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Setting the PACE: Financing Commercial Retrofits

Issue Brief

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Introduction

Property Assessed Clean Energy (PACE) finance is a new and growing municipal approach to support energy efficiency and renewable energy upgrades in commercial buildings in the United States. As of February 2013, there were 16 commercial PACE programs accepting applications to finance building efficiency projects. Most of these have been active for less than a year, and some are just now working on their first projects. As this new market develops, early-stage PACE programs have taken different approaches to program design and administration. Lessons learned from their experiences may well shape the overall success of PACE in the years to come.

Many reports have demonstrated that energy efficiency pays for itself and that there is a significant investment opportunity in the building efficiency market. Yet many barriers impede investment in energy efficiency, and access to financing is consistently cited as the top barrier to action.[1] Program designers and advocates believe that PACE financing structures offer significant advantages over other financing options, including:

- Zero up-front cash investment
- Immediate positive cash flow
- Long-term financing (up to 20 years)
- PACE assessment stays with the property upon sale
- Ability to pass payments through to tenants
- Low interest rates
- Higher rents and greater long-term property value because of energy efficiency
- Preservation of borrowing capacity through off-balance–sheet financing

PACE programs may also help advance energy efficiency improvements in the market because they provide validation of common technologies and improvement measures. In addition, PACE programs create a replicable transaction path that is accessible to a variety of commercial building owners.

Four leading programs demonstrate the range of approaches within the PACE community. This analysis offers insights into the activities of these programs to date and is designed to preview future PACE activities.

[1] Energy Efficiency Indicator Survey, Institute for Building Efficiency, Johnson Controls. 2012.

It must be noted that the PACE industry is still in the early stages of development, and therefore it is too early to predict which administrative and financing models will be the most successful. The four programs examined in this report are:

- Sonoma County (Calif.) Energy Independence Program (SCEIP)
- GreenFinanceSF (San Francisco) Commercial PACE Program
- Toledo-Lucas County (Ohio) Port Authority PACE Program
- DC PACE Program (Washington, DC)

More information on the research approach and methodology can be found in Appendix 1.

While PACE is designed to help overcome several key finance barriers, PACE alone will not remove all barriers to energy efficient buildings. Complementary policies and programs will be needed to help the building efficiency market reach scale.

Until recently, building owners have had limited options for financing energy efficiency, ranging from cash on hand (self-financing) to government-sponsored, unsecured loan products (sometimes subsidized and/or offset by rebates), to energy efficient mortgages. In the commercial sector, debt financing terms virtually never exceed 10 years, and one- to three-year terms are more common for construction projects. More recently, a number of new energy efficiency financing models have emerged, including Energy Service Agreements (ESA), utility on-bill repayment, and PACE. This paper focuses on PACE financing for energy efficiency improvements in commercial buildings.

The Opportunity

Buildings consume a substantial portion of the energy used in the U.S. and around the world, and there is a significant market opportunity to reduce demand by making buildings more energy efficient. In the U.S., buildings consume over 40 percent of the energy used, and nearly 75 percent of electricity. Making U.S. buildings more efficient represents an investment opportunity of nearly $280 billion, corresponding to over $1 trillion in energy savings over the next 10 years. At this level of investment, energy efficiency would create 3.3 million cumulative job-years of employment and reduce carbon emissions by 600 million metric tons per year.[2]

Background on PACE

Property owners participating in a PACE program receive financing support for energy efficiency or renewable energy measures from a local government or approved financial institution, and the investment is repaid by an assessment or other like charge added to the owner's property tax bill for up to 20 years. PACE applies the same method American cities and towns have used for decades to finance property improvements that meet a clear public purpose. In the U.S., there are over 37,000 land-secured districts created by

[2] The Department of Energy Building Energy Data Book. 1.1 Buildings Sector Energy Consumption. March 2012. Retrieved November 8, 2012 http://buildingsdatabook.eren.doe.gov/docs/xls_pdf/1.1.1.pdf.

[2] United States Building Energy Efficiency Retrofits: Market Sizing and Financial Models. March 2012. The Rockefeller Foundation and Deutsche Bank. Retrieved November 8, 2012. http://www.rockefellerfoundation.org/news/publications/united-states-building-energy-efficiency.

[2] The Department of Energy. Buildings Share of U.S. Primary Energy Consumption (Percent). March 2012. Retrieved November 8, 2012. http://buildingsdatabook.eren.doe.gov/docs/xls_pdf/1.1.3.pdf.

local governments to finance, through property tax assessments, infrastructure improvements such as street paving, parks, open space, water and sewer systems, septic tank replacement, street lighting, and seismic strengthening.[3]

Leading state and local governments in the U.S. are recognizing energy efficiency as a public benefit. The public benefits of efficiency include increased energy independence and security, avoiding or postponing the costs of new power plants and transmission systems, improved air and water quality, and job creation. These efficiency benefits are no less important than the benefits derived from sidewalks, parks, water and wastewater systems and other improvements already financed with assessments.

Early History of PACE

The concept of PACE originated in 2008 in Berkeley and Palm Desert, Calif. Early PACE programs largely focused on the residential market. While these programs received strong encouragement from the Obama administration,[4] issues relating to PACE lien seniority over mortgages at the time of the housing market crash brought residential PACE programs to a halt in 2010. Efforts to develop, staff, and launch commercial PACE programs began in earnest in 2011 and 2012, and continue to date, with official program launches in Connecticut and Washington, DC announced in January, 2013. These programs all are aimed at unlocking energy efficiency potential in industrial, office, retail, services, and other types of commercial buildings.

[3] U.S Census Bureau, "Local Governments and Public School Systems by Type and State: 2007," accessed March 12. http://www.census.gov/govs/cog/GovOrgTab03ss.html.

[4] http://www.whitehouse.gov/assets/documents/PACE_Principles.pdf

Figure 1 illustrates the steps required to create a PACE program.

Figure 1. How PACE Works[5]

[5] Developed by PACE*Now*

In states with PACE-enabling legislation, a municipal government typically establishes a PACE district in which property owners can voluntarily participate. Sometimes one PACE administering entity forms in a county or state and enlists multiple municipalities. Property owners interested in energy efficiency or renewables engage an experienced contractor to evaluate the scope of desired improvements. This may involve a thorough energy audit of the building to identify efficiency measures and projected costs and energy savings, or an evaluation of specific on-site renewable technology options. After the building owner decides to proceed with the project and all desired measures have been selected, financing for the project is arranged. The building owner may secure financing, the municipality (or PACE program) may help facilitate financing, or the municipality may actually provide financing through municipal revenue bonds or other means. Building owners who receive a financing benefit from the municipality agree to accept a property tax assessment or charge for up to 20 years (owners may choose or the municipality may require shorter periods, often depending on the expected life of the improvements being financed).

PACE Market Activity Today

The commercial PACE market is at a pivotal moment in its development. Twenty six states and the District of Columbia have PACE enabling legislation in place; some of these already have emerging or active PACE programs (Figure 2).[6] Active PACE programs are those that can accept applications for property improvements.[7] Sixteen such programs in seven states were active or launched as of February 2013.[8] Many of the active programs have multiple municipalities participating. Emerging programs are those finalizing program documents and administration arrangements, securing financing, and expected to launch within six months. In some states, such as Texas, Massachusetts, and Illinois, efforts are underway to amend PACE legislation to improve its effectiveness or correct flaws that are barriers to program implementation. There are also a number of PACE programs in various stages of development in California, Florida, Louisiana, and other states. Additionally, there are programs in the early stages of development in states with PACE-enabling legislation and in states where PACE law requires a legislative fix. In still other states, like Utah, Arkansas, and Arizona, efforts are being launched to get PACE legislation passed. Brief descriptions of the active PACE programs and web links for further information can be found in Appendix 2.

