you can also segment the market by personal values, interest in hot issues such as health concerns, or likelihood of getting savings.

Partner with trusted messengers—Larger subsidies and more voluminous mailings don't necessarily win over more customers. Programs can and should have a local face, with buy-in from community leaders. Tapping trusted parties, such as local leaders and local organizations, builds upon existing relationships and networks.

Language is powerful—Avoid meaningless or negatively-associated words like “retrofit” and “audit”. Use words and ways of communicating that tap into customers' existing mental frames. Encourage program staff and contractors to use specific vivid examples, personalize the material wherever possible, frame statements in terms of loss rather than gain, and induce a public commitment from the homeowners.

Contractors are program ambassadors—Contractors, more than any other party, are the people sitting across the kitchen counter making the final sales pitch to a homeowner—contractors are often the public face and primary sales force for the program. Most programs that succeed in performing a significant number of energy upgrades have worked closely with contractors. Conversely, poor first impressions or shoddy work by contractors can reflect poorly on the program.

One touch is not enough—The advertising industry's “three-times convincer” concept means that the majority of people need to be exposed to a product message at least three times before they buy into it. Energy

This report is the result of a literature survey and 34 interviews (Appendix 1) conducted over the summer of 2011 to understand what and how building owners in Philadelphia are investing in energy efficiency. Based on this information, the report recommends how to spur energy upgrades in the residential sector only. Philadelphia is home to the Greater Philadelphia Innovation Hub Cluster (GPIC) for Energy Efficient Buildings, located at The Navy Yard in south Philadelphia, which is focused on the full-scale retrofits of average size commercial buildings. GPIC is a five-year initiative funded by the U.S. Department of Energy and six other federal agencies. The goals of the GPIC are to transform the building retrofit industry from serial fragmentation to integrated systems methods; to improve design tools, building systems, public policies, market incentives, and workforce skills needed to achieve a 50 percent reduction of energy use in buildings; and to stimulate private investment and quality job creation in Greater Philadelphia and beyond.² Given the goals of GPIC, this report focuses only on the residential market.

Driving Demand for Energy Efficiency

In September 2010, Lawrence Berkeley National Laboratory released a report entitled “*Driving Demand for Home Energy Improvements: Motivating residential customers to invest in comprehensive upgrades that eliminate energy waste, avoid high bills, and spur the economy.*” Funded by the U.S.

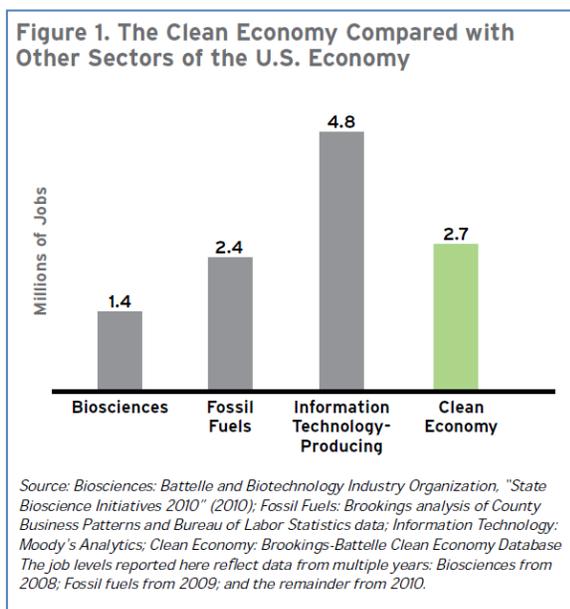
²<http://gpichub.org/>

Department of Energy, it attempts to answer the questions which motivated the research for this Philadelphia report, namely, how can investment in home energy efficiency increase, while matching opportunities for reducing energy waste and job growth increase. The guidance provided in the 136-page report is targeted at policy makers in state and local governments who are developing clean energy programs. Berkeley Lab reviewed 14 residential energy efficiency programs, met with industry experts, and conducted a literature review. See sidebars for key marketing, outreach, program design, and implementation lessons drawn from this report.

In the local context, EnergyWorks, a program in the five counties of southeast Pennsylvania referenced later in this report, has embraced the “*Driving Demand*” report and many of its program features were influenced by the findings of the study.

Energy Efficiency and Jobs

Figure 1 Taken from *Sizing the Clean Economy*



In July 2011, the Brookings Institute released a report entitled “*Sizing the Clean Economy: A National and Regional Green Jobs Assessment*,” which is also relevant to this report. Covering the years 2003 to 2010 for every county in the United States, it is a comprehensive assessment of the clean or green economy, and its size relative to the overall economy and other sectors (see Figure 1). The report makes several key recommendations about how to grow this important sector of the economy.

As shown in Figure 1, the clean economy represents a greater fraction of jobs than biosciences, a field that receives significant attention for its job growth potential, and the clean economy sector is now larger than the fossil fuels sector. The conservation category, which includes building energy efficiency occupations, grew by more than 121,000 jobs, which

represent a full 20% of all new clean economy jobs nationwide between 2003-2010.

Clean economy jobs³ directly created by investing in building energy efficiency include:

- Direct employment by the energy efficiency promotion programs for administrative oversight, rebate processing and related tasks

³ According to a study by the Center for American Progress entitled “Clean Energy Investment Creates Jobs in Every State”, clean-energy investments create 16.7 jobs for every \$1 million in spending. Spending on fossil fuels, by contrast, generates 5.3 jobs per \$1 million in spending. http://www.americanprogress.org/issues/2009/06/clean_energy_factsheets.html

- New and retained jobs for contractors performing services such as energy assessments and HVAC systems upgrades
- New jobs at suppliers such as window manufacturers

Energy efficiency investments have an additional impact on jobs which is harder to quantify but nonetheless very real. Elton Sherwin, author of *The Silicon Valley Way* and *Addicted to Energy*, in a keynote presentation at the 2011 Green California Summit titled “Where are California’s Green Jobs? Four Simple Recommendations to Create Full Employment,” argued that reducing utility bills for consumers creates jobs. Jobs are created because consumers save money that would have left the local economy to purchase electricity, natural gas, and heating oil and instead spend these “energy dollars” locally. Sherwin has a vivid metaphor to illustrate the job creating potential of energy efficiency improvements. In two fictional towns, OldTown and GreenTown, all building owners go up on their roofs and burn money once a month. In OldTown everyone burns \$1,000; in GreenTown everyone burns \$100. The towns are otherwise identical. Of course the burning money symbolizes the energy wasted in the towns’ buildings. He then asks, “After one year, which town is richer? After ten years, which town has more jobs?” Of course, GreenTown is richer because fewer dollars have been “exported” to pay for oil, natural gas, and electricity, and it has more jobs because those saved energy dollars were invested in other purchases, many of which supported local businesses.

In 2009, The American Council for an Energy-Efficient Economy (ACEEE)⁴ published “*Potential for Energy Efficiency, Demand Response, and Onsite Solar Energy in Pennsylvania*”. This report extensively models the job creation potential of instituting energy efficiency policies in the Commonwealth. ACEE uses an economic assessment model called the Dynamic Energy Efficiency Policy Evaluation Routine (DEEPER) to reflect the economic profile of the Pennsylvania economy (Laitner and McKinney 2009) and IMPLAN⁵ for the appropriate sector employment multipliers. ACEEE also looks at the workforce impact of a series of energy efficiency policies which could be implemented in Pennsylvania and estimates that these could spur the growth of 27,232 new net jobs over 15 years.

Figure 2 - From ACEEE 2009 report

Macroeconomic Impacts	2010	2015	2020	2025
Jobs (Actual)	1,669	1,873	14,451	27,232
Wages (Million \$2006)	\$36	-\$33	\$442	\$1,098
GSP (Million \$2006)	\$131	-\$110	\$1,021	\$2,567

⁴ The American Council for an Energy-Efficient Economy is a nonprofit, 501(c)(3) organization dedicated to advancing energy efficiency as a means of promoting economic prosperity, energy security, and environmental protection. <http://www.aceee.org/>

⁵ Minnesota IMPLAN Group, Inc. (implant.com)

CURRENT ACTIVITIES IN PHILADELPHIA RELATED TO ENERGY EFFICIENCY IMPROVEMENTS IN THE EXISTING BUILDING STOCK

Energy efficiency improvements almost always have a positive return on investment and they frequently result in increased comfort. Yet building owners (residential and commercial) aren't making these investments on a large scale. The reasons for this phenomenon are many-fold but can be generalized to these categories:

1. **Lack of awareness and motivation:** building owners need to be educated and informed about why energy efficient improvements are in their interest
2. **Lack of trusted sources of technical support:** building owners don't know where to get trusted technical support and contractors they can rely on
3. **Lack of capital:** building owners need financial assistance and/or incentives to make energy efficiency improvements



The commercial and residential markets in Philadelphia are making private energy efficiency investments without government mandates or incentives. But market forces alone do not spur enough adoption to impact job growth and decrease greenhouse gas emissions.

Interviewees involved with the residential housing market have anecdotally shared that the new housing market, while extremely weak overall, has high levels of demand for LEED certified or Energy Star homes. But the existing residential building stock, which is the focus of this report, isn't showing the same kind of demand for energy efficiency.

