



ISSUE BRIEF

CAPACITY, COGNIZANCE, CONFIDENCE, AND CAPITAL:

HOW GREEN BANKS ARE DRIVING ENERGY EFFICIENCY IMPROVEMENTS IN AFFORDABLE HOUSING

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ABOUT GREEN BANK NETWORK ISSUE BRIEFS

Biannual issue briefs are a new Green Bank Network (GBN) product that will consist of short reports that highlight collective successes and innovations of GBN Members in specific areas. They are an opportunity for the GBN Members to share their experiences and engage in continuous dialogue with the broader green finance community.

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About the Green Bank Network

The Green Bank Network (GBN) is a membership organization managed by the Natural Resources Defense Council and the Coalition for Green Capital. It was founded in December 2015 to foster collaboration and knowledge exchange among existing green banks, enabling them to share best practices and lessons learned. The GBN also aims to serve as a source of knowledge and a network for jurisdictions that seek to establish a green bank. The GBN founding members are the Clean Energy Finance Corporation (Australia), Connecticut Green Bank (U.S.), Green Finance Organisation (Japan), GreenTech Malaysia, NY Green Bank (U.S.), and Green Investment Group (U.K.). Visit us at greenbanknetwork.org/about-gbn.

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EXECUTIVE SUMMARY

Sufficient availability of affordable housing is a significant and growing concern across the world, in high-income and lower-income countries alike. The world's population is growing and, at the same time, urbanizing. According to United Nations estimates, the global population will rise to 8.5 billion by 2030, and around 60 percent will live in urban environments.¹ And according to analysis by McKinsey, current income and migration trends indicate that one-third of the world's urban households—1.6 billion people—could be struggling to afford decent housing by 2025.² Governments at all levels are feeling the urgency of driving construction and preservation of affordable housing.

Some multifamily housing properties are configured so that the owners pay all utility bills for the property. In many cases, these bills and related maintenance costs are among the largest—if not *the* largest—controllable operating expenses. In other properties, the owners pay a portion of utilities, and a portion is paid by residents. In both cases, lowering utility, maintenance, and other costs by improving building energy performance is a way to preserve the affordability of housing, whether because owners can avoid having to raise rents to cover those expenses, or tenants realize a reduction in total rent (rent plus utilities).

An affordable housing property typically moves through financing and physical milestones in its life cycle. Major financing events are purchase, refinance, and sale. Major physical events—new construction and major rehabilitation—usually coincide with major financing events. The time in between major financing events, when property owners may use reserves or access additional financing to fund projects such as ongoing maintenance and smaller renovations, is referred to as “mid-cycle.”

Affordable housing property owners and operators frequently report four major obstacles in pursuing high energy performance in a property, regardless of whether that property is nearing a major financing event or is mid-cycle. They are: **capacity**, limited staff time to explore and pursue seemingly complex and noncritical projects; **cognizance**, limited awareness of and familiarity with energy efficiency opportunities, and thus limited comfort managing a project involving them; **confidence**, limited exposure to information on the various benefits of successful projects; and **capital**, limited availability of capital reserves or affordable financing options to bring projects to fruition once they are designed. This brief examines each of these obstacles and describes the ways in which green bank products and staff can help owners to manage efficiency projects despite these challenges.

The Appendix provides a breakdown of offerings by each green bank highlighted in this brief as well as detailed information on each offering.

Pursuing energy-efficient design of or upgrades to any building requires staff capacity and cognizance beyond what would be required for more standard building design or capital improvements. Because affordable housing property owners tend to have many competing demands for their time and attention, the ready availability of technical assistance has proven valuable for a green bank to help an owner accomplish an energy efficiency project. A good example is predevelopment support (e.g., loans or funded expert support) to assist with project scoping, designing, and identification of funding sources. And as projects are undertaken and then completed, a green bank can augment the property staff's capacity for pursuing efficiency upgrades and cognizance of how to do so by offering support with contractor selection, construction, commissioning, and performance evaluation.

In addition to needing the capacity and cognizance to identify and pursue efficiency projects, a property owner allocating a portion of her or his limited funds to efficiency must have confidence that efficiency upgrades will yield benefits that are too great to pass up. Potential benefits will depend on the measures involved, and can include increased tenant comfort and stability; reduced utility consumption; reduced utility, maintenance, and insurance costs; reduced exposure to utility rate increases and volatility; higher debt capacity; increased property value; and lower carbon footprint. In some cases, lenders must also have confidence that benefits they see as relevant will be realized before extending financing.

It is therefore useful for green banks to collect and share baseline and post-upgrade information on completed projects to track outcomes (such as energy savings) and



Capacity

LIMITED STAFF TIME TO EXPLORE
AND PURSUE SEEMINGLY COMPLEX
AND NONCRITICAL PROJECTS



Cognizance

LIMITED AWARENESS OF AND FAMILIARITY
WITH ENERGY EFFICIENCY OPPORTUNITIES,
AND THUS LIMITED COMFORT MANAGING A
PROJECT INVOLVING THEM



Confidence

LIMITED EXPOSURE TO INFORMATION
ON THE VARIOUS BENEFITS OF
SUCCESSFUL PROJECTS



Capital

LIMITED AVAILABILITY OF CAPITAL
RESERVES OR AFFORDABLE FINANCING
OPTIONS TO BRING PROJECTS TO FRUITION
ONCE THEY ARE DESIGNED

build owners' and lenders' confidence in the realization of benefits from efficiency upgrades. Green banks are currently collecting and sharing this kind of information quantitatively and qualitatively to varying degrees; there is opportunity for all green banks to document and share their successes—as well as challenges—more widely. As green banks have experienced, collecting such information can be challenging and may require cooperation of other entities such as utilities.

Once efficiency opportunities are identified and a project is envisioned, one major obstacle remains: capital. The best way to finance that project may depend on whether the property has a major financing event on the horizon. Properties at major financing events typically have access to low-cost, long-term capital, while mid-cycle properties do not.

An effective strategy for green banks is to identify new properties planned for construction and existing properties approaching a major financing event (purchase, sale or refinancing). By doing so, green banks can help owners to include efficiency upgrades into the scope of capital improvements to be made and thus include funding for them in a low-cost, long-term debt arrangement. Not only can efficiency improvements be included in larger, long-term financing packages, but the future cash flow from utility bill and maintenance cost savings can be included in the underwriting process (as increased net operating income) to increase the debt capacity that a borrower can support. This can unlock loan proceeds to cover not only the efficiency improvements themselves, but also other upgrades like improvements to the property's safety, comfort, and aesthetic. The opportunity to underwrite efficiency as a part of the owner's operational cash flow is largest for properties for which the owner pays the utility expenses because the savings from the project will appear on the owner's account. The owner of a property with separately metered units might over time be able to realize higher rents for units with lower utility expenses and benefit from a higher property value, but this will take time and is difficult to quantify at this point.

And for mid-cycle properties, which tend to have very limited access to capital, green banks can offer a variety of products that facilitate efficiency upgrades. These include conventional unsecured and secured loans for projects. Some green banks have also offered loans to cover installation of third-party owned equipment the owner pays for through energy services contracts; these are most useful for solar and large equipment like combined heat and power (CHP).

Several green banks expressly allow loan proceeds to be used for health and safety remediation work (such as mold remediation). Financing this work can in some cases be critical to facilitating improvements in properties that need them most and is very valuable to residents. Such project expenses are unlikely to be financed by market lenders, and therefore is a high value function for green banks and other mission-driven lenders.

Because of the unique challenges associated with efficiency upgrades in affordable housing properties, advocates have had success in securing funding for utility incentives specifically targeting efficiency in those properties. Utility programs often provide a set financial incentive for the purchase of a certain type of equipment, like efficient lighting and appliances. These incentives are very valuable. In the absence of other funding sources, though, resource-constrained property owners are limited in the type of energy efficiency upgrades they can make. If an owner can combine utility incentives with other funding sources, including from commercial banks, community banks, and green banks, she or he may be able to pursue more extensive, whole-building upgrades ("deep retrofits").

Combining funding sources that all have their own application processes and timelines can be difficult. There is opportunity for green banks and other multifamily efficiency advocates to help coordinate programs to make it easier for owners to combine resources from multiple sources. Green banks can develop relationships with housing finance agencies, other lenders, and utilities to help coordinate their processes to ensure that hard-won utility incentives are put to work in deep retrofits with the most benefit for residents.

In sum, green banks make strategic investments of time and capital to address these challenges and help projects come to fruition. Approaches that green banks are already using that, if used more broadly, could help more owners make efficiency improvements in multifamily affordable housing include:

- Provide in-house technical assistance and/or financing for outside technical assistance to help owners navigate the process from assessing opportunities to obtaining funding (including identifying available incentives) to monitoring project performance.
- Facilitate consideration of efficiency upgrades during major financing events by providing funding for energy assessments to be done in conjunction with the capital needs assessments lenders typically require as well as by providing credit enhancements for “green mortgages” extended by partner institutions (including market-rate lenders).
- Offer financing products that work with properties’ existing debt commitments by reducing the need for existing debtholder consent, including unsecured financing. The importance of financing energy efficiency through third-party energy services agreements is yet to be determined but seems most appropriate for large equipment such as CHP.
- Provide bridge financing to help borrowers take advantage of incentives that are not disbursed until a project is completed.
- Provide gap financing for health- and safety-related work that must be completed before efficiency upgrades can be made, to ensure that financing for efficiency is accessible by distressed properties most in need of improvements.
- Include projected savings from efficiency projects (including reductions in utility costs, maintenance expenses, and insurance premiums) in the calculation of a property’s net operating income so that the financial benefits of high energy performance are adequately accounted for, and help train other lenders to do the same.
- Collect and broadly disseminate data on the benefits of high energy performance from completed projects to the affordable housing sector to build market cognizance of and confidence in the opportunity.
- Advocate for alignment of incentives offered by utility and housing authorities with holistic efficiency project time lines so that those incentives can be leveraged to attract private capital instead of used alone for less impactful projects.

As market-oriented and mission-driven financial entities, green banks are well positioned to help affordable housing owners take advantage of the many benefits of high-efficiency building design and operation. Doing so

requires working with property owners, affordable housing financiers, utilities, and others to implement financial products and programs designed with the realities of the affordable housing sector in mind.

INTRODUCTION

Green banks, also referred to as green investment banks, use limited funds (public or donor) to attract private investment to low-carbon, climate-resilient infrastructure projects.³ Although building efficiency is not “infrastructure” in the traditional sense, some green banks have prioritized investing in energy efficiency in buildings since the energy that buildings consume for heating and cooling contributes significantly to greenhouse gas emissions, given the current energy production mix.⁴

Green banks endeavor to catalyze private investment in these assets by working closely with the private sector and using market-responsive strategies such as credit enhancements to mitigate risks in early deals, project aggregation to get small projects to investible scale, contract standardization to reduce transaction costs, and demonstration projects to create precedents for new markets. They can also contribute to demand generation through market development activities like public awareness campaigns. Each of these approaches can help to build a track record and increase the confidence of private banks and investors without displacing private investment in projects that do not require support. Understanding that public capital is in short supply, green banks use the limited public resources available to unlock untapped or underutilized pools of private capital. Individual green banks focus on different sectors depending on policy priorities and needs of the local market.

