CHAPTER 2: STRATEGIES TO FACILITATE FINANCING
STORMWATER RETROFITS ON PRIVATE PARCELS

Presuming that demand among private parcel owners for stormwater retrofits materializes, the vast majority of nonresidential owners would likely seek outside financing for stormwater retrofits, rather than self-finance the entire up-front costs of a retrofit on their parcels. This chapter therefore introduces a third-party financing model that has been developed in the energy retrofit market and builds on the conclusions and recommendations of Chapter 1. The authors explore the specific challenges that could arise as both parcel owners and investors rely on avoided stormwater fees as a measure of payback on their up-front investments in green infrastructure. This chapter then borrows from the energy retrofit sector to suggest a handful of potential programs that the Philadelphia Water Department (PWD) could deploy to mitigate the identified challenges.

2.1 BACKGROUND: THIRD-PARTY “PROJECT DEVELOPER” MODELS

Conversations with property owners and engineering firms, as well as inferences from the energy efficiency finance context, reveal that most nonresidential parcel owners are unlikely to self-finance green infrastructure projects with payback periods longer than three to four years. As indicated in Chapter 1, however, few stormwater retrofits are likely to reach discounted payback within that time frame. As a result, for green infrastructure retrofit projects to be implemented at scale on private parcels, property owners will seek outside financing opportunities for desired projects.

In contrast to a private parcel owner, a third-party capital provider is likely to be more comfortable with a longer payback scenario, particularly when the provider designs, installs, and maintains SMPs, because such a provider will have better knowledge of risks specific to a given project. In addition, whereas a parcel owner is fully exposed to the risk arising from the stormwater retrofit installed on his or her property, a third-party provider will benefit from the ability to spread risk over a portfolio of green infrastructure projects. Drawing from practices in the energy efficiency finance market, where third-party financing of commercial property efficiency projects often extends across a 10-year period, the authors have utilized a 10-year discounted payback as a measure of economic viability for stormwater retrofits underwritten by third-party financing.

Under current market conditions, however, the majority of nonresidential parcel owners are unlikely to be unable to obtain traditional secured debt for stormwater retrofits.  

Most have existing liens on their assets, including covenants that prevent them from taking on additional (even subordinate) debt backed by the property. Because stormwater retrofit installations would have very low (if any) collateral value if they had to be repossessed, the retrofits themselves are not valuable security in the event of default. The lack of a valuable asset-based security, in combination with the lack of collateral resulting from the retrofit project installation, means that any traditional debt providers would be lending on an unsecured basis, driving interest rates high enough to deter most parcel owners from borrowing, if financing were to be offered at all. It is important to note here that the authors know of no existing loan products tailored to a building owner who will use the proceeds to reduce his or her stormwater fees.

To overcome the challenges of traditional debt financing for stormwater retrofits, the third-party financing models that have arisen in the in the energy retrofit sector may be a good fit for the emerging stormwater retrofit market. Like stormwater retrofits, energy retrofit projects on commercial buildings are also poorly suited to traditional asset-backed debt financing. Therefore, financing models from the energy efficiency sector, often termed “third-party off-balance-sheet” or “project developer” financing structures, are predicated on a private capital investor providing all, or a substantial portion, of the capital needed for a retrofit. Under this structure, the retrofit capital provider acts as a project developer, not only providing the financing but also arranging for the design, construction, and ongoing maintenance of the installed projects. In return for the up-front capital and maintenance services, the capital provider/developer enters a long-term service contract with the parcel owner, assuring the developer a portion of the owner’s avoided stormwater fees for a fixed period. From the project developer’s perspective, the control over the retrofit installation and maintenance provides assurance that the project will receive the optimal stormwater fee reductions, providing a basis for the project developer to be repaid. From the parcel owner’s perspective, these financing arrangements are preferable to traditional debt for a number of reasons. In addition to providing most or all of the capital up front, for accounting purposes the long-term service contract with the project developer can be treated as an operating expense, removing the stormwater management practice (SMP) asset from the owner’s balance sheet.

