

# Financing Stormwater Resilience

## How Energy Efficiency Can Inform Decision-Making for Green Stormwater Infrastructure

A Masters Project by Kendall Starkman

### Introduction

In order to better understand how to leverage private investment for green stormwater infrastructure, this project aims to identify the key criteria that influence the success of three types of energy efficiency (EE) financing programs in the United States and draw cross-sector parallels to green stormwater infrastructure (GSI) in order to inform a decision-making framework for GSI program design.

### Why EE and GSI?

Equivalencies	Energy Efficiency	Green Stormwater Infrastructure
<b>Market Barriers</b>	High up-front costs High transaction costs Split incentive Timing mismatch Uncertainty of savings & risk Limited capital availability Scalability	High up-front costs High transaction costs Split incentive Timing mismatch Uncertainty of savings & risk Limited capital availability Scalability More economical land use alternatives
<b>Rate Structure</b>	Base fee + Cost per kWh	Base fee + Cost per % impervious area
<b>Project Scale</b>	Whole-building, technical equipment installation	Landscaping, construction
<b>Key Players</b>	Utilities, property owners, city/county government, contractors	Utilities, property owners, city/county government, contractors
<b>Market Conditions</b>	Established, at scale	Experimental, not scaled
<b>Traditional Drivers of Action</b>	Incentives	Regulations
<b>Measurement</b>	Meters	No Meters – Measurement & Verification needed
<b>Billing Format</b>	Passed on to tenant	Either or both: passed on to tenant (water bill) and/or direct to building owner (property tax)
<b>Economic Drivers</b>	Lower operating cost	Lower stormwater fee, best use of property
<b>Available Information</b>	Medium info, many examples of program success, growing access	Little info, limited proven programs, limited access
<b>Alternatives</b>	Business as usual	Business as usual

Based on the report "Innovative Financing for Voluntary Green Stormwater Infrastructure: Lessons Learned from Energy Efficiency" by Kendall Starkman, May 2016. Available at: <http://dukespace.lib.duke.edu/dspace/handle/10161/11937>

Citations: PACE Nation. (2016). PACE Programs Near You. Website. Accessed September 8, 2016 at <http://pacenation.us/pace-programs/>

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\* Credit enhancements are financial instruments which reduce risk of investment and allow investors to offer loans to customers at a reduced interest rate. These include loan loss reserve funds, loan guarantee programs, interest rate buy-downs and revolving loan funds.

### Proven EE Programs

#### Energy Performance Contracting with ESCOs

Energy Services Companies (ESCOs) are large commercial firms that implement comprehensive energy efficiency retrofits from audit to measurement and verification. Energy Savings Performance Contracts with property owners are typically designed so the cost-savings meet or exceed the total cost of the retrofit. Projects must reach a large enough scale to produce a sufficient margin of energy savings to justify ESCO and investor involvement.

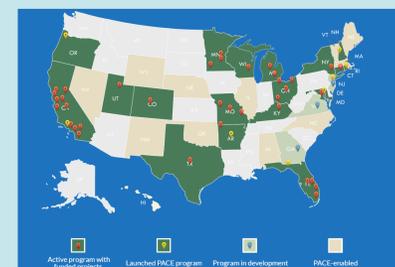
Funding Source	Payback Mechanism	Legislative Requirements	Payback Period	Managing Entity	Project Scale
Private	Direct to Financial Institution	No	10 years	ESCO	Large



#### PACE Financing

Performance Assessed Clean Energy (PACE) programs are a type of third party financing program that use property tax liens to back bonds issued by a municipal financing district for energy efficiency retrofits. The loan is repaid over the lifespan of the retrofit through the owner's property tax, and since PACE loans are associated with the property and not the owner, repayment costs remain with the building if it is sold.