Since 2010, more than a dozen national and subnational governments have created public green banks and green bank-like entities (which combine green bank activities with other activities or approaches) at the national, state, county, and city level. For the purposes of this report, “green banks” refers to both green banks and green bank-like entities.

As publicly capitalized entities, green banks may serve as vehicles for public policy that expands beyond carbon emissions reduction to include creating jobs, increasing resilience to climate change, improving public health, and lowering the cost of living for residents. Some green banks have an explicit commitment not only to grow green infrastructure markets broadly, but also to ensure that investments reach all market segments, including low- and moderate-income households. For example, Connecticut (CT) Green Bank’s tagline is “Inclusive Prosperity,” and it has an explicit directive from its board of directors to serve the needs of low- and moderate-income households.⁵

This mission, along with a clear commitment from the institution's president and senior leadership team, has led CT Green Bank to establish a dedicated Multifamily Housing Program focused on improving efficiency in multifamily properties where low- and moderate-income households live. The Australian Clean Energy Finance Corporation's (CEFC) Investment Mandate includes supporting energy efficiency in the built environment, which encompasses universities, local governments, affordable housing, property, infrastructure, and other sectors.⁶ This led the CEFC to establish its Community Housing Program to support high-efficiency, affordable housing.

In the United States, the term "affordable housing" is generally used to describe rental or owner-occupied housing that consumes no more than 30 percent of the total household income of low-income residents. "Low income" is usually defined as 80 percent or less of the area median income. Different terms are used in Australia, where the broad "community housing sector" includes the "social housing" and "affordable housing" subsectors.⁷ This issue brief uses the term "affordable housing" to refer to the multifamily rental segment of the housing market (properties with five or more rental housing units) that is economically accessible to low- and moderate-income residents.

This issue brief provides an overview of how green banks are promoting energy efficiency in the multifamily affordable housing sector. The purpose of this brief is to describe those approaches and highlight lessons learned that can inform efforts by other financiers, including but not limited to green banks, with an interest in contributing to improved physical and financial health of properties in this important sector. While utilities include both energy and water, this brief focuses on the energy portion of utility expenditures because it has been the focus of green banks' efforts to date in this market segment.

THE OPPORTUNITY PRESENTED BY EFFICIENCY IN AFFORDABLE HOUSING

Across countries where green banks operate, families and individuals most in need of affordable housing are also most likely to be affected by high energy costs. In Australia, more than 50 percent of affordable housing lacks any insulation.⁸ Many affordable housing properties are several decades old and were constructed at a time when buildings in general were built to a lower standard of efficiency, but the more important issue that has led to inefficiency of affordable housing properties specifically is the lack of building maintenance over time. Lack of basic maintenance leads to inefficient building operation, and inefficiency leads to higher utility consumption and costs.

Lower-income tenants paying their own utility bills are likely to have a larger energy burden than their higher-income neighbors—that is, they spend a greater percentage of their income on in-home energy expenses. In the United States, low-income families spend up to 20 percent of their income on energy, more than twice as much (percentage-wise), on average, as households of median income and three times as much as high-income households.^{9,10} The Australian Bureau of Statistics found that low-income Australian households also spend around three times as much on in-home energy, as a percentage of income, as high-income households.¹¹ Spending this income on energy means that it is being diverted from critical expenses such as food, transportation, and health care. High energy burden and poor housing quality contribute to health problems such as asthma, in addition to general discomfort and reduced quality of life.¹²

Tenants' wallets are affected by high utility bills in inefficient properties whether or not they are directly paying unit-level bills. If they are not, then the property owner is, and the rent will reflect those costs as well as the cost of common-area utilities and related maintenance. Whether through tenant-paid bills or higher rent or a combination of both, utility expenses can make the cost of living in a property unaffordable for some residents. Reducing operating expenses in multifamily buildings is a way of maintaining their affordability. And in existing properties where owners pay all utility bills, efficiency upgrades can free up cash to cover other maintenance needs.¹³

Since around 2010, many institutions have studied the concept of addressing high—and, in many places, escalating—costs of utilities in inefficient multifamily housing properties through efficiency upgrades. In 2011, for example, Deutsche Bank Americas Foundation funded the creation of a public database of information on multifamily property utility consumption before and after efficiency retrofits.¹⁴ This landmark tool and its companion report, showing that projected utility consumption and cost savings were being realized and property conditions were improved, was an important proof point for housing preservation-minded multifamily lenders to establish green loan products.¹⁵ Among these were Fannie Mae and Freddie Mac, the largest providers of multifamily financing in the United States by volume.

A table detailing possible efficiency upgrades and the percentage of consumption savings that can be expected from each measure can be found in the *Underwriting Efficiency Handbook*, a resource produced by the New York-based affordable housing lender Community Preservation Corporation.¹⁶

CHALLENGES TO IMPROVING EFFICIENCY IN AFFORDABLE HOUSING: CAPACITY, COGNIZANCE, CONFIDENCE, AND CAPITAL



Despite the large potential benefits of energy efficiency measures, it is not yet the norm for affordable housing property owners to prioritize identification of and investment in those measures during property construction, rehabilitation, or renovation. Why is that?

Owners of rental properties may not be as directly incentivized as homeowners or the owner of a master-metered property to invest in efficiency upgrades if the cost savings accrue to tenants who pay utility bills directly. Tenants are often not permitted to invest in building upgrades, and even if they were, would not likely purchase assets such as high efficiency windows that become the owner's property. This "split incentive" is present in properties that are separately metered rather than master-metered—that is, those with utility metering at the unit level. There are ways for separately metered tenants to share in the costs and benefits of upgrades, such as by using a green lease through which tenants and landlords agree contractually on how they will share in the costs and benefits of energy upgrades.¹⁷ These are typically more appropriate for office properties with longer term leases.

Because owners of master-metered properties tend to be the most motivated to explore utility and maintenance cost-saving opportunities, the majority of U.S.-based green banks' affordable housing projects to date have involved properties whose owners pay for all utilities. In Australia, on the other hand, most affordable housing tenants pay their own in-unit utility bills. The CEFC has learned to tailor financing solutions so that property owners receive enough benefit from the financing product (e.g. improved property condition, increased property market value, and lower tenant bills leading to more stable rental payments) to undertake the efficiency upgrade anyway.

Regardless of who pays which utility bills, property owners are likely to face a number of obstacles in pursuing higher energy efficiency. These include **capacity**, limited staff time to explore and pursue seemingly complex and noncritical projects; **cognizance**, limited awareness of and familiarity with energy efficiency opportunities, and thus limited comfort managing a project involving them; **confidence**, limited exposure to information on the various benefits of successful projects; and **capital**, limited availability of capital reserves or affordable financing options to bring projects to fruition once they are designed.

With expertise in energy efficiency as well as affordable housing, green bankers who focus on this housing sector are well positioned to help address property owners' challenges related to capacity, cognizance, confidence, and capital. The following sections describe the approaches green banks are taking to do so.

BUILDING CAPACITY AND COGNIZANCE THROUGH PREDEVELOPMENT SUPPORT



Most affordable housing property owners have a significant need for technical assistance in project

predevelopment to augment the owner's capacity for pursuing efficiency upgrades and cognizance of how to do so. Predevelopment includes conducting a professional assessment of the property to identify potential upgrade opportunities and the associated benefits. An affordable housing property owner may have never commissioned such an assessment, may not know a company in the area that can complete one, and may have no idea what it will cost. By offering to help coordinate and pay for the assessment, a green bank or other entity can help an owner get to the point of understanding the potential benefits of energy upgrades so they can at least be considered. This is even more true if financial support for assessments is grant-based (in the case of loans, forgivable loans): if nothing comes of the assessment, the owner does not have to worry about having wasted money, and they might be persuaded to undertake the predevelopment analysis.

The process of conducting an analysis, designing the project, and securing project development financing can be not only expensive financially but also human resource intensive. It requires staff capacity and efficiency-specific cognizance, both of which may be in short supply. Without a champion to work through the process alongside owners, efficiency projects might stay on the back burner indefinitely. Partnership with a green bank can kick-start an owner's first efficiency project. Chances are that once a property owner experiences the benefits of high efficiency firsthand, that owner will pursue high energy performance in other properties in her or his portfolio.

While relatively few projects have received predevelopment support to date, early outcomes of green bank programs described below indicate that this is a valuable use of limited public or donor funds. CT Green Bank and the New York City Energy Efficiency Corporation (NYCEEC) are helping owners get through the predevelopment process with the following offerings.

CT GREEN BANK SUPPORT FOR PREDEVELOPMENT TECHNICAL ASSISTANCE AND BENCHMARKING

In 2015, CT Green Bank developed a predevelopment loan program to support affordable housing property owners in identifying high-quality technical assistance providers and to fund the work needed to scope and secure financing for cost-effective energy efficiency upgrades. CT Green Bank has two predevelopment resources available to help building owners begin scoping, analyzing, and designing energy upgrades: the Sherpa and Navigator loans. The Sherpa loan is a solution through which a borrower works with CT Green Bank's technical service provider partner, New Ecology, throughout the entire predevelopment process.¹⁸ By working with a "sherpa," property owners can benefit from the capacity and cognizance of a specialized partner. Like the Sherpa loan, the Navigator loan provides low-cost, unsecured financing, but for borrowers who prefer to select their own contractors.¹⁹ This less "hands-on" product is well suited for borrowers who have built the capacity and cognizance to manage their own project development process. Since its inception, CT Green Bank has deployed a total of US\$870,000 in 14 predevelopment loans to multifamily borrowers.

For both predevelopment products, under specific conditions, it is possible for borrowers to apply for full or partial loan forgiveness if they do not move forward with efficiency projects. For example, if a Sherpa borrower decides to secure project financing through CT Green Bank for projects identified through the predevelopment work, the Sherpa loan may be wrapped into the project financing. But if the borrower decides not to move forward after the opportunity assessment, there is no obligation to repay funds advanced by CT Green Bank. Loan forgiveness for the Navigator loan may be granted in certain circumstances, such as if a borrower does not qualify for project financing from CT Green Bank or multiple other lending institutions. In this way, the predevelopment "loans" can end up being deployed as grants, which is a typical way for predevelopment to be funded in hard-to-reach markets like affordable housing. Nevertheless, with these products, CT Green Bank is working to change the model of predevelopment and technical assistance from one that is primarily grant funded in the low- and moderate-income housing space to one that is loan driven. Most predevelopment loans CT Green Bank has made to date are for projects still going through the predevelopment process.