In the energy retrofit sector, this type of third-party financing has taken root primarily in the municipal/university/school/hospital sector, where there is often a public credit backstop for project financing. In the purely private sector, only relatively large projects (larger than $500,000) tend to be financed through third-party off-balance-sheet arrangements, and in all cases of successful financing, building owner credit and debt service coverage ratios are strong, and consent for the financing is required from existing lenders.
The third-party off-balance-sheet model is described here to illuminate a financing strategy that could be applied to stormwater retrofits on commercial properties. Although the vast majority of stormwater retrofits within the Philadelphia combined sewer service area will cost less than $500,000 per project, this chapter will detail the important role that project aggregation strategies can play in unlocking stormwater retrofit financing.

The third-party off-balance-sheet model, depicted in Figure 2.1 below, is referred to in the energy efficiency retrofit finance sector as a “third-party off-balance-sheet financing,” “power purchase agreement–style financing” or “energy services agreement financing.”

**Figure 2.1: Third-party Off-Balance-Sheet Model**

<table>
<thead>
<tr>
<th>Capital provider</th>
<th>Property owner</th>
<th>Engineering firm</th>
<th>Post-retrofit, property owner can see stormwater utility bills greatly reduced.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplies the financing to design, install, and maintain green infrastructure.</td>
<td>Makes monthly payments to project developer/capital provider; payments can be based on avoided stormwater fees.</td>
<td>Installs green infrastructure and maintains the improvements for contracted period.</td>
<td></td>
</tr>
</tbody>
</table>

2.2.1 Regulatory Risk

While property owners who install green infrastructure projects can realize a variety of benefits (such as reduced flooding, increased property value, reduced summer cooling costs), the vast majority of investors will be making investments in green infrastructure based on the promise of reduced stormwater fees. For those investors who will rely on stormwater fee reductions to generate a return on stormwater retrofit investment, perception of the regulatory risk surrounding PWD’s stormwater fee and credit system will dramatically impact their willingness to invest.

In Philadelphia, key revenue uncertainties that could undermine investment potential in stormwater retrofits are 1) potential changes to the current credit and fee policy, and 2) an untested credit renewal process.

These challenges are explored in more detail in the following two subsections.

2.2.1.1 Changes in Credit and Fee Policy

Changes to the broader stormwater fee credit policy and implementation of a proposed Customer Assistance Program are examples of policies that create uncertainty for stormwater retrofit investors.

**Changes in Credit and Fee Policy**

If a given green infrastructure retrofit is expected to require eight years of avoided stormwater fees to break even, a project investor would require some certainty that the stormwater fee and credit system would remain intact for at least the next eight years. During that eight-year period, increases in utility fees (and corresponding credits) would be welcomed, since they would accelerate project payback and the return on the green infrastructure investment. Alternatively, a decrease in fees or a change in how owners are credited for green infrastructure could extend the project payback period and reduce the return on investment. In the unlikely case that a regulatory policy shift led to the elimination of the parcel-based fee system altogether, the projected payback on the green infrastructure project would be completely eliminated.

**Customer Assistance Program**

Under the new fee structure, owners of large parcels with significant impervious surface area are facing substantial increases in their monthly stormwater bills. In response to skyrocketing stormwater fees as the new parcel-based fee is phased in, a cadre of large parcel owners has organized and won concessions from the PWD, including allowances to “highly impacted” owners.

At the urging of these organized parcel owners, PWD implemented the Stormwater Assistance Phase-in Program (SWAPP). SWAPP provides eligible highly impacted owners with the opportunity to limit year-to-year stormwater fee increases to 10 percent.

When initially implemented by PWD, the SWAPP program was scheduled to terminate in FY14, the final year of the parcel-based fee phase-in period. However, earlier this year, at the urging of parcel owners and the City Council,
PWD proposed to extend the 10 percent annual increase cap for at least several more years. This continued rate relief program for highly impacted property owners is known as the Customer Assistance Program (CAP). If adopted and maintained over the long term, the CAP would extend the phase-in of the new parcel-based system from four years to as much as 20 to 30 years for the most highly impacted properties.

