FINANCING ENERGY EFFICIENCY:MECHANISMS TO INCREASE PRIVATE CAPITAL FOR HIGH-PERFORMANCE AND PASSIVE HOUSE PROJECT FINANCING IN MULTIFAMILY RESIDENTIAL BUILDINGS

MAY 2020 // PREPARED BY COLUMBIA UNIVERSITY SCHOOL OF INTERNATIONAL AND PUBLIC AFFAIRS CAPSTONE TEAM

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Acknowledgements

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Acronyms

City Community Capital	CCC
Community Development Finance Institution	CDFI
Climate Leadership and Community Protection Act	CLCPA
Climate Mobilization Act	CMA
Community Preservation Corporation	CPC
Debt Service Coverage Ratio	DSCR
Energy Efficiency	EE
Greenhouse Gas	GHG
Net Operating Income	NOI
New York State Division of Homes & Community Renewal	HCR
New York City Housing Development Corporation	HDC
Housing Finance Agency	HFA
New York City Department of Housing Preservation & Development	HPD
U.S. Department of Housing & Urban Development	HUD
Integrated Physical Needs Assessment	IPNA
Low Income Housing Tax Credit Program	LIHTC
Net Operating Income	NOI
Natural Resources Defense Council	NRDC
New York City Energy Efficiency Corporation	NYCEEC
New York State Association for Affordable Housing	NYSAFAH
Property Assessed Clean Energy	PACE
State of New York Mortgage Agency	SONYMA

Executive Summary

Approximately 70 percent of the total greenhouse gas (GHG) emissions in New York come from buildings, presenting a major challenge for achieving State and City climate policy goals. This report seeks to 1) analyze the market barriers inhibiting or even preventing private lenders from underwriting loans to energy savings for high performance and passive house projects and 2) to identify solutions to overcome such barriers. Through the analysis of several stakeholder interviews, potential recommendations are provided to incentivize private sector lenders to underwrite to these energy savings in existing multifamily affordable housing units in New York State and City.

The report begins by reviewing the policy landscape, then provides a high-level analysis of the hubs for change in the market place, lays out the barriers to underwriting to EE savings in the private and nonprofit sectors, and proposes a host of solutions to consider for increasing the uptake of high performance projects in New York. For the purposes of this report, the team conducted interviews with private, public, and nonprofit stakeholders involved with multifamily affordable housing lending in New York to better understand how to increase the uptake of high performance projects. In this report, high performance projects are defined as those that achieve an expected energy savings of 50 percent or more. This report focused on passive house style projects, which are defined by the International Passive House Association as houses that can reduce energy use by up to 90 percent compared to traditional building stock using intelligent design features including insulation, high efficiency windows, and an overall, sealed building envelope.[1]

Through the 25 interviews conducted for this report with 19 stakeholders, over 65 unique connections between private, public, and non-profit stakeholders were identified. These connections were visualized through a systems map (Figure 2), a detailed analysis for which is included in this report and a Systems Map Master document which has been shared in addition to this report. Through this map, major hubs of stakeholders that were deemed to be particularly influential were identified within this space according to the number of times that they were mentioned during interviews. Within each hub of stakeholders, the report identifies specific stakeholder relationships, possible solutions, and challenges that are unique to various stakeholders. Two of the biggest conclusions drawn from the systems map analysis were the importance of government incentives and comparables (colloquially referred to as "comps") data for private lenders which are detailed in the following analysis.

Diving deeper into the interviews with four private banks and two tax credit equity stakeholders, it is evident that private sector lenders in New York lack a familiarity with high performance projects. Some lenders have established internal protocols to assist their underwriters to validate savings by looking at comparable buildings in their portfolios. However, the underlying motivations for private sector lenders to underwrite to EE savings still relies on government mandates through housing finance program benchmarks, relationships with property developers, and the cost-benefit of a project. In considering how lenders may underwrite to the higher level of savings found on buildings with deep energy retrofits, the main reason cited by lenders is the need

[1] GRBR_EN_2018_Sammelmappe. (2018). Retrieved May 1, 2020, from Passivehouse-international.org website: https://www.passivehouse-international.org/upload/GRBR_EN_2018_Sammelmappe/GRBR_EN_2018_Sammelmappe.html

to prove savings within their own portfolios to use as comparable. While this leads to a "which came first" problem relating to the demand for data on high performance projects when there may not be enough buildings to provide data on, private lenders noted they would be willing to engage in high performance projects if the savings were guaranteed for the energy savings and cost-prohibitive projects were offered subsidies. Ultimately, many private lenders see the barriers to lending for high performance projects as driven by property developers and building owners, and thus remains a key component of increasing the underwriting to high performance projects in multifamily affordable housing in New York.

