NYCEEC

BUILDING FINANCIAL SOLUTIONS

CLEAN ENERGY PAYS OFF IN THE MULTIFAMILY MARKET

Commercial and industrial buildings are profiting from major energy efficiency upgrades. Here's how large multifamily properties can be next.

A case study from NYCEEC

OVERVIEW

If you have a significant investment in large multifamily buildings, energy costs have a major impact on your buildings' Net Operating Income (NOI). But lowering those costs to improve NOI calls for capital investment in building efficiency and systems that's often not an option given common debt structure and capital resources. At Roosevelt Landings, in New York City, a two-streamed approach combining deep building efficiency improvements with cost-saving cogeneration installation, created a model for improving NOI and rapidly increasing the value of the property by $19 million while serving the comfort needs of tenants, lowering the buildings' climate-related emissions, and meeting the City's audit and retro-commissioning requirements. NYCEEC provided the financing for $4.5M of the $8M total that allowed the project to come to fruition in 2013, and the results for both the building owners and the efficiency investors have been excellent. With a substantial return and no additional debt for the owners, it's a model that is likely to get the attention of property investors and managers nationwide.

The project took advantage of two increasingly common efficiency-related investment structures in which energy-related capital improvements become operating expenses to the building owner:

1. **The Power Purchase Agreement (PPA).** PPAs are used to finance onsite power generation such as rooftop solar and, in this case, cogeneration (cogen), in which natural gas is used to produce electricity and the excess heat is used for hot water or building heating. In a PPA, an outside entity finances, owns and operates the generation equipment and the building owner commits to purchasing the power generated at a set price for a specified length of time, benefitting the owner if market prices rise unexpectedly. The arrangement allows the owner to use more sustainable, more resilient power (because it's produced onsite, it may still be available during a grid outage) without putting up the capital or adding to the debt of the building.

2. **The Energy Services Agreement (ESA).** Similar to the Power Purchase Agreement, this less well-known approach brings third-party investment in deep energy efficiency improvements such as insulation, window operation, and system monitoring and controls. Having made the investment, the energy services provider keeps the majority of the returns. Costs for the owner don't rise, the building becomes more valuable thanks to the improved systems and infrastructure, regulatory requirements are met or exceeded, and the environment and tenants benefit, too.

While the two investment structures are reasonably well-known and well-proven in the commercial sector, they are underutilized in the large multifamily sector, particularly for affordable multifamily properties. In many parts of the country, there are often substantial government or utility incentives for these projects—in this case, $1.2M in rebates and grants.

The Roosevelt Landings results demonstrate the feasibility and the size of the multifamily opportunity both for the environment and for investors—a return high enough that ultimately Roosevelt Landings' investors chose to invest in the PPA and ESA entity outside of their investment in the building itself. Combining the energy efficiency and cogeneration investment stabilized the cash flow and increased the effectiveness of each (for example, sizing the cogen capacity took into account the low-flow fixtures). "Both have merit as standalone models, but combining them is super-powerful," says Susan Leeds, NYCEEC's CEO.

At NYCEEC, we expect to replicate this model, and we are taking an open-source approach so that others may benefit, too.

THE ROOSEVELT LANDINGS STORY: A CONFLUENCE OF PEOPLE AND CAPITAL

Roosevelt Landings is a 1,003-unit, nine-building (1,008,176 ft^2) mixed-income residential development located on Roosevelt Island in Manhattan. It was built in 1969 under New York State's Mitchell-Lama affordable rental housing program, and like many buildings of that era, its envelope, windows, hot water, and heating systems were created with little regard for energy efficiency. A first round of energy efficiency investment, in 2007, met incentive requirements but did not address many of the shortcomings.

What separated Roosevelt Landings from many other properties throughout New York City and the nation was not the buildings or their condition, but the people who were looking at options for improvement. Joshua Eisenberg, the executive vice president of the property owner, Urban American (the property has since changed hands), was concerned about the vast waste of energy in large multifamily properties and began driving Urban American to become a model for the reduction of carbon emissions. His recognition that energy efficiency was directly tied to NOI and building valuation made him open to innovative investment and financing options, especially when they presented alternatives to capital outlay.

