2014
Better Buildings Case Competition

Picking up the PACE:
Expanding PACE financing programs for Commercially Owned Buildings

Everpower Proposal
2/18/14

Executive Summary

Energy use reduction makes sense for fiscal, environmental, and public health reasons. Therefore, it is critical to reduce barriers associated with the adoption of energy efficiency and renewable energy technology. Within the commercial building stock, office buildings account for 20% of total energy use (EIA, 2003) and 40% of the commercial square footage in this state. In addition, energy use tends to be a significant cost (~20%) for commercial buildings. However, many commercial buildings do not take advantage of available technology—such as HVAC upgrades, insulation, and building control systems—to reduce energy use due to the high capital costs required for such retrofits. The Property-Assessed Clean Energy (PACE) financing program reduces this barrier by shifting the high up-front cost into annual payments spread out over the lifetime of the technology. Most importantly, the PACE program ties the cost of the technology to the building, rather than the owner, so that the building can be resold.

Overall, the success of a PACE program design relies on three main principles (1) simplicity, (2) effectiveness, and (3) scalability. In this proposal, this is achieved by:

- Starting with several high-profile "seed projects" to serve as case studies in each city
- Relying on contractors to encourage word-of-mouth advertising and support property owners through the PACE process
- Increasing energy use reporting via the EPA Portfolio Manager and a state-wide benchmarking and disclosure law

These aspects of the program allow the state-level program to build experience as demand increases and facilitate the evaluation of realized energy savings. This analysis uses a diffusion model to predict the impact of direct mailing and word-of-mouth advertising on market participation rates. Based on this model, the PACE program costs approximately $3.2 million to implement and begins to accrue revenue for the state after 8 years.

In addition, this report addresses several barriers to PACE programs. For example, by implementing energy reporting requirements for all commercial buildings, not just those that participate in PACE, it is possible for program officers to identify "low-hanging fruit" properties to target for PACE financing as well as facilitate evaluation after the project. Other key proposals include:

- Placing the risk associated with ineligible audits on contractors (to encourage building participation and focus on buildings with highest probability of eligibility)
- Establishing a competitive process for access to data by academics (to encourage research and improve the evaluation process).

More barriers and solutions are addressed in detail in the report.

The PACE financing program is a useful tool for states to reduce barriers and improve quality of life via energy efficiency improvements. In addition, this program can be a source of economic stimulus that creates jobs, increases spending on construction, and eventually creates revenue after achieving sufficient participation.

1. Background

The Property-Assessed Clean Energy (PACE) financing program removes a common barrier to energy efficiency and renewable energy investment – the high up-front cost. By tying the loan to the property, rather than the individual, property owners can spread out the cost over a longer period of time (typically 10-20 years) in order to reduce the cost of each payment. Since energy savings are being accumulated, it is possible for the savings to be used to make loan repayments directly – allowing the business owner to retain a positive cash flow. In this arrangement, the loan is repaid annually via the property tax bill (DOE, 2014).

However, there are still challenges to be addressed, which we elaborate on in this report. First, low participation rates can increase administrative overhead for the program. Second, it is possible that the long-term economic benefits will not outweigh the short-term inconvenience of construction, which may be associated with lost revenues. Finally, there are concerns that the estimated savings may not match the realized savings, which could increase the risk assumed by the business owner, who retains the loan obligation regardless of actual savings (Cox, 2011).

Although PACE has been successfully implemented at the municipal level, the next step is to launch a state-level program. Other states, such as Connecticut, have already made excellent progress in this arena (Calise, 2013; Guerster, 2014). This report outlines a strategy and business plan for implementing a statewide PACE program assuming that legislation to create an energy financing district is already in place.

2. Strategy

2.1. Overview

The goals of this PACE program are to reduce energy usage (natural gas, electricity, steam) in buildings and subsequent greenhouse gas emissions. Therefore, this includes both load shifting and load reduction measures. In order to increase participation, it is important for this program to be as simple as possible. With this in mind, we have based our program around a diffusion model that relies on word of mouth to encourage participation. Each building that participates and successfully finishes the implementation of energy efficiency measures will get a PACE insignia to place in their main entrance. This will both advertise the program and highlight green activity in the state. This also serves to begin shifting the perceived norm in the state toward more energy efficiency.