Many of the findings from the interviews with other market participants were similar to the findings from the private sector interviews. There has generally been limited experience with high performance energy efficiency retrofits and many of the interviewees mentioned the value of comps on performance and cost in supporting further implementation. Another common theme was the importance of incentives and developers in the process to accomplish wider implementation of high performance EE retrofits. On the other hand, it is evident that mission-driven organizations may have different risk appetites compared to traditional lenders with their socially driven lending. These other market participants have taken creative pathways to support the implementation of EE projects, including data sharing to help lower the constraints to lend posed by a lack of data on high performance projects, and ancillary support such as technical assistance. As barriers to underwriting and implementing high performance EE retrofits in affordable housing, other market participants have raised the lack of comps on performance and cost, the cost-prohibitive nature of some projects, limited incentives and rebates, limited knowledge and experience among developers, and a lack of alignment in policy and success metrics.

Overall, the interviews revealed that private and nonprofit lenders, public sector agencies, and developers face data and non-data barriers. In summary, the data barriers include 1) the inability to verify the savings achieved from high performance projects due to the absence of data and 2) a perceived cost on high performance projects that exceeds savings. The non-data barriers refer to 1) the capital constraints in affordable housing lending with highly levered projects and 2) the time and effort needed by underwriters to underwrite aggressive EE savings. To address these barriers, the following four solutions are proposed for consideration: performance guarantees, subsidies, risk transfer and specialization, and ancillary support including technical assistance and data sharing. Upon evaluating the solutions against the pros and cons, it is clear that a package of solutions is needed to address the barriers. One potential starting point is for market participants to engage in risk transfer and specialization and ancillary support as these solutions are the quickest to implement and less expensive compared to performance guarantees and subsides. For further study beyond the scope of this report, other solutions to consider include engaging an insurance company to provide performance guarantees, PACE programs, social impact funds, and partnerships among developers. As New York State and City seeks to galvanize the private sector in undertaking high performance projects in the existing multifamily affordable housing building stock, the solutions that address both data and non-data barriers will be most successful in helping reach the 2050 emissions reduction goals.

Background Section

The current State and City legislative landscape sets necessary goals for reducing carbon emissions, and existing multifamily affordable housing units will eventually have to follow suit to reduce building emissions. In 2019, the State of New York passed the Climate Leadership and Community Protection Act (CLCPA), which sets an ambitious target to reduce GHG emissions to net-zero by 2050, to mitigate New York's impact on the climate. Achieving the legislation's goal requires that 70 percent of the State's electricity be generated by renewable sources by 2030, increasing to 100 percent clean electricity generation by 2040.[2] Additionally, New York State has created the Climate Action Council consisting of a 22-member body.[3] In 2019, New York City also enacted the Climate Mobilization Act (CMA), which sets a strong goal to achieve carbon neutrality by 2050. Local law 97 regulates GHG emissions come from both commercial and residential buildings.[4] It introduces the Property Assessed Clean Energy (PACE) program and encourages building managers to install or use green roofs, solar PV, building labeling, and wind energy.[5]

Currently, about 70 percent of GHG emissions in NYC come from buildings.[6] These emissions are coming from fuel combustion and can occur on-site as a result of an oil or gas boiler or off-site at a power plant that burns natural gas to generate electricity. Local Law 97 regulates buildings more than 25,000 square feet to reduce emissions coming from lighting, heating, cooling and plug loads. These buildings make up only two percent of the 1.1 million structures in New York City, which accounts for thirty percent of the City's overall greenhouse gas emissions.[7] The remaining seventy percent of emissions are still outstanding under Local Law 97. In New York City, a 2018 housing supply study found that 42.9 percent of the City's housing units were market-rate, whereas the rest were subsidized or rent-stabilized in some way.[8] This means approximately 1.25 million units fit within some definition of affordability or rent-stabilization and require substantial energy efficiency retrofits in order to reach the City's reduction targets.[9]

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[2] The Climate Leadership and Community Protection Act (CLCPA) | CBCNY. (2020, February 7). Retrieved May 8, 2020, from cbcny.org website: https://cbcny.org/newsroom/climate-leadership-and-community-protection-act-clcpa

[3] Ramirez, R. (2020, January 6). New York's ambitious climate and environmental justice laws are in effect. Here's what's next. Retrieved May 8, 2020, from Grist website: https://grist.org/justice/new-yorks-ambitious-climate-and-environmental-justice-laws-are-in-effect-heres-whats-next/

[4] Bergland, C. (2019, May 9). The Climate Mobilization Act Overview. Retrieved May 8, 2020, from Building Energy Exchange website: https://be-exchange.org/insight/the-climate-mobilization-act-int-1253/

[5] Climate Mobilization Act Series: PACE Financing. (2019, July 17). Retrieved May 8, 2020, from Building Energy Exchange website: https://be-exchange.org/climate-mobilization-act-series-pace-financing/