Project manager David Davenport was looking to innovate from the other side. He, too, recognized the potential return, both financial and environmental, from major efficiency improvements. Together with Joshua Eisenberg, he formed an energy services company, Urban Greenfit, to take on the project design and implementation and to serve as the contracting PPA and ESA entity.

NYCEEC came into the project to analyze the financing opportunity and provide the debt to facilitate the transaction. Having energy expertise and a fundamental mission of helping buildings reduce energy use, NYCEEC was able to underwrite the projected savings, which in this financing structure serve as part of the collateral for the loan to Urban Greenfit. Thanks in part to this project, traditional lenders are now beginning to recognize the value of ESA and PPA contracts, but at the time, there were few options.

"Net operating income is a function of expenses as well as revenue. If you only focus on increasing revenue, you're missing critical ways to increase cash flow and value."

–Joshua Eisenberg, Urban American

ENGINEERING BEFORE FINANCING

While financing may seem like the critical factor in efficiency projects, it is engineering which determines the value of the project. The engineering must identify the building's efficiency potential and accurately project the savings, or the financials will falter. Achieving substantial efficiency gains often takes innovative engineering solutions. At Roosevelt Landings, for example, engineers recommended window sensors that turned the heat off in rooms with open windows.

Implementation is no less important. Small lapses in installation quality can multiply to have a large impact across 1M square feet of buildings.

The reality of engineering and implementation risk, however, reveals a major benefit of a PPA and ESA financing arrangement. The ESA and PPA investors have enormous incentive—far more than other capital project contractors—to get the numbers, the project design, the implementation and the on-going operations right. For the Roosevelt Landings project, Urban Greenfit and the engineering firm Steven Winter Associates not only met projections, they exceeded them by a considerable margin.

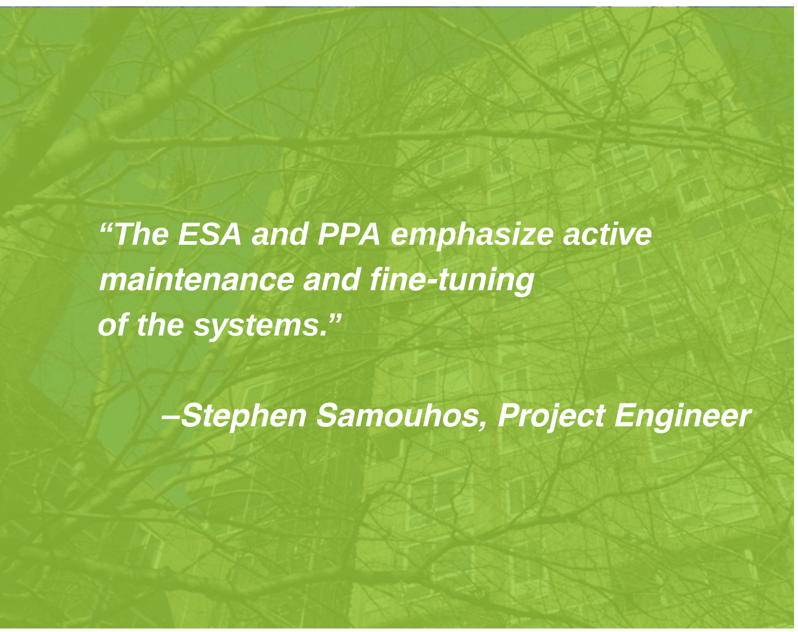
Hundreds of large and small improvements were identified and implemented. Major elements of the project included:

- Combined heat and power (CHP) and domestic hot water. Three 100-kW CHP (or cogeneration) units together have the capacity to generate 300 kW of electricity and 2.1 million BTU/hr of domestic hot water. The CHP system uses natural gas to create 15 percent of the building's electricity onsite and heats 40 percent of its domestic hot water. In projects with central heating systems, cogeneration capacity and power generation can be considerably larger. This system is equipped with "black start" capability to function as an emergency generator, supplying critical building systems such as in-house pumps for providing water to all apartments during grid outages. This project also installed five 1.35-million-BTU water heaters that operate at 95-percent fuel efficiency for supplemental hot water.
- Networked thermostats. The building is heated with electric baseboard heat. New baseboard heaters were paired with tenant-controlled and centrally-networked wireless apartment thermostats. Central networking allows for apartment-level

monitoring, limits thermostat settings and records in-unit temperatures. The window sensors only allow the heat to work when the windows are closed. Together, the systems help prevent overheating apartments or opening windows to adjust room temperature when the heat is on.

