

Report by:

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**April 2020**

# The Green Bank Opportunity:

## Mobilizing Capital for Low-Carbon Energy in Buildings

Financing Innovations from New York City  
Energy Efficiency Corporation



HSBC Centre of Sustainable Finance





**Zoë Knight,**  
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**The backdrop for the financial system to address sustainability goals is moving fast. Civil society campaigning is reinforcing the urgency to act, the financial sector is providing more guidance on sustainable finance definitions and categories, and there is a greater support for corporate roadmaps on transitioning to a low-carbon economy.**

In addition, more countries are adopting net-zero carbon emissions targets. This means that emissions sources from human activities contributing to the build-up of CO<sub>2</sub> in the atmosphere must be offset by sinks that absorb or capture the carbon. The net impact from humans on atmospheric CO<sub>2</sub> needs to be climate neutral, in other words, net zero.

Activities that contribute towards a net-zero outcome are energy efficiency, the shift to low-carbon power, roll-out of electric vehicles and more low-carbon heating, the use of carbon capture and storage and electrification in industry, tree planting and on-farm measures as well as the diversion of waste away from landfill.

The financial system is a critical enabler for change, since it provides capital for these carbon reducing activities. One of the reasons that the private sector has not financed some emerging technologies critical for enabling a low-carbon outcome in the past is that these technologies have risk-reward profiles that do not match the needs of investors or appetite of lenders. Green banks can help bridge these needs by blending sources of capital to maximise impact.

This report, produced by author Erin Muir, Graduate Student, and her advisor, Satyajit Bose, Associate Professor and Associate Director from Columbia University, provides a case study of how Green Bank activities helped to accelerate energy efficiency activities across the real estate sector in New York.

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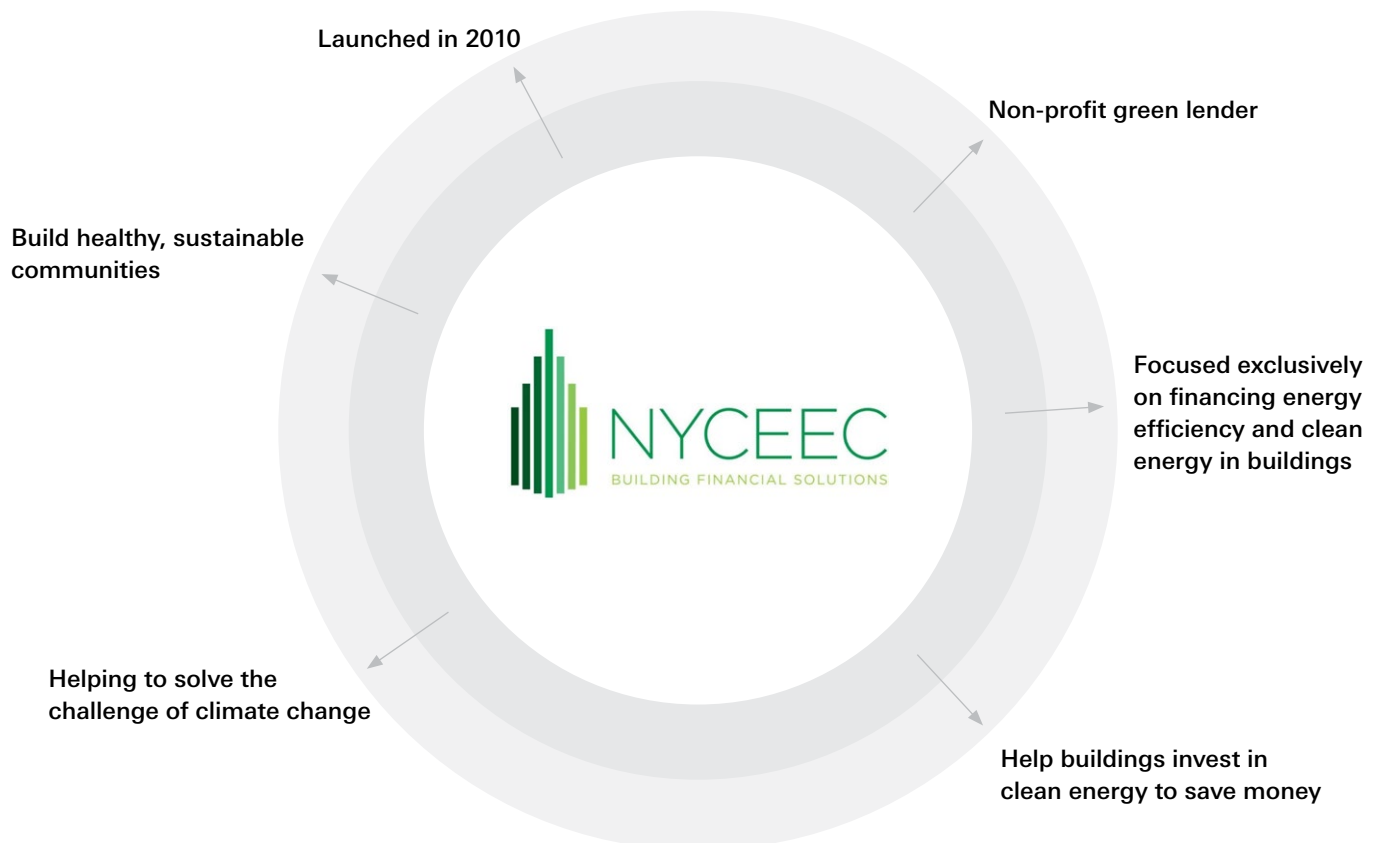
# Executive Summary

**Green banks are mainly mission driven financial institutions that have provided specialized financing expertise for sustainable technologies. They have been formed in cities and states around the world, each with distinct purposes and priorities. This report explores the purpose of green banks; how they develop; the novel financial products they offer; and the position of green banks in the context of the emissions reduction objectives. These unique and functionally diverse organizations can close various climate change mitigation and/or adaptation financing gaps, and warrant close analysis and consideration as a worthy component of a city, state or country's climate change financing strategy.**

In this report the features of green banks are illustrated and discussed through a case study of the **New York City Energy Efficiency Corporation (NYCEEC)**:

NYCEEC is a non-profit green lender focused exclusively on financing energy efficiency and clean energy in buildings. NYCEEC's loans help buildings invest in clean energy to save money, improve the environment and build healthy, sustainable communities. Partnering with financial institutions, policymakers and philanthropies, NYCEEC is working to build green financing markets to achieve scale and be accessible to all, while solving the challenge of climate change<sup>1</sup>.

NYCEEC launched in 2010 as the first city green bank in the United States. After nearly a decade of helping to drive a just clean energy transition, NYCEEC's growth, flexible financial products and investments, and leadership inform an understanding of the robust nature of the contribution of green banks to sustainable development, and the opportunities for expansion of the green bank blueprint globally. This report draws a number of insightful conclusions: impact is maximized through a blended capital strategy, diverse products are needed for financing technologies that reflect local circumstances, loan terms must balance competing objectives, and green banks must continue to evolve if they are to maintain purpose and execute their vision.



<sup>1</sup> <https://nyceec.com>

# Opportunity for Green Banks

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## **The purpose of green banks**

A green bank is a public, quasi-public or non-profit entity that leverages limited public funds to mobilize private capital, and potentially philanthropic funding, for clean energy and energy efficiency investments. Green banks may also finance climate resilient infrastructure, wastewater treatment, low-carbon transportation, natural resource conservation measures, and other projects that mitigate or adapt to the effects of climate change. Through their financing programs, products, and services, green banks can help public entities meet their greenhouse gas (GHG) emission reduction targets to fight climate change, provide resiliency against climate threats, and foster economic development. Green banks can help borrowers reduce their GHG footprint, save on energy and water costs, reinforce structures for extreme weather, and preserve natural resources.

## **Preservation of limited public capital**

Cities have significant competing budget priorities and public funds are often, by nature, deployed for the public good without direct monetary return and over a longtime horizon. City governments may focus resources elsewhere than on the expertise and capacity to extend credit and partner with private sector capital providers for clean energy projects. However, if public dollars are spent capitalizing a green bank that has a specialty financing capability, the green bank can underwrite green loans and replenish its funds upon the return of principal and interest. Green banks use available capital and grow by reinvesting returns on green loans, and this further ensures that the allocated public dollars are spent on the expansion of low carbon and/or climate-resilient infrastructure. These public funds are also used by green banks to attract philanthropic and private capital, enabling a green bank to lever its own balance sheet and provide further lending to increase the deployment of clean energy and efficiency technologies.

## **Mobilizing private capital**

The economic returns and environmental and social impacts of green bank financing can also help attract other capital providers. Once green banks are well-established and can evidence a record of successful transactions, commercial lenders and other private finance organizations, as well as ESG-principled investors who want to invest in green projects but lack the capacity or appetite to do so directly, can lend to green banks or acquire or participate in loans they originate. This can help diversify their portfolios and better position them to meet their green investment goals. For green banks, attracting this capital bolsters their entire portfolio and multiplies the initial capitalization impact.