In addition to offering predevelopment loans, CT Green Bank has supported partner cognizance of efficiency opportunities by offering benchmarking services. Benchmarking is the process of assessing the energy performance of a property (or a portfolio of properties) and comparing it with the performance of similar buildings. Through the BenchmarkCT program, CT Green Bank and the Connecticut Housing Finance Authority (CHFA), Connecticut's affordable housing lender, provided affordable property owners with one year of free energy benchmarking. Through this program, CT Green Bank and CHFA gathered data across many properties in their jurisdiction. Having these data has built awareness of which properties would most benefit from efficiency upgrades and establishes baseline data for buildings against which the results of efficiency upgrades can be compared.



NYCEEC SUPPORT FOR PREDEVELOPMENT TECHNICAL ASSISTANCE²⁰

In 2015, the New York City Department of Housing Preservation and Development (HPD) created the Green Housing Preservation Program (GHPP), a loan program that supports both NYC's emissions reduction goals and its affordable housing preservation goals by providing low- or no-interest loans for energy and water efficiency improvements in multifamily properties. In support of GHPP, NYCEEC developed a predevelopment loan fund to help eligible owners participate in the program. Through the partnership, NYCEEC receives a soft commitment from HPD that certain projects will be financed by GHPP, and then NYCEEC extends predevelopment loans to those projects.

NYCEEC received a grant from the David Rockefeller Fund to support the initial design and launch of the GHPP predevelopment loan fund. NYCEEC also received a program-related investment from the MacArthur Foundation to finance energy efficiency and clean energy projects in affordable multifamily buildings, and it uses this investment to fund some GHPP predevelopment loans.

The predevelopment loans fund any predevelopment expenses associated with participating in GHPP, including green physical needs assessments to identify efficiency opportunities, property appraisals and surveys, lead and asbestos testing, and engineering studies. NYCEEC can finance up to US\$40,000 in predevelopment expenses for up to 18 months. The loans are repaid to NYCEEC from HPD construction loan proceeds. If a project with predevelopment financing does not move forward with HPD financing, the borrower is responsible for repaying NYCEEC. In this situation, NYCEEC may allow a no-cost six-month extension on repayment and the option to enter into a payment plan. As of August 2018, NYCEEC closed 22 GHPP predevelopment loans totaling around US\$270,000. Ten of the loans have been repaid; of these, five have closed on HPD construction financing and several others are expected to close soon. The closed and nearly closed projects total US\$4.7 million in project costs, meaning this loan product is achieving a leverage ratio of over 16:1 (non-NYCEEC investment to NYCEEC investment). The average predevelopment loan size has been US\$11,000, and the average term is approximately 16 months. These loans were used for predevelopment work across 248 units in 22 buildings with an average size of 11 units.²¹

BUILDING MARKET CONFIDENCE THROUGH DATA COLLECTION AND DISSEMINATION



In addition to needing the capacity and cognizance to identify and pursue efficiency projects, a property owner allocating a portion of her or his limited capital to efficiency must have some degree of confidence that efficiency upgrades will yield the projected benefits, including utility bill savings, maintenance cost savings, and increased property value. Once an owner has completed one project and experienced the benefits of efficiency, confidence stemming from her or his own experience may inspire further efficiency investments. But without any prior personal experience, the first project can be the hardest to commit to.

It is therefore critical that green banks collect and disseminate, to whatever extent they are able, baseline and post-upgrade performance data. Valuable project performance information includes financial outcomes

for the lender (e.g., loan repayment rates) and project outcomes for the owner (e.g., energy and cost savings and property value changes). It is worth noting that green banks are limited in their ability to collect and report performance data by utility data availability and their own capacity to access and analyze that data. While energy consumption and cost data are ideally quantifiable, to date, information on changes in property value related to energy efficiency improvements has been largely qualitative, based on owner experience.

Getting a clear picture of project-level performance is difficult, but green banks recognize its importance and are working to improve their project monitoring processes. Building collective insight over time will build the entire sector's confidence that projected utility and maintenance cost savings will materialize and that efficiency projects are a worthy investment. Collecting and sharing this data also helps green banks fulfill their important role of demonstrating to commercial lenders the investment opportunity presented by efficiency in affordable housing.

CT GREEN BANK PROJECT- AND PORTFOLIO-LEVEL PERFORMANCE MONITORING

Any project that has CT Green Bank funding is required to include performance monitoring of the efficiency measures throughout the term of the loan. CT Green Bank is currently developing, in partnership with utility analytics company WegoWise, a quarterly performance report template that will provide both the property owner/manager and other financiers involved in a project with information on what the actual energy consumption and cost savings to date have been and how those figures compare to projections made during project design. CT Green Bank will aggregate these reports to track projected versus realized savings across its entire loan portfolio. Both anonymized versions of project-level reports and portfolio-level reports can help to make a consistent, strong case to other property owners and financiers of the outcomes expected from certain efficiency upgrades.

NYCEEC PERFORMANCE TRACKING AND CASE STUDIES

Similarly, NYCEEC borrowers submit pre- and post-implementation utility data to NYCEEC. NYCEEC tracks projects' actual performance compared with projected performance and uses aggregated data to report on NYCEEC's portfolio. As projects are completed and data collected, information is publicly shared at conferences, events, and webinars and also published through NYCEEC's detailed online case studies, such as that of the Roosevelt Landing multifamily property upgrade.²²

NYCEEC uses this detailed information to educate other lenders, policymakers, building owners, and related stakeholders about lessons learned, challenges, and opportunities of financing efficiency projects. NYCEEC regularly participates in lender round tables, housing conferences, and related industry events.

THE IMPERATIVE AND CHALLENGE OF UTILITY DATA TRANSPARENCY

Green banks like CT Green Bank and NYCEEC depend on utility data availability and quality to establish baselines and then monitor project performance. But utility data availability and quality are anything but guaranteed. CT Green Bank, for example, has faced major challenges in understanding what is included in the data automatically downloaded from utility accounts (for instance, which meters are represented). Further, whole building data or individual tenant data for properties with tenant-paid utilities are usually not easily available to property owners, energy engineers, or CT Green Bank, so projects are often designed with incomplete building information. This is an issue in Australia as well, where privacy is a key concern and tenant data are disclosed only on an opt-in basis.

Another challenge is that utilities can change, at any time, the way in which data are reported, making it difficult for users to regularly and automatically pull data into report templates. This is problematic because the high-quality energy modeling and financial analysis needed to inform investment decision-making can only be conducted with high-quality utility consumption data. Transparent, high-quality, and consistent availability of utility data greatly facilitates the work of any actors involved in energy upgrades, including green banks.

MEETING CAPITAL NEEDS FOR PROJECT DEVELOPMENT



Green banks help property owners acquire the capacity, cognizance, and confidence needed to build the momentum needed to get through the project predevelopment phase. But to bring projects to fruition, green banks also provide capital solutions to finance project development, whether that project is a small, stand-alone energy retrofit or the construction of a new, highly efficient property.

For properties in which major physical changes are being made and financed, green banks can be part of the vanguard of investors that see the opportunity to incorporate funding for efficiency upgrades into low-cost, long-term debt arrangements to reduce future operating expenses for

borrowers. And for properties between major financing events, green banks have developed a variety of products that facilitate efficiency upgrades even though most properties in this phase have very limited access to capital.

A key characteristic of successful efforts to increase investment in energy performance of affordable housing properties is partnership with other entities focused on meeting the needs of property owners and tenants. Green banks are already working closely with public housing finance agencies, community development banks, nonprofits, and other entities to design and deliver the right solutions.

The capital solutions green banks offer to facilitate high-efficiency affordable housing properties—often in partnership with utilities, technical services providers, and other financiers—are summarized in Table 1.

TABLE 1: PROJECT DEVELOPMENT CAPITAL SOLUTIONS OFFERED BY GREEN BANKS

GREEN BANK	PROJECT DEVELOPMENT FINANCING OFFERINGS	WHEN IS THE FINANCING APPLICABLE?
Clean Energy Finance Corporation (Australia)	Through its Community Housing Program, CEFC provides long-term, fixed-rate and flexible financing for new construction of energy efficient community developments and for efficiency upgrades to existing properties. ²³ The program is targeting the construction of as many as 1,000 new energy efficient homes in Australia, working in partnership with the country's community housing providers. The financing CEFC has made available makes it feasible for housing developers to develop high-efficiency properties at construction and to upgrade existing, older properties with energy efficient technologies. The program has to date focused on property owners with a portfolio of properties, including but not limited to multifamily properties. (see page 15)	Major financing events and mid-cycle
Connecticut Green Bank (United States)	Through its Multifamily Housing program, CT Green Bank finances predevelopment technical assistance and term financing solutions from the first planning stages of a project through to project performance monitoring. ²⁴ Project financing offerings include: Low-Income Multifamily Energy Loan (see page 18) Solar Power Purchase Agreement (see page 19) Commercial Property Assessed Clean Energy (see page 18) Health & Safety Revolving Loan Fund (see page 20) Catalyst Loan Fund (see page 20)	Major financing events and mid-cycle
Montgomery County Green Bank (United States)	MCGB's financial support enables its partner banks to offer a Commercial Loan for Energy Efficiency and Renewables (CLEER), an unsecured loan that can finance a variety of energy efficiency measures between property acquisition/refinancing. Affordable housing properties are eligible for CLEER financing. (see page 18)	Mid-cycle
New York City Energy Efficiency Corporation (United States)	NYCEEC's offerings, all of which affordable housing properties are eligible for, include: Equipment loans (see page 18) Loans for third-party service contracts (see page 19) Credit enhancement on green mortgages (see page 16)	Major financing events and mid-cycle
NY Green Bank (United States)	NY Green Bank offers structured wholesale financial products and solutions. All investment activities are driven by transactions proposed through open solicitations (requests for proposals). ²⁵ Affordable housing property owners are eligible to submit funding proposals, and two projects in affordable housing properties have received financing. (see pages 17 and 20)	Major financing events and mid-cycle

UNDERWRITING SAVINGS FROM ENERGY EFFICIENCY

An efficiency-savvy lender has a lot to gain from helping borrowers identify efficiency opportunities to either pursue a stand-alone project or incorporate efficiency measures into the scope of work for another project. Improving the energy performance of a borrower's property is likely to align with a lenders' interests by improving the property's condition, increasing the property's market value, and stabilizing a property owner's operating expenses. Some green banks and other lenders see efficiency as such an opportunity that they facilitate lending to efficiency projects by underwriting the anticipated savings from those projects.