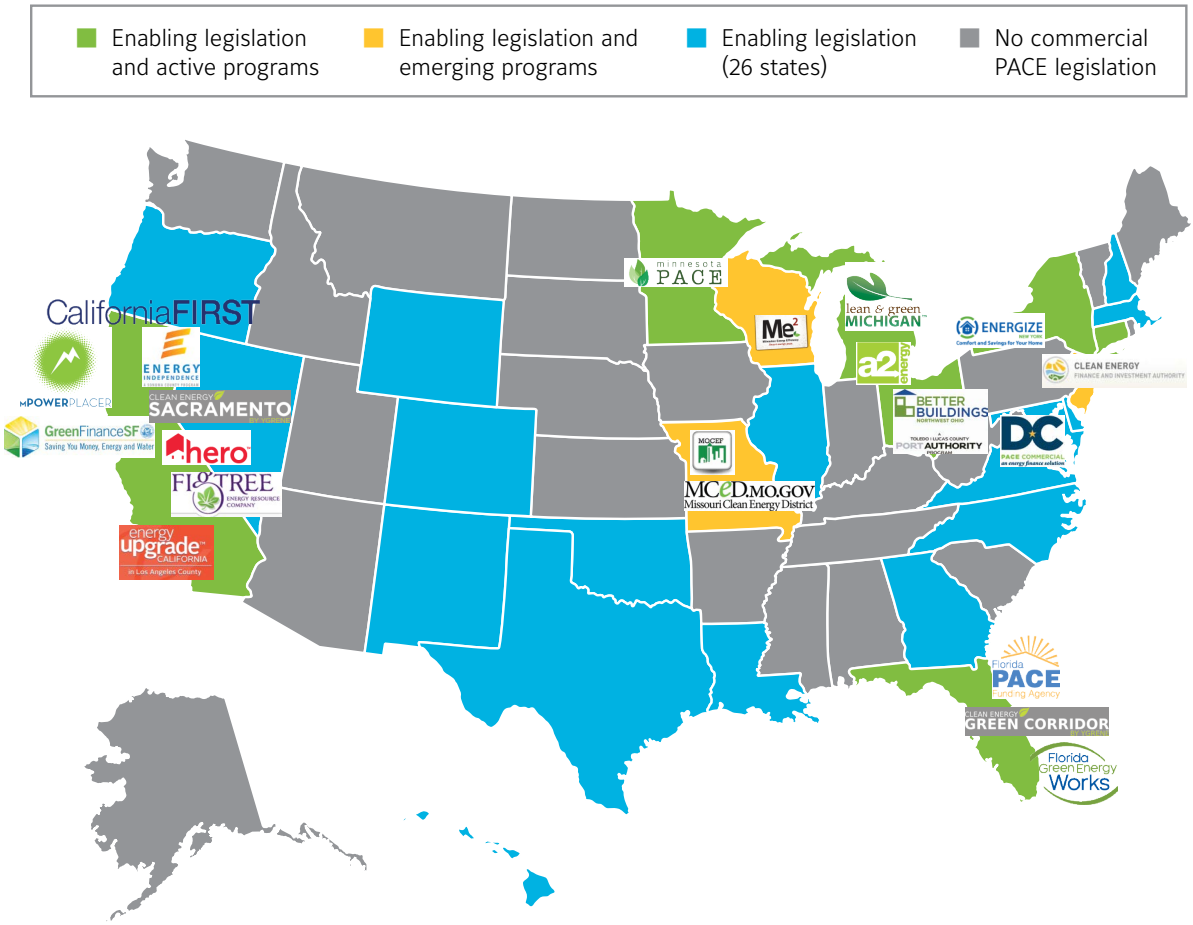
Despite all the activity shown in Figure 2, only a handful of programs had financed a significant number of projects by the end of 2012. In California, 58 projects have been completed in Sonoma County, and several other projects have been completed elsewhere, including the Prologis headquarters building retrofit in San Francisco. Outside of California, a number of projects have been financed in Toledo, Ohio; Edina, Minn.; and Boulder, Colo. (although the Boulder program is no longer active). The other active programs shown in Figure 2 were recently established and are building a pipeline of projects for which formal applications have been submitted for approval and funding. These new programs are engaging with the real estate community, contractors and financial institutions to pursue energy efficiency and renewable energy deployment in their communities. The design of the programs, the technologies and the transaction approach will determine how quickly and successfully these programs are accepted by the market, and what adjustments may be required for success.

[6] PACE*Now*. 2012. List of all PACE enabling legislation. Retrieved December 4, 2012 http://pacenow.org/resources/pace-enabling-legislation/.

[7] Such status may be contingent on the finalization of a bond validation process, securing a line of credit, having sufficient number of staff on board, having enlisted at least one municipality, and having finalized program documents, handbooks defining program attributes.

[8] A list of these programs is included in the Appendix.

Figure 2. 2012 Commercial PACE Activity as of December 2012[9]



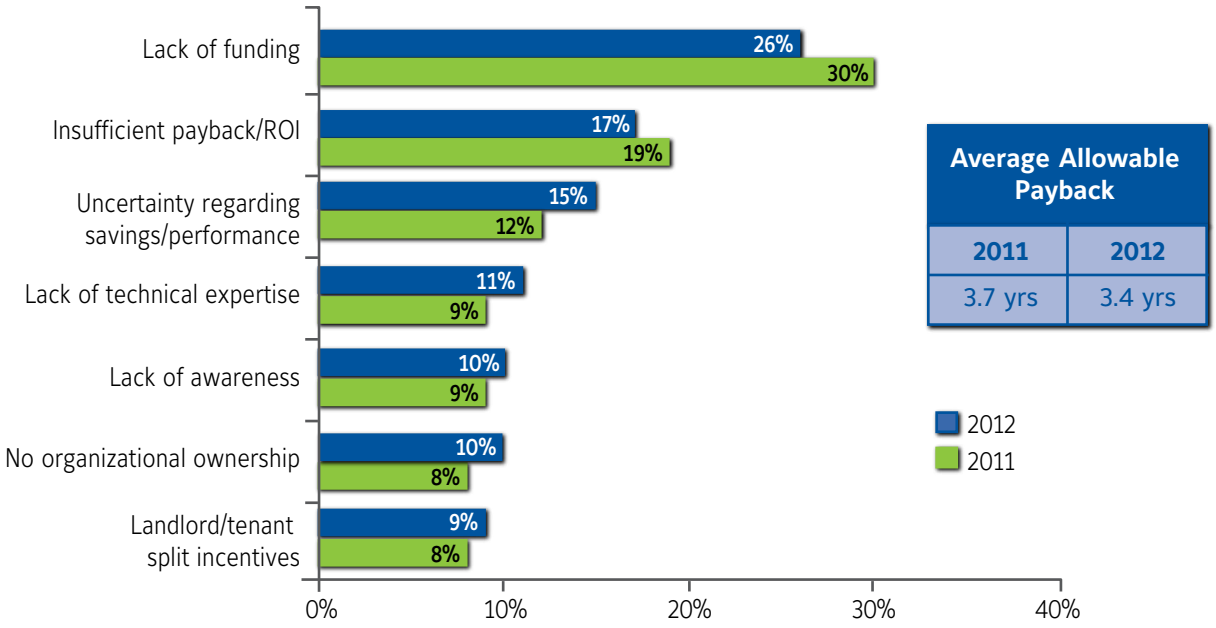
[9] The map shows active PACE programs and PACE programs in development.

PACE Financing

PACE financing is designed to overcome a number of financial barriers to investment in building efficiency. The details of the financing models vary, but in all cases program administrators and PACE market leaders believe PACE will have financial benefits for building owners. In this section we will first discuss the advantages to building owners of using PACE financing, and then walk through the two major categories of financing models found in PACE programs today.

When asked about the barriers to pursuing energy efficiency in building operations, executives responsible for energy investments in their companies have cited lack of funding as their top barrier in all of the six years in which Johnson Controls has administered the Energy Efficiency Indicator (EEI) survey. Insufficient payback or return on investment (ROI) was the second major barrier (Figure 3).

Figure 3: Barriers to Investing in Energy Efficiency[10]



Average Allowable Payback	
2011	2012
3.7 yrs	3.4 yrs

[10] Energy Efficiency Indicator Survey, Institute for Building Efficiency, Johnson Controls. 2012.

Advantages of PACE Financing

Here is a summary of ways in which PACE financing should help building owners overcome financing barriers to energy efficiency, according to program administrators and market leaders.

1. ***Zero up-front investment:*** PACE provides up to 100 percent financing for building efficiency projects, providing external capital and freeing up internal budget resources. This feature addresses the number one barrier to pursuing energy efficiency as identified in the EEI survey – lack of internal funding.