## **Underwriting based on GHG reductions**

Most green banks will generally avoid investing in projects that are expected to result in increased carbon emissions, differentiating them from other banks that may have green investment targets, but do not prohibit lending to projects that increase carbon emissions. Additionally, since the conventional green bank entity does not have shareholders, they can recycle their excess revenues to provide new loans rather than return capital to owners. Without public shareholders, green banks operate without the pressures of creating shareholder value and meeting expected growth targets, which allows green banks to focus on maximizing clean energy deployment. Conventional banks must consistently create shareholder value, which can lead to tension between green lending principles and investments in sectors that contribute to climate change.

Green banks, given their focus, often have a better understanding of the issues associated with providing credit to low-carbon infrastructure projects. These institutions can assess creditworthiness and originate loans where other lenders may not be willing. Furthermore, the green bank commitment to financing GHG-reducing projects sustains a consistent and reliable climate mitigation role.

Incumbent energy technologies and infrastructure, and the companies that provide them, have more established and better understood risk profiles than newer clean energy technologies, and can therefore carry a lower perceived risk. Clean energy technologies may also be perceived to have less certain near-term market opportunities, which could discourage conventional lenders and investors. This exposes the potential inadequacies of traditional underwriting and credit risk appetites for driving deals that feature GHG reductions.





### Green banks add value in different ways

A portion of the loans provided by green banks could be originated by private-sector lenders, but the focus of green banks on driving positive environmental outcomes rather than maximizing shareholder returns should make them a valuable part of the financing landscape for mitigating climate change. This is not to say that there is a trade-off between returns and impact, but green banks focus solely on their climate and environmental purpose and do not stray into financing opportunities misaligned with their mission. They may even pursue projects that do not create a return but have large environmental benefits and/or prioritize underserved communities.

Beyond the loans they provide, green banks may provide energy assessments and project planning services, both to assist customers in the deployment of clean energy and to help ensure the financial viability of the loan. Green banks often share lessons learned among other lenders to support their activities and spur co-lending opportunities. Feedback may also be given to policymakers about ways to favorably enhance rules and regulations.

Lastly, in cases where there are decentralized market incentives at utility, municipal, state, and federal levels, local green banks can help their customers navigate and take advantage of the opportunities. With strong community-based investments, the creation of new contractor jobs is supported as well, and both of these factors help expedite delivery of projects. A large bank attempting to scale an energy screening process across a large geographic area and multiple offices could miss an incentive, which could result in a project being deemed financially infeasible or too risky. Green banks maintain specialized knowledge in their regions that allows them to identify opportunities that other lenders may overlook.

# Green Banks Have a Variety of Paths to Development

## Green bank formation

Most green banks today have been capitalized by public funding or have been chartered by a governmental body. Therefore, it is commonplace for a green bank to be a public or quasi-public agency, at least through the initial formative years of securing partnerships, fostering credibility, and sourcing capital. A green bank may begin as a public or quasi-public agency and then become an independent non-profit or can also be incorporated as a non-profit entity at the outset.

## Timeline and capitalization

The definition of what constitutes a green bank can vary, and by one interpretation, the first green bank ever formed was Green Tech Malaysia in 2010 followed by the Connecticut Green Bank (CGB) in the United States in 2011. Green Tech Malaysia was formed by a restructuring of a government agency to devote its efforts solely to green financing, and later restructured once more to be a non-profit still under the purview of Malaysia's Energy, Green Technology, and Water Ministry.<sup>2</sup> Meanwhile, CGB was capitalized by a tenth of a cent per kilowatt hour of electricity usage (USD0.001/kWh) surcharge on households. This small amount calculated to be only about USD10 annually per household, but accumulated USD28.4 million, a fund large enough to allow CGB to launch and grow.<sup>3</sup> In 2012, Australia's Clean Energy Finance Corporation was wholly funded by the government with an adequate capital base to grow autonomously thereafter.<sup>4</sup> Japan's Green Finance Organization was funded by a national carbon tax on fossil fuels written into law that same year.<sup>5</sup> More recently, in 2014 Hawaii's Green Energy Market Securitization was formed by issuing a bond and Montgomery County Maryland's Green Bank was capitalized in 2017 by a settlement from a local utility merger.<sup>6</sup> There are various approaches to forming and capitalizing a green bank at the national, state, and local level. Funding can come from energy surcharges, government grants, bond proceeds, utility merger settlements or other sources.

## Green bank growth

Attracting diversified funding fosters a green bank's growth and sustainability. For example, during the Nevada Clean Energy Fund's first year, the Fund procured federal, state, and private grants, issued bonds, and received foundational support and money given from high net worth individuals.<sup>7</sup> Through diversifying its funding sources, Nevada's Clean Energy Fund was able to underwrite and issue larger volumes of loans and bonds, knowing that it could meet its debt requirements with the grant money supplementing portfolio returns. Ultimately, the multiple and varied sources of funding enabled a manageable approach to meeting liabilities and empowers the bank to invest in clean energy projects with a range of loan terms and interest rates. With more flexible loan terms and rates, green banks can meet customer needs across the loan pricing spectrum and potentially expand the types of projects the green bank is able to finance.

## Green bank self-sufficiency

Appealing to different customer types may help position green banks for sustained growth. If one sector-specific incentive program is discontinued, for example, having financial products suitable for other applications allows green banks to continue to close deals and expedite growth in clean energy deployment. As noted in the example of the Nevada Clean Energy Fund, to become fully self-sufficient, green banks need a mix of capital grants, operating support, and debt issuances. Debt may be in the form of long-term bonds issued in the capital markets, or other forms of private capital that green banks may obtain after establishing their track record. Foundations may also provide debt at attractive terms if the green bank is lending to projects that support the foundation's philanthropic goals.

<sup>2</sup> <https://www.thestar.com.my/news/environment/2013/07/30/green-tech-for-growth>

<sup>3</sup> <https://www.nrel.gov/state-local-tribal/basics-green-banks.html>

<sup>4</sup> <https://www.oecd.org/environment/green-investment-banks.htm>

<sup>5</sup> <https://greenbanknetwork.org/green-finance-organisation-japan/>

<sup>6</sup> [https://aceee.org/sites/default/files/pdf/conferences/eeff/2017/Norman\\_Session1B\\_EEFF17\\_5.22.17.pdf](https://aceee.org/sites/default/files/pdf/conferences/eeff/2017/Norman_Session1B_EEFF17_5.22.17.pdf)

<sup>7</sup> <https://www.oecd.org/environment/green-investment-banks.htm>



**Green bank re-formulation and exit**

Having catalyzed clean energy deployment in a marketplace for a few years and executed transactions across market segments, the decision may be taken for a green bank to exit the public sector and re-establish the organization as a non-profit entity or a for-profit entity. Disconnecting legally from government ties may provide increased flexibility to a green bank in pursuing its mission, although this may limit the local government's ability to direct the green bank in specific ways to achieve its policy goals. In the case of privatization, the public sector's influence on a green bank's mission is even more diminished as compared to a green bank's exit as a non-profit maintaining a distinct environmental purpose.

A recent example of a governmental green bank becoming privatized is the UK Green Investment Bank's acquisition by Macquarie, and subsequent rebranding as the Green Investment Group (GIG) in 2017. This has been viewed by some as a success; the UK government created a productive and specialized green investment entity perceived to be valuable enough for purchase by a private financial group. Other stakeholders worry that the acquisition may undermine GIG's willingness or ability to drive clean energy deployment. Suitable risk-return profiles for innovative green investments may be harder to come by, which would push GIG to invest in projects already commonly receiving private financing in the marketplace, such as commercial and utility-scale solar photovoltaic (PV) systems. But with its specialization in clean energy, GIG could be better suited to close these larger deals than its private competitors that lack a clean energy focus.





# NYCEEC: A Case Study of New York City's Green Bank

## First city green bank

NYCEEC (New York City Energy Efficiency Corporation) is a 501(c)(3) organization, and is therefore exempt from federal tax. It was launched in 2010 by the New York City Mayor's Office of Sustainability, making it the first local green bank in the United States. The City of New York initially capitalized NYCEEC to advance the City's climate and economic development goals by providing energy efficiency financing programs, products, and services for NYC's most GHG intensive sector, buildings.

While there are other green banks now operating in local geographic areas, such as the Montgomery County Green Bank in Maryland – and green banks expected to begin operations in places such as District of Columbia - NYCEEC remains the only green bank in operation that was initially capitalized by a municipal government. Since then, NYCEEC has established itself as a non-profit green bank that has successfully blended public, private and philanthropic capital to offer a range of climate financing solutions to building owners, property managers, project developers and contractors.



### **NYCEEC's mission is to:**

"Deliver financing solutions and advance markets for energy efficiency and clean energy in buildings".

### **NYCEEC's vision is**

"Energy efficiency and clean energy financing for buildings to achieve scale and be accessible to all".