“Driving Demand” Program Design and Implementation Lessons

Make it easy, make it fast—Offer seamless, streamlined services—package incentives, minimize paperwork, and pre-approve contractors— to give people fewer reasons to decide against home improvements by making it simple.

Contractors should be full partners—Contractors are the key point of sale for home energy improvements. They already understand the traditional renovation and home improvement market, and have access to customers who may initially want to replace a furnace but may be open to other improvements. It's imperative to design a program that contractors want to sell—and convince them that the opportunity is worth the time and money to get the appropriate training and equipment.

Rebates, financing, and other incentives do matter—Program experience shows that incentives do motivate the choice to do home upgrades, and can be extremely important to getting a program off the ground.

A well-qualified workforce and trustworthy work are vital—Promoting a program aggressively before contractors can handle the workload can lead to disgruntled customers. Solid performance builds trust with customers by reliably producing energy savings, as well as the health, safety, and comfort benefits of home energy improvements.

Persistence and consistency are valuable—It takes time for partnerships to take root, for word to reach consumers, and for contractors to respond to the opportunity. Consistent programs that last for more than a year or two can create a more robust market for home energy improvement. Ephemeral programs can undermine trust.

Know success and failure by measuring it, and experiment to figure out what works—Designing for data collection and evaluation at the start allows for mid-stream adjustments, better selection among strategies, and knowing success when it arrives. Programs should pilot strategies before launching full-scale to test a variety of strategies and to learn what works.

To boost energy efficiency investments, programs have been created that address one or more of the barriers noted above. While not a complete list, the following programs are the largest and most visible initiatives operating in Philadelphia in 2011. See Appendix 2 for a list of Pennsylvania and Philadelphia incentives for clean energy compiled by GPIC in its October 2011 report titled “Policy and Process Factors Impacting Commercial Building Energy Efficiency in Pennsylvania and New Jersey,” authored by Shari Shapiro, Esq., of Cozen O’Connor, P.C.

Table 1 – Summary of Energy Efficiency Initiatives for Philadelphia residents

Initiative	Targeted sector	Barriers addressed	Lead agency	Funder/source of funds
EnergyWorks	Commercial, industrial and residential	1,2,3	Metropolitan Caucus. ⁶ The City of Philadelphia Department of Commerce administers the program	U.S. Department of Energy (DOE) Better Buildings Program, American Recovery and Reinvestment Act (ARRA)
Keystone Home Energy Loan Program (Keystone HELP)	Residential	1,2,3	Pennsylvania Treasurer’s Office, Pennsylvania Department of Environmental Protection; AFC First Financial and Pennsylvania Housing and Finance Agency (PHFA)administer the program	Pennsylvania Treasurer’s Office, Pennsylvania Department of Environmental Protection. EnergyWorks builds on top of this program so that the 5 southeast PA county participants go through EnergyWorks to use the Keystone HELP program
Smart Ideas	Commercial, industrial and residential	1,2,3	PECO	Under Act 129, all Pennsylvania utilities are mandated to reduce overall electricity use. Smart Ideas is PECO’s set of programs created to meet Act 129 requirements
Energy Sense	Commercial, industrial and residential	1,2,3	Philadelphia Gas Works (PGW)	This is a set of programs PGW has set up voluntarily to promote energy conservation. The largest investment is in low income customers

⁶EnergyWorks is a program of the Metropolitan Caucus, a coalition of Commissioners and Councilmembers from Bucks, Chester, Delaware, and Montgomery Counties and the Mayor of Philadelphia.

Initiative	Targeted sector	Barriers addressed	Lead agency	Funder/source of funds
Weatherization Assistance Program	Low income residential	3	Philadelphia Housing Development Corporation (PHDC) and Energy Coordinating Agency (ECA)	DOE: the program has been in existence for more than 30 years. It recently got a new infusion of funds from ARRA which will soon be depleted
Sustainable Development Fund	Commercial and industrial	3	The Reinvestment Fund (TRF)	PECO and other sources

Energy Efficiency in the Commercial Building Sector in Philadelphia

As mentioned in the introduction, Philadelphia is home to the GPIC Energy Innovation Hub, a multi-year, one hundred thirty million dollar research, development, and demonstration initiative focused on commercial buildings. Thus, this report is limited regarding activity in the commercial space. A number of people focused on energy efficiency in commercial buildings were interviewed for this report, however, and several of their observations are noted in the box below.⁷

Mixed Signals on Commercial Building Energy Efficiency

On the positive side:

- Large property managers are starting to recognize that energy efficient buildings improve sale price and rental rates and increase occupancy rate.
- The technology for managing real-time building energy use continues to improve.

On the negative side:

- Limited capital is available for a range of property maintenance and improvement projects, and energy efficiency upgrades have to compete with other priorities that are often more visible such as lobby renovations
- Even when there are available tax incentives, they aren't necessarily helping right now because property owners aren't paying enough taxes for the credit to be usable.
- Although green buildings have better results than non-green buildings (first bullet above), information about energy use in all buildings is not readily available and transparent, making the positive news about higher

One of the most significant barriers in the commercial sector is the well-documented split incentive, where property owners shoulder the cost of energy efficiency improvements while tenants pay the energy bills. Thus, the motivation to save energy and cost lies with the tenant but the owner pays for upgrades. Green leases are one way around this problem. Owners and tenants can agree on lease terms

⁷ Numerous studies, usually citing the Costar database, show 3-5% better rental rates and similar numbers with higher occupancy rates, and sales values higher by as much as 26% for green buildings, in this case either LEED certified or Energy Star labeled (Fuerst and McAllister (2011)). *Energy Efficiency Finance 101: Understanding the Marketplace, August 2011, ACEEE*, states "Representing a major change in mentality in the banking sector, green buildings are considered a better risk than conventional buildings and internal appraisers now routinely add 3-8% to their valuations due to lower operating costs, higher rents, and increased value upon sale."

that share the benefits of lower utility bills. This structure gives owners an incentive to make investments. The green lease concept has been around for a number of years and there are toolkits and guidelines available. However, adoption of this practice has been slow. One of the leading property management companies in Philadelphia, Brandywine Realty Trust, noted that they have a green lease offering but it is not a significant part of their portfolio.

Large commercial buildings, particularly the grouping of buildings referred to as “MUSH,” (municipal and state governments, universities, schools, and hospitals), are increasingly using a method called Energy Performance Contracting (EPC).⁸ This model provides them with a comprehensive set of energy efficiency, renewable energy, and distributed generation measures and often is accompanied with guarantees that the savings produced by a project will be sufficient to finance the full cost of the project. A typical EPC project is delivered by an Energy Service Company (ESCO) and includes the following elements:⁹

- Turnkey Service – The ESCO provides all of the services required to design and implement a comprehensive project at the customer facility, from the initial energy audit through long-term monitoring and verification of project savings.

Honeywell Building Solutions (HBS) is a strategic business unit in Automation and Control Solutions. According to HBS, it “installs and maintains the systems to help keep buildings and facilities safe, secure, comfortable, and cost-efficient, and is a leading provider of energy efficiency solutions worldwide. HBS specializes in service of critical building systems, including heating, ventilation and air conditioning (HVAC); building automation; fire; security; and energy management.”

Philadelphia University is a local institution realizing energy savings from HBS’s work. Philadelphia University uses Honeywell’s Enterprise Building Integrator to manage operation of its infrastructure equipment and has enrolled in demand curtailment programs that generate revenue for the University. Honeywell is a partner of Philadelphia University as they work to meet their sustainability goals, which include achieving a 20% ROI on the energy reduction projects implemented at the University.

- Comprehensive Measures – The ESCO tailors a comprehensive set of measures to fit the needs of a particular facility, and can include energy efficiency, renewables, distributed generation, water conservation, and sustainable materials and operations.
- Project Financing – The ESCO arranges for long-term project financing that is provided by a third-party financing company. Financing is typically in the form of an operating lease or municipal lease.
- Project Savings Guarantee – The ESCO provides a guarantee that the savings produced by the project will be sufficient to cover the cost of project financing for the life of the project.

⁸ According to “A Survey of the U.S. ESCO Industry: Market Growth and Development from 2008 to 2011”, written by Berkeley Lab, approximately 70% of the ESCO market is from the “MUSH” sector.

<http://www.naesco.org/resources/industry/documents/ESCO%20study.pdf>

⁹ Retrieved from “Introduction to Energy Performance Contracting,” U.S. EPA, October 2007

http://www.energystar.gov/ia/partners/spp_res/Introduction_to_Performance_Contracting.pdf

Locally, the City of Philadelphia is in the audit phase of energy performance contracting with an ESCO for the four largest municipally owned buildings. The Philadelphia International Airport is also in the process of selecting an ESCO to perform similar work.

The University of Pennsylvania (Penn) has a comprehensive sustainability program which includes energy management. The program has three major components:¹⁰

- Develop and monitor energy conservation programs to encourage sustainable behavior among building occupants and ensure efficient management by staff
- Improve and accelerate the renovation process for existing buildings
- Adopt higher energy efficiency standards for new buildings and expand research of renewable energy investments

The education and engagement component of Penn's program is significant, and they have developed a very robust demand response initiative which manages load during periods of peak demand. The building renovation program referred to above is called recommissioning. Penn's Operations and Maintenance division works with an outside contractor to conduct 10-12 building audits annually. These audits include a comprehensive review of actual building performance against the design case to identify energy efficiency improvements, which typically save between 2 and 12% of energy.