2. ***Immediate positive cash flow:*** PACE projects are designed to ensure that the energy savings minus the PACE payment results in a positive cash flow each month based on a forecast of savings: Implementing PACE projects actually lowers monthly operating expenses. Some owners also consider in their cash flow calculations other avoided costs, including repairs and maintenance, equipment replacements, regulatory compliance costs, and tax deductions. Including these additional benefits could provide an additional incentive for owners to act. It may be possible for owners to combine PACE with other financing to support broader renovation projects.

3. ***Long-term financing:*** Financing for commercial property almost never exceeds 10 years. Terms from five to seven years are the most common for general real estate lending, and one- to three-year terms are most common for construction project lending. Funding of energy efficiency projects over their useful lives (up to 20 years) makes many more projects cost-effective. The EEI survey showed that building owners on average prefer a 3.4-year payback time on energy efficiency investments, but this is when they are investing their own capital and expect to be cash-flow negative until the payback date. By providing 100 percent financing with a 20-year amortization, PACE should help overcome the number two barrier to pursuing energy efficiency – insufficient payback/ROI.

Advantages of PACE Financing (continued)

4. ***A PACE assessment stays with the property upon sale:*** In the commercial buildings market where properties are often owned for short periods of time, PACE financing enables building owners to make deep energy efficiency improvements with financing that does not need to be paid off upon sale, but instead transfers to the new owner.

5. ***Ability to pass payments through to tenants:*** PACE projects are financed using a property tax assessment that can be passed through to tenants easily under many common lease structures. In most leases where tenants pay for their share of utilities, they also pay their share of property taxes. In contrast, capital expenses sometimes cannot be passed along to tenants, or when they can be passed along, the repayment amount is usually small, since it is based on the useful life of the equipment or a standard depreciation schedule. Under PACE, tenants, who generally pay the energy bills and will see the energy cost savings from a building efficiency project, also share in repayment of the energy efficiency investment. In this way, PACE structures overcome the landlord/tenant split incentives barrier to building efficiency projects. The building owner incurs no current costs and acquires permanent property improvements.

6. ***Low interest rates:*** Interest rates vary with lending type. PACE offers an opportunity to acquire a bond tax lien financing rate for projects with typical construction risks. Interest rates under PACE programs tend to be in the 6 to 7 percent range,[11] and sometimes lower if a city or state provides incentives, such as by subsidizing the interest rate directly or providing a loan loss reserve or other credit enhancement. While these rates may not match the 3 percent range available to high-credit-quality borrowers, they can be competitive with rates accessible to most commercial properties.[12] Interest rates in the 6 to 7 percent range can be attractive to a CFO because they can sometimes be locked in for up to 20 years. The longer borrowing term has a greater effect on improving cash flow than the interest rate. Rates at this level may also be attractive to building owners who are already above their leverage threshold[13] and are unable to finance capital expenditures through self-funding or borrowing. In addition, in programs like Toledo-Lucas County PACE and the Sonoma County program that target small businesses, PACE financing provides access to the institutional grade debt market and to longer-term financing than owners could secure on their own. An increase in PACE project flow is likely to encourage more efficient borrowing mechanisms that drive PACE borrowing rates down relative to current levels.

7. ***Higher rents and greater long-term property value:*** Research is emerging that validates the assumption of market advocates that efficient (green) buildings can command higher rents and increased property values.[14] PACE can enable more building owners to capture these potential financial benefits. Building owners note that since PACE adds a line item to the property taxes, it can help facilitate the discussion of the value of solar and energy efficiency projects when a property is sold or rented. Also, building owners noted that being the first in their community to do a PACE-financed project can enhance the public image of and add value to the improved building.

8. ***Off balance sheet:*** The accounting treatment is still an open question for building efficiency projects financed with PACE. The current year's assessment would always be on the balance sheet, but the entire investment may not be entered as a long-term liability because assessments are only a one-year obligation. It remains to be seen how this is decided under the new accounting principles that will be released by the Federal Accounting Standards Board.[15] If the full investment can be treated as off-balance-sheet, that helps building owners significantly with the first barrier cited in the EEI survey – the lack of funding – because a single year's assessment is less likely to affect a building owner's ability to take on additional debt for other projects.

[11] With up-front expenses included the real interest rates may be closer to 7-8%.

[12] At scale, it is likely that PACE assessments will attract capital at much lower rates. Part of the rate premium for PACE reflects its longer term (commercial mortgages almost never exceed 10 years), but the current market is also very "illiquid". Relatively few investors are familiar with PACE, and today's investors would find it difficult or impossible to sell their PACE investments to another. Like other property taxes and assessments, PACE assessments are senior to mortgages and other liens, making them a strong credit that is attractive to investors.

[13] Buildings with too much debt may not qualify for PACE. For example, many PACE programs limit total loan to value to 80 to 90%.

[14] Institute for Building Efficiency Fact sheet on Valuation. http://www.institutebe.com/Green-Building/multiple-studies-document-green-buildings-add.aspx

[15] Some people have hypothesized that because in California PACE was an extension of Mello Roos financing, which has been used for years to finance improvements on the property tax bill and is always off balance sheet, assessments there will always be off the balance sheet. Others have speculated that a PACE assessment may be treated differently since the investment is building-specific instead of for community infrastructure as in most Mello Roos financed projects.

Financing Models

PACE has its own niche in the landscape of existing energy efficiency finance initiatives, such as government loans, on-bill financing, ESAs, lease purchase agreements, energy savings performance contracts, and internal financing. The table in Appendix 3 offers a broad overview of existing energy efficiency financing options.

Four basic financing models exist in PACE programs. All four use the property tax assessment as the repayment mechanism, but the capital is provided in four different ways. Many programs use multiple financing models. For example, Sonoma County has primarily used the municipal bond funded model but has also done a privately funded project with Clean Fund. Here is a look at the four models:

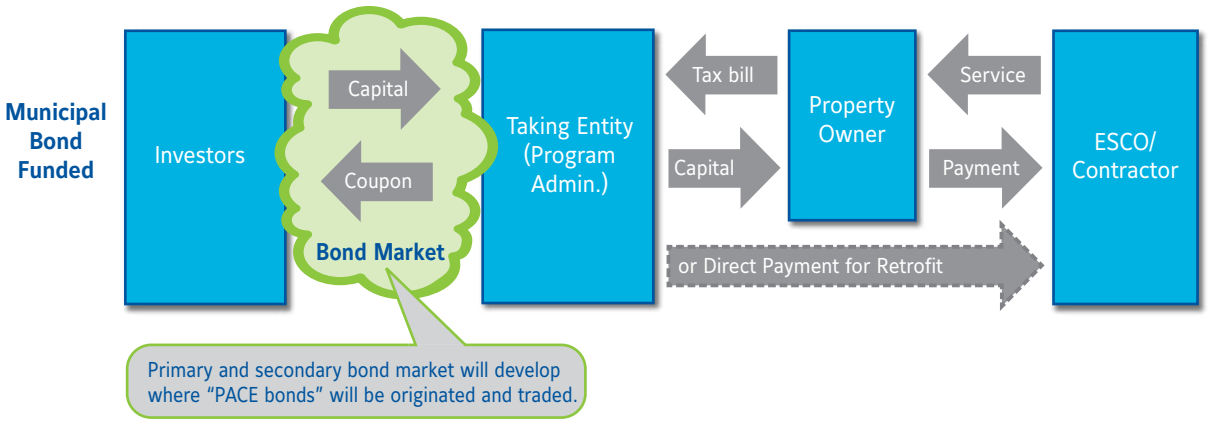
Municipal Bond Funded Model

There are two different structures under which a municipality may issue bonds to finance PACE projects:

1. ***Municipal bond funded, available on demand.*** The PACE authority uses an unallocated reserve pool to finance projects as soon as applications are processed and work is completed. In Sonoma, revenue bonds will be issued to replenish the reserve pool. This model makes funds available on demand and with a long-term interest rate that can be determined immediately.
2. ***Municipal bond funded, available as sufficient project volumes can be pooled for a bond issuance.*** The PACE authority waits to aggregate a sufficient dollar amount of projects so that a bond issuance makes sense. Once the sufficient volume is reached (minimum $2 million to $5 million), a municipal revenue bond sale is arranged. The advantage to this approach lies in the volume of the transaction, which potentially leads to a lower interest rate. One disadvantage is that projects have to wait from the time of application and approval until the time of the bond issuance to proceed. Also, bond-funded programs cannot determine an interest rate until bonds are sold, which means some uncertainty exists for building owners, in terms of cost and the date on which funding will be provided. The commercial PACE program in Toledo to date has raised nearly $12 million with PACE-supported bond issues that have financed over 50 projects in a mix of city, Toledo-Lucas County Port Authority, and commercial buildings. In addition, the City of Ann Arbor, Mich., expects to issue bonds within the coming months to finance a number of approved projects.