# Leveraging Blended Capital Structures to Fuel Growth

## NYCEEC's formation

NYCEEC was initially capitalized in October 2010 by federal grants from the 2009 American Recovery and Reinvestment Act (ARRA). The ARRA was issued by the U.S. Congress as an economic stimulus package after the 2008 financial crisis. Part of the ARRA was the Energy Efficiency and Conservation Block Grant (EECBG) program administered by the US Department of Energy (DOE) and granted to cities like New York, among other entities. At a time when job creation for economic recovery was vital, the EECBG provided a path for cities to develop energy conservation projects that would help businesses and residents save money while supporting construction-related jobs. When the ARRA and EECBG were issued in 2009, the City of New York applied to use the funding to create NYCEEC as a non-profit corporation. In 2010, NYC was awarded an EECBG grant of USD16.1 million dollars and over half (USD21.4 million) of a USD40 million joint federal grant between NYC and the New York State Energy and Research Development Authority (NYSERDA). Both of these federal grants were used to capitalize NYCEEC.

While the exact terminology of a "green bank" was nascent at the time, by being exclusively focused on energy efficiency and clean energy in buildings, NYCEEC became the first U.S. local green bank. The City of New York started NYCEEC with a diverse Board of public officials and private sector representatives, and the NYCEEC team is comprised of business development, finance, and engineering professionals. This organizational structure was thoughtfully designed to allow for evaluation of projects from both a technical and financial perspectives.

## Blended funding

In addition to revenue streams from its lending transactions, NYCEEC seeks continued public funding along with philanthropic and private capital to supplement operational revenue. Since inception, NYCEEC has been awarded USD6.8 million in private foundation funding, which can attract even more capital. Philanthropic grants can also be instrumental for investments in newer, unprecedented clean energy technologies that advance the field.

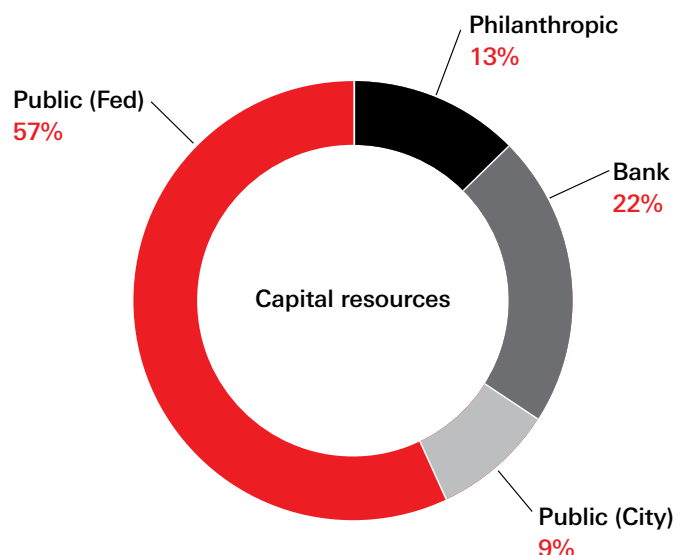
NYCEEC has received grant support from public sector entities and philanthropic funders, including the US DOE; NYC; NYSERDA; C40; Clean Energy Group; David Rockefeller Fund; Deutsche Bank Americas Foundation; Doris Duke Charitable Foundation; FJC: A Foundation of Philanthropic Funds; HSBC Bank USA; Institute for Market Transformation; The Kresge Foundation; Living Cities; The New York Community Trust;

NYC Housing & Neighborhood Recovery Donors Collaborative; Rockefeller Brothers Fund; Rockefeller Foundation; and Surdna Foundation. NYCEEC has also received third-party capital from Bank of America, Deutsche Bank and The MacArthur Foundation.

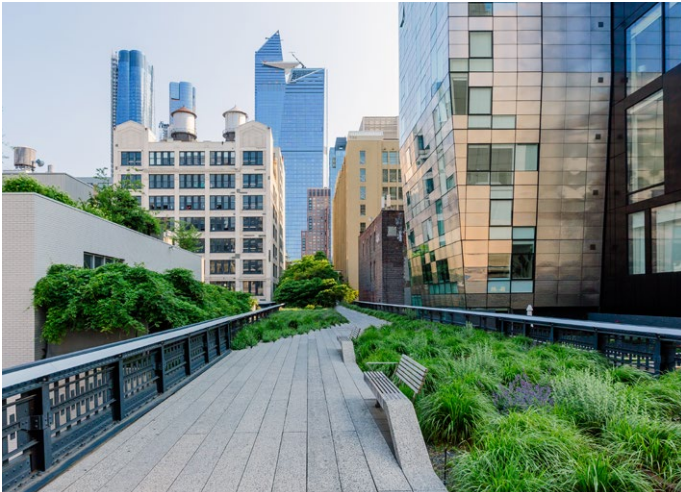
To expand upon the latter, banks lend money to NYCEEC in support of its projects or co-lend with NYCEEC on projects NYCEEC originates. These partner lending institutions allow NYCEEC to support the completion of more projects than would be possible if NYCEEC were limited to using its own capital. The long-term impact of private lending partnerships should expand these markets as well; as lenders gain greater familiarity with loan origination opportunities in clean energy and energy efficiency, they may decide to pursue other similar market opportunities.

In summary, NYCEEC leverages this blended third-party capital to increase its impact. NYCEEC has many public, private, and philanthropic supporters who promote NYCEEC's work and provide grants or friendly capital that allow NYCEEC to sustain itself and invest in decarbonizing projects that the private sector is generally not focused on. Thus, NYCEEC steps in where conventional lenders typically will not, and partners with investors, contractors, energy service companies, and clean energy developers to ensure the best and most suitable products are implemented.

Figure 1. NYCEEC's blended portfolio (2020).







### Origination channels

The projects that NYCEEC finances are usually complicated, sometimes involving newer technologies or work in older buildings. While some building owners reach out to NYCEEC directly, owners' first line of contact is typically with a contractor, project developer, or energy services company when they want to implement energy-saving solutions. When NYCEEC is able to provide financing for these projects, it removes one of the primary barriers to implementation for customers, developers or contractors. After completing a transaction, NYCEEC and the developer or contractor often form a close relationship. These companies help NYCEEC identify projects that need financing and, to date, have been NYCEEC's primary origination channel. As contractors and project developers typically do business in a region, NYCEEC accordingly expanded its area of geographic eligibility from initially only NYC to now financing projects throughout the Northeast and mid-Atlantic regions (including Connecticut, Delaware, District of Columbia, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, and Rhode Island). This shift was also possible as NYCEEC began to leverage its initial funding from NYC with debt and other incremental funding that was not geographically restricted to NYC. By expanding geographically, NYCEEC's contractor-based marketing strategy should attract new developers and contractors to NYC, increase clean energy deployment throughout the region, and drive down implementation costs in the region as well.

### Transition to an independent non-profit

In 2010, NYCEEC was established as a City affiliate (specifically, a component unit of the City) to lessen the burdens on government by helping to implement the City's emission reduction policies. This same reasoning was the basis of NYCEEC's filing with the Internal Revenue Service to become a 501(c)(3) non-profit public charity, and NYCEEC was approved as a non-profit in November 2012. The primary purpose was to improve the cost-effectiveness and efficiency of receiving grant funding from philanthropies as a 501(c)(3). Additionally, as a non-profit, after meeting its financial obligations including interest expense, operating costs, and provision for credit losses, NYCEEC uses any remaining profits to grow its operations and finance new loans. Furthermore, in order to maintain a self-perpetuating business model, NYCEEC's ex-officio board members and NYC Mayor Michael Bloomberg at the time, changed NYCEEC's bylaws to become fully independent from the City's government in 2013.