Implementation of the CAP program would send a signal to the market that Philadelphia’s stormwater fee and credit policy are malleable and susceptible to outside political pressure. Moreover, the implementation of a CAP would also negatively impact local investments in green infrastructure projects. Analysis has shown that CAP-eligible properties would realize much lower rates of return on SMP retrofits. In a substantial number of cases, retrofit projects that would be economically desirable to private investors under a full phase-in of the parcel-based fee system would become poor investments under the CAP.35

Extension and expansion of the CAP could significantly impact the budding market for SMP retrofit finance. This is due to the likelihood that many of the owners most likely to participate in the CAP are those who would have the most to gain from investing in stormwater retrofits. Currently, 278 parcels are participating in the SWAPP program, representing an aggregate total of 1,933 impervious acres; these would carry over into the CAP, continuing their rate relief and substantially undermining the incentive to invest in retrofits.

For prospective investors in green infrastructure projects, the CAP raises questions regarding the stability of PWD’s stormwater fee system, while simultaneously reducing the economic viability of a group of potential large SMP retrofit projects. It is safe to say that the adoption and expansion of the CAP program would further contract the total universe of economically viable retrofit projects—especially if it is repeatedly extended in the future, beyond the next several years.

Instead of repeatedly limiting stormwater fee increases via the CAP program, thereby discouraging potential investment in stormwater retrofits, PWD could create programs to improve the availability of retrofit financing, thereby enabling property owners to “earn” a reduction in their fees by investing in better stormwater management. These ideas are explored further in the sections below.

2.2.1.2 Untested Credit Renewal Process

PWD will be relying on the installation as well as the performance of stormwater retrofits to meet its Clean Water Act compliance obligations. Since many green infrastructure retrofits will cease to function at their designed performance level if not properly maintained, a process to periodically renew stormwater credits is needed. Under current PWD regulations, stormwater fee credits for private parcels expire after a four-year period. To renew the credit, at the end of each four-year period, a professional certification and photographic evidence of SMP functionality must be submitted for reapproval. In addition, the parcel owner must allow PWD access to the property to verify the information provided in the renewal application.36 Since few potential retrofit projects provide a return on investment in less than four years, the success of most projects would depend on the credit renewal process.

In discussing the stormwater retrofit market with members of the investment community, the authors noted that the limited duration of the initial stormwater credit (four years) and the untested credit renewal process create risk in the form of revenue uncertainty. Because the parcel-based fee and credit system has been in place since July 2010, owners who have obtained reductions in their stormwater fees have not yet had an opportunity to reapply for their credit. As a result, there is some uncertainty regarding how the renewal process will work in practice. While it is hoped that initial renewal applications will bring some sense of certainty to the process, the first renewals will not occur until mid-2014 at the earliest.

In the short term, PWD could take the following steps toward mitigating the perceived regulatory risk and risks associated with credit renewal:

- Publish a long-term fee schedule indicating projected stormwater fees and credits (preferably up to ten years).
- Create a “price floor” whereby investors in stormwater retrofits are guaranteed a minimum credit against their fee for a fixed amount of time, regardless of changes in stormwater fees and credit policy. (Credits would still be subject to periodic renewal, contingent on proper maintenance of the SMP.)
- Provide guidelines explaining what site inspection will entail and explicit examples of projects that will or will not meet renewal requirements.
- Make available an expedited appeal process in cases of credit nonrenewal.
- Consider extending the initial credit beyond four years in recognition of the extended payback period of most SMP projects. In considering such an approach, PWD will need to consider the potential impact that extending the credit period could have on meeting Philadelphia’s compliance obligations.

2.2.3 Project Risk

Project risk is a key concern for investors contemplating stormwater retrofits in Philadelphia. These risks include the technical risks of retrofit nonperformance, risk arising from changes in the parcel owner’s financial health, or any other scenario that could lead to default in repayment to a third-party retrofit capital provider.