Program administrators and market participants noted that there may be an advantage to using the municipal bond funded model to finance retrofits of smaller buildings. Cities with more small buildings tend to choose this model to date. However, the model does require a significant number of projects to justify a large bond issuance.

Figure 4. Municipal Bond Funded PACE Transaction[16]



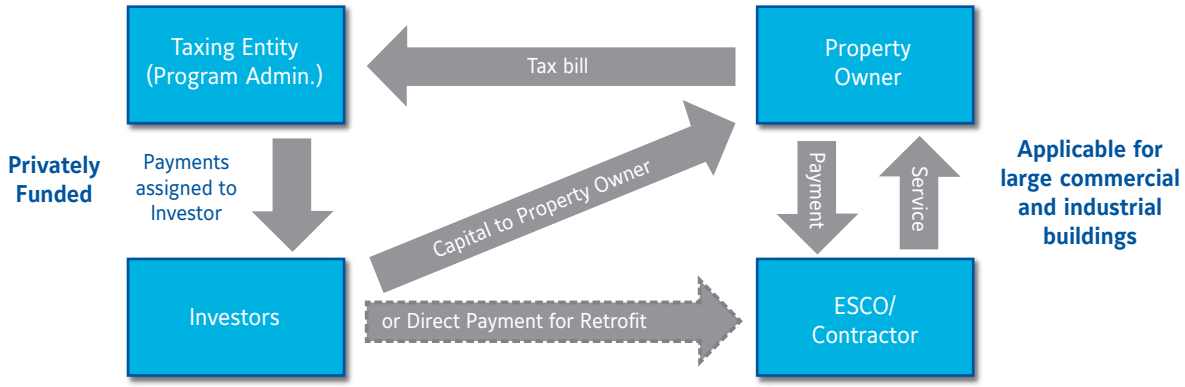
[16] Figure adapted from Johnson Controls PACE presentation.

Privately Funded Model

In addition to the municipal models, there are two different structures under which PACE projects may be financed using private financing:

3. ***Open-market/owner-arranged programs, funded individually.*** Projects are financed individually through a capital provider of choice, municipal bonds, or a combination of the two. Programs pair each PACE project with a prospective funder, selected through a competitive bidding process or as part of a financing solution offered by a contractor/installer. Potential PACE project funders today include privately held investment funds, such as Clean Fund, Structured Finance Associates, Samas Capital, and others that have raised capital specifically to fund PACE projects. PACE programs have also focused on outreach to local, regional, and national banks as potential sources of funding. The advantage of this model is that funding is available for each project on demand. Interest rates, terms, and transaction costs vary and are established between the owner and capital provider. GreenFinanceSF (San Francisco), CaliforniaFIRST, Los Angeles County PACE program, DC PACE program, and Connecticut's CT PACE are some examples of open-market/owner-arranged programs. Sometimes a line of credit from a capital provider is established that is available on demand to building owners. At other times, financing must be arranged for each individual project. The private funder is repaid through an assessment on the property taxes as arranged with the city.
4. ***Turnkey financing programs, funding on demand.*** These programs have one private financing option that is arranged by the program's administrator. Ygrene Energy Fund, a company offering program administration and financing solutions, which recently launched its first program in Sacramento, Calif., is using this approach, which may provide easy access to funding, on demand, at attractive rates negotiated on the basis of scaled projections.

Figure 5. Privately Funded PACE Transaction Process[17]



[17] Figure adapted from Johnson Controls PACE presentation.

Program administrators and market participants noted that there may be an advantage to using the *privately funded model* to finance retrofits of larger buildings. Cities with more large buildings tend to choose this model to date.

Model Examples and Implications

All four models may offer access to the broader capital markets through greater standardization and securitization once the market matures. PACE financing at scale would create an opportunity for broad aggregation of PACE assessments and the creation of a PACE specialty sector in the fixed income asset class among large institutional investors, such as pension funds and insurance companies. Ultimately, structured PACE financing vehicles could be placed with end-stage investors at low yield spreads to U.S. Treasuries or other market indices. Scale creates an opportunity for much lower financing costs due to lower interest rates and economies of scale related to financing transaction costs. Table 1 describes the financing attributes of the four selected programs.

Table 1: Financing Attributes of PACE Programs

Program	GreenFinanceSF (San Francisco)	SCIEIP (Sonoma County)	Toledo, OH	DC PACE
Financing model	***Open market/owner arranged program.*** Program allows multiple private capital sources for PACE retrofits.	***Municipal bond funded, available on demand.*** SCEIP is funded from the county treasury pool reserves.	***Municipal bond funded, available as sufficient project volumes can be pooled for a bond issuance.*** The Toledo Lucas County Port Authority (TLCPA) administers the program in conjunction with the NW Ohio Advanced Energy Improvement Corp. NWOAEIC signs a note with TLCPA, which then obtains the bond financing through the NW Ohio Bond Fund, which the port authority created and maintains. The port authority has established a revolving loan fund to facilitate the warehousing of smaller transactions into larger bond placements of $3.5M+.	***Open market/owner arranged program.*** Program has an initial commitment of $5 million from a regional bank. Program is also working with other capital providers.
Interest rate	~6-8% (varies by project)	~7%	4.32% for October bond issue and 4.67% for May bond issue with effective rate 5% to 5.5%	~6%
Loan loss reserve fund	American Recovery and Reinvestment Act (ARRA) debt service reserve fund; a portion of funding is likely to be made available for other potential enhancements, such as covering the costs of issuance.	None	The loan loss reserve is built into the bond fund.	None

(continued on next page)

Table 1: Financing Attributes of PACE Programs (continued)

Program	GreenFinanceSF (San Francisco)	SCIEIP (Sonoma County)	Toledo, OH	DC PACE
Existing lender engagement	Program requires lien holder's consent/affirmative acknowledgment.	Lender acknowledgement is required in the initial stage of application. Program staff does not engage with lenders.	Program staff interfaces with lenders up front to acquire their consent.	Program requires lender consent. Program staff report positive experiences.
Was PACE combined with other government incentive programs? Under all programs, owners keep all available energy efficiency/ renewable energy government incentives.	Owners keep all government incentives.	Teeter plan[18] is being used to guarantee payments. Through the California Energy Commission, an ARRA grant-funded pilot program provided free home energy analyses, which were used by some property owners to qualify for solar PV project financing.	The program uses Qualified Energy Conservation Bonds to support the rates and has used 1603 grants on solar energy. They also work with customers to obtain utility rebates and incentives.	DC PACE encourages participants to take advantage of inventive programs in the District, including incentives offer by the DC Sustainable Energy Utility.

The attributes of four of the leading PACE financing programs demonstrate similarities and differences among the types of programs in the market. All four programs help building owners find financing with competitive interest rates, though some use government funding and others help set-up financing with private lenders. Each PACE program can be used in combination with other government incentive programs. All require some sort of acknowledgement or consent from the existing lenders.

The issue of acknowledgment or consent[19] has been identified as one of the barriers for PACE projects. According to a study recently conducted by PACE*Now*,[20] based on 35 interviews with 25 lending institutions, there appears to be no blanket opposition to PACE in the lender community. The study found that lenders do insist on their right to consent to projects, but that they are receptive to approving projects that benefit their customers by improving cash flow and increasing the value of buildings. While lenders seem to support energy efficiency and renewable energy projects generally, they have limited firsthand experience in evaluating their effectiveness or in financing them.

Program Administration

There are several administrative models for PACE programs; much of the diversity can be attributed to the decentralized nature of the PACE universe. First, every PACE-enabled state has a different constitution and way of authorizing local government activities. No federal government agency is in charge of driving PACE programs and establishing uniformity. Instead, programs emerge as state and local initiatives. Hence, they vary in design, sources of financing, administration type, geography covered, types of eligible improvements, and other attributes. In some instances a PACE program has a permanent staff composed of municipal employees and a third-party administrator. In other instances, PACE financing is only a part of a city staff's mandate. Additionally, PACE can be a component of a more extensive energy efficiency program.