Although legally independent, NYCEEC still continues to work closely with NYC's government in the following ways:

- ◆ Two members of NYC government serve as Directors on NYCEEC's Board
- ◆ In 2015, NYC announced its goal to reduce carbon emissions 80% by 2050 and decided to convene a Technical Working Group with many relevant stakeholders including NYCEEC
- ◆ NYCEEC is a steering committee member and financial partner for NYC's Retrofit Accelerator Program that supports emission reductions by providing building owners free water and energy efficiency advisory services
- ◆ NYCEEC is partnered with NYC's Department of Housing Preservation Development's (HPD) Green Housing Preservation Program (GHPP), which provides low to no cost financing for energy and water efficiency for multifamily buildings (NYCEEC's involvement in the GHPP is discussed in more detail on page 15)
- ◆ NYCEEC now serves as NYC's C-PACE administrator (more details about C-PACE can be found on page 17).<sup>12 13</sup>

<sup>8</sup> [http://www.nyc.gov/html/gbee/downloads/pdf/greener\\_greater\\_buildings\\_plan.pdf](http://www.nyc.gov/html/gbee/downloads/pdf/greener_greater_buildings_plan.pdf)

<sup>9</sup> [https://www.energy.gov/sites/prod/files/2016/09/f33/NYCEEC%20Case%20Study\\_Final.pdf](https://www.energy.gov/sites/prod/files/2016/09/f33/NYCEEC%20Case%20Study_Final.pdf)

<sup>10</sup> <https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program>

<sup>11</sup> [https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/New%20York%20City's%20Roadmap%20to%2080%20x%2050\\_Final.pdf](https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/New%20York%20City's%20Roadmap%20to%2080%20x%2050_Final.pdf)

<sup>12</sup> <https://www1.nyc.gov/office-of-the-mayor/news/116-15/mayor-de-blasio-green-buildings-technical-working-group-another-major-step-toward-80-by>

<sup>13</sup> [https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/New%20York%20City's%20Roadmap%20to%2080%20x%2050\\_Final.pdf](https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/New%20York%20City's%20Roadmap%20to%2080%20x%2050_Final.pdf)

# Energy Efficiency Investment: The Dominant Strategy

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## Technologies in Scope for Financing

### Technologies financed by NYCEEC

NYCEEC finances building projects that reduce greenhouse gas emissions, normally through reducing energy consumption, but potentially—as in the case of storage—through shifting energy consumption from peak periods to off-peak periods when the grid-tied generation is cleaner. Common examples include lighting upgrades, building envelope insulation, and heating, ventilation, and air conditioning (HVAC) modifications. Additionally, fuel conversions, on-site renewable or cogeneration systems, building controls, and demand management systems can all reduce a buildings' carbon footprint. Among these different systems, many options exist, such as efficient combined heat and power (CHP) and fuel cells for cogeneration, and there are a variety of building renewable systems to choose from such as solar thermal and solar PV.

To date, 50% of the projects NYCEEC has financed have been in energy efficiency and another 45% in CHP. This apportionment reflects two areas of the market that are under served by traditional lenders, as well as historical policy initiatives in the region (e.g., specific incentive structures) for energy efficiency and CHP. With NYS and NYC placing a greater emphasis on decarbonization, NYCEEC expects increased demand for building energy efficiency, renewables, demand response and storage, and reduced emphasis on CHP powered by natural gas.

### Energy efficiency investments

Economically, short payback periods coupled with the longevity of the infrastructure ensures that most energy efficiency investments are cost-effective when engineered, installed, operated and maintained correctly. Oftentimes a portfolio of aggregated small energy efficiency projects is an opportunity for significant decarbonization and enhanced building performance, though private investors may be wary of underwriting a loan or providing credit enhancement for single energy efficiency investments or a combination of small upgrades. Without understanding the degree of risk associated

with typical energy efficiency projects—or the dynamics and trade-offs between different energy efficiency measures—private investors can struggle to correctly evaluate risk-return profiles. Indeed, energy efficiency projects may be risky if a borrower hasn't completed energy audits that would help the borrower prioritize projects and maximize returns. Each small energy efficiency retrofit may require different contractual costs too, all of which could make a project riskier if robust oversight is lacking. It is in these cases where experienced green banks like NYCEEC can evaluate investments, both in terms of the technologies and the financial returns.

An example of a cost-effective, easy-to-install energy efficiency project that virtually any building can undertake is switching to Light-Emitting Diodes (LED) lightbulbs, prices for which are continually falling. A simple switch over to LEDs in the common areas of a building – the lobby, stairwells, storage rooms, and hallways – can yield significant monetary and GHG savings. One LED project NYCEEC financed solely for a building's common area realized USD20,000 in savings per year from a 53% reduction in energy usage attributable to the upgraded lighting. LEDs also have long lifetimes, which lower maintenance costs. Other examples of energy efficiency installations include frequency monitors on pumps and fans, and building automation system upgrades, which minimize wasted heated or cooled air.

NYCEEC also finances high-performing energy efficiency retrofits and passive house solutions. One of NYCEEC's financed passive house properties, a 4-unit rental, saw a 72% energy savings, while another property that undertook many high-performance energy retrofits was projected to realize 85% energy savings. Heat pumps, solar shading, tri-pane windows and spray foam insulation were some of the HVAC and building envelope measures undertaken by the latter. Beyond the monthly energy savings, these buildings expect to have lowered maintenance and enhanced resident comfort.



### Solar PV Projects

NYCEEC specialized in energy efficiency early on but has placed a greater emphasis on solar PV now as NYC and NYS policies require greater building decarbonization and solar panel installment on new construction of larger buildings. Furthermore, solar panel prices have been decreasing significantly, dropping more than 50% between 2002 and 2013, with price reduction continuing.<sup>14</sup> This makes solar installations a more attractive investment. Given the favorable economics, many property owners can easily obtain private financing of their solar PV installations. Rather than compete with other lenders, NYCEEC has focused principally on solar PV installations for buildings that are underserved by traditional lenders given the size or complexity of the installation, or credit profile of the borrower.

One interesting solar project financed through a NYCEEC loan was for owners of a 24-unit self-managed co-op. NYCEEC partnered with a local solar PV developer to finance the installation of a 30.7kW PV system and new sub-meters per household which aggregated electricity usage data from each unit. This sub-metering was pertinent to the co-op receiving NYCEEC's direct loan as it allowed the co-op to take advantage of federal, state, and local tax credits and net metering rules that are typically designed for larger commercial buildings and/or small homes. First, with the sub-metering, shareholders received the solar clean energy credits paying a percentage to the co-op association for the first few years. Second, this allowed the building owners to monitor the investment across units. Third and most important, this aggregation of the sub-meters enabled the developers to receive a federal tax credit such that the building owners could afford the panels through NYCEEC's loan. Annual savings for the building amount to over USD10,000 and projected GHG savings were 16%.

### NYCEEC advances energy storage

NYCEEC financed the nation's first affordable housing micro grid with lithium-ion batteries, which became live in June 2017 in Brooklyn, NY.

This system was recognized for its market leadership later that year by an innovation award from Energy Storage North America. Financing the USD1.3 million onsite lithium ion battery served as a pilot for NYCEEC for financing energy storage, as NYCEEC regularly considers new energy technologies for its loan portfolio.

### On Site Generation and Storage Case Study

In 2014, the Marcus Garvey complex was acquired by L+M Development Properties and the new owner identified major renovation needs, including a high priority to reduce the buildings' high energy costs, due largely to the use of electric heat. Con Edison, the utility which supplies electricity to Brooklyn and Queens, was also facing an energy use, grid-constrained situation in the neighborhood surrounding Marcus Garvey. ConEd projected that it would not be able to accommodate the rising electricity demand with its current substations providing power. Hence, ConEd had to decide whether to build a new USD1.2 billion substation or incentivize more energy efficiency. ConEd chose the latter, allocating USD200 million to fund projects that would reduce local electricity demand through energy efficiency or distributed generation. The incentive program is called the Brooklyn Queens Demand Management (BQDM) program and was pivotal to making the Marcus Garvey microgrid system a reality.

The microgrid system is composed of 300kW/1200kWh lithium-ion batteries that provides resilient on-site power when combined with its 479-kW rooftop solar PV and 400kW electricity generating fuel cell systems. Upon completion of this microgrid after receiving the BQDM equipment incentives, the buildings subscribed to ConEd's demand response program whereby customer's electricity supply can be turned off or reduced in return for payments. This allows ConEd to reduce the electricity on the grid during high demand such that all of their customers still have an electricity supply and provides revenue to Marcus Garvey apartments, on top of their energy savings from the solar PV and fuel cell systems.

Additionally, the battery is integrated in the building's metering, able to sense when there is a peak in a day's electricity and use some of its power instead. This is called peak demand shaving, and since large customers such as apartment buildings are charged a supply fee and a demand fee, with the latter based upon the highest usage in a given month, this battery would help the Marcus Garvey Apartments save even more on demand charges, on top of their demand reduction payments. This battery also provides resiliency during power outages and can provide power when Marcus Garvey Apartments engages in ConEd's demand response program, such that the reductions are not noticeable to occupants.

In summary, combining generation and storage lowered operating costs for Marcus Garvey Apartments, as well as improved emergency resiliency and avoided expensive investment in the area's centralized energy distribution.

<sup>14</sup> [https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/New%20York%20City%27s%20Roadmap%20to%2080%20x%2050\\_20160926\\_FOR%20WEB.pdf](https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/New%20York%20City%27s%20Roadmap%20to%2080%20x%2050_20160926_FOR%20WEB.pdf)

# The NYCEEC Green Loan Product Suite

The table below summarizes some of NYCEEC’s loan products. While direct loans are offered in many sectors, the other products (Efficiency / Energy Service Agreement or Power Purchase Agreement -backed loan, Property Assessed Clean Energy loan) are specific to clean energy lending.