An important component of this approach will be to emphasize that worker productivity in office buildings can be improved by implementing energy-wise retrofits, as we will discuss. As Romm & Browning (1994) explain, “an increase of 1 percent in productivity can provide savings to a company that exceeds its entire energy bill”. By starting with several high-profile projects in each major city of the state, property owners can learn about the program from both local media as well as word-of-mouth. These “seed projects” will be carefully selected using the criteria described below to ensure that we identify the “low hanging fruit” in each city. Local contractor and Energy Service Companies (ESCO’s) participation will be critical to the outreach of the program. Emphasis in a “Systems Integration” approach will be encouraged to achieve synergy benefits inspired by the Total Building Performance concept (Hartkopf, 1986). This concept emphasizes that health, productivity, and comfort can be improved alongside energy efficiency improvements.

In addition, this program will also embrace the notion of open government by making all non-confidential data publicly available. Energy usage reporting through EPA Portfolio Manager is considered, not only for participant buildings, but for all commercial and government properties in the state. This data may include, for example, percent savings estimated, percent savings achieved, rate of loan defaults, and the number of participating buildings.

Overall, this program relies on contractor "champions" who, after being trained and certified in the program, support word-of-mouth advertising and support property owners in navigating the PACE program. This is summarized in Figure 1 and described in more details in the following sections.

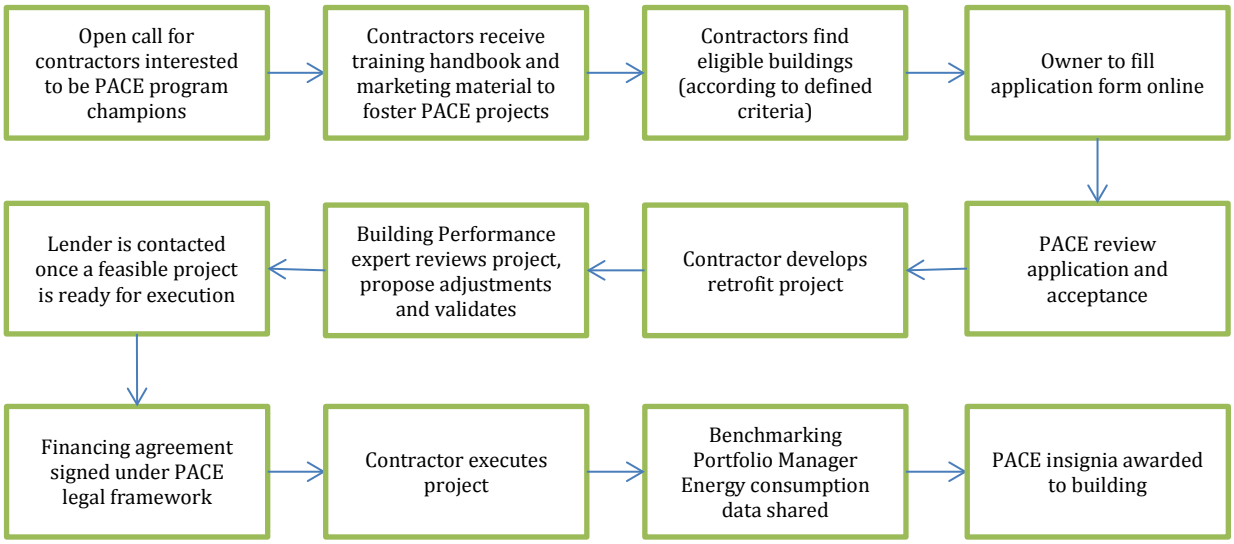

Figure 1. Step-by-step diagram on how the program works.

2.2. Market Assessment

Achieving scale is critical to the long-term sustainability of the PACE program. In particular, market uptake is required in order to drive down fixed and variable costs associated with the program both per project and per dollar loaned. Costs can be recovered via application fees (on a per project basis) and increased interest rates (on a per dollar loaned basis). It is important to find a balance between these two methods for a sustainable and efficient program.

In addition to driving down costs and increasing the efficiency of the program, high participation rates improve the quality of the infrastructure in place via loan options and contractors. In addition, high participation can derive benefits for the government via increased jobs and improved economic conditions (Goldburg, Cliburn, & Coughlin, 2011). In a National Renewable Energy Lab (NREL) report on Colorado's Boulder County ClimateSmart Loan Program, the implementation of PACE financing facilitated 85 new jobs, $5 million in earnings, and $14 million in economic activity within the county (Goldburg, Cliburn, & Coughlin, 2011).