The technical project risks associated with green infrastructure retrofit finance may be not only different but lower-risk, in some cases, than retrofit projects in the energy efficiency sector.37 For example, in the energy-efficiency space, behavioral factors, such as fluctuations in tenant energy use, can have a notable impact on the avoided costs resulting from a building retrofit. An unexpected decline in energy prices could also reduce future savings, as would a
net reduction in building energy use due to tenant vacancy. In addition to behavioral risk, the potential for retrofit performance problems also drives up project risk in the energy efficiency sector. Such risk can include failure of a new chiller or building management system, or unexpected degradation of project performance over time. While green infrastructure retrofits do require ongoing maintenance, such as the raking of a rain garden to ensure that fallen leaves do not block infiltration, the degree of technical risk is substantially lower than for energy-efficiency technologies installed in a high-tech building. Assuming successive credit renewal approvals, revenue risk for stormwater retrofits is therefore tied primarily to the policy resolve of the implementing utility. Therefore, if and when investors gain confidence in the longevity of the stormwater fee system and the character of the credit renewal process, revenue uncertainty can be substantially abated.

NRDC’s “Financing Stormwater Retrofits” report identified lack of collateral, high transaction costs in relation to project size, and lack of a track record for stormwater retrofit financing repayment as key project risk elements. Interviews with members of the investment community revealed that, while technical performance risks for SMP investments may be acceptable, the limited repayment track record for stormwater retrofits in Philadelphia, coupled with the unsecured nature of the financing, would lead to project loan interest rates into the double digits. Moreover, the investment community suggested that, in the absence of additional financial backstops against potential losses on green infrastructure investments, only a handful of stormwater projects would succeed in securing private financing.

2.3 PROGRAMMATIC INTERVENTIONS TO MITIGATE PROJECT RISK

To address the revenue challenges outlined in the preceding section, PWD could take a number of immediate actions to mitigate project risk and facilitate investment in green infrastructure. The following section outlines three programmatic options: creation of a loan loss facility to limit revenue risk, development of an on-bill financing program to facilitate project repayment, and development of a tax lien–based financing program to facilitate project repayment.

2.3.1 Loan Loss Facility to Limit Revenue Risk

Creation of a loss reserve facility has proved to be an effective mechanism through which to draw investors into a new and unproven sector by reducing potential financial losses. A loan loss facility, which serves to backstop a larger pool of investment capital, insulates investors from a specified amount of project risk and can thus improve private capital financing terms or enable project financings that otherwise might not have succeeded.

Loan loss reserve facilities have been utilized in a wide range of cases where a public or private entity seeks to stimulate investment in a particular sector. The source of funds for the loan loss reserve could be a public entity (municipal, state, or federal) or a private not-for-profit organization. Over time, the investments that benefit from the initial credit support provided by the loan loss reserve would create a track record of repayment/performance in the supported sector. Future market actors would therefore be better able to assess projects on a more specific, empirical basis.

For purposes of illustration, say a local community development financial institution (CDFI) wishes to help establish a $40 million fund that would be deployed in loans to individual commercial property owners to implement stormwater retrofits. The CDFI could act as project originator and could underwrite each loan on terms mutually agreed upon with other capital providers to the loan fund.

Figure 2.2 depicts a sample capitalization structure for a $40 million loan fund backed by a loan loss reserve. The loan fund could include capital provided by program-related investments (PRI) from a not-for-profit organization and/or funds from a local CDFI or commercial lender. A loan loss reserve to support the CDFI loan fund (depicted in Figure 2.2, below) equaling 10 percent of the total loan fund amount would act as a guarantee against losses incurred by the senior tier(s) of fund capital until the loss reserve is extinguished. (It is important to note that whenever a new loan is extended to the property owner to make improvements, existing lender consent will nearly always be required before any new financing can be undertaken.)