A direct loan is appropriate when building owners are looking to finance either construction or permanent installation of equipment. ESA or PPA-backed loans work when a developer is providing services under an ESA or a PPA; the developer would then look to finance the equipment through the ESA or PPA-backed loan (i.e., the building owner does not incur any debt). A PACE loan is effectively a loan to the building arranged by the current building owner, although the building owner itself does not incur any debt (see page 18). NYCEEC works with borrowers to determine the appropriate loan product for the situation and will provide pricing and other terms based on considerations including loan term, borrower creditworthiness, and market conditions.

Figure 2. Summary Table: NYCEEC’s Standardized Loan Products

	Direct Loan		ESA/PPA Loan		PACE Loan
	Construction	Equipment Loan	Efficiency/Energy Services Agreement (ESA)-backed	Power Purchase Agreement (PPA)-backed	PACE-backed
Borrower	Building owner	Building owner	Special purpose entity owned by developer	Special purpose entity owned by developer	Building (via property tax mechanism)
Eligible Technologies	Energy efficiency / clean energy projects	Energy efficiency / clean energy projects	Turnkey financing through third-party developer for energy efficiency projects	Turnkey financing through third-party developer for clean energy projects	Energy efficiency / clean energy projects / other, all as permitted with upcoming local laws criteria
Typical Terms	Short-term loan repaid through permanent financing upon construction completion	Medium - to long-term loan repaid through building cash flows, secured by equipment	Medium - to long-term loan repaid through ESA payments from building owner, secured by equipment With an ESA, the building owner makes payments based on the actual amount of energy saved	Medium - to long-term loan repaid through PPA payments from building owner, secured by equipment With a PPA, the building owner makes payments based on the actual amount of energy generated	Medium - to long-term loan repaid through assessments that are part of property taxes



### Specialized investment structures

NYCEEC uses a variety of financial products to underwrite loans for clean energy projects, such as green predevelopment loans for pre-construction requirements (for HPD's Green Housing Preservation Program, GHPP), direct (equipment) loans, construction loans, Power Purchase Agreement (PPA) and Energy Service Agreement (ESA)-backed loans, credit enhancement through loan-loss reserves, and Commercial Property Assessed Clean Energy (C-PACE), recently authorized by NYC, and available in several other jurisdictions nationwide.

### Green predevelopment loans

NYCEEC offers green predevelopment loans for borrowers in NYC's Department of Housing Preservation Development's (HPD) Green Housing Preservation Program (GHPP), which provides low interest loans to finance energy-related moderate rehabilitation projects to achieve at least 20% energy savings in small- and mid-sized affordable housing properties. NYCEEC provides green predevelopment loans to fund the pre-construction requirements that borrowers must meet to be eligible for the GHPP loans.<sup>15</sup> Required predevelopment activities may include lead and asbestos testing, property appraisal, engineering, and energy and water efficiency physical needs assessments. On average 80% of applications to GHPP express interest in NYCEEC's green predevelopment loans as many do not have the upfront capital to cover the pre-construction requirements. While NYCEEC's other loan products are offered at market rates, NYCEEC green predevelopment loans are priced on a concessionary basis to maximize program uptake.

To maximize impact in the affordable housing sector, NYCEEC offers green predevelopment loans at subsidized rates, from 0% to 5% and with limited to no fees. NYCEEC's loans enable these property owners to take crucial steps to assess their buildings in order to meet GHPP qualification requirements for the permanent financing offered by HPD.

#### Green predevelopment loan case study

An example of a green predevelopment loan that NYCEEC financed was for an affordable rental building, which took out a USD30,249 loan from NYCEEC in order to conduct an Integrated (Green) Physical Needs Assessment and to address asbestos found in the building. The results of this assessment qualified the property to receive a USD417,785 HPD loan. This allowed the owner to maintain rent-control of all 6 units to preserve their affordability all while implementing new lighting, converting from oil to gas, and adding radiator controls. These measures reduced the building's energy usage by 27%. More notable is the fact that NYCEEC's USD30,000 predevelopment loan facilitated a USD400,000 capital project loan for the borrower i.e., unlocking USD13 of capital for every USD1 advanced on the green predevelopment loan. Across NYCEEC's green predevelopment portfolio, it has invested nearly USD200,000 to mobilize nearly USD10 million of energy-related rehabilitation projects. The impact leverage of this financial product is sizeable.

### Flexible equipment loans

NYCEEC offers equipment loans and unlike a typical conventional lender allows multiple draws on the facility to match construction and/or incentive milestones. NYCEEC will generally disburse loan funds when equipment has been delivered to the site and/or when work has been performed. When borrowers submit these invoices and status updates, NYCEEC staff verify that the project is on track. Allowing for these multiple draws rather than providing a lump sum also helps mitigate the risk that the project runs out of funding or goes significantly over budget and can bridge financial incentives.

NYCEEC will also cover costs of construction with minimal down payments but does monitor payments to contractors closely. NYCEEC may even finance ancillary construction needs that arise in order to complete the equipment installation (e.g., a roof repair that is necessary to permit rooftop solar PV). This recognition of the importance of funding construction along with equipment is one of the reasons NYCEEC is able to help support borrowers looking to deploy energy efficiency or clean energy technologies who may have been turned away by other lenders.

### Power Purchase Agreement- and Efficiency / Energy Savings Agreement- backed loans

An additional loan structure that is not only advantageous but unique to energy services are PPA and ESA-backed loans. Both investment structures have contracts that require the building owner to pay for the energy generated in the case of a PPA, or the energy saved in the case of an ESA. These loans are favorable to building owners since they only pay for the energy services and do not incur any debt.

### Combined PPA and ESA Case Study

NYCEEC financed a project at Roosevelt Landings, on Roosevelt Island in New York City. Roosevelt Landings is a 1,008,176 square foot property that is a multifamily complex of nine buildings (1,003 units). Built in 1969, the complex had outdated hot water heating and air heating systems. There was ample opportunity to cut utility expenses while also improving resident comfort. NYCEEC helped finance the installation of a cogeneration system, air sealings, floor slab insulation, smart thermostats, and high-efficiency boilers. Notably, NYCEEC provided USD4.5 million to fund these investments, repaid by both an ESA and PPA to support different retrofits.

NYCEEC's financing of an ESA and PPA in one investment with a sole developer, to rapidly improve net operating income and building performance, was novel. The PPA was used to finance the on-site cogeneration installation, which generates electricity to meet 15% of the building's energy needs and provides resiliency in case of power outages. The excess waste heat from this CHP system also contributes to the building's hot water, meeting 40% of this energy requirement. Meanwhile, an ESA was used to finance tenant-controlled and centrally-networked wireless apartment thermostats matched to new baseboard heaters. This is expected to save 17% of heating energy and allows the building to monitor performance of individual apartments. Also, notable, and at a cost of over USD1 million, it was the largest air-sealing retrofit project in

<sup>15</sup> <https://www1.nyc.gov/site/hpd/developers/development-programs/green-housing-preservation-program.page>

New York City at the time. Among the specific air-sealing 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. Air sealing alone was projected to save 20% of the property's heating energy.

For Roosevelt Landings, the full project provided a substantial return at no additional debt for the owners through the PPA-ESA investment structure. The property value increased while serving the comfort needs of tenants, lowering the property's greenhouse gases and meeting NYC's local laws.

### Credit Enhancement

The NYC Housing Development Corporation (HDC), the nation's largest municipal housing finance agency, had strong interest in implementing energy efficiency in its portfolio, but needed additional technical expertise and a risk mitigation strategy. HDC partnered with NYCEEC to establish a green mortgage program, the Program for Energy Reduction Loans (PERL), in 2012. NYCEEC's role was to provide input on energy efficiency best practices from an engineering perspective and credit enhancement, in the form of a USD2.5 million cash collateralized loan loss reserve. The purpose of the credit enhancement was to enable HDC to provide additional mortgage proceeds for energy efficiency. PERL was designed to support an initial pilot of USD17.5 million for energy efficiency projects.

As a result of PERL, NYCEEC developed a technical best practice guide for HDC that codified a set of energy efficiency financing best practices and aligned with the local laws. PERL successfully encouraged additional energy efficiency at critical decision points for building owners. Three building complexes (Franklin Plaza, Kelly Towers, Washington Square) were financed through PERL, enabling USD6.9 million of energy efficiency savings over 2,488 units, in total. PERL has been retired since 2018, as the goal of PERL has been accomplished with HDC now incorporating energy efficiency considerations into its business-as-usual mortgage program.