- **Whole-building air sealing.** At a cost of over $1 million, this was the largest air-sealing retrofit project in New York City at the time. Among the specific measures was a new ventilation system for elevator shafts. Prior to the retrofit, the tops of the shafts were vented directly to the outside, resulting in thousands of cubic feet per minute of conditioned air escaping. The old venting had met a building code that was changed in 2014, in part thanks to this project.

- **Floor slab insulation.** High-density spray foam was applied directly below the concrete floor slabs and at the wall penetrations of apartments that protrude over walkways and sidewalk arcades. This reduced the issue of cold floors in certain areas of the buildings, affecting the amount of apartment heat required for tenant comfort.



"The ESA and PPA emphasize active maintenance and fine-tuning of the systems."

–Stephen Samouhos, Project Engineer

IMPLEMENTATION	PROJECTED SAVINGS
Thermostatic control system	17% of heating energy 3.75% of total source energy
Air sealing	20% of heating energy 4.45% of total source energy
Cogeneration	6.1% of site electricity 5.5% of total source energy
Insulation, boilers, etc.	Savings calculated but not used to project ESA return
TOTAL	18.2% of source energy 9.2% of total site energy

"Site" energy refers to the energy used at the building location; "source" energy accounts for total energy use including production and delivery.

BUSINESS MODEL AND FINANCING

The Roosevelt Landings deal was innovative in that the PPA and the ESA were combined and executed at the same time. It gave NYCEEC, the building owners, and the other parties to the transaction a clear picture of the deal's potential. Then, once the savings calculations had been made and the financial return from the PPA and ESA looked very positive relative to the risk, the investors behind the building owner chose to make an equity investment in Urban Greenfit, giving them an additional stake in the performance.

The fact that the ESA was projected to generate more first year revenue than the PPA shows how much can get left on the table in cogen-only deals.

"We first presented it to our equity investors who were sophisticated in real estate, but not necessarily in energy efficiency. But we were projecting a substantial return over 10 years and even though we had outside investor interest, we didn't need it."

–Joshua Eisenberg, Urban American

Given existing financing arrangements, the building owners did not have capacity for additional debt. Furthermore, Roosevelt Landings' primary lender had the right to approve additional secured lending arrangements, a typical circumstance and a common energy efficiency barrier. At the end of the day, the lender was educated by the owner, project management team and NYCEEC, and appreciated the value enhancement of the project, without having to relinquish collateral.

ENERGY SERVICES AGREEMENT

The parties signed a 10-year ESA outlining the scope of work, the baseline energy use and the payment mechanism. Under the ESA, the building owners make a payment to Urban Greenfit based on the difference between the buildings' modeled energy performance, or baseline, and actual performance: (payment = (baseline - actual) x energy price). Urban Greenfit bears all of the risk if the project under-performs. In other words, if actual performance is no better than the baseline, Urban Greenfit does not get paid. The year 1 estimated revenue under the ESA was approximately $440,000.

After the term of the ESA, the building owners keep the full financial benefit of the installed measures. During the ESA term and beyond, the buildings' utility bill is lowered due to decreased energy use.

POWER PURCHASE AGREEMENT

The PPA is also for 10 years, with the host building agreeing to purchase all of the electricity and heat generated by the cogen facility at the prevailing market price (there is a price floor set in the agreement). Heat is purchased at the prevailing market price for fuel plus 33% to account for the production efficiency factor of the cogen facility over a standard utility. The year 1 estimated revenue from the PPA was $505,000. For this property, which is heated with electricity, the cogen facility is used for domestic hot water. In buildings that use hot water for space heating, the scale of the PPA may be considerably larger.