For this case, it is recommended that sustainable costs equal 2% of the total loan volume (BBCC, 2014). In order to recover startup costs as soon as possible, it is beneficial for initial loans to be larger in order to compensate for lower participation rates during the program's infancy. As shown in Figure 1, if 10% office building participation is expected, loans must be at least $100,000 each to cover the salaries of the PACE program staff. Additional costs include marketing, supplies, printing, loan fees, and administrative fees. Some of these fees (e.g. property title search fees) may be more appropriate to recover on a per project basis via an application fee). If 10% of office buildings participate, this implies that 220 of the 2,220 office buildings in this state start a project, which may be an optimistic scenario. Therefore, it is expected that it will take several years for this program to have achieved sufficient participation rates to cover the costs.

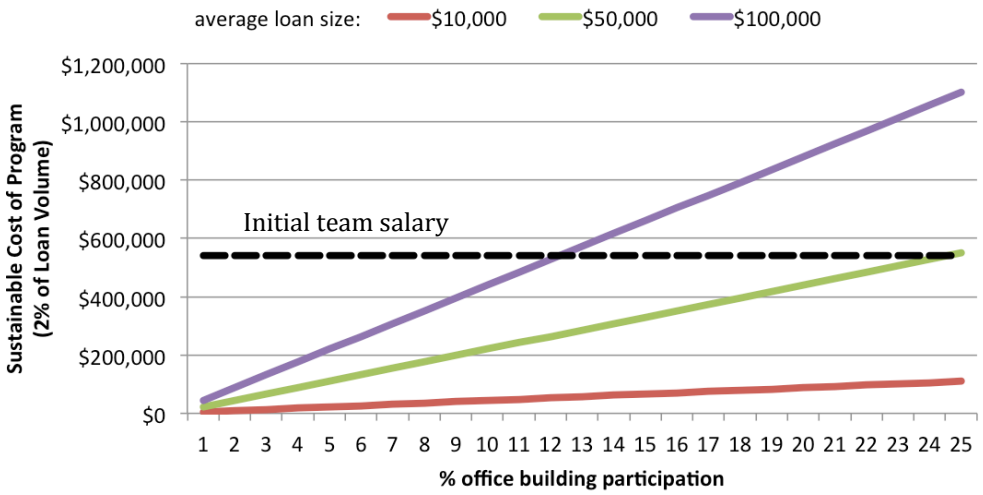

Figure 2. In order to cover the team salary ($90,000/person with 6 staff including benefits), initial loans must be larger to compensate for lower participation rates. For example, with 10% office building participation, loans must be $100,000 on average to achieve a sustainable program.

3. Proposed Program Design

The goal of this program design is to be (a) simple, (b) effective in reducing energy use and subsequently carbon emissions, and (c) scalable. In the following section, we justify specific aspects of the program to achieve these goals. In addition, the key elements of each aspect are summarized in Table 1. In general, this program anticipates that participation rates will follow a diffusion curve. Therefore, this program focuses on identifying projects that can make big investments for significant savings to serve as "seed projects". This is facilitated by starting the program with very restrictive eligibility criteria and gradually expanding the criteria over time. Historically, office building projects have fit these criteria for PACE projects (PACENow, 2014). Therefore, this program will focus on office buildings in the initial years.

3.1. Marketing & Outreach

In order to achieve the volume of projects needed to sustain the program, the marketing strategy will be concentrated in two main issues.

The first and most innovative marketing strategy is focused on the increased employee productivity associated with better indoor environments. One common barrier of clean energy programs is that energy consumption by itself does not represent a strong value generator for companies; however, employee productivity does because it directly impacts the performance of the company. People perform better in spaces with proper lighting and natural light (National Lighting Bureau, 1988), comfortable thermal conditions, and natural ventilation when possible (Wargocki, Wyon, & Fanger, 2000). These three aspects of Indoor Environmental Quality can also be related to energy savings (Fisk, 2002). With this approach, we want to make building owners aware that, through the implementation of energy efficiency measures, they can also achieve healthier and more comfortable workspaces, which may boost employee's quality of life, decrease absenteeism, reduce stress, and increase productivity during office hours (Romm & Browning, 1994). In addition, given the uncertainty surrounding the efficacy of financial incentives related to energy savings due to concerns about risk if estimated savings are not achieved and potential rebound effects, it makes sense to emphasize other benefits (Costanzo, Archer, Aronson, & Pettigrew, 1986; Sullivan, 2009; Zimring, Borgeson, Todd, & Goldman, 2013).