Another similar green mortgage pilot with the outcome of transferring energy efficiency best practices from NYCEEC to a partner organization (in this case, the Federal National Mortgage Association ("Fannie Mae")) was the M-PIRE program – Multifamily Property Improvements to Reduce Energy. NYCEEC provided a funded guarantee to facilitate incorporation of projected energy savings into Fannie Mae's underwriting practices. This enabled larger loan sizes to finance

efficiency improvements. NYCEEC provided a guarantee for the program, but through shared learnings between the organizations, Fannie Mae later launched its own national "Green Rewards" program. Through the pilot, Fannie Mae gained insight into these energy investments in NYC's diverse real estate market, observed NYCEEC's energy-efficiency technical and financial auditing processes, and became comfortable projecting cost, energy, and water savings. Together NYCEEC and Fannie Mae developed best practices that allows Fannie Mae's subsequent Green Rewards program to scale nationally, conserving energy and water across the United States.<sup>16</sup>

### Property assessed clean energy

Another noteworthy energy investment structure is Property Assessed Clean Energy (PACE), which allows loans to be repaid through property tax bills. Property tax bills have historically low default rates, subsequently lowering default risk of PACE loans.<sup>17</sup> With reduced risk, comes the ease of acquiring private financing at reasonably low interest rates, with longer terms (up to 20-30 years commonly for PACE loans), and with coverage of entire hard and soft project costs such that no down payments are generally required.<sup>18</sup>

PACE transactions avoid the direct incurrence of debt by the borrower (i.e., off-balance sheet) since these only show up as a short-term debt and a tax expense for that year.<sup>19</sup> Most other loan products (excluding ESA- and PPA- backed loans) are treated as debt, which can affect how a building is perceived when applying for other loans and services. Furthermore, if a building owner sells the property before the PACE loan is completely paid off, the liability remains with the property, and the next owner will continue to pay it back on their property taxes. In other words, the new owner acquires the loan responsibilities but is seeing the benefits of the clean energy or energy efficiency project already installed. As with most other long-term loans to energy efficiency and clean energy projects, energy savings are expected to exceed the cost of debt service, and thus, the new property owner should have a positive cash flow. Most importantly, the original borrower will not be saddled with the debt after she moves. She only pays the PACE loan on property taxes when she's living there and reaping the energy savings benefits associated with that property.

<sup>16</sup> <https://thegiin.org/m-pire-pilot-and-green-rewards>

<sup>17</sup> <https://sahlln.energyefficiencyforall.org/sahlln/sahlln-resources/commercial-pace-affordable-multifamily-housing>

<sup>18</sup> [https://www.energy.gov/sites/prod/files/2018/05/f51/Lessons\\_in\\_Commercial\\_PACE\\_Leadership\\_Finalv2.pdf](https://www.energy.gov/sites/prod/files/2018/05/f51/Lessons_in_Commercial_PACE_Leadership_Finalv2.pdf)

<sup>19</sup> <https://sahlln.energyefficiencyforall.org/sahlln/sahlln-resources/commercial-pace-affordable-multifamily-housing>



Since PACE payments are with property taxes as a new tax lien, PACE loans are authorized and offered by municipalities and other government entities, to serve commercial or residential properties depending on the local laws.<sup>20</sup> New York State has had Commercial PACE (C-PACE) since 2012; 35 other states, including the District of Columbia, have also enacted C-PACE legislation.<sup>21 22</sup>

Connecticut's C-PACE program has been administered since 2013 by their Green Bank and is the first state to have PACE administered through its state green bank. NYCEEC will serve similarly as an administrator for NYC, now as the first local green bank to provide C-PACE administration.

While NYCEEC may provide C-PACE loans, the program allows for any qualifying lender to provide a C-PACE loan, which maximizes the pool of available capital and should help ensure competitive rates for borrowers in the program. Specifically, NYCEEC will administer the C-PACE program approved as part of NYC's Climate Mobilization Act (more of which will be discussed on page 20). NYCEEC expects NYC's C-PACE program to launch in 2020.

### Impact of PACE

The City enacted PACE legislation for climate change mitigation purposes as well as for the expectant growth in job opportunities from the increased demand in contracting services.<sup>23</sup> Since C-PACE inception in 2009 through 2018, an estimated 16,600 jobs have been created across the nation and over USD1 billion dollars have been invested in projects (nearly 50% in energy efficiency, almost a quarter in renewables, 7% in resiliency, and the rest for mixed usage).<sup>24</sup> With low-cost, long-term financing, NYCEEC and NYC expect there to be great demand for this financial product, with potential investments of USD100 million annually.<sup>25</sup> All of this clean energy and energy efficiency investment will support NYC in meeting its cleaner air quality, affordable housing preservation, economic development, and greenhouse gas reduction goals, and help building owners become compliant with new emission regulations.

<sup>20</sup> [https://pacenation.org/wp-content/uploads/2016/10/PACEBasics\\_2016\\_10\\_7.pdf](https://pacenation.org/wp-content/uploads/2016/10/PACEBasics_2016_10_7.pdf)

<sup>21</sup> <https://www.energy.gov/eere/slsc/property-assessed-clean-energy-programs>

<sup>22</sup> <https://sahlln.energyefficiencyforall.org/sahlln/sahlln-resources/commercial-pace-affordable-multifamily-housing>

<sup>23</sup> <https://pacenation.org/pace-market-data/>

<sup>24</sup> <https://pacenation.org/pace-market-data/>

<sup>25</sup> <https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/1point5-AligningNYCwithParisAgrmtFORWEB.pdf>



# Financing Terms: Flexible and Innovative

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## **Loan pricing**

With the exception of the Housing Preservation Development's (HPD) Green Housing Preservation Program (GHPP) predevelopment loan program (see page 15) which is offered at below-market interest rates, NYCEEC tries to price its loans at "market" rates of interest, although the "market" for the smaller loans that NYCEEC provides – especially loans used to finance newer technologies or buildings serving low- and moderate-income tenants – is quite limited (i.e., underserved by traditional lending institutions).

Given the desire to price loans at rates that approximate the market, NYCEEC's interest rates vary over time, and are adjusted periodically. Typically, average loans are financed at a 6-8% rate over a 5-7-year term (maximum 12-15 years), fully amortized by the end of the decided term length, with the term considering both the number of years necessary to create loan payments less than the expected energy benefits, and the useful life of the project. NYCEEC is more likely to offer interest rates at the lower end of its ranges for projects that benefit LMI communities, given both its mission/vision, and the focus of its public sector partners on LMI communities. NYCEEC will also lend at concessionary rates on a limited basis when there is no viable market alternative and when it is necessary to facilitate deployment of climate solutions (e.g., HPD GHPP predevelopment loans).

The typical loan size that NYCEEC provides (again, excluding HPD GHPP predevelopment loans) is from USD250,000 to USD2.5 million, although NYCEEC has financed larger projects, generally with the involvement of other lenders who can provide a portion of the loan funding. This participation not only allows NYCEEC to manage its exposure to a single borrower, but also allows other lending institutions a greater opportunity to gain exposure to clean energy and energy efficiency investments, which offers long term benefits to the development of the market.

Additionally, as of July 15, 2019, closing fees for the average direct loan are 1% with a USD2,500 minimum. The average ESA/PPA-backed loans and green construction loans are priced similarly at 1-2% closing fees with a USD3,500 minimum. Once again, affordable housing, be it condos, co-ops and any rental that provides demonstrable benefits to LMI tenants, may be eligible for reduced closing costs. Lastly, construction loans are normally priced at a small premium to loans for completed projects given the greater risks and more complex monitoring (e.g., multiple draws to fund different phases of construction) associated with the overall loan.

## **Provider of flexible financing**

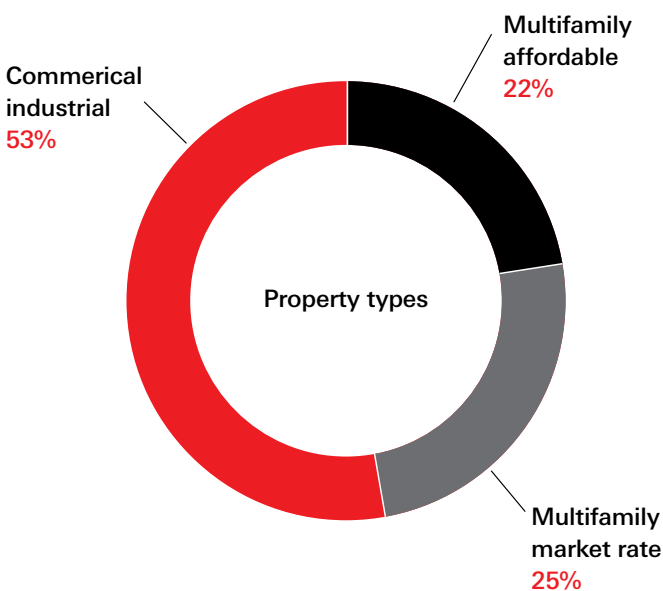
In summary, NYCEEC offers tailored financing to meet borrowers' needs for a variety of low-carbon energy projects. With both in-house and outsourced engineering capabilities, NYCEEC is able to carefully evaluate the technical aspects of projects in an attempt to ensure energy savings – that provide cash flow to repay the loan – are realized. Thus, once a new installment is online, buildings can immediately begin to save money. NYCEEC's staff of building energy efficiency and clean energy experts further help borrowers navigate utility, local, state, and federal incentives, choose the optimal energy projects, streamline construction, and assure high project quality. NYCEEC can provide construction loan, non-debt and turnkey financing solutions through EPA- and PPA-backed loans, and long term secured financing through PACE backed loans. This is how NYCEEC bridges conventional lending market gaps to provide options that match borrower needs to achieve lasting cost and energy savings.