[18] Teeter Plan allows municipalities to impose strict penalties and interest on delinquent taxes. Municipalities in California can opt-in to the Teeter Plan. See http://www.lao.ca.gov/ballot/2011/110462.aspx

[19] Lender consent and lender affirmative acknowledgment are functionally the same. Some programs have chosen to use the term "affirmative acknowledgement" because the term "consent" in their opinion undermines the assertion that PACE is a valid use of municipal taxation authority. SCEIP, for instance, considered it necessary to clarify that they had the right to levy assessments without consulting the existing lender (even though they required consent to avoid triggering due-on-encumbrance clauses). It must be noted, however, that not all PACE programs plan to require the acknowledgement or consent of existing lenders. Ygrene programs plan to simply notify existing lenders instead, but since none of those programs were active as of the beginning January 2013 and the first Ygrene program just launched when this paper went to print, they were not included in the highlighted examples.

[20] Lender Support Study. 2012. PACE*Now*. Retrieved http://pacenow.org/wp-content/uploads/2012/12/Lender-Support-Guide-12.28.20121.pdf

With the development of PACE programs, a new market for PACE program service providers has emerged. Private-sector companies and nonprofits are organizing and offering program administration, marketing and financing services. All PACE programs do involve some local government resources (at a minimum, authorizing the issuance of debt and imposing, collecting and enforcing tax assessments), but programs vary greatly in their reliance on third-party providers. This can be a function of available financial resources (large or small) and the level of interest and active participation of the sponsoring state or local government. Some programs meet the needs of a single municipality, though it is more common for programs to seek economies of scale by enlisting multiple municipal members.

Eligible Technologies and Projects

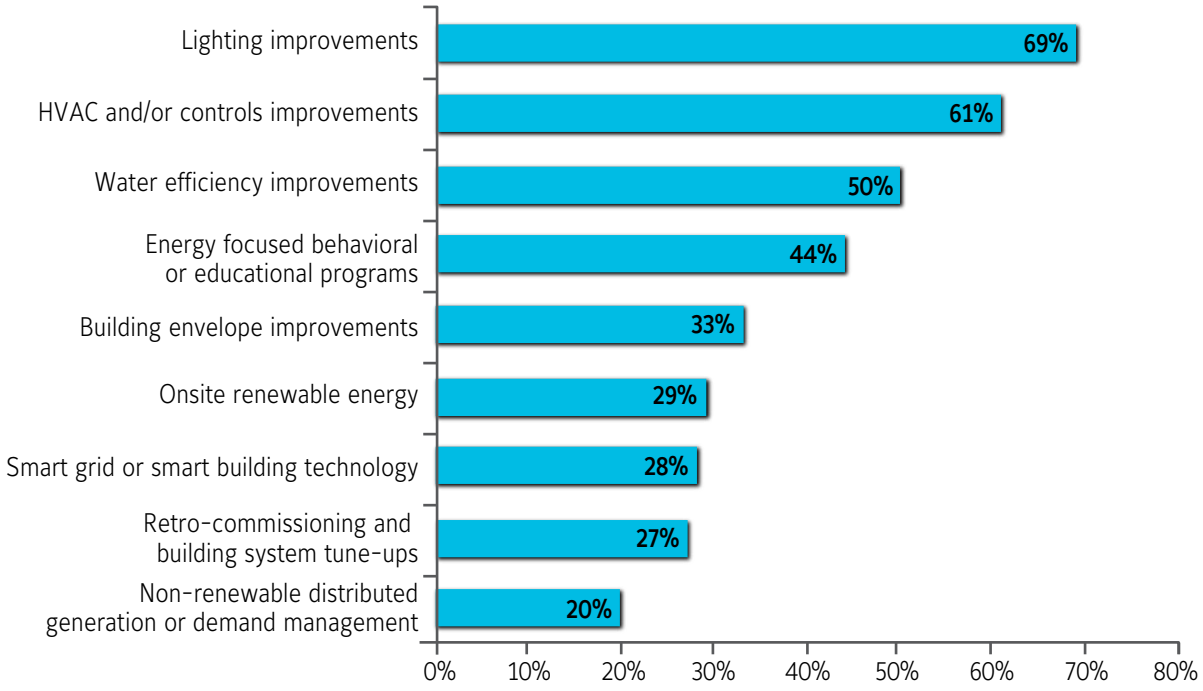
PACE programs across the country have differing approaches to eligible technologies and eligible project sizes because PACE programs have been designed to reflect local market conditions. For instance, programs located in large urban centers tend to have a higher minimum project amounts, and programs in smaller towns with few large buildings welcome smaller projects.

Technologies and Measures

PACE programs are generally designed to finance nearly all types of building efficiency technologies and measures. This means the programs have potential to help building owners solve many challenges. For example, efficient lighting, upgraded wall and roof insulation, high-efficiency HVAC systems, solar panels, and many other improvement measures are eligible. Under all programs, all improvements have to be permanently affixed to the building. Lists of eligible improvement measures for GreenFinanceSF, Sonoma County, DC PACE and Toledo are included in Appendix 4.

In the 2012 EEI survey, decision-makers listed a number of energy efficiency measures they had adopted in their buildings in the past 12 months, indicating which efficiency improvements are already the most popular in the market (Figure 6). Program administrators indicated that PACE financing has the potential to pay for these same types of technology investments.

Figure 6. Energy Efficiency Measures Implemented by Decision Makers in the Last 12 Months[21]



[21] Energy Efficiency Indicator Survey, Institute for Building Efficiency, Johnson Controls. 2012.

Building renovations often take place at specific times in a building's life. Program administrators indicate that building owners are, in part, interested in using PACE financing to undertake projects they needed or wanted to do anyway, but with greater efficiency gains than might have been achieved without PACE financing. Building owners have expressed interest in using PACE financing for building system upgrades and maintenance, whole-building renovations, projects to bring buildings into compliance with code, and other energy savings technologies. Program administrators hope PACE allows owners to achieve multiple goals, thus increasing the attractiveness of program participation.

Toledo, Ohio

PACE is an attractive financing instrument for existing mortgage lenders. Energy efficiency measures financed with PACE can immediately improve a building's cash flow, increasing the value of a mortgage lender's collateral. A less typical example, from Toledo, further illustrates how PACE can benefit an existing lender. The Toledo-Lucas County Port Authority PACE program was approached by the owner of a property that needed a new boiler to stay in operation. The owner was able to finance a new, more energy efficient boiler using PACE. The building has housed a successful day care center and remains current on its mortgage and taxes. Overall project costs at about $45,000 were relatively low, but the property no longer met the lender's loan-to-value criteria, so the lender preferred that the PACE program fund the boiler and was happy to provide consent. The additional cash flow from energy savings above the PACE payment improved the financials of this small business and the lender's position.

Transaction Size

Several factors may influence a program's preferred project size. There is a natural preference to find larger projects because of the economies of scale they represent. It may take only marginally more effort to source, analyze, administer and fund a large project that has potential to save substantially more energy than a smaller one. Programs, third-party administrators and funders may rely on project-specific fees to operate, so larger projects will generate more revenue. Programs in markets comprised mainly of smaller buildings will have to address their needs efficiently. Conversely, programs that operate in markets with a mix of large and small potential projects may need to develop dual-track project processes. Connecticut's statewide program, for example, has established a fast-track application for projects with simple or single energy conservation measures, and a more detailed one for larger, deep energy efficiency upgrades.

Table 2 provides information on the short-term and long-term goals for projects in the San Francisco, Sonoma, Toledo and Washington, DC PACE programs.

Table 2: Target Project Size

Location	Preferred Initial Project Size	Eligible Size of Projects
GreenFinanceSF (San Francisco)	> $1 million	$50,000 (though ideally >$400,000), no maximum
SCEIP (Sonoma County)	N/A	$2,500 to a maximum amount dependent upon property value; cannot exceed 10% of property value unless (for commercial projects) acknowledged by lender. (Projects $60,000 and over require a steering committee approval, and projects $500,000 and over require county Board of Supervisors approval)
Toledo, OH	$100,000 to $500,000	$25,000 to $10 million
DC PACE	$1 million to $1.5 million	$100,000 to $5 million

Program administrators in San Francisco and Washington, DC noted that ideally they would like their first few transactions to be at the upper end of their eligible project size range, since the higher initial transaction costs can be more easily absorbed within a larger overall transaction. All programs expressed an interest in making PACE financing available to a more diverse range of transactions over time as the process becomes more standardized.