The second strategy is benchmarking. Knowing how buildings use and waste energy is the first step for property owners towards lowering operating costs and improving competitiveness. This requires a state-wide benchmarking and disclosure law to be launched in our state before or at the same time as the PACE program so that all commercial buildings are required to report their energy consumption through the U.S. EPA's Portfolio Manager. In an attempt to make it easier for building owners, the local utilities will be required to automatically upload data at the request of the owner. Several local jurisdictions have implemented similar policies and have achieved energy savings with this measure itself (US Policy Briefs, 2013).

The information gathered through the Portfolio Manager will facilitate identifying future candidate projects without having to assign additional resources. Case studies generated with the energy and financial results of the high-profile seed projects will serve as the marketing platform for the first year of implementation.

A key component of the program is educating contractors and encouraging them to recruit property owners for potential projects. The PACE program will host several interest meetings for contractors to explain how PACE works and how they can improve their business by participating. In addition, these "champions" will be connected to promising projects as determined by the Portfolio Manager. PACE accreditation acts as a value-added differentiator for both contractors, who can advertise state certification in energy efficient construction, and building owners, who can advertise energy savings and healthy workspaces to tenants.

3.2. Modeling Participation Rates

The Bass diffusion model aims to forecast the adoption of innovations in a marketplace (Bass, 1969). Although there are many differences between energy efficiency projects and consumer durables, this simple model can be a useful tool in estimating adoption based on two factors: (a) external and (b) internal advertising. In reality, energy efficiency technology adoption is slowed due to the high upfront cost. However, the PACE program reduces the barriers to entry for these technologies. Although there are still barriers (as discussed in the following sections), the notion

of diffusion can be a useful paradigm for disseminating an idea or product. There are some property owners for whom participation in the PACE program does not make good fiscal sense and so those buildings are excluded from eligibility. For example, old buildings that are poorly insulated may not achieve the necessary savings from an energy efficient HVAC system to justify the cost.

By having several high-profile "seed projects" in each city, other property owners are able to learn about PACE via both external advertising (e.g. newspaper articles, direct mailing) as well as internal advertising (e.g. word-of-mouth, social media). We conservatively estimate these two parameters based on the literature (see details in Appendix). As shown in Figure 3, slow annual growth peaks in the year 2031. This type of growth allows time for the program to refine its methods in the first several years before it needs to be at peak capacity. Although this model is based on adoption in the office building sector, not all office buildings will be eligible to participate. Therefore, other building types will need to be included in the eligibility criteria as time goes on. This participation forecast could be improved as the program is implemented to refine the parameter estimates based on realized participation rates and bottlenecks (e.g. application approval process).

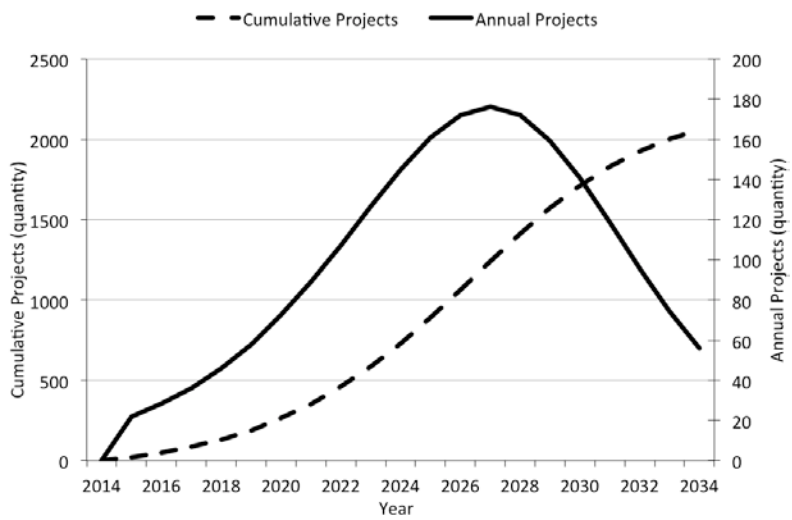

Figure 3. Potential annual and cumulative project adoption based on the bass diffusion model. This is meant to be illustrative of a pattern of growth, rather than predictive, and assumes a mix of building types.

3.3. Application Requirements

The application must clearly identify eligibility. In addition to the interest meetings described above as part of the marketing approach, the program website should include an online quiz to quickly determine eligibility. Given the plan to expand the eligibility criteria, this will facilitate clarification over time. Once eligibility has been clearly established, business owners can build a proposal together with a local contractor interested in the implementation of the project. The contractor will assist the owner with the energy assessment, necessary modeling, and measurement in a case-by-case basis. Once the project is determined to be eligible and the energy calculations are reviewed by the program staff, it will be presented to third-party financial institutions.