Pennsylvania's Department of Treasury just launched the Campus Energy Efficiency Fund (CEEF), a \$45 million dollar fund to be administered by Blue Hill Partners,¹¹ with Drexel University as the first participating university. Drexel is planning to make substantial investments to improve the energy efficiency of its campus with support of the CEEF, and also plans to launch a broad sustainability plan for adjacent neighborhoods.

Innovative Local Job Training Program

In order to address green job training for union labor, the Philadelphia Area Labor Management Committee (PALM) embarked on a program several years ago to integrate energy efficiency practices into the apprentice training programs for most of the building trades including electricians, sheet metal workers, pipefitters, and carpenters (insulators). The premise is that blue collar workers (the existing building tradespeople) need to become green collar workers. Rather than training someone off the street to take a new green job, incumbent workers can learn how to build and retrofit for energy efficiency and sustainable design become part of the clean energy economy. Two-hundred fifty apprentices are currently going through the program currently.

A very new strategy to finance energy efficiency in commercial buildings comes from a program originally intended for the residential sector using a financing mechanism called Property Assessed Clean Energy (PACE). A consortium of businesses is currently working in the Miami, Florida and Sacramento, California areas to invest as much as \$650 million in energy efficiency in commercial buildings using a tax arrangement whereby buildings are improved with no upfront cost to the building owner and property

¹⁰<http://www.upenn.edu/sustainability/energy.html>

¹¹<http://bluehillpartners.com/index.php/about>

tax surcharges pay back the investment over time.¹² The Commonwealth of Pennsylvania or the City of Philadelphia would need to pass enabling legislation in order to allow PACE in Philadelphia.

The individuals interviewed for this report with expertise in multifamily housing were involved with affordable housing. Most affordable housing receives federal funding which either requires or provides significant incentives for energy efficiency improvements. According to Innova Services CEO Jeff Allegretti, the most cost effective ways to achieve energy savings in commercial-sized residential buildings are to:

1. Replace heating systems with new highly efficient and right-sized units
2. Replace central corridor ventilation systems which are often 10-20 times oversized
3. Upgrade lighting and controls
4. Improve the building shell to mitigating stack effect losses and pressure boundary breeches (traditional air sealing routines are often less effective than improvements to mechanical systems and lighting).

Energy efficiency improvements are most accessible when the full range of capital improvement financing vehicles, including tax credits, PHFA bond financing, and owner reserves, is available. These funds can be leveraged with additional energy financing vehicles such as utility-funded public benefit programs and low-interest loan funds.

Energy Efficiency in the Residential Building Sector in Philadelphia

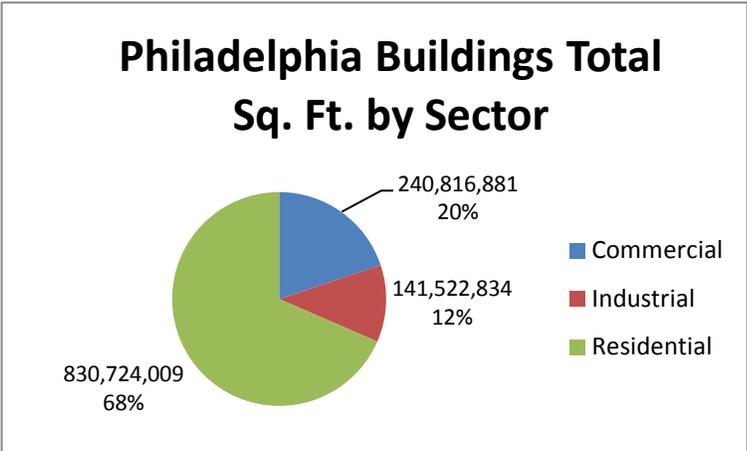
According to the Philadelphia City Planning Commission,¹³ residential houses (detached, semi-detached, and rowhouse) account for nearly half of total Philadelphia building floor space and make up 80% of the parcels (about 530,000). When apartments, condos, and coops are included, the residential market makes up 68% of Philadelphia's building stock. This presents enormous opportunities and challenges: opportunities because of the large overall percentage of the building square footage the residential sector represents and challenges because there are a half-million separate building owners that need to take action individually.

¹²http://www.nytimes.com/2011/09/20/business/energy-environment/tax-plan-to-turn-old-buildings-green-finds-favor.html?_r=1&hphttp://www.nytimes.com/2011/09/20/business/energy-environment/tax-plan-to-turn-old-buildings-green-finds-favor.html?_r=1&hp

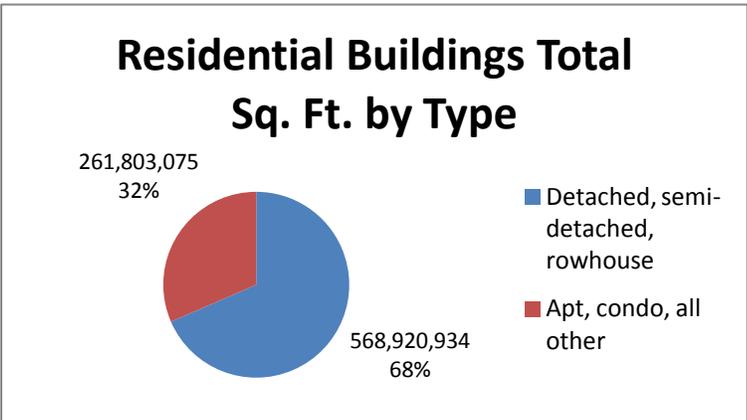
¹³PhilaBldgFloorArea.All.2007.Rev, Philadelphia City Planning Commission

Quick Facts about Philadelphia from 2009 U.S. Census data¹⁴

- 661,575 housing units in Philadelphia
- Homeownership rate
 - Philadelphia = 56.8%
 - Pennsylvania = 71.5%
 - U.S. = 66.9%
- Median household income
 - Philadelphia = \$36,959
 - Pennsylvania = \$49,501
 - U.S. = \$50,221
- % of persons below poverty
 - Philadelphia = 24.5%
 - Pennsylvania = 12.5%
 - U.S. = 14.3%



While the home energy efficiency industry has been around for approximately three decades (its first major boost coming from the OPEC oil embargo and subsequent oil shortages of the 1970's), and the federally subsidized Weatherization Assistance Program (WAP) has been in existence for a similar amount of time, it has had a resurgence with increased energy costs and the focus on climate change and the impacts of our use of fossil fuels in recent years.



Because of the barriers to energy efficiency investment noted previously (lack of awareness and motivation, lack of trustworthy resources, lack of capital/credit) programs at the federal, state, and local level have attempted to encourage energy conservation through a combination of energy efficiency standards, mandates, and incentive programs.

The American Reinvestment and Recovery Act of 2009 (ARRA) invested millions of dollars in energy efficiency across many sectors of the economy. Locally, ARRA funds supported EnergyWorks and an expansion of WAP, among other energy related initiatives. GPIC released a report in October 2011 titled

¹⁴<http://quickfacts.census.gov/qfd/states/42/42101.html>

“Policy and Process Factors Impacting Commercial Building Energy Efficiency in Pennsylvania and New Jersey.” The GPIC report provides a comprehensive list of all federal, state, and local programs for clean energy (Appendix 2).

Utilities and Energy Efficiency

Pennsylvania Act 129 of 2008 imposes requirements on electric distribution companies to reduce energy consumption and demand. The Pennsylvania legislature was motivated to pass Act 129 in part because of concerns that the forthcoming electricity deregulation was going to result in significant price increases to Pennsylvania’s ratepayers. They therefore wanted to make sure consumers could mitigate the rate increases with subsidized energy conservation. Act 129 requires electric utilities to reduce their overall electricity load by 1 percent by 2011 and by 3 percent by 2013, and reduce peak demand by 4.5 percent by 2013. Utilities are meeting these goals by offering customers a portfolio of energy efficiency and conservation programs. Utilities are permitted to spend up to 2 percent of their annual 2006 revenue on these programs, estimated to equal approximately \$250 million per year throughout Pennsylvania. The Pennsylvania Public Utility Commission (PUC) oversees implementation of Act 129, which will expire in November 2013, unless extended by the PUC.

Locally, PECO achieved the 2011 goals ahead of schedule and is on track to meet the overall reduction targets well in advance of the deadline (perhaps by the end of 2012) and under budget. In the words of one energy efficiency advocate, “PECO has done superlatively in achieving Act 129 targets.”¹⁵



Many stakeholders agree that Act 129 should be extended and that new goals should be established long before November 2013 to ensure some continuity of current energy savings programs. PECO has already restructured their program so that it can stay in the market and retain program infrastructure until there is an extension of Act 129. PECO made these changes with approval from the PUC, working under the assumption that Act 129 will be extended.

According to PECO, the statewide evaluation of Act 129 which is currently underway will influence what will be included in the extension of Act 129. PECO believes that ACT 129’s extension should focus more on consumer behavior – both to influence consumers’ energy efficiency purchasing and investment decisions and how to accurately track energy savings that result from consumer behavior changes.