Loading Order Requirements

Loading order is a requirement in some PACE programs that ensures that property owners implement energy efficiency work before undertaking on-site renewable energy projects. Loading orders are well intentioned and make sense from a policy standpoint, since generally energy efficiency is more cost-effective than renewable energy, and after implementing energy efficiency measures the renewable energy system can be appropriately sized for the building's new load. However, there are drawbacks to imposing loading orders. For instance, in Sonoma County, the loading order requirement significantly slowed the program because solar contractors, who might initiate a project, do not typically perform energy efficiency work. For these contractors, with a limit on the amount of PACE financing available, there was little incentive to split the value of a project with another contractor. As a result, PACE became less attractive for solar contractors. The Sonoma County program eventually eliminated its loading order requirement.

The City of San Francisco program received ARRA funds from the California Energy Commission State Energy Program, which mandates the priority of energy efficiency improvements. Programs elect to implement a loading order based on their program design, geography, market peculiarities, and goals.

Table 3: Loading Order Requirements

GreenFinanceSF (San Francisco)	Property owners who access California Energy Commission grant funds for identified purposes must reduce energy use by 10% in order to be eligible for renewable energy upgrades. Program requires ASHRAE level II audits to demonstrate compliance with the loading order.
SCEIP (Sonoma County)	Program had a loading order for residential properties for the first year; today there is no requirement to install energy efficiency measures before renewable energy on any property. For commercial properties, the utility conducts a free energy analysis before the owner participates in the program.
Toledo, OH	A participating Commercial Real Estate (CRE) owner implementing renewable energy upgrades must be part of an energy efficiency plan as the Port of Toledo has to get approval from the U.S. Department of Energy (though no approval is required for solar projects on government buildings). There is no specific percentage or number; the Port Authority evaluates each project on a case-by-case basis.
DC PACE	A building has to be ENERGY STAR rated or, for buildings that are not supported by ENERGY STAR, reduce energy consumption by 10% before PACE can be used to finance renewable energy.

Minimum Energy Savings Requirement

Some programs have a minimum energy savings requirement as an eligibility criterion. For instance, the Toledo program requires that the portfolio of buildings reach 15 or 20 percent energy savings to qualify for funding. This requirement is necessitated by the U.S. Department of Energy and its Better Buildings Challenge. While all programs have a goal to save energy with PACE projects, few have set a specific requirement.

Table 4 illustrates minimum savings requirements for the four programs.

Table 4. Minimum energy savings requirement

GreenFinanceSF (San Francisco)	No minimum
SCEIP (Sonoma County)	No minimum
Toledo, OH	15% for DOE requirements, 20% for Better Buildings Challenge participants. These targets must be met on a portfolio basis, not necessarily for each individual project.
DC PACE	No minimum

As the industry matures, some programs choose to remain flexible and avoid minimum energy savings requirements, while others prefer to have a preset mandate. Given that some programs have minimum energy savings requirements, this is a key attribute for market participants to understand when pursuing a PACE project.

Eligible Asset Classes, Target Market

In each municipality, the target market largely depends on the geography and goals of that locality. As noted earlier, the PACE markets described here, with the exception of Sonoma, are currently limited to nonresidential buildings.

Table 5: Eligible Asset Classes

Program	Preferred initial asset class	Eligible asset class
GreenFinanceSF (San Francisco)	Class A & B real estate	Nonresidential (commercial, retail, industrial), and multifamily properties with 5+ units; nonprofit-owned properties are eligible.
SCEIP (Sonoma County)	Small-medium businesses, wineries, agricultural facilities (This program also includes single- and multi-family residential.)	Nonresidential: (commercial, retail, industrial), and multifamily properties with 5+ units; nonprofit-owned properties are not eligible unless they are on the secured property tax roll.
Toledo, OH	Under-served markets, unrated small businesses, municipal buildings, large office buildings.	Commercial buildings, including multi-family. The program follows Energy Efficiency Conservation Block Grant guidelines.
DC PACE	Class A buildings	Commercial and multi-family

While PACE programs are generally designed to include a broad range of building efficiency projects, each program has slightly different eligible technologies and measures, target transaction sizes and eligible asset classes. In addition, some programs require a certain amount of energy efficiency improvement to be met before they will finance renewable energy installations, and some others require a minimum level of energy savings to qualify for financing. Building owners need to check individual program attributes for their market to understand exactly what types of projects will qualify.

Building Owner Engagement

PACE programs are engaging building owners through marketing and outreach as well as through the project application process. Program managers and administrators reach out to the building owner community through formal and informal channels. At this time, a few large property owners function as market leaders (e.g., McKinley Property Group, Simon Property Group, Prologis Inc.). This process is expected to be more formal as the industry matures. PACE is a new mechanism, and building owners may be positively influenced by leaders in the industry.

Once building owners are engaged with a PACE program, they are expected to go through a formal application process. Basic steps in the application process, as well as differences between the application processes of different programs, are analyzed below.

Marketing and Outreach

The marketing and outreach strategies of PACE programs and PACE market participants will likely be crucial to their success. Discussions with market leaders and the EEI survey results indicate that PACE programs may help increase demand for building efficiency by providing the platform from which to start discussions with building owners. The strategies PACE programs are using to present their programs to building owners in their markets are summarized below.

In the 2012 EEI survey, decision-makers in the U.S. indicated that the top three reasons they invest in building efficiency measures are cost savings, government incentives or rebates, and enhanced brand and public image. While building efficiency may still not be a top priority for building owners today, programs that appeal to these top three reasons will best help the market scale up.

PACE, as a type of government incentive, may be a good platform for engaging with building owners on building efficiency projects, since owners already see government programs as key drivers for their investments in building efficiency. By providing a platform for starting the building efficiency conversation, and by overcoming many financial barriers in its design, PACE enables building owners to address the other two top reasons they say they invest in building efficiency – cost savings and enhanced brand and public image.

The four surveyed PACE programs use several outreach strategies. Programs tend to work with local partners, professional organizations, and chapters of national membership associations. Outreach and marketing efforts include:

- Traditional marketing through local TV, radio, and newspapers. The Sonoma, GreenFinanceSF, and Toledo PACE programs are using this form of marketing to a varying extent. Sonoma County reports that radio generated significant interest. Toledo program advertises at basketball and football games.
- Online marketing. This includes program websites, emails to partners, and contact databases with communication materials.
- Partnering with local economic development organizations such as Chambers of Commerce and economic development corporations. All program administrators noted that they used this channel, since these organizations often hold functions aimed at broad audiences, which include PACE stakeholders. These partners could include PACE-related communication materials in their mailing campaigns.
- Outreach to contractors. Since contractors generally have access to building owners, it is very important to reach them. In Sonoma County, contractors are the main source of projects.
- Working with utilities. Utilities could be valuable partners for several reasons. In some states, utilities are mandated to reduce energy consumption in their service areas, and PACE programs become natural allies to help achieve mandated goals. For instance, utilities may offer data on building energy usage and include PACE ads with monthly bills. All four programs are engaged with utilities in some way.
- Partnering with professional groups. The Sonoma County program actively engages professional associations, from lawyers and doctors to gas station and winery owners. The San Francisco, DC and Toledo programs recognize the importance of reaching out to engineer and architect associations.

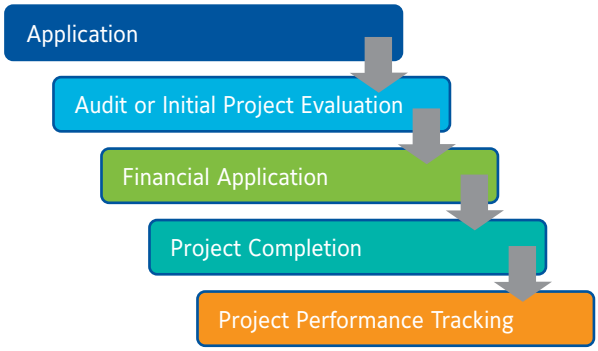
- Participating in conferences, local forums and university panels. –The Toledo PACE program staff recently participated in the local Greentown conference and the International Facility Managers Association (IFMA) conference. All programs see value in speaking engagements at local forums.
- Working with national membership associations. Organizations such as the Building Owners and Managers Association, the Urban Land Institute, the U.S. Green Building Council and the American Institute of Architects remain important outreach partners for urban PACE programs.
- Targeted mailings. In Sonoma County, an insert is being added in property tax bills each year.