Assuming that a private property owner seeking financing from the fund contributes 20 percent of the retrofit costs for a given retrofit project (thereby seeking 80 percent financing from the fund), and a maximum loan size of $36,000 for each acre (which is the threshold cost under which a project will pay back within ten years, as indicated in Chapter 1), a $40 million loan fund backed by $4 million in loss reserves could support approximately 890 acres on the terms outlined in Figure 2.3.86

As indicated in Figure 2.3 below, the blended cost of capital for the example loan fund is in the range of 3.9 percent to 5.4 percent. This serves as a minimum interest rate that the fund would charge to borrowers. In order to cover its operating costs, the fund could assess an origination fee to each borrower.

The capital structure in any given fund would need to be agreed upon by the participating capital providers. In order to attract capital providers who would put funds at risk while still keeping the weighted average cost of capital (and therefore the baseline interest rate for borrowers) sufficiently low, the loan fund should be structured to reduce senior lender risk to the maximum extent possible.

There are several approaches the fund could take to reduce risk to the senior lender:

- Require borrowers to provide additional security or guarantee.
- Have second- and third-position capital providers take a longer amortization schedule or even deferred amortization, so that senior tiers of capital could be structured with accelerated amortization and receive early repayments on their principals.
Pledge the full loan loss reserve to the senior lender, such that the senior lender would be willing to lower its cost of capital in line with the lower risk of lost principal. Note that this would increase the risk to the second and third positions, potentially causing them to increase their expected return on investment.

As indicated in the illustrative example in Figure 2.4, following, a number of local institutions could play instrumental roles in augmenting a pool of capital available for stormwater retrofits in Philadelphia.

Although lending could be originated by a local CFDI, a commercial lender or other aggregators could also play origination roles as long as agreed-upon underwriting criteria are met that would minimize repayment risk. Specific underwriting criteria would ultimately be determined by the leadership of the fund and credit enhancement administrator, but could include:

- threshold loan-to-cost ratio with required borrower contributions;
- requirement that borrowers be current on stormwater utility bills and able to demonstrate a track record of timely utility bill payment;
- minimum debt service coverage ratio;
- maximum cost per greened acre; and
- maximum and minimum project cost.

The fund structure presented above represents only one way of addressing credit enhancement through a loan loss reserve fund. Alternatively, concessionary capital from PWD and other institutions could be used in a credit enhancement program to individual lenders.
Figure 2.3: Sample Terms for Participation in Stormwater Retrofit Loan Fund Backed by $4M Loan Loss Reserve

<table>
<thead>
<tr>
<th>Capital Tier</th>
<th>Capital Contribution</th>
<th>Loan Fund Subordination Position*</th>
<th>Lender Project Cost Basis **</th>
<th>Effective Lender Project Cost Basis***</th>
<th>Term and Amortization</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Lender Tier</td>
<td>$20M (50%)</td>
<td>Senior Position</td>
<td>0%–40%</td>
<td>0%–34.3%</td>
<td>10 Years</td>
<td>6.0%–8.0%</td>
</tr>
<tr>
<td>CDFI Tier</td>
<td>$8M (20%)</td>
<td>Second Position</td>
<td>40%–56%</td>
<td>34.3%–48.0%</td>
<td>10 Years</td>
<td>3.0%–4.0%</td>
</tr>
<tr>
<td>PRI Tier (multiple institutions)</td>
<td>$12M (30%)</td>
<td>Third Position</td>
<td>56%–80%</td>
<td>56%–80%</td>
<td>10 Years</td>
<td>1.0%–2.0%</td>
</tr>
</tbody>
</table>

Total fund size: $40M

Weighted average cost of capital: 3.9%–5.4%

*Subordination Position refers to the preferential position of each capital tier in cash flow distributions. For example, the senior position receives payments from borrowers first. Once full payment is made to the senior position lender, any excess cash flow is used to pay the second position lender until full payment owed to the second position lender is made. Once full payment is made to the second position lender, any excess cash flow is used to pay the third position lender until full payment is made.