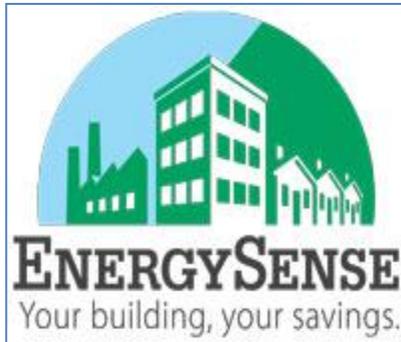
Currently Act 129 sets mandates and targets and sets punitive fines for failure to meet targets. Utilities, stakeholder groups and now the PUC,¹⁶ believe that financial rewards are also an effective tool to incent utility measures that result in energy conservation.

¹⁵ Liz Robinson, Executive Director of the Energy Coordinating Agency, 9/7/2011

¹⁶ PA PUC Bulletin 41 Pa.B. 4596 Section II. “Additional Commission Measures That Address Section 410(a) Goals.” <http://www.pabulletin.com/secure/data/vol41/41-34/1447.html>

Improvements to Act 129 which many stakeholders will push for in the extension of Act 129 include:

- Financial incentives to promote energy conservation.
- Performance target incentives.
- Rate adjustments to allow for recovery of lost revenues.
- Alignment of utilities' financial interests with maximum energy savings that benefit the economy, ratepayers, environment and, utilities.



Natural gas utilities are not covered by Act 129 and therefore have no conservation mandate. As noted above, Act 129 came about in the context of electric rate deregulation and concerns by the Pennsylvania legislature that electricity consumers needed to have protection from anticipated price increases. Helping consumers conserve electricity was seen as a way to partially mitigate the effects of deregulation for Pennsylvania ratepayers. Many in the energy efficiency community working to reduce overall energy use in the state are pushing to expand Act 129-like requirements to the natural gas utilities.

The essential premise of mandating or incentivizing utilities to put energy reduction programs in place is that they do not have inherent financial incentives to save energy; in fact, they are motivated to sell more energy since to increase profits.

Philadelphia Gas Works (PGW), which is municipally owned, provides all natural gas service within the city limits. Approximately 80% of all Philadelphia households heat their homes with natural gas, a percentage which is typical of urban environments in the northeast United States. In the four other southeast Pennsylvania counties approximately 45% of households heat with natural gas.

PGW has voluntarily adopted an energy conservation program called Energy Sense. Four of the six EnergySense programs are available to the residential sector:

1. Enhanced Low Income Retrofit Program: Started in January 2011 to retrofit high energy users enrolled in PGW's Customer Responsibility Program (CRP), which provides assistance to low-income customers. The CRP customer base receives subsidized rates; therefore investments in energy conservation benefit all PGW customers by reducing the amount of energy used by those subsidized homes.
2. Residential Heating Equipment Rebates: started in April 2011 to encourage residential and small business customers to purchase the most energy-efficient natural gas heating equipment available.
3. High-Efficiency Construction Incentives: launching in September 2012 to encourage developers to design and build the most energy-efficiency buildings possible at the time of initial construction.

4. Comprehensive Residential Retrofit Incentives: launching in March 2013 to offer incentives to all of PGW's residential customers to encourage homeowners to reduce their overall home energy usage.

While PGW has established some significant energy savings programs, it faces the same financial challenge as all utilities: reducing energy sales reduces revenue. In addition, because the program is voluntary, financial or other pressures to limit the investment in Energy Sense, could lead to its reduction or elimination. However, because it is municipally owned, PGW is accountable ultimately to the residents of Philadelphia and not to shareholders and therefore has different financial drivers than a private utility such as PECO.

Keystone Energy Efficiency Alliance¹⁷ (KEEA) is currently working with members of the Pennsylvania legislature to draft legislation that would require the state's natural gas utilities to meet energy reduction targets similar to Act 129.

Players in the residential energy efficiency market

The residential market for energy efficiency improvements is decentralized: home energy auditors typically work independently from contractors; contractors are often very small businesses which are neighborhood-based; and contractors tend to have expertise in a specific field (i.e. insulation or HVAC), often without understanding the interrelationships between their specialty and whole-house energy efficiency.

The Energy Coordinating Agency (ECA) and Keystone HELP have invested heavily in contractor training and education. ECA and AFC First Financial, the lending arm of Keystone HELP and EnergyWorks, have training centers for certifying their approved contractors. ECA's training center is located in Philadelphia and has trained more than 1,200 men and women in energy efficiency in 2010 and 2011, including more than 300 for BPI¹⁸ certification.

The Mark Group, a UK-based residential energy efficiency company, planned to start a U.S. operation several years ago and chose to locate its headquarters at the Philadelphia Navy Yard. The CEO and President of Mark Group U.S., Jeff Bartos, stated that one of the deciding factors in selecting

¹⁷ The Keystone Energy Efficiency Alliance (KEEA) is a non-profit, tax-exempt 501(c)(6) corporation (pending IRS determination) dedicated to promoting the energy efficiency and renewable energy industries in Pennsylvania. KEEA advocates on behalf of energy efficiency and renewable energy professionals on the local, state, and federal levels. By representing the interests of the clean energy industry in Pennsylvania, KEEA is growing the market for energy efficiency and helping the Keystone State secure a prosperous, sustainable tomorrow. (<http://energywisepa.org/keea>). Liz Robinson, a member of the Advisory Board to this report, is the President of KEEA.

¹⁸ Building Performance Institute (BPI) is the leading developer of technical standards for home performance and weatherization retrofit work in North America. The Building Analyst certification is the nationally-recognized standard for residential energy auditors.

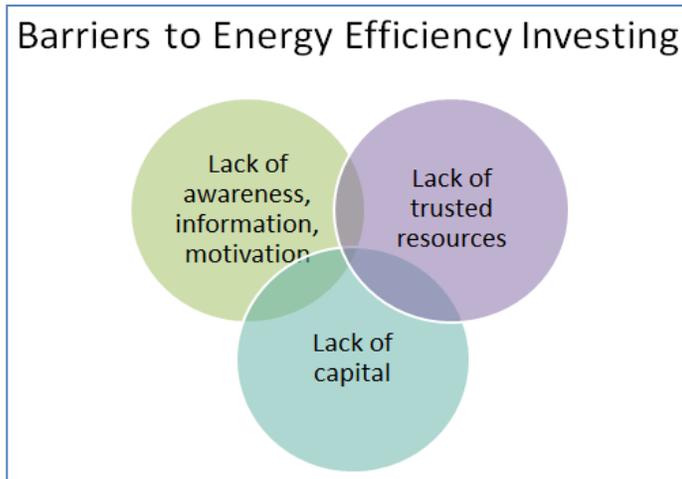
Philadelphia is the existence of Act 129 in Pennsylvania. The company also received funding from the Commonwealth to locate at the Navy Yard. The Mark Group has been successful in Britain serving utility companies who must comply with the national Carbon Emission Reduction Targets, which mandates and subsidizes energy conservation. Thus the business decision to locate in Pennsylvania was based in part on Act 129's energy conservation requirements that favorably impact businesses like Mark Group and allow for future growth.

BARRIERS TO RESIDENTIAL ENERGY EFFICIENCY

The three most common barriers to residential energy efficiency improvements are lack of awareness, lack of trusted resources, and lack of capital. Making significant energy efficiency improvements in a building is expensive, often running from the low thousands to tens of thousands of dollars. The good news is that energy efficiency improvements usually yield a positive return on investment (even with energy prices not reflecting their true environmental cost). The bad news is that the upfront costs can be too high for homeowners to be able or willing to pay.

Lack of awareness and trusted resources:

1. Programs need to have strongly integrated public education and outreach. Getting community based organizations involved is critical because they are trusted resources. EnergyWorks has started working with community groups in Philadelphia as part of its outreach and marketing efforts.
2. Marketing needs to be audience-specific since not all messages work for everyone. For some, saving energy and reducing their carbon footprint is going to resonate; for others making their home more comfortable will be what is important; for others saving money is the only message that reaches them; health and safety concerns may motivate others to take action.
3. Developing strategies to educate contractors about energy efficiency is important so that they can make recommendations to their customers about potential energy improvements beyond the normal scope of work. Many homeowners make energy efficiency investments when there is a precipitating event such as a furnace that needs to be replaced or a roof that needs repair. When a furnace is replaced, for example, it makes sense to also assess the building shell and ventilation system. Air sealing and insulation can reduce loss of conditioned air, thereby

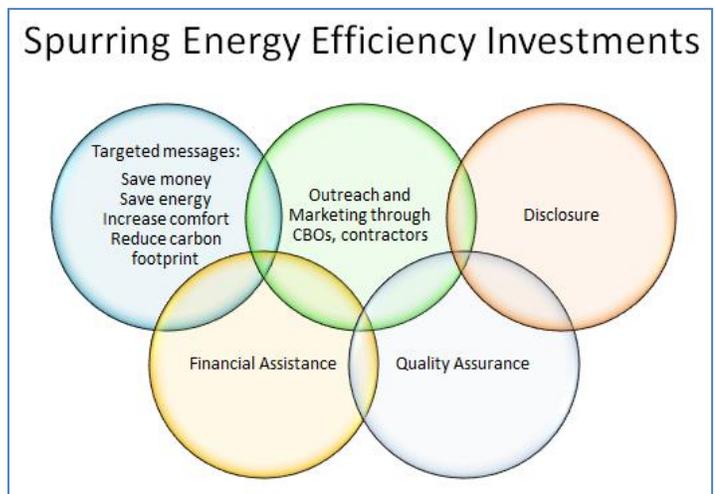


lowering the size required for a new heating unit.