Since improved building performance can stabilize tenancy as well as reduce a property's exposure to utility rate increases and volatility, more efficient properties may be associated with lower risk of loan delinquency. A recent paper found evidence that more energy efficient properties were correlated with lower loan delinquencies in the commercial mortgage-backed securities market.²⁶ Improved financial and physical performance results in higher market value of a property—a significant benefit to both owners and lenders with long-term interest in it. A US\$4.5 million NYCEEC investment in efficiency upgrades, for example, led to a US\$19 million increase in property value of nine-building development in New York City.²⁷

Utility bill and maintenance savings from efficiency investments can help borrowers reduce and stabilize operating expenses, leaving borrowers with higher net operating income with which they can pay debt service. The process of including these projected savings from energy efficiency in computing net operating income that can be used to cover debt service is called "underwriting efficiency."²⁸ In some cases, more efficient properties can fetch higher rents in the future, but analysis on that is not typically included in pre-project assessments and so is difficult to quantify. Similarly, at this time increases in future property values due to energy improvements is not quantifiable such that it can be included in underwriting.

Despite the potential advantages of underwriting efficiency, it is not yet common for lenders to do so. Lenders may not be familiar with interpreting energy assessments, and, like property owners, they may lack confidence that projected savings will actually be realized from efficiency projects. Lenders may also find it difficult to assess whether efficiency work is properly designed, installed, and maintained by qualified contractors, leading to further uncertainty in lending to energy efficiency projects.

As green finance specialist institutions, green banks are well positioned to lead the lending community in underwriting efficiency. In the United States, CT Green Bank, NY Green Bank, and NYCEEC are already doing so.

Underwriting efficiency allows projects to move forward in cases where otherwise, using traditional underwriting that does not account for future savings, a borrower would not have sufficient cash flow to pay debt service to cover the efficiency upgrade. For CT Green Bank, NY Green Bank, and NYCEEC borrowers, the efficiency upgrades that have been financed generate operating cost savings for the properties, and these savings are used to cover the debt service. In this way, distressed, inefficient properties that have little surplus cash flow and high utility costs can "unlock" additional cash flow by reducing utility and maintenance costs, thereby raising the property's net operating income and increasing the maximum debt capacity it can support (as illustrated in Table 2). In some cases, enough cash flow can be unlocked not only to cover the efficiency upgrades themselves, but also to cover other upgrades that further improve the property. Or the leftover cash flow can be saved, bolstering the property's cash reserves.

TABLE 2. NOTIONAL EXAMPLE OF HOW UNDERWRITING EFFICIENCY-RELATED SAVINGS CAN INCREASE MAXIMUM DEBT CAPACITY²⁹
LOAN WITH 10-YEAR TENOR AT 6% INTEREST FOR WHICH THE LOAN CONSTANT IS 13.5868%

	UNDERWRITING BASED ON 12-MONTH AVERAGE	UNDERWRITING BASED ON PROJECTED EXPENSES AFTER EFFICIENCY UPGRADE
Revenue	\$200,000	\$200,000
EXPENSES		
Electricity	\$30,000	\$20,000
Water	\$15,000	\$10,000
Other Operating Expenses	\$50,000	\$50,000
Subtotal	\$95,000	\$80,000
Net Operating Income	\$105,000	\$120,000
Maximum Debt Capacity	\$772,809	\$883,210

An affordable housing lender may want to reduce the risk of loan repayment being affected by expected savings not being realized by discounting the savings projection. For example, if annual energy savings of 10,000 kilowatt-hours (kWh) are predicted, the lender could include the cost savings associated with 50 percent of anticipated savings, 5,000 kWh, in the net operating income used to calculate the maximum loan a property can take. In this way, even if only 50 percent of projected savings are realized, the borrower fulfills the loan guidelines. Another way to reduce risk related to realized savings is to use an “energy savings coverage ratio” (ESCR) as an underwriting criterion, as CT Green Bank’s loan delivery partner Capital for Change does. The Low-Income Multifamily Energy loan (described on page 18) is unsecured provided the ESCR is at least 1.3X (1.1X for solar). Similarly, Montgomery County Green Bank’s Commercial Loan for Energy Efficiency and Renewables (described on page 18) is unsecured provided a minimum ESCR of 1.3X (1.1X for solar). A minimum 1.3X ESCR means that projected energy cost savings from the project being financed must exceed loan costs by a factor of 1.3. This criterion is easy to integrate into the underwriting process because it operates just like other ratio criteria, like debt service coverage ratio and loan to value.

NYCEEC underwrites projected savings but does not use a specific ESCR or energy savings discount rate. Instead, NYCEEC underwriters use their expertise in energy efficiency projects to assess the sensitivity of projected savings calculated by the borrower or contractor and underwrite the maximum possible amount of savings on a case-by-case basis. The sensitivity analysis may include how a change in project performance or future utility costs would affect the borrower’s cash flow and thus the ability to repay the loan. This process results in some discounting of expected savings to hedge against those risks but also allows underwriters flexibility in determining what the discount rate should be.

CT Green Bank’s involvement in the Plaza on the Green project (see Plaza on the Green case study) demonstrates

how, by underwriting a loan to projected savings, an affordable housing property is able to cover debt service with cash flow to spare.

While energy efficiency upgrades would be expected to generate savings on utility bills, an eye-opening lesson learned by CT Green Bank and its community development financial institution (CDFI) partner, Capital for Change, has been the extent to which efficiency upgrades can lead to savings on building maintenance. As they do for utility costs, project developers can look at historical maintenance costs in a building and project how they will be reduced after upgrades. And like projected utility bill savings, these maintenance cost reductions can be counted as future cash flow, increasing the net operating income against which a property owner can borrow. What is especially significant about the potential for underwriting to maintenance cost savings from efficiency upgrades is that property owners pay for maintenance, not tenants. Since there is no maintenance-related split incentive to address in separately metered properties, underwriting maintenance cost savings presents a significant potential opportunity to pursue deeper efficiency retrofits in any property. Maintenance cost savings are not the only owner-paid savings that can be explored for underwriting. For example, CT Green Bank realized through one project that building improvements may move a property from an expensive, high-risk insurance category to a less expensive one, and these savings on premium payments can also be included in future cash flow.

CT Green Bank’s investment in Heritage Commons (see Heritage Commons case study) demonstrates how underwriting to maintenance cost savings can unlock the cash flow needed for a project to move forward, leveraging utility incentives to do deep, comprehensive retrofits that cannot usually be funded by utility incentives alone. And since the Heritage Commons project was implemented as a stand-alone undertaking between major financing events, it also demonstrates that lenders can underwrite efficiency even in smaller, mid-cycle loans.

CASE STUDY: CT GREEN BANK UNDERWRITING EFFICIENCY TO UNLOCK FUNDS FOR RETROFITS AT PLAZA ON THE GREEN

Plaza on the Green is a 12-story, 157-unit, publicly owned, master-metered property serving low-income elderly residents. The state’s housing finance authority identified Plaza on the Green as in need of energy upgrades because its utility costs represented 27 percent of its total operating cost, mostly for electric heating and hot water. The property’s air ventilation system had been turned off to reduce operating costs. The project team, funded by CT Green Bank, designed a comprehensive energy renovation plan that is currently being implemented; it includes electric-to-gas conversion for heating and hot water, water efficiency measures, a high-efficiency lighting retrofit, and an improved ventilation system.

The project was financed by a US\$2.6 million unsecured loan from a local community bank, with participation from CT Green Bank and the Housing Development Fund using a MacArthur Foundation program-related investment. Utility incentives put toward the project totaled US\$200,000. Post-retrofit, the property is projected to have more than US\$248,000 in additional net operating income every year, representing utility cost savings of more than 50 percent. With roughly \$216,000 in debt payments, the property’s cash flow will increase by \$32,000 annually. The loan for this project was secured by personal guarantees from the owners (not equipment or real estate) and was underwritten based on the use of cash flow from energy savings to service the debt.

CASE STUDY: CT GREEN BANK UNDERWRITING EFFICIENCY TO UNLOCK FUNDS FOR RETROFITS AT HERITAGE COMMONS³⁰

Heritage Commons is a four-story, 89-unit, privately owned property serving primarily low-income elderly residents. The retirement home's staff provide an array of recreational, health, and other support services to the residents. In 2014, the property owner, Middletown Heritage Associates (MHA), determined that the heat pump units and oil-fired hot water boilers should be replaced. MHA decided to take the opportunity to explore a comprehensive energy efficiency improvement. Over two years, MHA worked with CT Green Bank, partner lender Capital for Change, and an energy services company to identify efficiency opportunities and design a comprehensive project costing over US\$1 million. The local utility provided an incentives package to support the project, but this covered only around 10 percent of total project costs (US\$111,274). The borrower was able to use US\$20,898 of reserves. Heritage Commons already had two mortgages secured by the real estate and MHA's personal property, so Capital for Change provided an unsecured LIME loan (see page 18) of US\$960,000. The unsecured status of the loan allowed the borrower to proceed without obtaining consent from existing creditors to take on additional debt. The table below shows the estimated annual savings on energy and on operations and maintenance (O&M) costs that could be underwritten as cash flow and included in calculation of the debt service coverage ratio. Note that the O&M cost savings are nearly as high as the energy savings and that the annual O&M savings are expected to decline over the life of the loan as the efficiency of the replacement units declines. The inclusion of training programs for both staff and tenants as well as ongoing performance monitoring will reduce the risk of inadequate project performance resulting from human error.

TABLE 3. ANNUAL SAVINGS

YEAR	ENERGY SAVINGS	O&M SAVINGS	TOTAL SAVINGS	DEBT SERVICE COVERAGE RATIO
1	\$48,579	\$49,900	\$98,479	1.30
2	\$49,793	\$49,651	\$99,444	1.31
3	\$51,038	\$49,402	\$100,441	1.32
4	\$52,314	\$49,155	\$101,470	1.34
5	\$53,622	\$48,909	\$102,532	1.35
6	\$54,963	\$48,665	\$103,628	1.36
7	\$56,337	\$48,422	\$104,758	1.38
8	\$57,745	\$48,179	\$105,925	1.39
9	\$59,189	\$47,939	\$107,127	1.41
10	\$60,669	\$47,699	\$108,367	1.43
10 Year Total	\$544,249	\$487,921	\$1,032,170	
10 Year Average	\$54,425	\$48,792	\$103,217	1.36

Source: Capital for Change. Reproduced with permission from CT Green Bank.

Over time, as green banks work with partner financial institutions on deals in which projected savings are underwritten, those partner institutions may themselves become comfortable with the idea of depending on projected savings to cover debt service. This is the case at CT Green Bank, which has been working for a year alongside the Connecticut Department of Housing, where employees are witnessing the green bank's growing track record of success in extending loans for efficiency projects and borrowers' success at covering debt service with realized savings. And NYCEEC, based on its own experience underwriting efficiency, it is actively working to help lenders in New York develop new underwriting standards that adequately account for the financial benefits of efficiency upgrades. This demonstration effect is at the heart of how green banks can help to transform the financing market for energy efficiency in the affordable housing sector.