TAKING ADVANTAGE OF INCENTIVES

In addition to the $4.5M in financing from NYCEEC, the project was eligible for more than $1.2M in federal, state and utility grants. The largest by far was from the state's ratepayer-funded energy efficiency organization, NYSERDA, which provided nearly $750,000 for the cogeneration installation. From a separate program NYSERDA offered a zero-interest loan of $500,000, rounding the borrowed amount to $5M. Finally, the building owners committed $1.8M, for a total amount in investment and grants of approximately $8M.

NYCEEC's financing was designed to unlock these incentives by servicing the subsidized NYSERDA loan and bridge-financing the incentives, which were staggered and dependent on project milestones.

PROJECT LOAN SUMMARY

Borrower	Urban Greenfit SPV LLC
Property location	Roosevelt Island
Building type	1,008,176 ft^2 multifamily (1,003 units; 9 buildings)
Total project cost	$8.0 million
NYCEEC project loan amount	$4.5 million
NYCEEC interest rate	Negotiated
NYCEEC origination fee	Negotiated
Amortization period	96 months + 18 month construction period
Debt service coverage ratio	1.25
NYSERDA loan	$500,000
NYSERDA interest rate	0.0%
Equity contribution	$1.8 million
Incentive payments	$1.2 million
Scope of work	• Air sealing • Floor slab insulation • In-unit networked programmable thermostats and building monitoring system • Combined heat and power plant (cogeneration) • High efficiency domestic hot water boilers
Projected energy savings	18.2% on a source basis
Security	First priority security interest in all equity and properties of the Borrower, including the ESA and PPA, and the project equipment.

RESULTS

The first result of the investment in both cogeneration and building efficiency is neither financial nor energy-related: Roosevelt Landings is a more comfortable place to live. The buildings simply work better—they are less drafty, air moves more naturally, hot water is plentiful, and there is little reason to overheat one's apartment or to balance the heat with open windows.

The benefits for the tenants are crucial not just for occupancy rates and general satisfaction, but because the installation required entering every apartment and gaining access to places like window sills and room corners. The wireless thermostats added control and convenience, but required a learning curve. And the extensive in-unit improvements meant there were workers in every part of the building over the course of the project. It was important that the disruption had positive outcomes for the residents.

Still, the clearest outcomes are in the numbers.