It is too early to determine definitively which outreach strategies are the most successful in the long run. However, based on discussion with leaders of the four programs, partnering with contractors was a winning strategy, as was working with local professional organizations. Outreach/marketing differs with context (geography, priority market, program resources). In large urban areas, programs seem to put more emphasis on national membership associations.

PACE Project Process

Some PACE programs, such as Sonoma County, have a highly standardized application process. Others, often those in earlier stages of development, adapt their application processes to fit the project at hand. The following highlights the common application process steps (Figure 7) in the four programs analyzed and highlights some differences between them. Some of these steps may run at the same time, or in a slightly different order, depending on the project and the program.

Figure 7: Steps in the PACE Application Process



- Application – In all cases, the process begins with the submission of an application. The applications include basic information about the building and type of project to be undertaken. There is no fee for applying to any of the four programs today, though Washington, DC and San Francisco are considering a fee structure to cover their costs in the future, and Toledo builds a 2 to 2.5 percent fee into the whole transaction.
- Audit or Initial Project Evaluation – In San Francisco and Washington, DC, an ASHRAE Level 1 audit is required initially to assess whether the project is a good fit for the PACE program. Toledo's program requires the work to be completed by certified industry professionals (e.g. Professional Engineers and Certified Energy Managers) and an ASHRAE Level 1 or 2 audit is required on more complex buildings. In Sonoma, most projects are fully prepared by the contractor and building owner before contact with the PACE program, so no further audit is required.

- Financial Application – The property is screened for eligibility using program-level underwriting criteria (property-based debt limit, mortgage and tax payment history, etc.). Financial health of the building owner is often assessed as part of the financial provider's due diligence. The financial returns on the project are analyzed in greater detail with an ASHRAE Level 2 audit or other engineering analysis, the project is reviewed by the PACE program, the mortgage-holding lender acknowledges the assessment, underwriting is completed for the loan, and contracts are signed for the assessment. The cost of completing the more detailed audit required during this stage typically can be built into the project costs, and financing and does not need to be paid up front. The program administrator in Washington, DC pointed out that the process for approving a PACE assessment is similar in its complexity to a typical construction loan. There are transaction and legal costs in this stage. Programs are trying to subsidize these for early projects using federal funds. These costs should decline significantly as programs reach scale. For example in Sonoma, a more mature program, the program administrator estimated the total process costs at $200.
- Project Completion – The project is executed as planned.
- Project Performance Tracking – Program support for reviewing the performance of a project may help with mitigating building owner's concern about performance risk. San Francisco and Toledo require their projects to use the U.S. EPA's ENERGY STAR Portfolio Manager to track project performance over time. Sonoma collects its own energy data on projects. Washington, DC requires two years of detailed measurement and verification (M&V) based on the IPMVP protocol – the level of M&V is determined by an engineer based on what is necessary for the improvement. In Washington, DC, ENERGY STAR Portfolio Manager is used for M&V after the first two years. There is a trade-off between the convenience of using ENERGY STAR Portfolio Manager versus the confidence in using the IPMVP industry standard; each program has balanced that trade-off a little differently to date. Performance tracking that lowers the technology performance risk can lower the interest rates offered on the loan and builds understanding of technology risk over time, allowing financial institutions to factor in the relative technology risk into loans for energy efficiency.

Most program administrators indicated that projects take six to 18 months from initial contact with a building owner to project completion. In Sonoma County, the PACE program administration is typically involved only in the later stages of a project; the time it takes to approve an application can vary from three weeks for small projects to two or three months for larger projects that require board approval. These variations in processing times match with the target transaction size for each market. San Francisco, Toledo and Washington, DC all focus on larger, more complicated transactions than Sonoma, and therefore the project development process takes longer. Program administrators commented that they have not yet seen any of their program requirements become barriers to the success of projects, though some did note that the audit can be perceived as a barrier, even though it is a standard part of contractor's process of developing a building efficiency project.

Prologis HQ in San Francisco

San Francisco's GreenFinanceSF program financed $1.4 million in PACE financing for energy efficiency and renewable energy upgrades at the historic Pier 1 headquarters of Prologis, a global real estate owner, operator and developer. Pier 1, next to San Francisco's landmark Ferry Building on the Bay, is owned by the Port of San Francisco and leased on a long-term basis to Prologis.

The project was completed using the open market/owner arranged financing model. Clean Fund, a PACE finance company based in San Francisco, purchased the $1.4 million bond to fund the project and other eligible administrative costs. The financing term is at 6.9 percent over 20 years, and

(continued on next page)

Prologis HQ in San Francisco *(continued from previous page)*

the assessment will be 70 percent allocated to five subtenants based on their square footage of occupancy in the building.

Working with Johnson Controls, a global energy services company based in Milwaukee, cost effective energy measures were identified, including a retro-commissioning of building energy monitoring systems, LED lighting upgrades, and a 200kW rooftop solar electric array. When work is completed in 2013, overall grid demand for electricity is expected to fall by more than 30% from a 2011 baseline, taking into account the efficiency measures and on-site generation (all of which will be used by the building). This amounts to nearly 400,000 kWh and 17,500 therms saved annually, and annual cost savings to Prologis and sub-tenants of approximately 25%. The project is expected to create nearly 30 jobs and should generate close to $4 million of economic benefit in the San Francisco economy and beyond.

Prologis, with $18 billion in assets under management, has made a substantial commitment to finding energy efficiency and renewable energy project opportunities among the more than 500 million square feet of industrial and commercial properties in its portfolio, here in the United States, and in 20 other countries around the globe. The Pier 1 project has special significance for Prologis, since it is their headquarters. They hope that Pier 1 will set an example for other property owners in San Francisco who want to make their buildings more energy efficient.

Conclusion

As 16 PACE programs begin accepting applications to finance building efficiency projects, the design of key attributes of those programs will shape the future of the PACE market. Given that the PACE market is in its earliest stages of development, it is unclear which program design options will be the most successful, but program administrators and industry leaders agree that PACE should help the market overcome financial barriers and scale up energy efficiency.

Market leaders agree that the PACE finance features most attractive to building owners are zero up-front investment, immediate positive cash flow, and long-term financing of up to 20 years. Building owners also find it appealing that the PACE assessment stays with the property upon sale, owners can pass payments through to tenants, interest rates under PACE are low, PACE projects can lead to higher rents and greater property value in the long term, and PACE financing may be off the balance sheet.

PACE programs have adopted project eligibility criteria that fit their local market needs. The programs follow a number of financing and administrative models, and all are testing different approaches to engaging their commercial markets. Once PACE becomes more mainstream, the application process and engagement approaches are likely to become more standardized.

Future research could evaluate the most attractive features of PACE financing and which program attributes and design decisions best drive uptake in the market. Future research also could delve further into the question of existing mortgage-holder consent, since this is potentially a key barrier to PACE adoption. Additionally, once a significant number of PACE projects has been completed, a study with building owners could be useful in evaluating their experiences before and after project completion. Also, when a comprehensive project database exists, a study evaluating PACE project performance and economic impacts in the locality could be conducted.

Appendix 1: Research Methodology and Interview Questions

The authors interviewed the program administrators of four of the most developed PACE programs, as well as a number of other leading participants in the PACE market. A list of those who contributed their time and energy to our research can be found in Appendix 5, and our interview questions can be found below. The data collection stage took 1.5 months.

In addition to one-on-one interviews, the authors participated in a meeting of PACE program administrators and market leaders organized by PACE*Now* and sponsored by the Rockefeller Brothers Fund in September 2012 on "Accelerating Commercial PACE."

Based on those interviews and the PACE*Now* meeting, we have attempted to summarize these market leaders' working hypotheses about what attributes and design features of PACE programs will enable the building efficiency market to scale up.

Interview Questions

Overall

1. What resonates with building owners? What benefits do they find most attractive? What goals does it help them accomplish?
2. Who has already been applying to PACE programs? What has driven this early success?
3. What other drivers of success have you experienced in discussions so far? What challenges have you encountered?