# NYCEEC Market Focus: Specialization and Impact

## Markets served

NYCEEC works across property types, such as multifamily, commercial and industrial, retail, hospitals and other healthcare facilities, schools, and other institutions such as non-profits and religious facilities.

**Figure 3. Property types served (as of January 2020)**



Multifamily buildings actually comprise the largest share (40%) of NYC’s building stock and NYCEEC is committed to making sure that low and moderate income (LMI) multifamily housing properties are served by its products. 20% of NYCEEC’s loan balances through 2019 were for affordable housing properties, although given their usual smaller loan size, by number, a majority of NYCEEC’s loans were for affordable housing properties.

Commercial buildings comprise 15% of NYC’s buildings, industrial 5%, other institutions 10%, and 1-4 family homes about 25% (the latter of which is the only property type NYCEEC does not serve). While commercial buildings are a smaller share of NYC’s building stock, multifamily buildings and commercial buildings alike each contribute approximately 30% to NYC’s overall buildings emissions, with industrial and institutional emissions trailing at about 12% each. So, while there are fewer commercial properties, the potential for energy efficiency and GHG emission reductions is just as great for multifamily and commercial properties alike. This is one of the reasons commercial and industrial customers share prominence with multifamily properties in NYCEEC’s loan portfolio.

For multifamily buildings including condominiums, co-ops, and rental buildings, NYCEEC is able to fill gaps in financing for energy efficiency upgrades as these properties normally have limited capital available. Building reserves or lines of credit are often only meant to cover emergencies. When these properties have capital needs, they tend to incorporate these into any mortgage refinancing; however, when projects have to be dropped from the list during the refinancing process, energy efficiency projects are often among the first to go – despite the fact that they can help improve these properties’ values and increase net operating income. With NYCEEC’s financing solutions, these multifamily properties can complete the energy efficiency projects and see net positive cash flow from day one of project operation.

Large multifamily buildings in NYC also have different building energy efficiency needs as compared to other commercial properties. Space heating and domestic hot water account for nearly 75% of GHG emissions in NYC multifamily buildings on average, whereas in commercial buildings heating only accounts for 25% of a building’s GHG footprint. Meanwhile, for commercial buildings air cooling, lighting, and plug loads contribute approximately 20% each to overall building GHG emissions. Commercial buildings also have higher ventilation needs that account for 10% of emissions. For multifamily buildings, cooling, lighting, and ventilation is only 10% in total on average. In this vein, these large building types in NYC have very different energy efficiency considerations, which NYCEEC can use as a basepoint to suggest viable projects.

<sup>26</sup> [https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/TWGreport\\_04212016.pdf](https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/TWGreport_04212016.pdf)

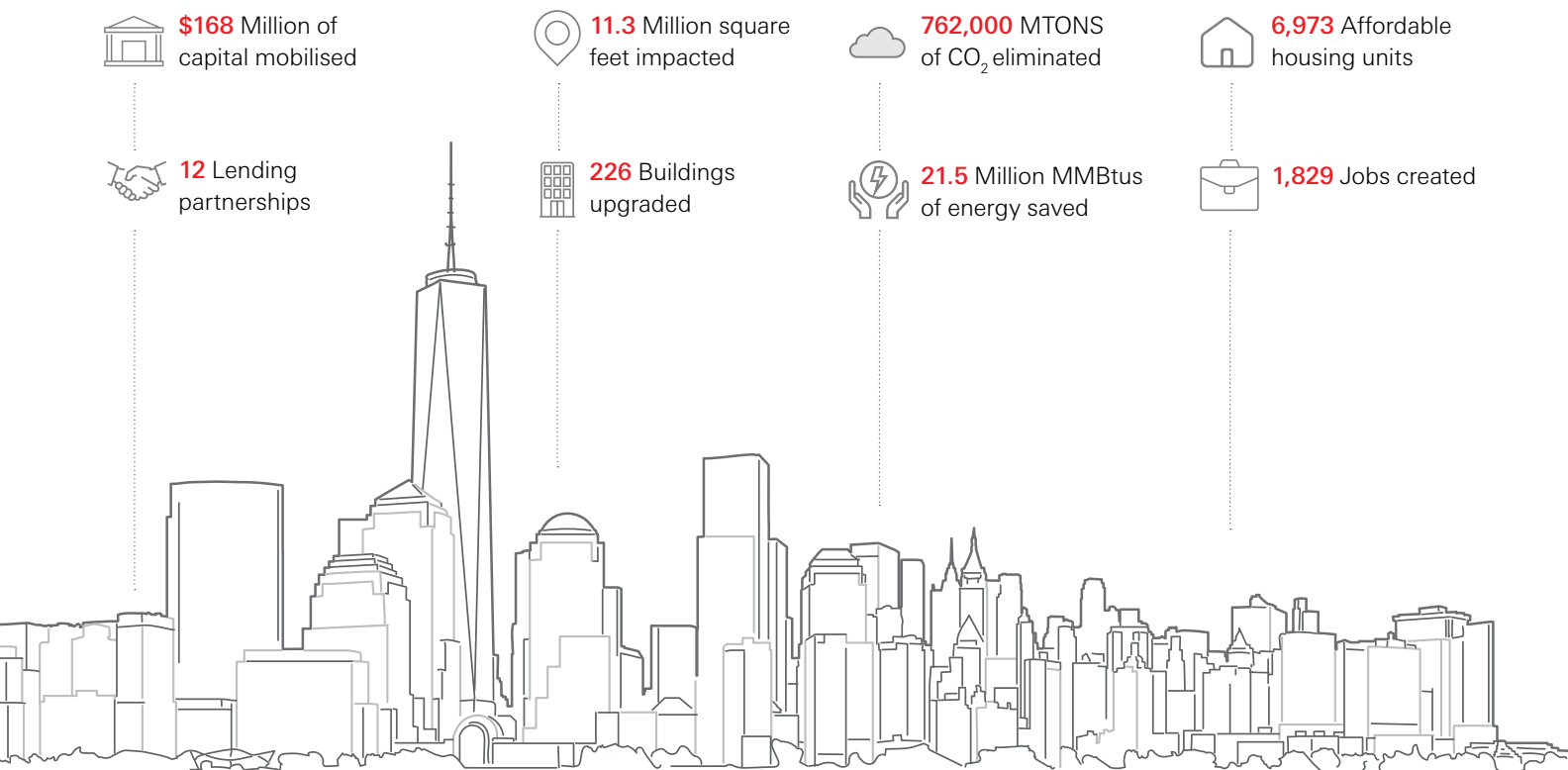
### Sharing data

A tenet of NYCEEC's core strategy is to collect project and loan data in order to improve its own environmental and financial analyses, and to disseminate this information to the marketplace (however feasible given any client sensitivities to sharing data). Information pertinent to project improvements includes not only the financial terms of the loan agreements, but also the engineering strategies and energy efficiency technologies utilized. Lack of data in clean energy and energy efficiency investments continues to be a large barrier in the space. While, NYCEEC has made information regarding twenty-two deals publicly available, NYCEEC and other lenders need to continue data collection to bridge the data gap.

NYCEEC's published data normally includes 1) financial instrument provided, 2) building size, year built, and type, 3) projected annual cost savings, 4) projected energy savings and GHG savings, 5) loan term, and 6) any ancillary customer needs that were addressed through their work with NYCEEC. These are all valuable metrics for other green banks and interested parties to learn from and for prospective customers to view similar project archetypes to their prospective projects. Furthermore, NYCEEC regularly aggregates its data to show its positive environmental and economic impacts. Publishing this data provides transparency, and showcases to existing lending partners, philanthropic funders, policymakers, and building owners the importance of green financing as a tool to facilitate a transition to a just and clean energy economy.

Figure 4. NYCEEC's cumulative impact since inception in 2010 (Data as of January 2020).

### Summary of Impact – January 2020



<sup>27</sup> [https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/New%20York%20City%27s%20Roadmap%20to%2080%20x%2050\\_20160926\\_FOR%20WEB.pdf](https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/New%20York%20City%27s%20Roadmap%20to%2080%20x%2050_20160926_FOR%20WEB.pdf)



# Climate Mobilization – Reducing Emissions

## NYCEEC's Climate Change Mitigation

Implementation of NYCEEC's projects is expected to result in the avoidance of 762,000 metric tons of CO<sub>2</sub> over the lifetime of the projects. This is equivalent to the GHG reductions of taking 159,023 passenger vehicles off of the roads for one year.<sup>28</sup>

NYCEEC seeks to continue reducing carbon emissions in collaboration with its lending partners and hopes that through administering NYC's new C-PACE program, that many more qualified lenders will join the business of mitigating carbon emissions. This would facilitate the achievement of NYC's goal of carbon neutrality by 2050 with broad-based support from all building stakeholders – non-profit lenders like NYCEEC, private sector lenders, public sector agencies, energy service companies, contractors, and developers.