Other lenders too are leveraging projected energy savings to cover debt service for the efficiency upgrades that engender them. As providers of secondary-market

financing for affordable rental housing, Fannie Mae and Freddie Mac are helping move the financing market toward underwriting efficiency as mainstream practice. After determining through in-depth research that projected energy savings from energy upgrades are reliable, both Fannie Mae and Freddie Mac launched green mortgage products that allow lenders to underwrite savings from efficiency.^{31,32} And there is demand for these products: As of the end of 2017, Fannie Mae had a green lending portfolio of 1,100 loans worth US\$31 billion that are projected to reduce borrowers' utility bills by US\$53 million and has issued US\$27.6 billion in green mortgage-backed securities.³³

Because of the potential benefits of underwriting efficiency and the reservations most lenders have about doing so, green banks have the opportunity to demonstrate to affordable housing lenders that including efficiency measures in loans and underwriting the projected savings from those loans are in the best interest of the borrower, the lender, and tenants.

INTEGRATING EFFICIENCY INTO MAJOR FINANCING EVENTS

Standard building design for new or substantially rehabilitated affordable housing properties entails some level of building efficiency. Many cities and states have energy codes, and some jurisdictions have adopted more stringent energy efficiency requirements for properties receiving public funding, such as through Qualified Allocation Plans in the United States.³⁴ Because incorporating efficient design into a building from the beginning tends to be cheaper than upgrading it later, new construction and major rehabilitation are prime times in the property life cycle for properties to be built to the highest possible level of efficiency. But the opportunities presented by new construction and major rehabilitation, when low-cost capital is likely to be accessible, might be missed. Fortunately, a property owner can also do simple upgrades or even substantial improvements during other major financing events, like acquisition and refinancing, when again there is access to low-cost and long-term capital.

EFFICIENCY AT NEW CONSTRUCTION AND MAJOR REHABILITATION: CEFC CONSTRUCTION AND PERMANENT LOANS

Energy-efficient design in new construction can increase the up-front capital costs of a project. Green banks can provide developers with construction financing to supplement the developer's conventional financing to help manage those costs. Construction loans are typically converted to or recapitalized into permanent loans. In the absence of permanent financing from commercial lenders in markets where they are active, green banks may opt to provide longer-term debt.

While short-term construction loans can be useful if there is long-term financing that follows, the Australian green

bank realized that this is not the case in Australia. In 2016, the CEFC published a market report on financing energy-efficient affordable housing.³⁵ The report stated that there was a waiting list of 200,000 people for affordable housing in Australia. Public schemes to support affordable housing construction exist, but they are limited, and private debt is generally offered at full market rates. Private financing for affordable housing has tended to be short-term, which does not align with the economic lifetime of housing assets. CEFC's market report noted that accessing affordable financing is especially challenging for small housing providers with limited borrowing capacity. Given the challenge of accessing enough financing to meet growing demand for affordable housing in general, energy-efficient design elements that add up-front costs to new construction are vulnerable to abandonment.³⁶

The findings of the market report informed CEFC's Community Housing Program, the objective of which is to close the funding gap for energy-efficient affordable housing by providing long-term, fixed-rate financing for new construction and upgrades of energy-efficient housing properties that directly benefit tenants through reduced energy bills (see CEFC case study). CEFC initially offered financing for only the efficiency portion of property construction, but this approach proved too complicated and difficult for both CEFC and its borrowers. Therefore, CEFC shifted to financing the construction of an entire property so long as it is built to achieve energy efficiency significantly higher than minimum building code.

CEFC can provide either construction finance or a term facility (mortgage), or both, for new construction. For certain loans, a portion of the CEFC's lending margin is allocated specifically to sustainability initiatives, including energy efficiency but also renewable energy generation such as solar photovoltaic (PV).³⁷

CASE STUDY: CEFC PROVIDES FINANCING FOR THE NEW CONSTRUCTION OF EFFICIENT AFFORDABLE HOUSING³⁸

Australian affordable housing provider SGCH worked with the Clean Energy Finance Corporation to construct 500 homes that achieve on average a 7-star rating (out of 10 stars possible) under the Nationwide House Energy Rating System (NatHERS). Through two investments in 2015 and 2017, CEFC has committed a total of AU\$170 million (US\$121 million) in mortgage financing to help SGCH take resource-efficient design of new construction to the next level, including improved insulation, LED lights, energy-efficient appliances, smart meters, and solar installations. The first commitment of up to AU\$40 million, made in 2015, has a rate of 4.6 percent and a tenor of 10 years. The second commitment of AU\$130 million, in 2017, has a rate of 4.5 percent and a tenor of 14 years.³⁹

The high NatHERS rating of the new properties puts these homes well above the legal efficiency requirements, increasing tenant comfort and lowering energy costs. In addition to supporting affordable housing development, CEFC's finance for SGCH is an example of its focus on accelerating investment in clean energy solutions in Australian cities through its Sustainable Cities Investment Program.

“The CEFC is able to make finance available over a longer period, allowing the benefits of lower operating costs to be passed on to the tenants. This model will help make such investments more appealing for the housing sector to meet growing needs for more sustainable social housing.” –Oliver Yates, former CEO of CEFC⁴⁰

EFFICIENCY AT ACQUISITION AND REFINANCING: NYCEEC FINANCING FOR ENERGY ASSESSMENTS AND CREDIT ENHANCEMENT FOR GREEN MORTGAGES

Construction and rehabilitation are important but infrequent occurrences in a property's life cycle. Acquisition and refinancing are more frequent: refinancing can occur every 5–10 years. Major financing events are times at which the costs of needed efficiency projects can be incorporated into long-term, low-cost financing arrangements. These financing events follow a well-established mortgage lending process. But under the current process, highly efficient properties are often not properly credited for that efficiency, and the risks associated with inefficient properties are not properly assessed.⁴¹ Fortunately for energy-conscious lenders, energy factors can be better accounted for throughout the process.

CEFC, the only green bank extending mortgages to date, can refinance mortgages for existing properties if they are being rehabilitated to include significant energy efficiency improvements. Non-mortgage-lending green banks can still support the incorporation of efficiency into the mortgage lending process. They can extend funding for energy assessments to be part of property assessments (which for larger properties can be a significant expense) as well as by providing credit enhancements for green mortgages extended by partner institutions.

In the United States, progress is being made on ensuring that properties' efficiency opportunities are evaluated at the time of property assessment when a borrower applies for a mortgage. It is standard practice for lenders financing an acquisition or refinancing a loan to require a standard property needs assessment (PNA), which involves an inspection of the property and the outlining of work needed to maintain the property for the present and into the future. Traditionally, PNAs have not included a specific energy and water audit, so opportunities for efficiency improvements go unidentified and funding for those improvements are not wrapped into the low-cost, long-term mortgage loan. Some affordable housing lenders are starting to require property owners to evaluate the energy, water, and health needs of a property in conjunction with the property's physical condition.⁴² This type of assessment is called an integrated PNA, or IPNA.⁴³

In jurisdictions where energy assessments are not yet required as part of a traditional capital needs assessment, green banks can consider encouraging housing lenders and property owners to complete a full assessment that includes energy. If financial support is needed to make that happen, green banks can provide it. NYCEEC predevelopment funds do just that: They can cover an energy assessment as part of an overall property needs assessment. This is a key way in which NYCEEC helps both owners and lenders think about efficiency upgrades as part of the broader scope of capital improvements.

Green banks can also support other financial providers' offerings of green mortgages through credit enhancement. NYCEEC partnered with the NYC Housing Development Corporation (HDC) to develop the Program for Energy Retrofit Loans (PERL). Through PERL, NYCEEC credit enhanced HDC and HPD mortgages with a cash collateral loan loss reserve, enabling HDC and to provide additional loan proceeds for energy efficiency and resiliency upgrades. NYCEEC was paid through a credit enhancement fee built into the interest rate, as stipulated in NYCEEC's agreement with HDC.

Three transactions closed through PERL, representing 17 buildings and 2,488 residential units including Franklin Plaza (see Franklin Plaza case study). Uptake of PERL became limited as HDC found ways to integrate energy efficiency measures into its projects through its own financing tools. Although NYCEEC offered flexible terms of 10 years or greater, HDC's financings typically feature 30-year terms. Therefore, PERL was somewhat short-lived because it helped catalyze internal efforts on the part of HDC to promote energy efficiency.

While PERL is no longer active, it served as an important pilot for HDC and HPD to test energy efficiency financing concepts and best practices. HDC and HPD now require integrated physical needs assessments as part of any loan process to ensure that the holistic needs of the property, including energy needs, are addressed.

Supporting green mortgages at acquisition and refinancing is an area in which green banks have had relatively limited involvement to date. Funding energy audits as part of property assessments and offering green mortgage credit enhancements are ways in which green banks can help property owners take advantage of a major financing event to pursue whole-building efficiency improvements.

CASE STUDY: NYCEEC GREEN MORTGAGE CREDIT ENHANCEMENT FOR FRANKLIN PLAZA⁴⁴

Built in 1960, Franklin Plaza is an affordable multifamily property in East Harlem, New York, with 14 20-story buildings and 1,632 units, all of which are accessible to low- and moderate-income residents. The property owners wanted to update its building systems; however, the property's net operating income could not support enough financing from HDC to cover all project costs. NYCEEC was able to step in and provide a US\$285,000 loan loss reserve. This credit enhancement enabled HDC to provide a larger loan—a US\$3.8M green mortgage—that filled the building upgrade's financing gap. This project allowed the co-op to upgrade its property and comply with local laws. NYCEEC anticipates that this upgrade will lead to over one million MMBtu of energy savings and nearly 200,000 metric tonnes of greenhouse gas emissions avoided over the equipment lifetime. NYCEEC is gathering data on realized savings and aims to publish the data when sufficient volume is available, as it did for a project at the multifamily property Roosevelt Landing.⁴⁵

SUPPORTING MID-CYCLE RETROFITS

Properties generally go through a major financing event every 10–15 years, with some properties refinancing more frequently. Between these events, affordable housing property owners often have limited cash reserves to use for unplanned capital-intensive building improvements like efficiency upgrades. Reserve accounts tend to be used for planned repair projects and urgent repairs resulting from deferred maintenance rather than for discretionary improvements. Accordingly, there will be a sizable number of properties that will not be undergoing a financing event in the next decade, a critical period for preserving existing affordable housing stock as well as for addressing climate change. Many of those properties will have efficiency projects that make sense to pursue outside of a major financing event. Therefore, there is a need to enable efficiency upgrades in these “mid-cycle” properties.