**Lender Project Cost Basis is the percentage of total project cost associated with underlying loans in the fund’s portfolio that is borne by the lender, with the private property owner/borrower assumed to contribute 20 percent of total project costs. Project cost basis is a measure of risk in the project and is often referred to as “loan to cost.” The lower the range of exposure, the less risky the lender’s position in the capital structure of a given underlying loan in the fund’s portfolio.

***Effective Lender Project Cost Basis represents the maximum percent of a given underlying project’s cost that could be lost by the lender, given that the loan loss reserve would be used to guarantee and repay the first portion of any losses incurred by default of the underlying loans in the fund’s portfolio.

Figure 2.4: Illustrative Example of Institutions Participating in Stormwater Retrofit Loan Fund

<table>
<thead>
<tr>
<th>Institution (Examples)</th>
<th>Participation</th>
<th>Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philadelphia Water Department</td>
<td>$4M (Loan Loss Reserve)</td>
<td>Meeting CWA requirements by finding lowest-cost acres available within combined sewershed, including those on private parcels</td>
</tr>
<tr>
<td>Program-Related Investment(s) From Foundations</td>
<td>$12M</td>
<td>Diverse, such as community investment, green jobs development, and clean water</td>
</tr>
<tr>
<td>Community Development Financial Institution (Originator)</td>
<td>$8M</td>
<td>Diverse, such as community investment, green jobs development, and clean water</td>
</tr>
<tr>
<td>Commercial Lender (Originator)</td>
<td>$20M</td>
<td>Commercial</td>
</tr>
</tbody>
</table>

2.3.2 On-Bill Financing

A local utility’s existing relationship with ratepayers provides a unique opportunity to use known channels for collection of retrofit financing repayment. As indicated by the recent passage of on-bill legislation in New York and California, the structure has gained popularity in recent years in the energy sector, where electric utilities offer on-bill financing and repayment programs in order to facilitate energy efficiency retrofits. As discussed in the NRDC issue brief “On-Bill Financing: Overview and Key Considerations for Program Design,” utilities may lend capital to ratepayers to fund energy efficiency retrofit installations and then collect repayment through utility bills. In the energy finance sector, the funds provided for on-bill financing typically come from ratepayer funds or other state or local funds.39

In addition to using ratepayer or public funds, a utility is motivated to help facilitate a particular type of project financing on customers’ property can lend its own funds directly to property owners. It can also pare down its role to a purely collection function, allowing third-party capital providers to lend directly, but enabling repayment collection through the existing utility billing system, as depicted in Figure 2.5, below. In this case, the utility would collect the baseline utility rate in addition to the repayment, and would pass the retrofit repayment portion of the bill to the capital provider.
Where the utility serves as the collection intermediary, a demonstration that a particular owner has a track record of timely utility payment can improve investor confidence that the owner will also submit timely repayment of the SMP line item included as an add-on to the utility fee. In this way, on-bill collection of repayment for project financing can help mitigate project risk for investments, such as stormwater retrofits, where there is no track record of repayment for financed projects.

On-bill financing allows the property owner to view in one statement the aggregate impact of the stormwater credit applied against his or her bill as well as the additional monthly SMP capital repayment. The parcel owner and capital provider could contractually agree on a savings-based repayment schedule that addresses whether and how to divide the fee savings resulting from the retrofit. Only once the final payment to the capital provider has been made will the owner be able to capture the full benefit of the reduced stormwater utility bill.

Whereas on-bill collection can facilitate repayment, it does not address the lack of recourse for capital providers: In the event of nonpayment, capital providers are left with only a contractual dispute with a property owner. Although a water or energy utility may technically have the power to shut off service, in practice many utilities may be unwilling to do so in order to compel payment.