Two types of eligibility requirements need to be clarified – project and property. In order to identify appropriate seed projects, the initial eligibility will differ significantly from the ultimate eligibility criteria. Therefore, the initial seed projects will be restricted to:

- Office buildings, which account for 20% of total commercial energy use (EIA, 2003) and 40% of the Commercial square footage in the state.
- Energy efficiency improvements for space heating, ventilation, cooling, lighting, and water heating, which together account for 79% of energy use in commercial buildings (EIA, 2003).
- A minimum cost of $100,000, with a target average cost of $400,000 across the portfolio of projects.

These restrictions will serve to limit the potential candidates in order to allow the program office to streamline processes before opening PACE financing more broadly. By focusing on the projects that are likely to have the biggest impact, the program will be able to target large projects that will effectively highlight the benefits of PACE to encourage adoption across other sectors and building confidence for contractors and property owners. Ultimately, project eligibility will be determined via Building Performance validation based on the Building Investment Decision Support Tool (BIDS™) developed by the Center for Building Performance and Diagnostics (Loftness, 2007). In turn, this validation will serve as the basis of the evaluation process to determine the efficiency of the investment (Zimring, Borgeson, Todd, & Goldman, 2013). PACE projects will be required to install monitoring devices to accurately assess the savings achieved by the new technology. In addition, follow-up surveys will measure satisfaction and spillover effect, such as residential energy use.

In order to improve the efficiency of this program, there will be one deadline per quarter. This serves to improve transparency and give some information to project owners on the anticipated wait time for application approval. In addition, this will facilitate bundling loans to access better funding mechanisms.

3.4. Loan Requirements

The interest rate for PACE financing ranges from 3-8% across nationwide programs. We recommend a 5% rate with an additional 2% charge used to finance the program. This loan covers the cost of the project as well as the audit, application fees, and evaluation. Savings are required to cover the cost of all aspects of the project. Credit underwriting serves to ensure that the savings associated with an energy efficiency or renewable energy project will cover the cost of loan repayment. This is primarily accomplished through audits that estimate savings (Buonicore, O'Neill, & Bailey, 2013). The specific annual loan payment is determined by the audit results and will be verified by the government office. The state government program coordinates with municipal governments to service the loans. While the state centrally approves projects, all loan administration is the responsibility of the municipal government. The municipal government will collect and keep all late fees.

If property owners are particularly concerned that realized savings could be less than anticipated, they may choose to reduce this risk by purchasing energy savings insurance (Buonicore, O'Neill, & Bailey, 2013; Mills, 2003) or brokering a contract with a 3rd party retailer that adopts the risk. The cost of doing so may be included in the loan. However, the robust data collection, reporting,

and retrospective analysis included in our program design should increase confidence in savings estimates and reduce this risk over time.

Table 1. Summary of program design.

Program Element	Key Aspects of Design
Marketing	
Outreach and marketing	Interest meetings for contractors in each city Focus on recruiting seed projects for diffusion PACE participant window sticker
Application Requirements	
Application process	Take online quiz to check eligibility Contractor acts as navigator
Property owner and project eligibility	Start with energy efficiency projects at office buildings Phase in other projects and properties
Project size limits	Capital projects must be >$100,000 until deemed appropriate to expand
Closing process	Required to install energy monitoring equipment for continuing evaluation Follow-up survey
Bundling and coordination of program services	Semi-annual deadlines to facilitate loan bundling
Loan Requirements	
Loan interest rates and terms	7% (2% for program financing)
Credit underwriting	Energy audit ensures that annual savings are more than annual payments
Loan terms and conditions	Repayment over 5-20 years depending on lifetime of project Savings cover all aspects of project costs (including audit, evaluation etc.)
Admin structure for servicing loans	Responsibility of municipal government Municipal government keeps late fees
Loan payments	Depends on specific project, determined by audit

3.5. Organization & Management

For the successful ongoing operations of the PACE program the efforts are split into three operational teams, (1) In-house staff, (2) Outside Senior Advisors, and (3) Energy Efficiency Contractors. The in-house staff is comprised of 6 full time professionals who will have the following positions, (1) General manager, (2) Legal counsel, (3) Finance auditor, (4) Marketing coordinator, (5) Building performance & diagnostics specialist, and (6) Customer service and application manager.