4. Standardizing and disclosing information about building energy efficiency will raise awareness and help educate people about energy efficiency. DOE is currently developing the Home Energy Score (HES) to make this possible. The HES program requires a modified energy audit by a certified contractor that produces a score on a 1-10 scale for home energy efficiency and provides recommendations for improvements. This tool can be used to disclose energy performance when a property is sold, which is known as time of transaction disclosure. A more rudimentary way of disclosing energy use is to require utility bill sharing. This method is less useful because utility data is not normalized to account for variable weather and energy usage patterns, but this approach does not involve the cost of an audit. Benchmarking and reporting is the beginning of putting a market value on energy efficiency.
5. Investing in contractor training and promoting contractor certification to the national BPI standard helps to prevent inaccurate, misleading, and unsubstantiated claims of energy/cost savings.
6. Quality checks are key for building confidence in consumers. EnergyWorks has found that the promise of an independent inspection is an important part of the sales process. To increase consumer confidence, poorly performing contractors should be screened out.
7. Public policies at local, state, and federal levels need to encourage and enable investment in energy efficiency.

Financial Barriers:

1. Many households cannot or will not spend money on energy efficiency upgrades upfront even if these investments will save money over time. An exception to this is when improvements have significant visual appeal.
2. To keep monthly payments affordable, the majority of households need a financing mechanism that keeps the monthly cost of loan repayment close to the monthly energy savings.
3. Preexisting buildings conditions can prevent energy efficiency improvements from being appropriate. Structural problems and water infiltration, for



example, need to be remediated before embarking on energy improvements. Many homeowners with preconditions have limited financial means to repair the problems.

4. The split incentive seen in commercial real estate is also a barrier in rental housing. When the building owner is not responsible for paying utilities, the owner has no direct financial incentive to make energy efficiency investments:
 - a. In multi-family housing, a building owner can be motivated to purchase an efficient piece of equipment that is durable and requires less maintenance, but owners typically need some additional financial incentive to defray increased upfront costs.
 - b. Advertising for rental housing in Philadelphia does not typically mention utility costs. This may indicate a lack of awareness of energy costs in the rental market. Jeff Allegretti of Innova Services has extensive experience in the subsidized housing market and has observed that certain buildings get reputations for high utility bills. In these cases there may be pressure on those building owners to make investments. It is important to note, however, that subsidized rental rates are fixed, and cannot be raised to offset the costs of energy upgrades.
 - c. Potential solutions to the split incentive challenge include:
 - i. Energy performance disclosure would allow prospective renters to shop for energy usage along with the base rental rate when choosing housing.
 - ii. Financing options, such as utility on-bill financing, can keep financing costs lower than energy savings on a monthly basis.
5. Traditional loan programs, including subsidized programs such as EnergyWorks, do not reach large numbers of home owners with low credit scores because they require standard loan approval.
 - a. EnergyWorks operates in the five-county southeastern Pennsylvania region. To date the program has approved approximately 65% of the applications in the four suburban counties and 40% in Philadelphia. These numbers include disapprovals and application withdrawals, so other factors besides credit history are affecting the approval rate.
6. Other financing mechanisms reach higher credit risk households and are more inclusive than the loan programs currently in place in Philadelphia. For a comprehensive analysis of energy financing mechanisms see the ACEEE report released in August 2011 entitled "*Energy Finance 101: Understanding the Marketplace.*" Another ACEEE report released in September 2011, titled "*What We Have Learned from Energy Efficiency Financing Programs,*" includes additional relevant information.

7. Many energy efficiency advocates locally and nationally support a program referred to as utility on-bill financing (on-bill).¹⁹ Advocates list the many benefits of on-bill as follows:
 - a. Eligibility is expanded to households who do not meet traditional loan criteria because history of utility bill payment is the typical screening mechanism. Utility bill nonpayment rates are typically very low because non-payment results in shut off of utility service. Some on-bill programs include shut off of utility services if the loan portion of the bill is not paid and other on-bill programs do not allow for shut off in the event of non-payment of a loan.
 - b. Payments are made on a bill that households already pay, which removes the barrier of having to take on another monthly bill, as EnergyWorks and PHIL loans require.
 - c. With the tariff method of on-bill financing (see footnote 19) the bill is attached to the meter so that when a customer moves, the next customer at that meter continues to repay the financing.
 - d. On-bill tariffs are one of the few financing options that address the split incentive issue for rental properties where the tenant pays the utility bill. Midwest Energy's How\$mart program is an example of an on-bill tariff program that also provides financing for renters.
 - e. Default rates for on-bill are very low, which makes private capital investment attractive for financial institutions

The Pennsylvania Public Utility Commission regulates most utilities in the state, including both PGW and PECO. On-bill financing in Pennsylvania would require approval by the PUC. Utilities have serious concerns regarding the funding, implementation, and execution of an on-bill financing function. The utilities are wary of assuming lending functions that are outside of their core business competencies and could have negative impacts on both their operational and financial performance.

¹⁹Utility on-bill financing is when the utility or some other entity (such as a third party financial institution) incurs the cost of the energy efficiency upgrade and the customer repays the investment through a charge on their monthly utility bill. This eliminates the upfront cost to the consumer for clean energy improvements by financing all costs not covered through rebates. These programs typically stretch out the financing costs over a sufficiently long period to make the repayments equal to or less than the savings. Improvements financed through this mechanism tend to be relatively “shallow” because the more expensive deep energy savings improvements cannot be financed with these criteria. On-bill repayment allows for a streamlined process as utilities already have a billing relationship with their customers, as well as access to information about their energy usage patterns and payment history. There are two distinct types of on-bill repayment programs — on-bill loans and on-bill tariffs. On-bill tariffs are actually attached to the meter, so that when a customer moves, the next customer at that meter continues to repay the financing. On-bill tariffs are significantly more complicated to set up, but they allow a longer financing term (retrieved from <http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/onbillrepayment.html>).

Residential real estate professionals have been resistant to on-bill in several locations where it has been proposed, citing that buyers are often either unfamiliar with or apprehensive about on-bill obligations that become their responsibility after time of sale.

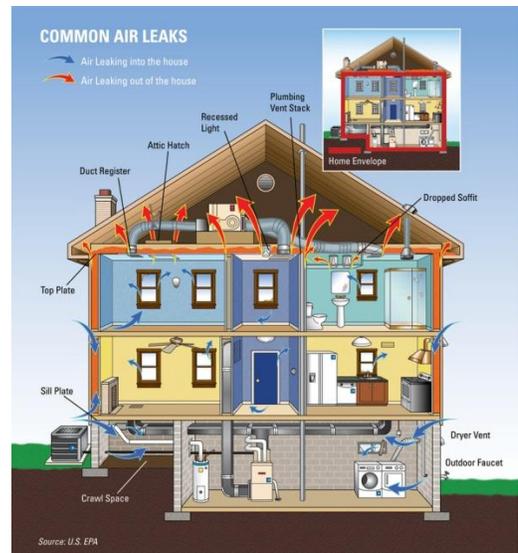
The recently released ACEEE report “*What We Have Learned from Energy Efficiency Financing Programs*” concludes that:

While the energy finance sector is expansive, several financing avenues appear well suited for energy initiatives. Many of these avenues relate to ongoing work to better integrate unbanked and underbanked households into the traditional financial services industry. According to the Federal Deposit Insurance Corporation and other experts on this field, such as Center for Financial Services Innovation, nearly 60 million people in the U.S. are unbanked and millions more are underbanked due to tougher credit standards on credit cards. In total, as many as 100 million people in the U.S. lack good financial services. It is very likely that many of these individuals face considerable utility bills and could greatly benefit from energy efficiency efforts. But, lacking a connection to the mainstream financial community, new avenues to serve them must be found. Among the areas for exploration: peer-to-peer lending platforms, such as Prosper.com to provide financing for appliances or HVAC upgrades in the residential sector; the Individual Taxpayer Identification Number (ITIN) loans for undocumented homeowners; using mobile phone applications to make loan servicing less costly and easier; and distributing loans through emerging channels, such as debit cards.

While on-bill is the dominant alternative to traditional loan programs, some of the ideas put forth by ACEEE are worth further consideration in the Philadelphia market.

Shifting the Paradigm

The dominant model in the energy efficiency world is the whole-house²⁰ approach. This methodology delivers the most energy conservation benefits, but it is costly. The first step, an energy audit, typically costs in the \$400-600. When EnergyWorks lowered the initial audit cost from \$400 to \$150, the program saw a dramatic increase in enrollment. The whole-house model treats every property as a unique prospect, therefore maximizing cost effective energy savings for one house, but missing opportunities to realize economies of scale. In the words of one industry expert, “every contractor has their own bag of tricks.” While this custom model has its place, several alternative approaches to the “each house is a unique model” may promote greater participation:



1. Apply a standard set of treatments on a wide scale to particular housing types. This is the model used by the Mark Group in Britain, where they service entire neighborhoods by applying the same treatments to all the households which have elected to participate.
2. Develop a standard set of treatments for building areas such as the attic and basement that include low, medium, and high impact/cost options. A standard collection of measures can be used if a homeowner is going to address their basement, for example. In a program with established standards, a homeowner can use these to make implementation of energy conservation measures simpler and more prescriptive. A decision tree can be used to determine which part of a house to tackle first without needing an energy audit.
3. DOE is funding a study in Levittown, Pennsylvania, a planned suburban community built in the 1950's, where there are six standard housing types. MaGrann Associates is conducting a study of whether a prescribed set of energy conservation measures (ECMs) for different housing types within Levittown can be applied on a wide scale.