Figure 1. Monthly energy performance – baseline over actual

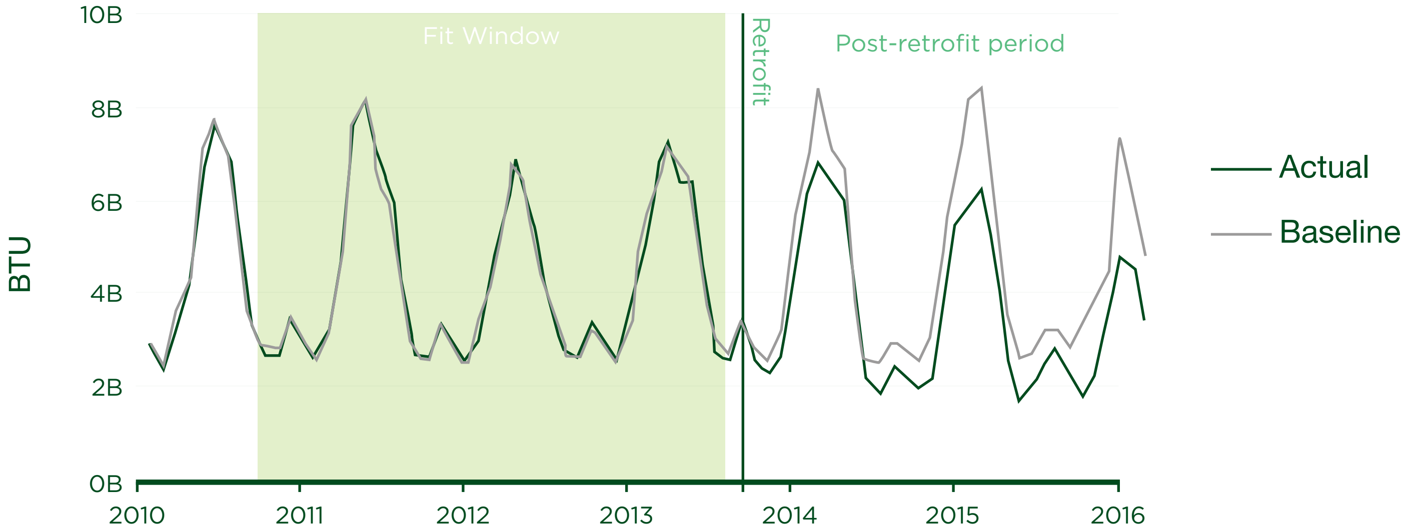


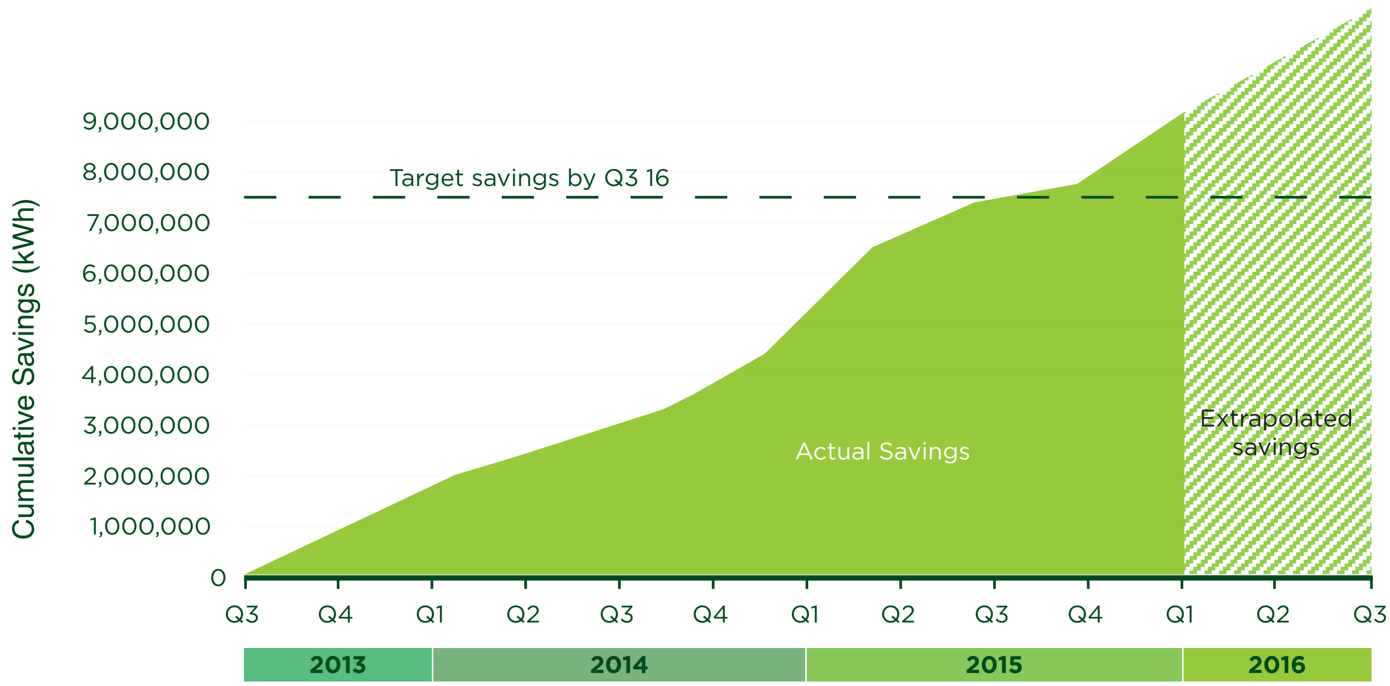
Figure 1 demonstrates both the project's success and how the baseline was derived. The "baseline" is a curve modeled to fit the buildings' historical energy usage, then projected forward with adjustments for changes in weather. The shaded "fit window" shows the 3-years of data used to model the baseline. It's an excellent fit -- the baseline is a reliable indicator of the buildings' energy use. Note that post-retrofit, the baseline shifts with actual changes experienced in the weather.