Funding Source	Payback Mechanism	Legislative Requirements	Payback Period	Managing Entity	Project Scale
State and/or private	Property Tax	Yes	20 years	Third party admin, state, county	Small, Medium, Large



#### On-Bill Repayment

Though On-bill repayment (OBR), third party entities or utilities can provide up-front capital for an energy efficiency retrofit that is then repaid through a surcharge on the property owner's utility bill. OBR strives to achieve "bill neutrality" and existing OBR programs have seen low default rates and positive cash flows while being able to utilize multiple funding sources and target multiple building sectors with one program.

Funding Source	Payback Mechanism	Legislative Requirements	Payback Period	Managing Entity	Project Scale
State, local and/or private	On-Bill	Yes	3-10 years	Third party admin	Small, Medium



#### ESCO Case Study: Ameresco

Ameresco leverages bill neutral solutions through ESPCs or Power Purchase Agreements to realize energy savings for large-scale commercial, industrial and institutional clients. Typical clients include large-scale institutional facility owners, such as the Chicago Housing Authority, Arizona State University, and the Logan International Airport.

#### PACE Case Study: Connecticut CPACE

Connecticut's state-wide PACE program is seen as the largest and most successful commercial PACE program in operation. 110 out of the state's 169 municipalities participate. It provides low-interest, long-term capital through the lien process so that government financing is not required. The program initially gained more success than other PACE programs by restoring senior lien status to PACE assessments and requiring mortgage lender permission for project approval.

#### OBR Case Study: California CHEEF Program

The California Hub for Energy Efficiency Financing has launched pilots for a state-wide on-bill repayment program for residential and commercial energy efficiency retrofits. Rather than having the state or utility establish and originate the loans, this program engages private investors on the front end to provide financing directly to the customer. The program is supported by a loan loss reserve fund sustained by ratepayer energy efficiency fees.

### Key Criteria for GSI

- Building stock of greatest concern:** small businesses, multifamily, commercial (high rises, office buildings), large-scale commercial (warehouses, large parking lots, multi-building complexes).
- Authorizing legislation:** PACE authorizing legislation, OBR authorizing legislation for energy efficiency, potential for OBR authorizing legislation
- Political buy-in:** High, medium, low
- Incentives:** Significant existing stormwater management incentives, minimal existing incentives, no incentives
- Regulatory requirements:** existing requirement (consent order, TMDL, etc.), potential requirements, basic requirements (Clean Water Act)

### Decision Tool: Durham, NC

Weight	Prerequisites			Market Drivers						Net Benefit
	Itemized Stormwater Fee	OBR Legislation	PACE Legislation	Customer of Primary Concern	Political Buy-In	Existing Stormwater Incentives	Maximum Allowable Parcel Credit	Average Claimed Savings	SW Consent Decree	
Location-Specific Characteristics	Yes	Yes	Yes	Small to Medium	Medium	No	0%	0%	Yes	
PACE	1	--	1	0.5	0.5	0	-1	-1	1	6
OBR	1	1	--	0.5	0.5	-0.5	-1	-1	1	5
ESCOs	1	--	--	-0.5	0	-1	-1	-1	0	-6.5

Key for Prerequisites		Key for Market Drivers	
Score	Impact	Score	Impact
0	Disqualified	-1	Negative
0.5	Potential	-0.5	Small Negative
1	Qualified	0	Neutral
		0.5	Small Positive
		1	Positive

### Summary of Findings

- PACE programs** are most appropriate in states with a history of PACE authorizing legislation, strong regulatory drivers for action and a wide range of target property sizes.
- Performance contracting with ESCOs** is more appropriate in places with a high concentration of large commercial building stock, limited legislative support and multiple incentives.
- On-bill repayment** programs are most applicable for small-scale GSI and where strong regulatory drivers for action exist.
- Shared key criteria include:
  - stormwater fee size and available margin,
  - potential to offer credit enhancements,\*
  - ability to leverage an economy of scale,
  - policy requirements affecting loan term stringency, and
  - existing availability of financial partners.
- As green stormwater infrastructure becomes a more attractive stormwater management solution for commercial properties due to increased awareness, regulatory drivers or rising rates, the cross-sector parallels identified here will be able to guide a more in-depth look into effective local program design.