One or more of these methods could potentially be applied to Philadelphia housing stock.

The energy efficiency industry set-up is currently more complicated than it needs to be. In particular:

²⁰ The whole-house systems approach looks at the entire house as an energy system with interdependent parts. When one part functions poorly it affects the performance of the entire system. For instance, the benefits of an energy-efficient air conditioner are lessened when a duct system leaks, windows don't close tightly, attic insulation is insufficient, and humid summer breezes are drifting in under the door. The systems approach recognizes the interaction of windows, attics, foundations, mechanical equipment, and all other components and assemblies within the home.

- There are currently two types of home performance companies: auditor/contractor combinations and energy auditors who are separate from the contractor. Energy auditors separate from entities installing home improvements can cause inefficiencies and loss of customers. This separation requires homeowners to deal with multiple contractors in the process of making energy efficiency upgrades. The justification for this practice is that people do not want the same person to make recommendations for home improvements and carry them out, because they believe that they will overstate improvements needed in order to get more business. Yet in analogous situations, such as car repair or medical care, consumers go to the same mechanic/doctor for diagnosis and repair/treatment unless they choose to get a second opinion.
- Energy efficiency practitioners have influenced the software and business practices to be more focused on the science and less on making the process easy and business-friendly.

Energy efficiency services and funding provided by government and utilities have spawned multiple stand-alone programs, each with its own administrative structure, entry point, funding mechanism, and qualifying energy saving improvements. This duplication creates an inefficient and sub-optimized system. A sweeping change to the energy efficiency landscape would be to syndicate all energy efficiency financing programs which into one combined administrative structure with a common entry point and rules (subject to funder restrictions). Several statewide models similar to this exist, for example in New York (NYSERDA²¹) and Vermont (Efficiency Vermont, run by the Vermont Energy investment Corporation²²).

Other findings

While new construction housing is outside the scope of this report, anecdotal reports indicate that in an otherwise weak housing market, demand for LEED certified housing remains strong.²³

Several community based organizations in Philadelphia have sustainability initiatives which often include education, outreach, and technical assistance for home energy improvements. Ogontz Avenue Revitalization Corporation in northwest Philadelphia and Sustainable 19125 in the lower northeast are two examples of community organizations with active sustainability programs which include home energy efficiency programming. ECA provides energy conservation workshops citywide to more than 7,000 Philadelphia households each year.



²¹ <http://www.nyserda.org/>

²² http://www.veic.org/Implementation_Services/Project_Profiles/Efficiency_Vermont.aspx

²³ Jon Jensen of Magrann Associates reports strong demand for his company's LEED consulting services

While this report focuses on the residential sector, many of the findings and recommendations are equally applicable to small businesses.



RECOMMENDATIONS FOR INCREASING ENERGY EFFICIENCY INVESTMENTS IN PHILADELPHIA

The recommendations offered here focus exclusively on single-family housing stock. Some of the recommendations are applicable to small multi-unit apartment buildings and small commercial buildings. Recommendations fall into three general categories: (i) disclosure, (ii) financing and (iii) marketing/outreach. Each section has background on the topic followed by recommendations for action.

DISCLOSURE

Encourage building energy efficiency disclosure at time of sale

Background: The benefits of a standard energy disclosure are similar to the benefits of the Energy Star rating for appliances or fuel economy labels for cars. Because home energy efficiency improvements such as air sealing, insulation, and high efficiency heating and cooling systems are not highly visible, they are less desirable than remodeled kitchens and bathrooms for most prospective home buyers. Benchmarking home energy performance using a recognized standard helps assign value to energy efficiency beyond basic utility data. Home Energy Score (HES), a free tool in development by the U.S. Department of Energy, combines basic building attributes and energy usage information to generate a score relative to similar homes across the country. Due to the variability of building types in the residential sector, using HES requires a professional home energy audit, and the additional time and cost to complete this audit during the sale process present a significant barrier. While energy cost per

square foot is another metric sometimes used for this purpose, it ignores the impact of occupant behavior on energy consumption and is therefore less accurate.

A growing number of state and local governments currently require commercial buildings to benchmark and disclose energy performance ratings using the free EnergyStar Portfolio Manager tool developed by the Environmental Protection Agency. The largest such effort, currently underway in New York City, requires benchmarking, disclosure, and retrocommissioning.²⁴ Unlike HES, Portfolio Manager for commercial buildings does not require energy audits due to commercial building stock uniformity. Very few states and municipalities have passed residential benchmarking requirements, and only Austin, Texas has enacted an audit-backed residential energy disclosure requirement at time of sale for both new and existing residential properties. Austin's Energy Conservation, Audit, and Disclosure (ECAD) ordinance is supported by a set of grants and subsidized loans run through the municipally-owned electric utility to offset audit costs and encourage enhanced energy efficiency upgrades. The release of DOE's HES, will encourage more cities and states to consider residential energy disclosure programs.

Two other important recent developments include the new Residential Green and Energy Efficient Addendum to Fannie Mae Form 1004, the appraisal form most widely used for home loan lending across the country,²⁵ and Senate Bill 1737, or SAVE Act, which supports time of sale energy disclosure for residential properties.²⁶

²⁴ In December 2009, New York City passed a package of mandates known as the Greener, Greater Buildings Plan. It requires that all commercial buildings greater than 50,000 square feet benchmark and publicly report their energy use. It also toughens energy-efficiency requirements for renovations, obligates most facilities to undergo energy audits every 10 years, and forces buildings to update their lighting systems to more efficient technology.

²⁵ In October 2011, the Appraisal Institute released the Residential Green and Energy Efficient Addendum to Fannie Mae Form 1004. The new three-page optional form features guidelines to help appraisers make accurate valuations about a home's green components. Before the addendum, appraisers could not consider solar panels, Energy Star appliances, and other green features in an appraisal. Source: Urban Land October 2011.

²⁶ According to the Institute for Market Transformation, "the SAVE Act is proposed legislation to improve the accuracy of mortgage underwriting used by Federal mortgage agencies by ensuring that energy costs are included in the underwriting process. The bill, S. 1737 [112th Congress], was introduced on October 19th, 2011 by Senators Bennett (D-Co.) and Isakson (R-Ga.) and referred to the Committee on Banking, Housing, and Urban Affairs. Comparable legislation has not yet been introduced in the House of Representatives. The proposal is supported by a diverse coalition of organizations, including the U.S. Chamber of Commerce, the Appraisal Institute, the U.S. Green Building Council, and the Natural Resources Defense Council. The SAVE Act would help revitalize the hardest hit sectors of the economy by providing lower rate mortgage financing for cost effective energy improvements; allowing homebuilders and homeowners to recover the cost of efficiency investments; and enabling better federal mortgage underwriting while lowering utility bills for American households." <http://www.imt.org/save-act>

In its “2012 Agenda for (Philadelphia) City Council,” Next Great City²⁷ advocates for disclosure of energy costs to property buyers. For residential home sellers Next Great City is pushing for provision of one year of utility bills. While it is not normalized for variations in weather and behavior, sharing this data is a solid first step in the direction of full disclosure.

Recommendation: Phase-in disclosure beginning with municipal and large commercial properties.

FINANCING

Expand the pool of homeowners eligible for low-cost energy efficiency loans and increase participation rates for eligible households

Background: The Commonwealth of Pennsylvania and the Philadelphia region have Keystone HELP and EnergyWorks, respectively, two strong programs that provide low cost financing for energy efficiency improvements. Despite relative strength, both programs could improve participation rates by expanding access to credit. Many Philadelphia homeowners do not meet the eligibility requirements for Keystone HELP/EnergyWorks loans, because their credit scores are too low and/or their debt-to-income ratio is too high.

LOAN PRODUCT	RATE	JURISDICTION(S)
EnergyWorks	Lower interest loans than Keystone HELP (from 0.99% to 6.375% depending on total loan amount)	Philadelphia, Bucks, Chester, Delaware and Montgomery counties
Keystone HELP	Low interest loans for energy efficiency upgrades (from 2.99% to 8.99% depending on type of improvement and loan amount)	State of Pennsylvania
PHIL Loan	Low interest loans for home improvements including energy efficiency (3-5% depending on income)	City of Philadelphia

Another subsidized loan product called the Philadelphia Home Improvement Loan (PHIL) is available in Philadelphia through three banks²⁸ which partner with the Philadelphia Redevelopment Authority (PRA). PHIL is an FHA loan product which can be used for a wide range of home improvements including energy efficiency upgrades. This loan product has been available for almost 30 years. Each participating bank sets underwriting criteria which are generally similar to the Keystone HELP criteria. The marketing budget for the program is limited, with roughly \$20,000 spent annually to promote the loans.²⁹

²⁷ The Next Great City is a coalition “dedicated to creating a positive future for Philadelphia by advocating for common sense, cost effective policies that enhance environmental quality, strengthen neighborhoods and increase our economic competitiveness.” <http://www.nextgreatcity.com/agenda/energy>

²⁸ Citizens Bank, PNC Bank, and TD Bank

²⁹ Estimate by Nick Dema, Senior Deputy Executive Director, Philadelphia Redevelopment Authority

	Low Credit Risk Borrower	High(er) Credit Risk Borrower
Larger loan sizes		
Keystone HELP	Yes	No
EnergyWorks	Yes	No
PHIL loan	Yes	No
Smaller loan sizes		
On-bill	Yes	Yes
New (untested) approaches such as Peer-to-peer, ITIN, mobile to mobile, debit cards	Yes	Yes

Recommendations: Current financing mechanisms are insufficient to meet the needs of higher risk borrowers, as demonstrated in the table above.