While in 2014 NYC committed to reducing citywide emissions 80% by 2050, NYC has since aligned its GHG reduction targets with that of the Paris Agreement to reach carbon neutrality by 2050.<sup>29</sup> To create a policy-aligned and incentivized pathway to carbon neutrality, NYC announced the Climate Mobilization Act (CMA) in April 2019 that includes five pieces of progressive legislation including: C-PACE financing, buildings posting energy efficiency letter grades, building emission limits (with fines for non-compliance), and mandates for most new buildings constructed to have either green roofs or solar PV systems. The CMA's laws focus on building emissions as these constitute two thirds (66%) of NYC's overall GHG emissions.<sup>30</sup>

Additionally, more than 90 percent of NYC buildings today will still stand in 2050, so it is important to require these buildings to reduce carbon emissions in accordance with the new CMA legislation (emission caps pertain to buildings greater than 25,000 square feet).<sup>31</sup> It has been projected that approximately 50,000 buildings are greater than 25,000 square feet, and will therefore be in scope for compliance. The policy's success would reduce NYC's building emissions by 40% and create 17,000 construction-related jobs by 2030.

## Diverse green bank services

The fact that the building emissions dominate NYC's greenhouse gas inventory absolutely motivates NYCEEC's green lending for servicing buildings. For other city green banks transportation might be a key sustainability focus if car usage is the key contributor to the city's carbon footprint. Elsewhere, waste-to-energy infrastructure, sustainable agriculture technologies, measures for conservation of natural resources, afforestation, resiliency or other climate mitigation and adaptation related infrastructural services that align with a city's sustainable development goals could be the focus. Consequently, green banks operating on citywide, regional, state, and national levels in a country can all serve symbiotic and distinct roles in creating greener and equitable futures.

## Green bank mobilization

Multiple green bank lenders all synergistically pursuing diverse missions across sustainability sectors – indirectly or directly coadjutant – fill the gaps in global sustainable development investments. Green banks finance projects that are impactful, but also potentially complex, challenging, and not-necessarily materially profitable in the near-term (i.e., projects private sector lenders will not actively pursue until the market matures). There are over a dozen green banks currently operating at national, sub-national, and local levels across the world, that may convene to share learnings, and potentially even spread exposure of their investments across each other's portfolios.

With existing green banks presenting a menu of inspiring missions, a variety of initial capitalization methods, and a portfolio of unique specialty financing solutions, a government, non-profit, or financial service provider thinking about creating a green bank has models to follow.

NYCEEC is an example of a city green bank that brings specialization and focus to building energy efficiency and clean energy, providing flexible capital when other options are lacking. Cities can look to GHG intensive sectors or other areas of sustainable development that are deficient in flexible private capital when devising their own versions of green banks.

<sup>28</sup> <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

<sup>29</sup> <https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/1point5-AligningNYCwithParisAgrmtFORWEB.pdf>

<sup>30</sup> <http://1w3f31pzvdm485dou3dppkcq.wpengine.netdna-cdn.com/wp-content/uploads/2019/05/OneNYC-2050-A-Livable-Climate.pdf>

<sup>31</sup> [https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/TWGreport\\_04212016.pdf](https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/TWGreport_04212016.pdf)

**Required scale of green investments**

The UN's International Panel on Climate Change predicts that limiting warming to 1.5°C as per the Paris Climate Agreement will require average energy-related system investments of USD2.4 trillion annually through 2035.<sup>32</sup> Counting from 2020 onward, this constitutes approximately USD36 trillion of energy investments needed through 2035, but in the context of mitigating climate change this will avoid USD26 trillion in climate change losses and open up USD12 trillion dollars of market opportunities along with meeting other sustainable development goals.<sup>33</sup> The benefits of pursuing an ambitious and unprecedented quantity of low-emissions energy investments appears to outweigh the costs; however, with such a great quantity of investments needed, lenders all across global financial services will need to participate, including green banks.

Green banks driving clean energy investments are valuable to transitioning towards a carbon neutral global economy as long as green banks continue to offer differentiated and targeted services, and co-lend, originate, and de-risk clean energy investments that inspire other lenders to join this transition to a clean energy economy.

Competing priorities, closing deals in unforeseen territories, and balancing financial stability and mission driven impacts are challenges for forming and operating green banks. Yet, proceeding on a business as usual path is not an option if nations want to come close to fulfilling the Paris Agreement. Thus, green banks provide stakeholders with an option to accelerate clean energy investment through specialized financing facilities.



<sup>32</sup> [https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15\\_SPM\\_version\\_report\\_LR.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf)

<sup>33</sup> <https://www.undp.org/content/undp/en/home/librarypage/time-for-hard-choices.html>

# Recommendations from Lessons Learned

Green banks are a relatively recent innovation in finance. For each institution, its formation and growth has followed a unique path. Nevertheless, the experience of NYCEEC, the first local green bank in the US, provides several insights that can assist stakeholders in the creation and operation of any green bank.

- ◆ **Blended capital maximizes impact:** Beyond its initial capital grant, NYCEEC has borrowed from the private sector and secured government and philanthropic support in different forms. These additional sources of capital increase NYCEEC's impact, while creating valuable partners that can help NYCEEC achieve its goals.
- ◆ **Technologies financed reflect local circumstances:** NYCEEC focuses on building-scale technologies (both energy efficiency and renewables) as building emissions constitute 66% of NYC's overall GHG emissions. The specific technologies financed reflect both market needs and policies (e.g., programs supporting fuel conversions and CHP). The types of projects financed by NYCEEC will adapt as new technologies and policies are developed.
- ◆ **Diverse financial products are needed:** NYCEEC offers pre-development and construction loans to address the early-stage capital needs of borrowers. It also offers permanent loans backed by equipment, ESAs, PPAs, and PACE assessments. This diversity of loan products allows NYCEEC to finance the broadest range of borrowers.
- ◆ **Loan terms must balance competing objectives:** NYCEEC must be flexible in the pricing and other terms it offers borrowers. At the same time, its portfolio overall must produce a certain yield and generate adequate cash flow to sustain operations at the desired scale.
- ◆ **Green banks target market gaps:** NYCEEC tries to "crowd in" other capital providers, rather than compete with private sector lenders. Accordingly, NYCEEC operates in markets underserved by traditional lenders. For example, a majority of NYCEEC's loans, by number, support projects at affordable housing properties.
- ◆ **Partners are critical to success:** For NYCEEC, partners include contractors, developers, and energy services companies that can drive project origination. Government agencies also work to support shared goals (e.g., clean and affordable housing). Commercial lenders that can help fund larger projects are also critical partners to NYCEEC.
- ◆ **Green banks have many positive impacts:** For NYCEEC, impacts can be measured in economic terms (e.g., capital mobilized), environmental terms (e.g., CO<sub>2</sub> eliminated), or social terms (e.g., affordable housing units impacted). All impacts are critical to the overall value proposition.
- ◆ **Institutions must continually evolve:** In response to market needs, NYCEEC has undergone many changes including transition to an independent not-for-profit, expansion of its geographic reach, and growth in its product offerings (e.g., PACE). NYCEEC will undoubtedly continue to evolve in the future.

As NYCEEC nears the end of its first decade of operation, other green banks can learn from its experiences. This will help other green banks achieve their specific goals. With a growing number of these institutions, green banks are contributing a meaningful support for the needs of a clean energy economy and addressing climate change.



## About the Centre of Sustainable Finance

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“For more than a decade, HSBC has been at the forefront of the sustainable finance market. In November 2017, HSBC made five sustainable finance pledges. We committed to provide USD100 billion of sustainable financing and investment by 2025, source 100 per cent of electricity from renewable sources by 2030, reduce our exposure to thermal coal and actively manage the transition path for other high carbon sectors, adopt the recommendations of the task force on climate related financial disclosures to improve transparency, as well as leading and shaping the debate around sustainable finance and investment.

Taken together, these commitments reflect the scale of the challenge of delivering the Paris Agreement and UN Sustainable Development Goals. They also demonstrate the heights of our ambition to be a leading global partner to the public and private sectors in the transition to a low-carbon economy.”

**Daniel Klier**, Global Head of Sustainable Finance



“Each and every one of us has a stake in developing a sustainable economic system. It is the combined responsibility of all players in society to respond to climate change, rapid technological innovation and continuing globalisation to secure a prosperous future. Yet addressing these changing forces is by no means straightforward. More work is needed to provide the financial system with the right toolkit to solve sustainability challenges.

Working with internal and external partners, this central think tank is uniquely positioned to lead and shape the debate. We will promote the sustainable finance agenda using our global network which covers the world’s largest and fastest growing trade corridors and economic zones. We can provide the connections needed to foster sustainable growth across borders and geographies. We aim to mobilise the capital flows needed to address the world’s major sustainability challenges.”

**Zoë Knight**, Group Head, HSBC Centre of Sustainable Finance

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