The Outside Senior Advisors team will be a group of Senior Managers and Finance Consultants interested in the growth of Clean Energy Finance solutions that will have regular meetings, mainly for planning activities. Members of this group may be employees of lender companies, ESCO's, and City administration agencies. This team will give periodic feedback to the in-house staff to continue improving the overall performance of the program.

A commercial partnership will be engaged with qualified local contractors who will be the main promoters of the program. They will be provided with marketing materials about the PACE program and a handbook with procedures on identifying candidate buildings, approaching

owners, and offering the benefits of the program. It is expected that the participation of contractors wanting to be hired for retrofit projects will be critical for word-of-mouth advertising. With this strategy, we are ensuring the creation of local jobs and keeping the in-house team at a minimum.

Other potential partnerships that will help strengthen the program will include energy efficiency non-profits, mortgage lenders, local governments, utilities, energy technology suppliers, property owner associations, and trade associations.

3.6. Barriers & Solutions

The cost of performing an initial energy audit of the building is a major barrier to participation in the PACE program. Since PACE financing is only awarded to buildings that can implement energy efficiency or renewable energy projects that generate savings to cover loan payments, not every building is eligible, even if it meets the other criteria. Therefore, the contractors are expected to absorb this risk as part of their marketing strategy for encouraging buildings to participate. This will increase trust, since contractors are not will not appear to be scamming business owners to buy an unnecessary audit. In addition, this will motivate contractors to focus on buildings with the highest probability of eligibility, thus reducing the risk. The state office will support contractors by making recommendations of what buildings to target based on the EPA portfolio manager data.

To reduce the complexity of evaluating technologies, this proposal recommends limiting the eligibility to proven technologies selected from case studies of existing successful municipal and state PACE programs. Once the staff is comfortable with these types of projects and a procedure has been established, the program can expand to renewable energy and more cutting edge technology.

Another key barrier is in identifying a reliable tracking mechanism. This proposal proposes establishing a competitive process to give academic researchers access to the data. This will encourage research, which may further improve methods for the future. In addition, all projects will be required to install monitoring for this purpose. Solutions to other barriers are summarized in Table 2.

Table 2. Summary of barriers and proposed solutions.

Barrier	Proposed Solution
Education/market acceptance	Get info from trusted source (word-of-mouth, government) Advertise with other related programs (tax software, utility)
Lien holder consent	Get major regional banks to endorse program
Complicated application/administration	Use low reading level Online self-test to determine eligibility Partner with contractors to act as ambassadors
Market identification	Based on EPA Portfolio Manager
Intrastate coordination	Annual meeting for municipal representatives Centrally coordinate project applications
Methods for tracking/evaluating program success	Competitive grant process to do evaluation Required to install monitoring

3.7. Roadmap to Sustainability

As determined appropriate based on participation rates, the PACE program will be opened to more complex projects and other types of buildings. This will be assessed on an annual basis with input from the Outside Senior Advisors. An example timeline is shown in Figure 4.

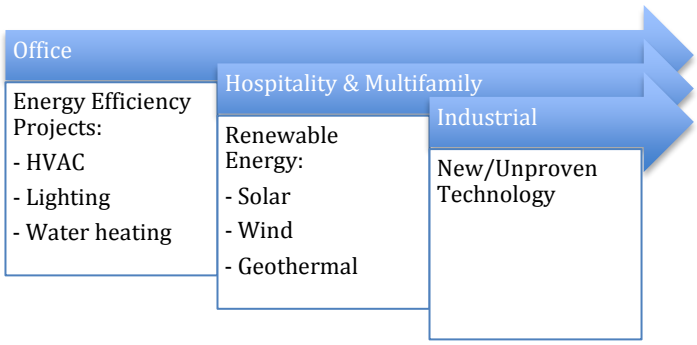

Figure 4. Sample timeline for project and building eligibility.

In addition, strategic indicators, shown in Table 3, for the success of the projects have been identified in order to ensure the sustained administration of the program. These indicators include the debt-to-income ratio, total and average savings, savings to investment ratio, and energy audit modeling. If these indicators are not achieved within the first 10 years of the program, a study will be conducted to recommend changes and potentially recommend eliminating the program.

Based on this model, the PACE program costs approximately $3.2 million to implement and begins to accrue revenue for the state after 8 years (see details in Appendix). Cash flow projections (included in the Appendix) indicate that a linear growth model increases revenues initially, but doesn't achieve the same adoption rates as the diffusion model. As shown in Figure 5, the linear model revenue becomes positive in year 3, while the diffusion model takes a year longer. This delay in revenues is justified by the increased efficiency of the program by scaling slowly.