- Further investigate the relative benefits and hurdles of on-bill and other solutions which address the higher credit risk population in Philadelphia before determining whether to actively promote their creation in Philadelphia.
- Alternative financing requires a source of funds to start a loan pool identified for this purpose. Expanding participation also requires a significant expansion of marketing and outreach. See recommendations in the marketing/outreach section below.
- Investigate streamlining program administration services to eliminate duplication, inefficiencies, and confusion of consumers attempting to access services. Successful new initiatives will avoid duplication of program administration and service delivery.

MARKETING AND OUTREACH

Focus on greater penetration in the Philadelphia

Background: According to “Driving Demand for Home Energy Improvements,”³⁰ partnering with trusted messengers is essential. “Larger subsidies and more voluminous mailings don’t necessarily win over more customers. Programs can and should have a local face, with buy-in from community leaders. Tapping trusted parties, such as local leaders and local organizations, builds upon existing relationships and networks.” The same report also states that contractors are key allies - or can be program detractors. “Contractors, more than any other party, are the people sitting across the kitchen counter making the final sales pitch to a homeowner—contractors are often the public face and primary sales force for the program.” Most programs that succeed in performing a significant number of energy upgrades have worked closely with contractors. Conversely, poor first impressions or shoddy work by contractors can reflect poorly on the program. EnergyWorks and Keystone HELP have invested in

³⁰“Driving Demand for Home Energy Improvements: Motivating residential customers to invest in comprehensive upgrades that eliminate energy waste, avoid high bills and spur the economy,” Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, September 2010

contractor training and certification and also perform inspections of completed work.

EnergyWorks has recently begun working with civic organizations. For example, EnergyWorks is partnering with Passyunk Square Civic Association in South Philadelphia to provide discounted audits and to assist the group with negotiating bulk rates with service providers to lower rates on home improvements.

Many homeowners will only make energy efficiency investments after a precipitating event such as equipment breakdown or roof failure. However, even common kitchen and bathroom remodeling projects can represent a good opportunity to making energy efficiency improvements. HVAC contractors, roofers, general contractors, plumbers, and insulation vendors should be knowledgeable about energy efficiency and refer consumers to appropriate programs, such as EnergyWorks.

Collaboration, Data Sharing, and Program Integration

PGW cannot make energy efficiency improvements to many houses in its low-income program because of preexisting conditions such as structural problems, water infiltration, or sewer/plumbing problems. These houses require pre-treatment before efficiency improvements can be made. The homeowners rarely have funding to fix these conditions, and therefore PGW cannot weatherize. The Basic Systems Repair Program (BSRP) through the Philadelphia Housing Development Corporation can help, but they currently have a three-year backlog of applications.

Maximizing data sharing, partnerships between programs, and interagency cooperation may help address pre-existing problems. An example of this is the Green and Healthy Homes Initiative (GHHI), locally led by the Philadelphia Department of Public Health to “implement a cost-effective and integrated approach to housing interventions by combining federal and philanthropic investments in weatherization, energy efficiency, health and safety. GHHI replaces stand-alone programs with a comprehensive and seamless process that creates safer and more stable homes, improves the health of children and families, and produces higher-quality green jobs. GHHI is setting a new standard for policies and practices to create more sustainable, affordable, and healthier homes.”³¹

Recommendations:

1. Encourage City departments, utilities, and housing agencies, to establish a coordinated communications campaign and streamline access to services and funding for home improvements, whether for increased energy efficiency or improved health and safety, such as lead remediation.
2. Pursue creative approaches to engaging community groups in becoming ambassadors for EnergyWorks. Investigate implementing a financial incentive such as a referral fee for neighborhood groups to step up their outreach efforts. EnergyWorks has already begun working with civic groups in the region.
3. When there are financing programs in place that can be offered to higher risk borrowers, experiment with street outreach teams, subway and bus advertising, and radio advertising

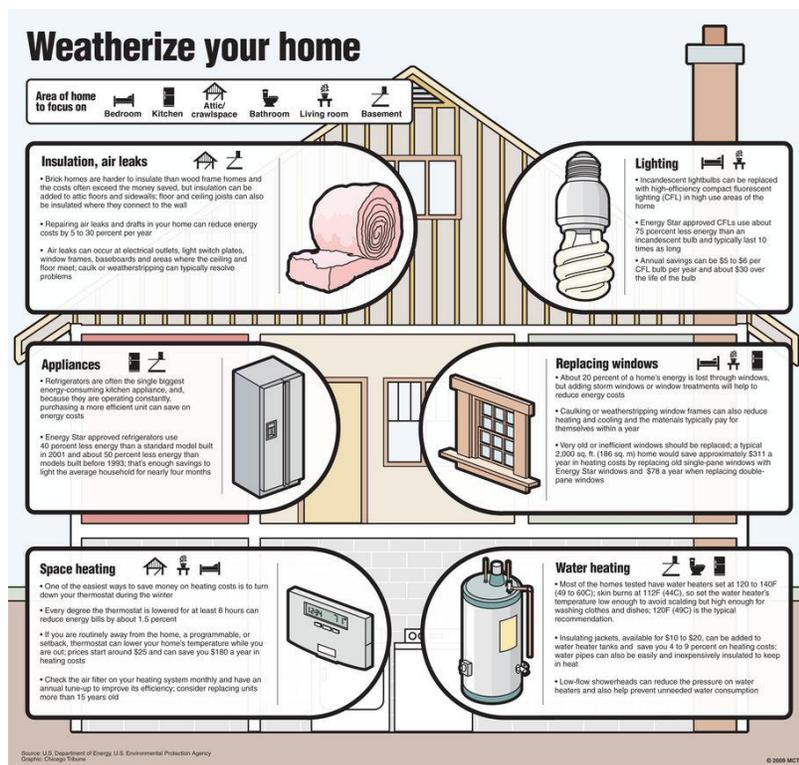
³¹ From the Green and Healthy Homes Initiative website <http://www.greenandhealthyhomes.org/>

in the city. Continuous marketing and advertising are essential to motivate homeowners to take action.

4. Advertising campaigns need to be tested and revised to be sure the target audience, message, and seasonal variations are aligned. Leverage more private sector investment in marketing and consider creating educational and incentive programs for HVAC contractors, roofers, and general contractors to refer to EnergyWorks and other programs.
5. PGW and PECO should partner with EnergyWorks to limit customers' out of pocket costs and maximize the participation level for the equipment upgrades.

OTHER

Alternative Program Designs to serve broader population. The whole-house model has dominated the home energy efficiency industry. As financing mechanisms aimed at higher credit risk populations become available, prescribed sets of energy conservation measures will need to be more economical and effective to reach large numbers of homes and make improvements more affordable.



Simplify the Industry

The energy efficiency industry can be challenging for consumers to navigate. Contractors have the ability to influence this by:

- demanding more user-friendly metering and energy tracking software that emphasizes rapid/real-time analysis; not just accuracy
- offering complete energy assessment and retrofit services either under one corporate entity or through collaborations

Existing programs and funders of energy efficiency such as EnergyWorks, PGW (Energy Sense), and PECO (Smart Ideas) can also leverage funding and relationships to promote more seamless and user-friendly service delivery.