In cases such as Philadelphia, however, where the water utility is a municipal entity, on-bill collection of stormwater financing repayment may be able to provide additional security for capital providers in stormwater retrofit projects. If a municipal utility (such as PWD) were both legally able and willing to treat nonpayment of the stormwater financing line item as equivalent to nonpayment of the stormwater bill, failure to repay the stormwater financing line item on a utility bill could result in a tax lien on the property. If the proceeds from the tax lien were assignable to the stormwater retrofit capital provider, this would provide attractive collateral—as well as a strong incentive for the owner to remain current on both utility fees and retrofit repayments.

In Philadelphia, relevant market participants have suggested that municipally backed collection could be sufficient to draw investors to projects they would otherwise be reluctant to finance, even absent another financial backstop such as a loan loss reserve. As of this writing, it remains a question whether PWD has the legal authority to treat nonpayment of a private debt with the same tax lien consequences as nonpayment of a utility bill.

Alternatively, if a utility were willing to assign some or all of the cash value of a stormwater credit directly to the capital provider, rather than provide the full value of the credit directly to the parcel owner, this would improve the attractiveness of an on-bill program to prospective capital providers. While this mechanism has not been implemented by any existing on-bill utility program, it has the power to provide additional repayment assurance and reduced risk to the capital provider. This structure, illustrated in Figure 2.6, below, would appeal to capital providers because instead of underwriting the parcel owner, they would be underwriting the utility. This structure would also provide benefits to the parcel owner, as financing terms for PWD-insured projects should be better than those for individual parcel owners.
### 2.3.3 Tax Lien–Based Security Mechanisms: PACE and Springing Liens

Given the role that tax lien-based security can have in attracting project investors, two variations on the tax lien theme are also instructive. The best-known example of tax-lien financing, developed in the energy efficiency/renewable energy context is Property Assessed Clean Energy (PACE), where repayment for constructed clean energy projects is secured through a line item on the property tax bill. Another variation on the tax lien financing theme is a “springing lien” structure, which will be discussed below. Although in both cases the municipality utilizes its tax lien authority to ensure payment, project underwriting standards would still be need to be met (e.g., credit rating, debt service coverage ratios, timely property tax payments) in order for properties to qualify for program participation.

#### 2.3.3.1 Property Assessed Clean Energy (PACE)

**PACE** is a finance program that was developed to help residential and commercial building owners afford renewable energy, energy efficiency, and water efficiency improvements. Currently, 27 states and the District of Columbia have passed legislation providing municipalities with legal authority to implement local PACE programs.40

In a typical PACE model, a municipality issues special revenue bonds, the proceeds of which are disbursed to participating property owners to finance parcel-level energy or water efficiency improvements. Property owners who receive PACE financing for such retrofits agree to repay the project costs via assessment fees on their property taxes for up to 20 years.

#### 2.3.3.2 Springing Liens

An alternative to PACE is a “springing lien” financing structure. In this model, similar to PACE, investors extend capital to parcel owners for property improvement and are repaid through municipal tax collection. However, under the springing lien approach, a tax lien on the property is triggered only when property owners default on project repayment. In this regard it differs from the PACE approach, which is premised on municipal collection from the start.

The springing lien structure was suggested to the authors of this report by a Philadelphia-based commercial banker. Although the idea appears to be viable if a municipality is willing (and legally authorized) to implement it, there are no current known examples of this structure’s actually being used, in the energy project finance context or elsewhere.

The springing lien model was suggested to PWD, but the agency indicated that under current law, the City of Philadelphia lacked statutory authority to levy tax liens in the event of property owner default on private debts. However,

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**Figure 2.6: Utility Assigns Credit Resulting From Retrofit Directly to Capital Provider**

<table>
<thead>
<tr>
<th>CAPITAL PROVIDER</th>
<th>WATER DEPARTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital provider pays for design, installation, and maintenance of green infrastructure.</td>
<td>Post-retrofit, utility assigns credit resulting from the retrofit to the capital provider.</td>
</tr>
<tr>
<td>ENGINEERING FIRM</td>
<td>PARCEL OWNER</td>
</tr>
<tr>
<td>Engineering firm maintains the improvements for contracted period.</td>
<td>Post-retrofit, parcel owner pays utility bill, which is reduced by a credit against the fee and is augmented by a repayment line item for capital provider.</td>
</tr>
</tbody>
</table>

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in cities where municipalities are authorized to use their tax lien authority to enforce a private contract when the purpose is public in nature (such as alleviating the need for the city to pay for expansion to public storm sewer systems), a springing lien financing structure could be a viable way to provide additional security to investors in green infrastructure retrofits. As of this writing, however, it remains a question whether other cities may have such legal authority.