Without access to the kind of long-term, low-cost financing that is available at a major financing event, most mid-cycle properties do not have access to the capital needed for efficiency projects, especially for the deep, whole-building upgrades that are most beneficial. Given limited access to funds, limited capacity and cognizance of staff, and the fact that doing construction in occupied buildings is disruptive to residents, demand for efficiency upgrades in mid-cycle properties tends to be low. While not addressing all those issues, it is possible that making loans available could stimulate demand for mid-cycle project financing by giving owners more reason to explore those projects.

Green banks can play a key role in both building mid-cycle demand for efficiency investments and ensuring supply of affordable financing options to enable them. They are well positioned to build demand because their marketing and communications are already centered around the benefits of low-carbon, climate-resilient technologies, and their missions require that they partner with other actors familiar with the needs of the market segments they target.

Once a building owner has scoped and designed a project, perhaps taking advantage of green bank predevelopment support, a green bank can help identify financing solutions to make the project a reality. Green banks can supply their own mid-cycle project financing solutions, and they can also support other financiers in developing them. This section describes the various products green banks are offering to finance mid-cycle projects: short-term bridge loans, permanent unsecured loans, permanent secured loans, loans to pay for energy services contracts with third-party developers, and gap financing for health and safety work completed in conjunction with efficiency upgrades.

BRIDGE LOANS: NY GREEN BANK FILLING THE GAP BETWEEN INCENTIVES AND PERMANENT FINANCING

A bridge loan is a short-term loan (typically up to one year) used to fund project expenses until permanent financing is in place. It can be secured or unsecured. While generally offered at a higher rate than longer-term loans, bridge loans are a valuable option for property owners to finance building upgrades before they are refinanced by longer-term debt upon completion.

Bridge loans are useful in easing the transition to longer-term financing for many types of transactions. They are of particular value for energy efficiency projects that are eligible for public subsidies from utilities and housing agencies. In cases where financial incentives are not

disbursed until a project is completed, a bridge loan brings the project to the point at which those incentives can be delivered and used to help pay off the loan. Green banks can join affordable housing efficiency advocates in pushing for incentive-delivery time lines that better align with actual project development time lines and thus lessen this need for bridge loans. Until that alignment is the norm, the provision of bridge loans presents an opportunity for green banks to help more efficiency projects happen.

In 2016, NY Green Bank provided an unsecured bridge loan to the New York City Housing Authority to finance a lighting upgrade (see NYC Housing Authority case study). While a housing authority is not a typical property owner/borrower, the case study demonstrates a way in which green banks can help local housing authorities make efficiency upgrades in their portfolios.

CASE STUDY: NY GREEN BANK BRIDGE LOAN TO NYC HOUSING AUTHORITY FOR LIGHTING UPGRADES⁴⁶

In December 2016, NY Green Bank committed US\$11.0 million in an unsecured, short-term bridge loan made to the NYC Housing Authority (NYCHA). The loan proceeds were used to finance the installation of LED lighting retrofits in 18 buildings inhabited by low- and moderate-income tenants. Following installation and verification of the retrofit lighting, Bank of America extended a long-term (20-year) equipment loan to finance the project. This transaction is expected to save NYCHA 10–15 percent in annual energy costs by replacing current lighting equipment with cleaner, more efficient alternatives. NY Green Bank and Bank of America's participation in this transaction demonstrates to commercial banks a structure through which they can help affordable housing providers complete efficiency projects by filling a gap between public subsidies and longer-term financing.

UNSECURED LOANS: CT GREEN BANK LIME LOAN AND MONTGOMERY COUNTY GREEN BANK CLEER LOAN

Flexible, long-term, unsecured loan products are especially useful in overcoming the barriers to projects in the affordable housing market segment. An unsecured lender does not have the right to foreclose on any of the borrower's property in the case of a loan default. For affordable housing properties that already have debt holders who would reject additional debt secured by the property, having access to unsecured debt can be the determining factor for a mid-cycle project to move forward. The examples below show how green banks work with partners to extend this valuable type of project financing.

CT Green Bank works in partnership with Capital for Change, a local CDFI, to deliver unsecured Low-Income Multifamily Energy (LIME) loans for stand-alone mid-cycle efficiency projects. With the LIME loan, borrowers use projected energy savings to cover the debt service on the loan, which is extended by Capital for Change. CT Green Bank supports LIME with a \$625,000 loan loss reserve and has provided \$3.5 million to capitalize the initial \$5 million loan fund. Through August 2018, 25 LIME loans had been closed with an average loan size of around US\$400,000. Nearly US\$12 million in LIME loan commitments have been made to date. For every US\$1 CT Green Bank has invested through this product, nearly US\$2 worth of efficiency investment has been made in affordable housing properties.

Montgomery County Green Bank (MCGB) has also partnered with other local financiers to offer a loan product designed to finance standalone mid-cycle efficiency projects in Montgomery County, Maryland. With its support, Ascentium Capital (a national lender) and Revere Bank (a local community lender) now offer the Commercial Loan for Energy Efficiency and Renewables (CLEER) product to property owners who would like to invest in energy efficiency and renewable energy at their properties but are not near a major financing event at which they can access lower-cost capital. Without MCGB's financial support these partner banks would not offer the CLEER loan in Montgomery County. The local utility's service contractors will offer their customers access to these loan products to increase their business, serving as excellent marketers for the loan program to the property owners with whom they have relationships. Loan terms may vary between the participating banks. The loan product was launched in early 2018, and while no CLEER loans have yet been made to affordable housing borrowers, the Montgomery County Green Bank team is working with affordable housing owners toward closing its first deal in this sector.

SECURED LOANS: NYCEEC EQUIPMENT LOAN, CT GREEN BANK C-PACE LOAN, AND CEFC EUA LOAN

A secured loan is one in which the borrower provides some collateral for the loan (such as a property, in the case of a mortgage), and if the borrower defaults on the loan, the creditor can foreclose on the collateral. The loan being secured makes it easier for borrowers to access low-interest capital. Loans can be secured by the borrower's assets generally (recourse debt) or by a specific piece of property only (non-recourse debt).

NYCEEC offers equipment loans that can finance up to 100 percent of an efficiency project (e.g. cogeneration, new HVAC systems) for up to 10 years, including in affordable housing properties. The loan is secured by the efficiency equipment through a Uniform Commercial Code (UCC) financing statement, which gives a creditor a security interest in the equipment as collateral for the credit extended.⁴⁷ NYCEEC requires confirmation from the borrower that any senior mortgage lender has consented to the NYCEEC financing, and it assesses the need for written consent from existing lenders on a case-by-case basis, depending on the risk profile of the borrower.

Affordable housing owners often require immediate cost savings to justify undertaking energy efficiency projects. One way to achieve that is for the monthly debt service for the upgrades to be less than monthly savings realized through the upgrades. And one way to reduce the monthly debt service is to increase the number of months over which the debt is repaid. Private capital providers may not be able or willing to provide financing with long enough tenors to bring debt service down to less than realized energy savings, especially for small to midsize projects.

Some specialized clean energy financiers offer longer-term financing and mitigate the associated risks by tying repayment to a property's tax bill, increasing the likelihood that it will be paid and, in theory, allowing the debt to stay with the property to be paid by the new owner if the property is sold. In the United States, this type of financing is called a commercial property-assessed clean energy (C-PACE) loan. CT Green Bank and other C-PACE lenders finance 100 percent of a clean energy project over up to 20 years. The C-PACE program effectively secures the loan with a senior lien on the property, since property taxes in most states take priority over other secured debt under the law. The borrower repays a C-PACE loan through her or his property tax bill, and this lowers the risk for lenders since loan repayments attached to property taxes are perceived as highly secure.⁴⁸ In Australia, commercial borrowers can access tax-linked clean energy financing through an Energy Upgrade Agreement (EUA), which the CEFC offers.⁴⁹

While cumulative C-PACE financing in the United States totaled US\$715 million across 1,693 projects at the end of 2017, there is very limited experience with C-PACE in the affordable housing sector.⁵⁰ And EUAs have had limited uptake overall in Australia.⁵¹

One limiting factor could be that deals involving affordable housing properties tend to be more complex and time consuming than those involving other commercial properties, so C-PACE and EUA providers have not sought them out. Low demand for mid-cycle financing may also be a result of low interest in mid-cycle efficiency projects overall for reasons related to capacity, cognizance, and confidence. As of early 2018, CT Green Bank had completed four C-PACE transactions in multifamily housing properties. All four transactions were in properties without subsidized mortgages, making the transactions more straightforward than those in subsidized properties with more stakeholders. How C-PACE might be used to fill financing gaps for efficiency projects in affordable housing properties in the United States is explored in the 2018 report from Energy Efficiency for All, *Commercial PACE for Affordable Multifamily Housing*.⁵²

FINANCING FOR ENERGY SERVICES CONTRACTS: NYCEEC ESA AND PPA LOANS AND NY GREEN BANK EQUIPMENT LEASE LOAN

Affordable housing properties, often managed individually as small businesses, can be restricted by existing loan agreements from taking on additional debt. For this reason, property owners may find efficiency-related investment structures through which re-payments are designed to be treated as an operating expense to be attractive. Two such investment structures are power purchase agreements (PPAs) and energy services agreements (ESAs). In both structures, an outside entity funds the installation of equipment in a property, and the property owner makes payments as laid out in a contract. An owner's entry into such an agreement may not require consent from existing debt holders, which, when that is the case, is a major advantage of this financing approach.

ESAs for energy efficiency projects have been available for some time and green banks offer financing for them, but to date there has been less uptake of them than solar PPAs. This is in part because efficiency measures are incorporated into buildings themselves, making assets hard to remove in the event of foreclosure, but more importantly because the assets are likely subject to existing security interest agreements that cover the property. ESAs may be more appropriate – and thus uptake may be greater – for projects involving larger equipment that can be separated from the rest of the property.

Proponents of ESAs argue that ESAs could allow property owners to take advantage of the benefits of energy efficiency assets without the risk or work associated with ownership and with no up-front capital expenditure, in the same way that PPAs have been important to boost deployment of solar. Instead of purchasing the asset, this financing arrangement is structured so the property owners purchase electricity from a solar asset (via PPA)

or “purchase” realized energy savings from an efficiency upgrade (via ESA) over a contract term of typically between 5-15 years. Net cost savings accrue to the utility customer because the purchase price of the electricity or savings is less than the baseline utility price.⁵³ These arrangements can make clean energy more accessible to nonprofit property owners and other entities that do not have tax liability and thus cannot directly take advantage of any clean energy tax benefits that are available. Working with a third-party service provider makes it possible for owners of large property portfolios to enter into a single service contract for many projects across the portfolio.⁵⁴ In fact, one downside is that energy services providers look for large service contracts and are less interested in small projects.