Finance

1. Who will provide financing (city bonds, owner-arranged/open-market, warehouse, etc.)? Has the funding been secured?
2. What is your current/anticipated interest rate?
3. Do you have a loan loss reserve fund or credit enhancement (if applicable)?
4. What has been your process for working with existing lenders? If you have gotten to this stage with a PACE project, who has been responsible for preparing the "sales" pitch to an existing lender?

Eligible Transactions

1. What types of improvement measures, projects, and transactions are eligible to use PACE financing? Please select eligible measures from the attached list, add any that are not listed.
2. Does your program have a requirement regarding what type of improvement must be done first?
3. Is there a minimum energy savings requirement? If so, what is it?
4. What is the minimum/maximum size of an eligible project?

Channels and Outreach

1. How are building owners hearing about your program?
2. What partners are you working with to find and reach out to building owners who are good candidates for PACE? Local lending community, contractors, utilities, others?
3. How do you explain PACE to building owners? What do you tell them when you get inquiries today? What do you use for marketing materials? Can you send us a copy? Do you have a handbook or technical assistance available?

Application and Approval Process

1. Give a basic outline of the steps in the application process. What is the cost?
2. Do you require an audit? What level of audit? Is there any subsidy for audits? If yes, do you have a list of specific audit providers in your municipality?
3. What is the measurement and verification protocol?
4. How long do you expect it to take from first contact with building owner through project completion? How much time does it take to put a transaction together? How does that vary with transaction size?
5. Do any (all) of your program requirements (if applicable, such as application fees, audit requirements, benchmarking, M&V) appear to be barriers to success?

Appendix 2: Active PACE Programs, by state, as of January 2013

State	Program Name	Location	Brief Description
CA	Energy Upgrade California LA PACE Program	Los Angeles County	Program is using open market/owner arranged model. Program is open for non-residential commercial properties.
CA	mPower Placer	Placer County	The program uses municipal bond financing. Open for commercial property owners in Placer County. The program has a simple 6% interest rate.
CA	GreenFinanceSF	San Francisco City and County	An open market/owner arranged program, provides financing for commercial properties. The program has completed a $1.4 million project on a Prologis building.
CA	Sonoma County Energy Independence Program (SCEIP)	Sonoma County	Government-funded program, has completed 58 commercial PACE projects.
CA	CaliforniaFIRST	Statewide	Owner-arranged open market program, launched in September 2012.
CA	California PACE, Figtree Program	Presence in 18 counties	The program is open to commercial properties.
CA	HERO Program	Western Riverside County, becoming statewide	The program has an arrangement with a few capital providers: Samas capital and Structured Finance Associates for commercial project financing.
CA	Yucaipa PACE Program	City of Yucaipa	Program is government-funded, using general fund of the City of Yucaipa.
CA	Clean Energy Sacramento	City of Sacramento	A turnkey program available for residential and commercial properties in Sacramento. Program was launched in the end of January, 2013.
CT	CT Statewide PACE Program	Statewide	A statewide commercial PACE program established through Connecticut Clean Energy Finance and Investment Authority (CEFIA). The program will develop a list of potential funders.
DC	DC PACE Program	DC	Owner-arranged/open market program, open for commercial properties, soft-launched in September 2012.
FL	Florida Green Energy Works Program	Statewide	The owner-arranged/open market program launched in the spring of 2012 and is accepting applications.
MI	Ann Arbor's PACE	Ann Arbor	Bond-pooling PACE program, open for small to medium commercial projects in the City of Ann Arbor.
MI	Lean & Green Michican™	Statewide	Owner-arranged/open market statewide PACE program, structured to allow every municipality to join after holding a public hearing and passing a resolution of intent and adoption. Open to commercial properties.
MN	Edina Emerald Energy Program	Edina	The program has completed one commercial PACE project, it's an owner-arranged/open market program.
OH	Toledo PACE Program	Toledo-Lucas county	Bond-pooling PACE program, financed over 50 projects with $12 million in PACE financing in 2 bond issuances.

Appendix 3: Building Efficiency Financing Options

Financing type	Description
Internal Financing	This is a straightforward financing option and requires no external funding. Property owners become responsible for 100% of underperformance. Real estate owner must have sufficient cash reserves and identify energy efficiency/renewable energy upgrades as a priority among other compelling investment opportunities.
Energy Savings Performance Contract	ESPCs are typically implemented by energy service companies (ESCOs), which design a project specific to the property and put together a contract to finance the up-front costs in exchange for a portion of the energy savings over the term of the contract. The ESCO guarantees a certain level of energy savings sufficient to pay off the up-front costs of the project by end of contract's term. This gives the ESCO incentive to closely monitor results. Generally ESCOs prefer large projects.
Energy Services Agreement	Energy efficiency service firms offer 100% financing with no upfront costs and assume the responsibility to manage the project over its lifetime. The property owner agrees to pay a fixed or floating rate fee over a term of 5 to 15 years, and the revenues are distributed to investors. Energy efficiency service firms earn from savings generated by the new equipment, while building owners continue to pay a fee to an energy efficiency service firm that is treated as an operating expense.
Property Assessed Clean Energy	PACE offers secure 100% assessment financing. Additionally, the PACE assessment can be passed through to tenants, and the assessment stays with the property upon sale. PACE is a relatively new mechanism, and it requires lender acknowledgment due to the first lien status of the property tax assessment.
Government Loans	The American Recovery and Reinvestment Act allocated $11.6 billion in 2010 to state and local governments to finance energy efficiency programs. State and Local governments use this capital to offer loans for energy efficiency retrofits. The loan rates correlate with projected savings from the project, favoring more comprehensive approaches.
On-bill Repayment	A third party covers the up-front cost of a limited-scale energy efficiency upgrade, and the utility charges the customer on the monthly utility bill. This takes advantage of billing and monitoring mechanisms already in place. Loans are tied either to the customer or to the property.
On-bill Financing	Similar to on-bill repayment, but instead of third-party financing, the utility covers the up-front cost and charges the customer on the monthly utility bill.
Sustainable Energy Utility	A statewide SEU is created and funded to administer financing programs, offer technical assistance, and provide incentives to building owners to implement energy efficiency measures. This allows standardization and aggregation of investments to help access capital markets.

Appendix 4: Efficiency Measures Eligible in Each Program

Program Name	Improvements
SCEIP (Sonoma County)	High-efficiency windows Solar and/or tankless water heaters Solar panels Upgraded wall and roof insulation "Smart" irrigation controllers High-efficiency HVAC systems Cool roofs Multiple improvements for deep energy savings
GreenFinanceSF (San Francisco)	Lighting HVAC Domestic hot water Building envelope Refrigeration Compressed air Process/plug loads Energy storage Renewable energy Water conservation measures
Toledo-Lucas, Ohio PACE Program	Lighting HVAC Compressors Refrigeration Waste energy recovery Electrical distribution
DC PACE Program	Projects eligible for PACE financing include upgrading, repairing, or replacing energy-using systems and equipment, provided that (a) the measurable savings produced exceed the costs on a discounted lifecycle cost basis; (b) the cost and savings projections are made by licensed professional engineers with relevant experience; (c) recognized measurement and verification protocols are employed during the loan term to ensure the savings are valid and sustained; and (d) the work is done by general contractors and subcontractors who meet District standards.

Appendix 5: Acknowledgements

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Thank you to our partners:

PACE*Now* is an advocate for Property Assessed Clean Energy, an innovative way of financing energy efficiency and related upgrades in our nation's homes and commercial buildings. Our mission is to promote and assist the development of PACE programs by state and local governments and provide leadership and support for a growing universe of energy efficiency and PACE stakeholders.

www.pacenow.org

The Urban Land Institute provides leadership in the responsible use of land and in creating and sustaining thriving communities worldwide. ULI is an independent global nonprofit supported by members representing the entire spectrum of real estate development and land use disciplines.

www.uli.org

The Institute for Building Efficiency is an initiative of Johnson Controls providing information and analysis of technologies, policies, and practices for efficient, high performance buildings and smart energy systems around the world. The Institute leverages the company's 125 years of global experience providing energy efficient solutions for buildings to support and complement the efforts of nonprofit organizations and industry associations. The Institute focuses on practical solutions that are innovative, cost-effective and scalable.

If you are interested in contacting the authors, or engaging with the Institute for Building Efficiency, please email us at: InstituteforBE@jci.com.