2.4 CHAPTER CONCLUSIONS AND RECOMMENDATIONS

Conversations with property owners suggest that, even in a market environment where the economics of stormwater retrofits are favorable, property owners would still be reluctant to tie up capital in an on-site SMP project. Therefore, in addition to the policies and programs outlined in Chapter 1, the Philadelphia Water District would need to consider further measures to encourage the development of a thriving third-party financing market for private parcels. In considering the development of third-party financing mechanisms, it is clear that issues surrounding regulatory and revenue certainty will impact the development of private financing markets for greened acres. Based on the authors’ findings, PWD should consider the following recommendations to strengthen regulatory and revenue certainty:

Recommendations to Increase Regulatory Certainty

- **Establish a long-term stormwater fee schedule.** Increased certainty of long-term stormwater fee policies and credit renewal procedures would 1) help parcel owners and third-party investors evaluate the desirability of the stormwater retrofit market, and 2) reduce risk of revenue volatility. For example, any actions PWD could take to make available a 10-year projected fee schedule could help alleviate long-term fee and credit policy uncertainty.

- **Restrict the Customer Assistance Program.** The CAP substantially reduces the viability of private investment in stormwater retrofits on the largest impervious properties. If PWD’s goal is to optimize private sector investment in green acre development, it should consider greatly reducing the scope of the CAP; at a minimum, the program should not be extended beyond the three additional years PWD is currently proposing.

- **Create a credit price floor.** PWD could establish a “price floor” whereby investors in stormwater retrofits are guaranteed a minimum credit against their fee for a fixed amount of time, regardless of changes in stormwater fees and credit policy. (Credits would still be subject to periodic renewal, contingent on proper maintenance of the SMP.)

Recommendations to Increase Revenue Certainty

- **Reduce stormwater credit renewal uncertainty.** To reduce uncertainty and risk regarding the credit renewal process, PWD should consider the following:
  - Provide guidelines for the fee credit renewal process, including what site inspection will entail and examples of projects that would or would not meet renewal requirements.
  - Provide an expedited appeal process, in case of credit nonrenewal.
  - Consider expanding the credit time period, given that very few projects will reach simple payback in less than four years.

- **Continue to research the viability of on-bill financing and collection,** with efforts including but not limited to:
  - exploring the legal viability of on-bill financing in Philadelphia;
  - determining whether default on a stormwater retrofit repayment could be treated in the same way as default on a stormwater bill;
  - determining the legality and political will to assign liens on property to ensure retrofit repayment; and
  - determining the cost to administer an on-bill financing program.

- **Explore development of a loan loss reserve fund.** PWD should continue investigating the impact, viability, and structure of a loan loss reserve facility that would serve as a financial backstop for a commercial loan fund, with efforts including but not limited to:
  - researching viable sources for a loan loss facility, including but not limited to public sources such as clean water state revolving funds or private funds such as corporate or philanthropic sources;
  - determining how a commercial loan fund backed by a PWD-provided loan loss reserve could impact parcel owners differently from existing financial assistance programs offered by PWD, such as grants available through the Stormwater Management Incentives Program (SMIP);
  - exploring how a PWD-funded loan loss facility might impact PWD’s financial bottom line differently from existing financial assistance programs, such as SMIP;
  - working with relevant stakeholders to evaluate the potential impact of a loan fund in proving out specific retrofit financing models and creating an attractive market for project developers/aggregators;
  - in partnership with relevant stakeholders, gauging the volume of interest in a commercial loan fund from potential capital contributors and potential demand for financing from parcel owners.