Recognizing the opportunity presented by third-party energy services contracts, CT Green Bank finances solar PPAs for affordable housing properties; 14 loans have closed to date totaling around US\$3 million. NYCEEC also offers turnkey financing through third-party developers for both ESAs and PPAs. NYCEEC has offered loans for ESAs and PPAs ranging from \$400,000 up to \$5 million and works closely with service providers to connect them with property owners who are looking to enter into energy services agreements.

In one project at the nine-building Roosevelt Landings affordable housing development in New York City, NYCEEC financed both a PPA and an ESA at the same time. Coupling a combined heat and power installation with energy efficiency upgrades maximized the effectiveness of each investment. NYCEEC's CEO, Susan Leeds, said about the project, “Both [PPA and ESA] have merit as standalone models, but combining them is super-powerful.”⁵⁵ Another exciting example of an ESA financed by NYCEEC is that of Marcus Garvey apartments, an affordable housing property that now has the first battery storage microgrid installation at a low-income property in greater New York. NYCEEC anticipates that the microgrid will lower the property's operating costs and aid the local utility in providing emergency backup power when the grid goes down.⁵⁶

In addition to extending loans to pay for energy services provided through an ESA or PPA, green banks have financed leasing arrangements in which an affordable housing property owner gets efficiency upgrades installed but leases the equipment for an extended time instead of purchasing it (see NY Green Bank CHP System Lease). Financing third-party owned energy efficiency equipment that benefits affordable housing properties is a promising way for green banks to support reliable efficiency improvements with no up-front capital expenditure by property owners.

CASE STUDY: NY GREEN BANK FINANCING FOR CHP SYSTEM LEASING IN A NURSING HOME⁵⁷

NY Green Bank and Bank of America Merrill Lynch (BAML) co-financed an equipment lease that allowed the installation of a combined heat and power system at the Hebrew Home for the Aged at Riverdale (HHAR) in New York City. This transaction is expected to save HHAR US\$1.6 million annually. NY Green Bank's investment facilitated the extension of the tenor of the lease beyond the number of years BAML alone would have financed. Demonstrating that long-term financing allows projects to provide property owners with immediate cost savings will drive growth in the small to midsize energy efficiency leasing market and encourage property owners to pursue even deeper efficiency retrofits.



GAP FINANCING FOR HEALTH AND SAFETY WORK: INTEGRATED INTO CT GREEN BANK AND MONTGOMERY COUNTY GREEN BANK PRODUCTS

Sometimes housing properties accessible to low- and moderate-income households have substantial deferred maintenance. These properties may need to address not only aesthetics but also health- and safety-related issues like mold, water leaks, draftiness, and the presence of lead or asbestos. Work to mitigate these problems can be undertaken at the same time as an efficiency upgrade. In fact, in some cases health and safety issues (e.g. mold or asbestos) are required to be remediated before other work can be implemented.

The additional cost of these required repairs can make the entire project unattractive from an economic standpoint. Utility incentive programs are meant to help the economics of these highly beneficial but unbankable projects. But utility incentive programs for efficiency in affordable housing do not always allow prerequisite health and safety work to be funded by those incentives because such work is not technically considered part of the efficiency upgrade. Unfortunately, this means that sometimes those incentives are not accessible to properties that are financially distressed and could most benefit from unlocking future cash flow from efficiency upgrades. With few options left to fund an upgrade that would improve its physical and financial performance, a property in this situation could fall deeper into disrepair or be sold to a private developer and be converted into more expensive, non-affordable housing. In short, helping owners to finance the package of building

improvements (including the non-energy-efficiency work that addresses health and safety issues) can deliver value to residents most in need of those improvements.

CT Green Bank and Montgomery County Green Bank have decided that financing health and safety remediation work is a high value use of green bank funds. Up to 25 percent of loan proceeds from CT Green Bank and Capital for Change's LIME loan, for example, can be used for qualified non-efficiency measures, such as health and safety remediation work required by building codes to be completed before efficiency upgrades can be made. And up to 30 percent of loan proceeds from Montgomery County Green Bank's CLEER product can be used in this way.

Additionally, CT Green Bank has two dedicated funds for gap financing to help spur implementation of efficiency improvements if adequate funds for worthy projects cannot be secured elsewhere. One, the Catalyst Fund, is made possible by a program-related investment by the philanthropic MacArthur Foundation, which, like the financing provided by the Fund itself, has a low interest rate and a relatively flexible repayment term.⁵⁸ And in June 2018, CT Green Bank announced the EnergizeCT Health & Safety Revolving Loan Fund. This fund is capitalized with US\$1.5 million from the state's Department of Energy and Environmental Protection. CT Green Bank will administer the fund, which will be used to provide loans and limited grants to owners of affordable housing properties to do health and safety remediation work required in conjunction with energy upgrades.⁵⁹ To date, CT Green Bank has deployed almost US\$22 million through five gap financing loans for multifamily borrowers.

GREEN BANKS AS ADVOCATES FOR LEVERAGING UTILITY INCENTIVES FOR DEEPER RETROFITS

Green banks and other programs that offer financing support to owners can work to shape available incentives (such as utility incentives and weatherization programs) so that the funding is available to the building owner at the time a project is considered and aligns with typical project timelines.

Because of the unique challenges associated with efficiency upgrades in affordable housing properties, advocates have had success in securing funding for utility incentives specifically targeting efficiency in those properties. Ideally, those incentives for efficiency upgrades could be accessed by housing owners in a way that facilitates an extensive, whole-building upgrade (a “deep retrofit”).

In practice, utility programs often provide a set financial incentive for the purchase of a certain type of equipment, like efficient lighting and appliances. These incentives are useful but, in the absence of other funding sources, resource-constrained property owners are limited in the type of energy efficiency upgrades they can make. If an owner can combine utility incentives with other funding sources, including commercial banks, community banks, and green banks, she or he may be able to pursue those deeper retrofits.

Combining funding sources that all have their own application processes and timelines can be difficult. There is opportunity for green banks and other multifamily efficiency advocates to help coordinate programs to make it easier for owners to combine resource from multiple sources. CT Green Bank, for example, has worked to coordinate the state’s housing finance agencies and utility companies on how to make it easier for owners to access both resource pools. The CT Housing Finance Authority (CHFA) and CT Department of Housing (DOH) now require that affordable housing owners and developers identify applicable utility incentives for efficiency projects when applying for funding. As part of its funding application, CHFA and DOH have developed step-by-step guidance that helps owners and developers know how to concurrently go through the housing agencies’ and utility’s application processes.⁶⁰ The Minnesota Housing Finance Agency (MHFA) has developed a similar document aligning its application process with that of a utility program to help borrowers understand how they can identify and secure utility rebates to use as part of a larger project.⁶¹ Green banks are well positioned to develop relationships with housing finance agencies, other lenders, and utilities to help coordinate their processes to ensure that hard-won utility incentives are put to work in deep retrofits with the most benefit for residents.



CONCLUSION

As evidenced by green banks’ involvement in this sector to date, providing technical assistance before, during, and after efficiency projects is key to assisting resource-constrained housing owners gain the capacity and cognizance to pursue them. The project performance data green banks collect and share contribute to the growing confidence the sector has in the many benefits of energy efficiency. And by understanding the capital constraints of properties in different phases of their life cycles, green banks can develop financial products that fill financing gaps.

For any solution—financing or otherwise—aimed to increase the energy efficiency of affordable housing properties, the most important characteristic is that it be easy for busy property owners to understand and to use. Even for a motivated and informed individual, it is a formidable task to align stakeholders, determine efficiency upgrade options, and develop a project financing package that includes available incentives and is appropriate given a borrower’s level of access to capital. Financial institutions like green banks can make strategic investments of time and capital that address these challenges and help projects come to fruition.

CLEAN ENERGY FINANCE CORPORATION (AUSTRALIA)

Established in 2012, the CEFC's mission is to accelerate Australia's transformation toward a more competitive economy in a carbon-constrained world by acting as a catalyst to increase investment in emissions reduction. CEFC has government funding in the amount of AU\$10 billion (US\$7.47 billion) over five years, comprising annual appropriations of AU\$2 billion (US\$1.49 billion) per year. CEFC invests through project finance, equity finance, corporate loans, and aggregation funding.

Through June 2018, total capital committed to projects since inception exceeded AU\$6.6 billion (US\$4.9 billion), with a total value of projects (including non-CEFC investment) of more than AU\$19 billion (US\$14.1 billion). As of June 30, 2018, after allowing for repayment, amortization, and any cancellations, the CEFC investment portfolio was AU\$5.3 billion (US\$3.9 billion). CEFC has directly invested in more than 110 individual transactions and indirectly facilitated financing for more than 5,500 smaller-scale projects. These investments are expected to lead to annual avoidance of 10.8 million tonnes of carbon dioxide equivalent (CO₂-e) and more than 190 million tonnes of CO₂-e over the portfolio's lifetime. Each dollar invested by CEFC has crowded in an additional \$1.8 of private capital.⁶²

Through its Community Housing Program, CEFC provides long-term, fixed-rate, and flexible financing for new construction of energy-efficient community developments and for efficiency upgrades to existing properties.⁶³ The program is targeting the construction of as many as 1,000 new energy-efficient homes in Australia, working in partnership with the country's community housing providers. The financing CEFC has made available makes it feasible for housing developers to develop high-efficiency properties at construction and to upgrade existing, older properties with energy efficient technologies. The program has to date focused on owners with a portfolio of properties, including but not limited to multifamily buildings. The Community Housing Program supports CEFC's Investment Mandate to improve energy efficiency of the built environment, of which community housing is a part.^{64,65}

CONNECTICUT GREEN BANK

CT Green Bank was created in 2011, with the mission to promote cleaner, cheaper, and more reliable sources of energy while creating jobs and supporting local economic development. Under its authorizing legislation, CT Green Bank is funded by a surcharge on ratepayer bills as well as carbon-trading proceeds, leading to approximately US\$32 million in funding annually. Through March 2018, total capital committed or disbursed since inception was US\$205 million, with a total value of projects in excess of US\$1.2 billion.

CT Green Bank aims to lower barriers to energy improvements, especially in underserved market segments like affordable multifamily housing. CT Green Bank has a dedicated multifamily housing program. Through the program, it finances predevelopment technical assistance and term financing solutions from the first planning stages of a project through to monitoring project performance. Offerings are grouped into predevelopment resources and project financing.⁶⁶ Since inception, CT Green Bank has deployed a total of US\$870,000 through 14 predevelopment loans and US\$71.3 million through 57 term loans (LIME, solar PPA, and gap financing) to multifamily borrowers.⁶⁷ This financing has contributed to efficiency improvements (or potential improvements, in the case of predevelopment work) in more than 5,300 properties in the state of Connecticut. In August 2018, CT Green Bank and the Connecticut Department of Energy and Environmental Protection spun out a nonprofit organization, Inclusive Prosperity Capital, which will work with CT Green Bank to administer its affordable housing products in Connecticut and other states.⁶⁸

CT Green Bank Sherpa Predevelopment Energy Loan⁶⁹

Offered in partnership with New Ecology, Inc.