Table 3. Strategic indicators for project success.

Indicators	Who	Expected Change	Benefit
Debt-to-income ratio	Participants	Must improve	Increase ability to repay PACE and other debt
Savings	Participants	Must be positive	Reduced utility bills RE Credits
SIR (Savings to Investment Ratio)	Investment project	SIR > 1	Limit eligibility
Energy audit & modeling	Participants, Government	Deliver energy and dollar savings	Limit investment to identified positive measures. Encourage energy efficiency before renewable energy

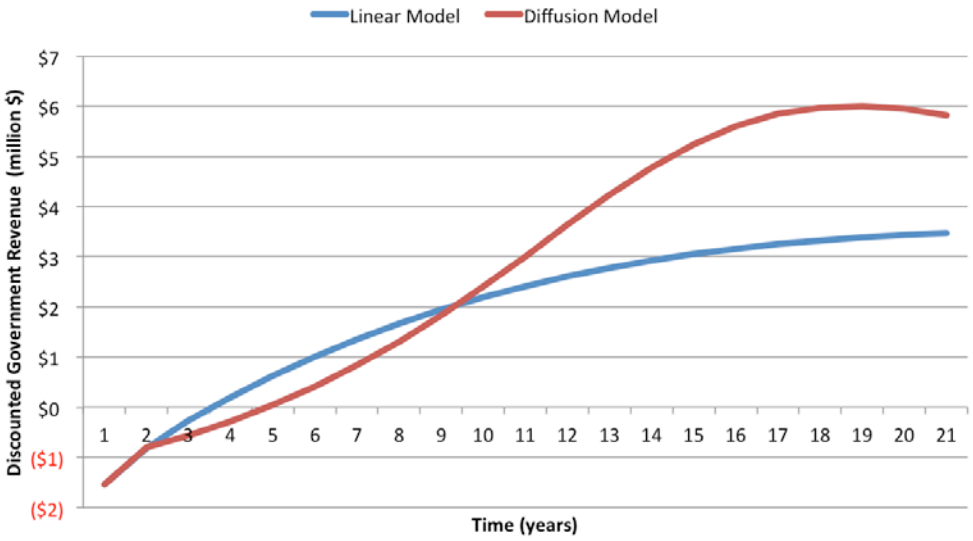

Figure 5. Revenue projections for government with diffusion versus linear growth models.

4. Conclusion

This program relies on slow growth initially to establish efficient procedures and allow the program to quickly evolve as challenges are identified. This will initially limit the number of eligible projects, but continuous evaluation will determine the best time to expand the complexity of the program. Based on the grassroots efforts of contractors, potential project candidates will be identified and recruited to build enthusiasm for the program. Although there are high short-term costs for the state, this program is ultimately a good investment that will improve quality of life across the state via more jobs, reduced pollution, and increased economic activity.

5. Bibliography

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6. Appendix

6.1. Market Assessment

Figure 1 was calculated via:

$$(P * B * L) * T$$

P = participation rate
B = number of office buildings (2200)
L = average loan size
T = threshold for sustainable program (2%)

6.2. Diffusion Model

The Bass diffusion model (Bass, 1969) is defined as:

$$\frac{dN}{dt} = \left[p + \frac{q}{m}\big(N(t)\big)\right][m - N(t)]$$

where:
N(t) = cumulative adoption at time t
p = coefficient of external advertising = 0.004
q = coefficient of internal advertising = 0.3
m = total potential (i.e. total number of buildings) = 2,200 (total number of office buildings)

On average, p is 0.3 and is often less than 0.1. Therefore, we assumed that our external advertising would be lower than average to estimate 0.004. A larger p moves the peak annual projects sooner.

(on average, q is 0.38 but typically ranges from 0.3 to 0.5. Therefore, we used a conservative estimate of 0.3. A larger q narrows the peak.