The notion of baseline is fundamental to the ESA contract. ESA payments are based on actual energy units that are avoided, not "stipulated" or pre-agreed savings. The baseline allows the parties to measure these avoided energy units.

The green line reflects actual energy usage, pre- and post- retrofit. The green line dips significantly below the baseline post-retrofit, capturing savings. During this period, the building experiences lower utility bills.

Figure 1 shows that savings can be measured reliably against a baseline. Figure 2 below depicts ***cumulative*** savings from the ESA project completion through the most recent quarter with reported performance data.

Figure 2. Energy savings exceeding projections



The green dotted line in Figure 2 represents the ***projected*** cumulative savings as of Q3 2016 – the target performance for the retrofit measures by this date, and the basis for investment decisions. This project has out-performed projections by a considerable degree, demonstrating that the contractual incentives work.

"This type of deep energy retrofit requires participants with expertise that bridge engineering, finance, property management, ownership and layers of government policy. NYCEEC has the capacity and commitment to work with all sides to achieve optimal results."

–David Davenport, Urban Greenfit

Figure 3. Summing up the outcomes

		ANNUAL ENERGY SAVINGS		ANNUAL GHG SAVINGS	
	ESA & PPA REVENUE	MMBtus	% OF BASELINE	Mtons	% OF BASELINE
Projected	$945,000	35,835	18%	1,671	17%
Year 1	$1,076,826	36,351	21%	1,710	20%
Year 2	$999,026	35,754	23%	1,685	23%

Year 1 is first year of full ESA and PPA operations. Year 2 is annualized based on 10 months of data. Baseline is weather dependent. Year 2 baseline is lower due to the mild 2015/16 winter; therefore less absolute savings represent a larger percentage of baseline.

The numbers tell the story.

Through the smart use of technology and the right financing strategy, this team of creative professionals produced results that exceeded expectations and increased property valuation by $19 million.

REPLICABILITY

NYCEEC sees enormous potential in the ESA and PPA approaches validated at Roosevelt Landings.

Large multifamily family properties in NYC tend to have low vacancy rates and stable cash flows, but they often have limited incremental debt capacity, which makes them ideal targets for this solution. NYCEEC estimates that in New York City there are more than 5,000 residential buildings of greater than 250,000 square feet that might be candidates for this kind of efficiency investment (our analysis indicates that the ESA or PPA models make the most sense when the investment is $1M or more). These buildings represent an important sector for project developers, energy services companies, and contractors. And the major benefits are clear.

1. With little or no capital outlay, owners and managers can dramatically improve building performance, contain energy costs, satisfy tenants and grow property value.

2. Management can focus resources on other needs and “outsource” energy improvements to specialists with financial incentives appropriately aligned for success.

3. Buildings can share in the economics and benefit from the physical improvements.

4. Tenants can enjoy improved comfort through optimized energy performance.

5. Each building that improves its performance takes a significant step toward a sustainable future.

THE BOTTOM LINE

What does the market need to scale this approach? Willing owners who see the benefits, project developers with the sophistication to carry out the projects, and equity investors who appreciate the value of PPAs and ESAs as standalone assets. The technologies are available. The contractual template now exists. Strong building candidates in NYC are numerous. NYCEEC stands ready to evaluate, underwrite and finance. Incentives await, particularly for affordable housing. The results are impressive, and smart investors are beginning to notice.

NYCEEC is available to work with managers, investors and owners.

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NYCEEC is a leading non-profit finance company that provides loans and alternative financing solutions for clean energy projects. NYCEEC finances projects that save money, save energy and reduce greenhouse gases. We are helping New York achieve a clean and sustainable future.

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