Purpose	Affordable, low-risk, one-stop solution to analyze, design, and acquire financing for green energy upgrades
Project size	Not specified
Interest rate	0% for eligible affordable properties
Term	Maximum 24 months or upon financing and installation
Eligible property types	Multifamily properties, 5+ units (market rate and affordable). ⁷⁰ Best candidates are buildings with 20+ units with owner-paid electricity, central heating, and hot water.
Eligible borrowers	Private and nonprofit owners, public housing authorities, senior/assisted- living communities, condominium/co-op associations, etc.
Eligible improvements	Analysis and design of energy improvements with the help of technical service provider New Ecology, Inc.
Incentives and other features	No fees. If borrower decides to stop after the opportunity assessment, there is no obligation to repay funds advanced by CT Green Bank. If borrower secures project financing through Connecticut Green Bank, funds advanced under this program may be wrapped into the project financing.
Loan security and underwriting	Unsecured

CT Green Bank Navigator Predevelopment Energy Loan⁷¹

Offered in partnership with Housing Development Fund and MacArthur Foundation

Purpose	Financing for analysis and design of energy improvements for building owners who prefer to select and manage the energy professionals required
Project size	Not specified
Interest rate	0% for eligible affordable properties
Term	Maximum 24 months or upon financing and installation
Eligible property types	Multifamily properties, 5+ units (market rate and affordable)
Eligible borrowers	Private and nonprofit owners, public housing authorities, senior/assisted-living communities, condominium/co-op associations, etc.
Eligible improvements	<ul style="list-style-type: none">■ Energy benchmarking, opportunity assessments, audits■ Green charettes and physical needs assessments■ Energy-related health and safety assessments■ Design, engineering, and bidding work■ Costs to secure energy upgrade project financing■ Other reasonable expenses needed to get an energy project designed and funded
Incentives and other features	No fees. Owners can request full or partial forgiveness of the loan if there are conditions that prevent financing and/or implementation of all or a portion of upgrades after completing the predevelopment services.
Loan security and underwriting	Unsecured

CT Green Bank and Capital for Change's Low-Income Multifamily Energy (LIME) loan⁷²

Purpose	Up to 100% financing for mid-cycle energy improvements
Project size	Based on project needs and source availability
Interest rate	300 basis points over Capital for Change's blended cost of funds (currently ~6.00%)
Term	Up to 20 years
Eligible property types	Affordable multifamily properties with 5+ units ⁷³
Eligible borrowers	Partnerships, trusts, LLCs, public housing authorities, sole proprietors, and 501(c)3 nonprofit corporations
Eligible improvements	Energy efficiency improvements, including solar
Incentives and other features	Up to 25% of loan proceeds may be used for non-energy-efficiency improvements (structural, health/safety, etc.)
Loan security and underwriting	Unsecured provided minimum energy savings coverage ratio of 1.30X (1.10X for solar) has been met

CT Green Bank Commercial Property Assessed Clean Energy (C-PACE) loan

Purpose	Finances 100% of energy efficiency and renewable energy costs with no money down
Project size	Minimum of US\$150,000. No maximum.
Interest rate	5–6.5% depending on term
Term	5–20 years
Eligible property types	Commercial
Eligible borrowers	All commercial property owners
Eligible improvements	Energy efficiency, solar and other renewables
Loan security and underwriting	Secured by a property tax assessment with loan repayment on property tax bill

CT Green Bank Solar Power Purchase Agreement⁷⁴

Purpose	Financing third-party owned solar PV
Project size	Not specified
Interest rate	No interest rate, as a PPA is a service contract. The price per kWh under the contract can be fixed or escalating.
Term	Up to 20 years
Eligible property types	Affordable multifamily properties
Eligible borrowers	Multifamily property owners
Eligible improvements	Solar PV
Incentives and other features	No fees
Loan security and underwriting	C-PACE secured when possible; UCC-1 filing in all cases

Energizect Health & Safety Revolving Loan Fund⁷⁵

Purpose	Gap financing for health and safety remediation to help spur implementation of energy improvements
Project size	\$10,000 to \$300,000 (waivers for larger loans are possible)
Interest rate	Project dependent; can be provided as a grant as necessary
Term	Up to 20 years
Eligible property types	Affordable multifamily properties
Eligible borrowers	Multifamily property owners
Eligible improvements	Energy improvements and energy-related health and safety measures
Incentives and other features	Fee: 0.5% of funding amount, may be funded out of loan proceeds
Loan security and underwriting	Usually unsecured

MONTGOMERY COUNTY GREEN BANK

Montgomery County Green Bank is a publicly chartered nonprofit corporation dedicated to accelerating affordable energy efficiency and clean energy investment in Montgomery County, Maryland.

MCGB's financial support enables its partner banks to offer the Commercial Loan for Energy Efficiency and Renewables (CLEER), an unsecured loan that can finance a variety of energy efficiency measures. Affordable housing properties are eligible for CLEER financing, but as it became available only recently (early 2018), no CLEER loans have yet been made to affordable housing borrowers.

Montgomery County Green Bank Commercial Loan for Energy Efficiency and Renewables⁷⁶

Purpose	Financing for energy efficiency and renewable energy in commercial properties
Project size	US\$10,000–250,000
Interest rate	Varies by lender
Term	Up to 12 years
Eligible property types	Any commercial or industrial property or business, including multifamily housing (rental, condominium)
Eligible borrowers	Owners of properties in Pepco service area of Montgomery County
Eligible improvements	Energy efficiency improvements as defined by the local utility, as well as solar PV, energy storage, and HVAC (gas) ⁷⁷
Incentives and other features	Up to 30% of loan proceeds may be used for non-energy-efficiency improvements (structural, health/safety, etc.)
Loan security and underwriting	Unsecured provided minimum energy savings coverage ratio of 1.30X (1.10X for solar) has been met

NEW YORK CITY ENERGY EFFICIENCY CORPORATION

NYCEEC is a nonprofit finance company that provides innovative financing solutions to help building owners and tenants save money and transform their properties into cleaner, greener, and more affordable buildings.⁷⁸

To date, NYCEEC has financed more than US\$142 million of energy efficiency and clean energy projects in 203 buildings across all building types and neighborhoods, avoiding the emission of more than 769,000 metric tons of greenhouse gases.

NYCEEC's primary geographic focus is New York City, although NYCEEC finances projects throughout New York State and in an eight-state region around New York.

As part of its mission to advance energy efficiency financing markets, NYCEEC collaborates with other partner lenders to “crowd in” more private capital into this space with the goal of proving the financial viability of energy efficiency investments.

NYCEEC's offerings, which all affordable housing properties are eligible for, include:⁷⁹

- Short-term financing for predevelopment expenses
- Long-term financing for energy efficiency and clean energy projects
- Turnkey financing through third-party developers for energy efficiency products (energy services agreement loans) and for renewable energy projects (power purchase agreement loans)

NYCEEC Equipment loan

Purpose	Up to 100% financing for energy efficiency and clean energy projects
Project size	US\$50,000–6,000,000 (inclusive of incentives and equity commitment)
Interest rate	See website for current rates: https://www.nyceec.com
Term	Up to 10 years
Eligible property types	Multifamily (affordable and market rate), commercial/industrial, schools/religious/nonprofit, healthcare
Eligible borrowers	Co-op, condo, LLC, corporation, 501(c)(3)
Eligible improvements	<ul style="list-style-type: none"> ■ Energy efficiency ■ Cogeneration ■ Fuel conversion ■ Renewables ■ Demand management
Incentives and other features	Construction and permanent financing, multiple draws for larger loans, incentive bridging, in-house technical guidance
Loan security and underwriting	Debt service coverage ratio for multifamily rental: 1.15X. Will underwrite savings. Secured by equipment only.

NYCEEC Green housing preservation program Predevelopment loan⁸⁰

Purpose	Short-term financing for predevelopment expenses
Project size	Up to US\$40,000 for 1 building, up to US\$60,000 for 2–5 buildings
Interest rate	0% for < \$15,000 5% for ≥ \$15,000
Term	Maximum of 18 months
Eligible property types	Affordable multifamily eligible for NYC HPD's Green Housing Preservation Program
Eligible borrowers	Buildings under 50,000 square feet
Eligible improvements	<ul style="list-style-type: none"> ■ Green physical needs assessment ■ Property appraisals and surveys ■ Lead and asbestos testing ■ Engineering studies <p>Loans are made available to projects that are projected to achieve at least a 15% energy use reduction.</p>
Incentives and other features	Simple application, multiple draws
Loan security and underwriting	Personal and/or corporate guaranty, depending on sponsor and borrower structure, from person or entity with control, and majority economics may be required.

Product: NYCEEC Energy Services Agreement (ESA) loan and Power Purchase Agreement (PPA) loan

Purpose	Financing for third-party owned energy efficiency (ESA) and solar (PPA)
Project size	US\$150,000–10,000,000 (inclusive of incentives and equity commitment)
Interest rate	See website for current rates: https://www.nyceec.com
Term	7–12 years
Eligible property types	Multifamily (affordable and market rate), commercial/industrial, schools/religious/nonprofit, healthcare
Eligible borrowers	Larger buildings interested in full-service solution with no up-front cost
Eligible improvements	ESA: Energy efficiency, fuel conversion, demand management PPA: Cogeneration, renewables
Incentives and other features	Incentives coordinated by developer
Loan security and underwriting	Collateral limited to project equipment. No financially distressed properties.

NY GREEN BANK

NY Green Bank was established in December 2013 and formally launched in the summer of 2014 with a mission to accelerate clean energy deployment in New York State by working with the private sector to transform financing markets. Its investments directly contribute to the state's efforts to meet 50 percent of its electricity needs with renewable energy by 2030. It is capitalized by ratepayer funds and carbon-trading proceeds of US\$1 billion over 10 years. Through September 30 2018, NY Green Bank had committed US\$580.1 million into projects with a total estimated value of between US\$1.44 billion and US\$1.68 billion.

NY Green Bank offers structured wholesale financial products and solutions. All investment activities are driven by transactions proposed through open solicitations (requests for proposals). Affordable housing property owners are eligible to submit funding proposals, and two transactions in affordable housing properties have been closed. Through one, NY Green Bank made a senior debt investment in a CHP project at a nursing home. Through another, NY Green Bank provided a bridge loan to the NYC Housing Authority for the installation of LED lighting in 18 of its buildings.^{81,82}

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