6.3. Cash Flow Model

Loan payments were calculated according to the amortization formula:

$$A = P\frac{r(1+r)^n}{(1+r)^n - 1}$$

where:
A = annual payments
P = principle loan = $400,000
r = interest rate = 5% + 2% = 7%
n = loan length = 20 years

Table 4. Assumptions for Cash Flow Analysis

Parameter	Value	Rationale
Number of cities	7	Given
Staff	6	Given
Cost of electricity	$0.13	Given
Total office buildings	2200	Given
Discount rate	5%	Typical Value (DOE, 2014)
Inflation (energy)	3%	Typical Value (DOE, 2014)
Application fee	$350	Typical Value (Efficiency Vermont, 2014)
Loan interest rate	5%	Midpoint for range (3-8%)
Program fee (interest)	2%	Slightly higher than existing program to improve cash flow (Efficiency Vermont, 2014)
Salary (including benefits)	$90,000/year	Average for government workers (BLS, 2013)
Fixed program costs (marketing, supplies, fees)	$500,000	Estimated
Number seed buildings per city	3	Based on diffusion model results
Average loan size	$400,000	Order of magnitude estimate based on historical projects – between median and average (PACENow, 2014)
New project rate	3%	Estimate for linear model
Average energy savings per project	20%	Estimated
Target building energy use	1,500 MWh/year	Estimated

The government program earns revenue from the application fees and interest. Costs include salaries, start-up, and various fixed costs (marketing, supplies, fees etc.). Variable costs, such as the property title search fee is charged to the property owner and included in their loan.

For office buildings, loan payments must be less than expected savings such that the property owner is cash flow positive as soon as construction is finished. Given that energy prices are subject to inflation, the savings become more valuable over time. The loan payments are calculated using the amortization formula.

Table 5. Cash Flow for Typical Office Building. Savings increase over time to account for inflation of energy prices.

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Revenue																					
Estimated Savings (thousand $)			$41	$43	$44	$45	$47	$48	$49	$51	$52	$54	$56	$57	$59	$61	$63	$64	$66	$68	$70
Costs																					
Loan Payments (thousand $)			($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)	($38)
Application Fee		($750)																			
Discounted Revenue (thousand $)	$0	($0.71)	$2.7	$4.3	$4.9	$5.5	$6.7	$7.1	$7.4	$8.4	$8.6	$9.4	$10	$10	$11	$11	$11	$11	$12	$12	$12
Aggregated Discounted Revenue (thousand $)	$0	($0.71)	$2.0	$6.3	$11	$17	$23	$31	$38	$46	$55	$64	$74	$84	$95	$106	$118	$129	$141	$152	$164

Table 6. Cash Flow for Government with Linear Growth Model.

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Revenue																					
Application Fees (million $)		$0.0074	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023	$0.023
Loan Interest (million $)		$0.17	$0.70	$1.22	$1.75	$2.28	$2.81	$3.34	$3.86	$4.39	$4.92	$5.45	$5.98	$6.50	$7.03	$7.56	$8.09	$8.62	$9.14	$9.67	$10.20
Costs																					
Salaries (million $)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)
Start-up (million $)	($0.5)																				
Fixed (million $)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)
Discounted Revenue (million $)	($1.5)	($0.8)	($0.3)	$0.2	$0.6	$1.0	$1.3	$1.6	$1.9	$2.2	$2.4	$2.6	$2.8	$2.9	$3.0	$3.1	$3.2	$3.3	$3.4	$3.4	$3.5
Aggregated Discounted Revenue (million $)	($1.5)	($2.4)	($2.7)	($2.5)	($1.9)	($0.9)	$0.5	$2.1	$4.0	$6.2	$8.6	$11	$14	$17	$20	$23	$26	$30	$33	$36	$40

Table 7. Cash Flow for Government with Diffusion Growth Model.

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Revenue																					
Application Fees (million $)		$0.008	$0.010	$0.013	$0.016	$0.020	$0.025	$0.031	$0.038	$0.044	$0.051	$0.056	$0.060	$0.062	$0.060	$0.056	$0.049	$0.042	$0.034	$0.026	$0.020
Loan Interest (million $)		$0.18	$0.40	$0.69	$1.1	$1.5	$2.1	$2.8	$3.7	$4.7	$5.8	$7.1	$8.5	$9.9	$11	$13	$14	$15	$15	$16	$16
Costs																					
Salaries (million $)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)	($0.54)
Start-up (million $)	($0.5)																				
Fixed (million $)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)	($0.5)
Discounted Revenue (million $)	($1.5)	($0.8)	($0.6)	($0.3)	$0.0	$0.4	$0.8	$1.3	$1.8	$2.4	$3.0	$3.6	$4.2	$4.7	$5.2	$5.6	$5.8	$6.0	$6.0	$5.9	$5.8
Aggregated Discounted Revenue (million $)	($1.5)	($2.4)	($2.9)	($3.2)	($3.2)	($2.8)	($2.0)	($0.7)	$1.1	$3.5	$6.4	$10	$14	$19	$24	$30	$36	$42	$48	$53	$59