Appendix 1

List of Interviews conducted during the summer of 2011

First Name	Last Name	Organization
Adam	Agalloco	City of Philadelphia Mayor's Office of Sustainability
Jeff	Allegretti	Innova Services
Kara	Angotti	KO Angotti Design Features
Kenny	Ashe	Progress Investment Associates
Jeff	Barg	Greater Philadelphia Innovation Cluster
Jeff	Bartos	The Mark Group
Leslie	Billhymer	Greater Philadelphia Innovation Cluster
Heather	Blakeslee	Delaware Valley Green Building Council
Roger	Clark	The Reinvestment Fund
Barry	Davis	City of Philadelphia Office of the Solicitor
Travis	Douglas	University of Pennsylvania
Rudy	Ellis	National Association of Minority Contractors, Philadelphia Chapter
Sam	Foley	National Association of Minority Contractors, Philadelphia Chapter
Dan	Garofalo	University of Pennsylvania
Elliott	Gold	Philadelphia Gas Works
Jeremy	Hancher	Pennsylvania Small Business Development Center
Nancy	Hohns	EnergyWorks
Jon	Jensen	Magrann and Associates
Frank	Jiruska	PECO
Christine	Knapp	Greater Philadelphia Innovation Cluster
Peter	Krasja	AFC First Financial
Courtney	Lane	Penn Future
Nancy	Mifflin	independent
Janet	Milkman	Delaware Valley Green Building Council
Brad	Molotsky	Brandywine Realty Trust
Anne	Nevins	Philadelphia Industrial Development Corporation
Andrew	Rachlin	Office of the Deputy Mayor for Economic Development
Sherry	Riesner	Realtor and Solar Consultant
Liz	Robinson	Energy Coordinating Agency
William	Sampson	National Association of Minority Contractors, Philadelphia Chapter
Shari	Shapiro	Greater Philadelphia Innovation Cluster
John	Ungar	Ogontz Area Revitalization Corporation
Keith	Welks	Pennsylvania Treasurer's office
Tony	Wigglesworth	Philadelphia Area Labor Management Committee

Appendix 2

DRAFT: Incentives Appendix to “Policy and Process Factors Impacting Commercial Building Energy Efficiency in Pennsylvania and New Jersey,” prepared for GPIC by Shari Shapiro, Esq. of Cozen O’Connor P.C. (Pennsylvania and Philadelphia only are shown below)

I. Pennsylvania State Incentives

	Program	Agency	Benefits	Requirements	Additional Information
1.	Pennsylvania Energy Development Authority (PEDA) Grant	Pennsylvania Department of Environmental Protection (DEP)	<ul style="list-style-type: none"> - Issues periodic funding solicitations to provide support for innovative, advanced energy projects - Provides funding for businesses interested in locating or expanding their alternative-energy manufacturing production operations to PA - Funding can be used for equipment purchases, design, renovation, and construction projects 	<ul style="list-style-type: none"> - Project must involve clean, alternative fuels for transportation; solar or wind energy; hydropower; geothermal; biologically derived methane gas; fuel cells; IGCC; demand management; EE and load management; or energy education - Open to corporations, partnerships, and associations, among others 	<ul style="list-style-type: none"> - Current solicitation closed; future application start date unknown - Solar projects must be greater than 200 kW to qualify
2.	Alternative Fuels Incentive Grant (AFIG) Program	DEP	<ul style="list-style-type: none"> - Provides grants towards alternative fuels and the deployment of alternative fuel vehicles, fleets, and technologies 	<ul style="list-style-type: none"> - Open to transportation projects that use mixtures of E85, LNG, CNG, liquid propane, hydrogen, electric and biodiesel/diesel blends, and other R&D fuels 	
3.	High Performance Building Incentives Program	Department of Community and Economic Development (DCED) and DEP under direction of the Commonwealth Finance Authority	<ul style="list-style-type: none"> - Incentives available for green buildings in the form of loans, grants, and loan guarantees - Funding may be used for the acquisition of land and buildings, rights- 	<ul style="list-style-type: none"> - Construction projects (new and renovation) must achieve gold certification under USGBC LEED or the National Green Building Standard, or must receive at least three globes under the 	<ul style="list-style-type: none"> - Loans are available at fixed interest rate and must be repaid within 10 years - The maximum small business loan is \$2 million - Grants are available for up to \$500,000 or

		(CFA)	of-way, and easements necessary for construction; clearing and preparation of land to build an eligible project construction or renovation costs; project planning, design, and modeling; registration and/or certification with USGBC; and verification of building performance	GBI Green Globes system	10% of eligible costs - Loan guarantees are available as grants, in the event of default, for up to \$2 million for small businesses
4.	Wind and Geothermal Incentives Program	DCED and DEP under direction of CFA	- Provides support for wind and geothermal technologies in the form of loans, grants, and loan guarantees - Funding may be used for acquisition of land and buildings, rights-of-way, and easements; clearing and preparation of land; construction or renovation; equipment purchases; project planning and feasibility studies; permit fees and administration costs (not to exceed 3% of total funding)	- Eligible projects include energy production facilities and manufacturing facilities for wind turbines and other system components	- Loans available at fixed interest rate up to 10 years for equipment and 15 years for real estate Loans for manufacturing facilities limited to \$35,000 per job created within three years of the loan's approval. Loans for geothermal systems may not exceed \$3 per sq. ft. or \$5 million. Loans for wind energy generation or distribution limited to \$5 million - Grants for renewable manufacturing facilities available for up to \$5,000 per job created within 3 years of the grant's approval. Grants for wind energy production or distribution facilities limited to \$1 million Planning and

					<p>feasibility costs are limited to the lesser of 50% of the study's cost or \$175,000</p> <p>Grants not available for the installation of geothermal energy systems</p> <ul style="list-style-type: none"> - Loan guarantees limited to 75% of the deficiency up to \$5 million - Terms may not exceed 5 years
5.	Alternative and Clean Energy Program	DCED and DEP under direction of CFA	<ul style="list-style-type: none"> - Offer support for alternative energy and clean energy projects in the form of loans, grants, and loan guarantees - Funding available for clean energy projects; construction or renovation of high performance buildings; site preparation; installation of EE equipment; installation of alternative energy systems (not including solar); facilities that manufacture or produce alternative fuels, facilities that manufactures or produces components of alternative energy or EE systems; R&D facilities; alternative energy; or EE rail systems 	<ul style="list-style-type: none"> - Eligible EE technologies include water heaters, lighting, lighting controls/sensors, chillers, furnaces, boilers, heat pumps, CACs, CHP/cogeneration, energy management systems/building controls, among others - Eligible renewable technologies include landfill gas, wind, biomass, hydroelectric, geothermal, and fuel cells, among others 	<ul style="list-style-type: none"> - Manufacturer loans limited to \$35,000 per job created within 3 years - Manufacturer grants limited to \$10,000 per job created within 3 years - Loans for distribution projects and high performance buildings limited to \$3 per sq. ft. or \$5 million - Grants for distribution projects and high performance projects limited to \$2 million - Grants for ESCOs limited to \$500,000. Grants for feasibility studies limited to \$175,000 - Loan guarantee available to 75% of deficient funds up to \$5 million - Incentives generally limited to 50% of project costs, except for high performance

					buildings, which are limited to 10%
6.	PA Green Energy Loan Fund	DEP, The Reinvestment Fund (TRF)	<ul style="list-style-type: none"> - Provides loans to finance energy conservation and EE improvements - Supported improvements include retrofit measures, equipment replacement, new construction, and CHP systems 	<ul style="list-style-type: none"> - Project must result in an estimated energy consumption reduction of at least 25% 	<ul style="list-style-type: none"> - Loans available from \$100,000 to \$2.5 million with interest rates generally falling between 4% and 6.5% - Loans will be secured by financed assets or other collateral such as personal or corporate guarantees
7.	Small Business Pollution Prevention Assistance Account Loan Program	DEP and DECD	<ul style="list-style-type: none"> - Offers low-interest loans to help businesses implement EE and pollution prevention projects 	<ul style="list-style-type: none"> - Applicants must have fewer than 100 full-time employees - Must adopt or install pollution prevention or EE equipment that reduces or reuses materials on-site, reduces waste production, or significantly reduces energy consumption - The modifications must be directly related to the business activity 	<ul style="list-style-type: none"> - Loans available up to 75% of project's total cost, at 2% fixed interest over a maximum term of ten years - Individual loans capped at \$100,000
8.	PA Sunshine Solar Rebate Program	DEP	<ul style="list-style-type: none"> - Offers rebates for installation of photovoltaic (PV) and solar thermal systems 	<ul style="list-style-type: none"> - Equipment must be new - PV equipment must be eligible under the CA Solar Initiative - Work must be performed by a program-approved installer - PV systems generally must be connected to the grid - System performance analysis must indicate system output of at least 80% of optimum - Small business 	<ul style="list-style-type: none"> - Ownership of SRECs not specified, but net metering customers generally retain title. - May expire around 2013-2014 - Businesses do not submit applications themselves – an approved installer must do so on their behalf - PV incentives limited to the first 100 kW of production - Solar thermal

				applicants must be for-profit entities within PA with no more than 100 full-time employees	incentives limited to 35% of system cost or \$50,000
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II. Pennsylvania Utility Incentives

	Program	Utility	Benefits	Requirements	Additional Information
1.	Energy Sense Program	PGW	<ul style="list-style-type: none"> - Comprised of 6 initiatives for residential and business customers. - High Efficiency Construction Incentives will provide 80% of the incremental cost of purchasing high-efficiency boilers and furnaces for space and water heating, building controls, and making shell improvements. - Commercial and Industrial Equipment Rebates will provide 80% of the incremental cost of purchasing high-efficiency heating and processing equipment. - Commercial and Industrial Retrofit Incentives will provide customized incentives for high-efficiency boilers and furnaces for space and water heating, building controls and shell improvements 	- Available to commercial and industrial customers seeking to supplement existing natural gas supply	

III. Local Government Programs: Philadelphia

	Program	Agency	Benefits	Requirements	Additional Information
1.	Greenworks Loan	Philadelphia Industrial Development Corporation (PIDC) and TRF	- Makes loans ranging from \$100,000 to \$1,000,000 at below-market interest rates to help businesses finance EE construction projects		
2.	Rebate Fund	Philadelphia Industrial Development Corporation (PIDC) and TRF	Refunds up to 50% or cost of energy retrofits, up to \$10,000		