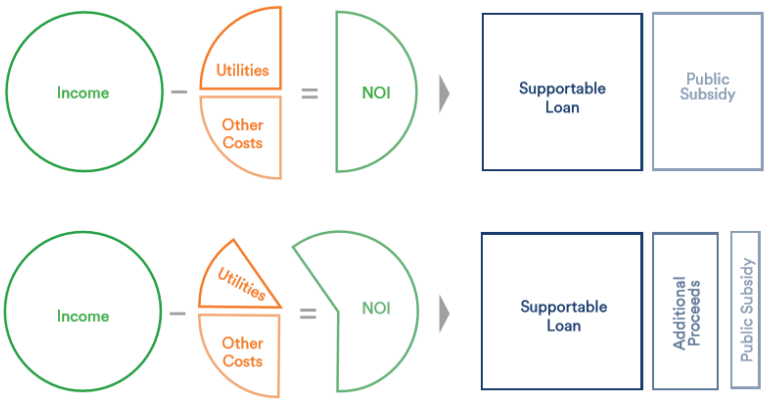
[6] All About NYC's Historic Building Emissions Law. (2019, April 12). Retrieved May 8, 2020, from Urban Green Council website: https://www.urbangreencouncil.org/content/projects/all-about-nycs-historic-building-emissions-law

[7] Chiu, D. (2019, September). Buildings Must Meet Greenhouse Limits Starting in 2024 - Local Law 97. Retrieved May 8, 2020, from cooperator.com website: https://cooperator.com/article/local-law-97

[8] Botein, H., Camarena, R., Joza, C., Reiss, D., Pinsky, A., Walsh, S., … Superville, C. (2018). *New York City Rent Guidelines Board 2018 Housing Supply Report Executive Director*. Retrieved from http://www.cynthiaramirez.nyc/uploads/1/1/8/7/118704813/2018_housing_supply_report.pdf

[9] All About NYC's Historic Building Emissions Law. (2019b, April 12). Retrieved May 7, 2020, from Urban Green Council website: https://www.urbangreencouncil.org/content/projects/all-about-nycs-historic-building-emissions-law

Figure 1: CPC Underwriting Efficiency Report



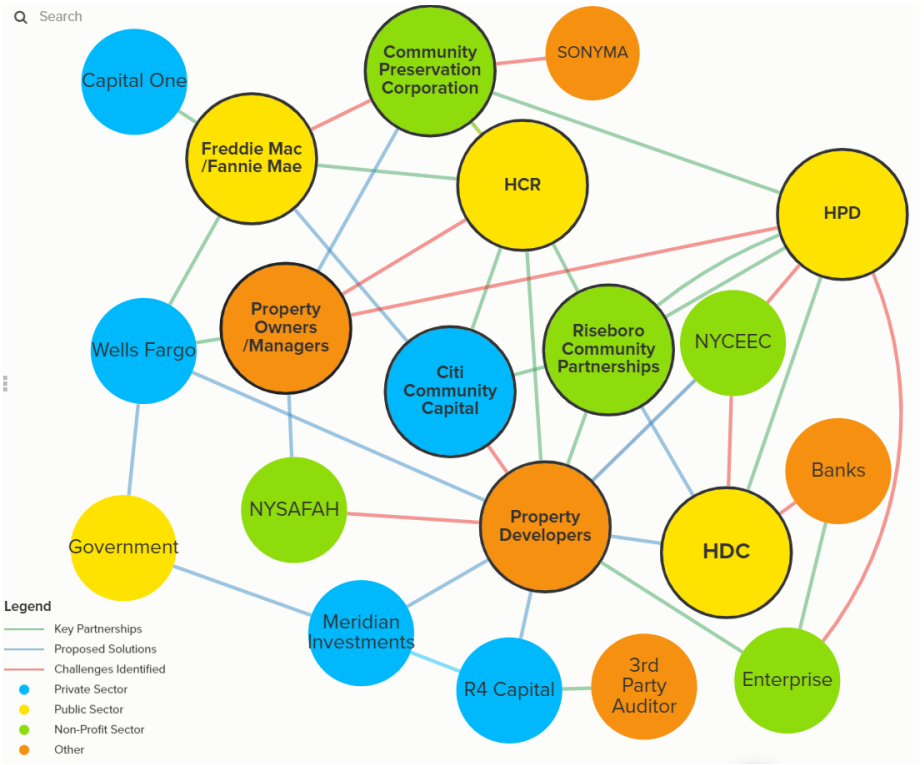
UNDERWRITING EFFICIENCY A mortgage lender's handbook for realizing energy and water efficiency opportunities in multifamily housing. (2017). Retrieved from http://communityp.com/wp-content/uploads/2017/05/CPC_Underwriting_Efficiency_Handbook_Full_Interactive_FINAL.pdf

In many cases, energy efficiency upgrades are an opportunity for building owners to lower their expenses and improve their net operating income (NOI). As utility bills can comprise an average of thirty percent of operating expenses for large, multifamily buildings, pursuing energy efficiency retrofits presents a long-term solution to reducing utility bills. Efficient buildings also provide a host of long-term benefits to reduce the cost of utilities for investors and tenants.[10] However, energy efficiency upgrades are not implemented a lot in reality because there are many stakeholders in the market, each with unique problems to overcome. In the lending community, underwriting loans to the cost-savings associated with energy efficiency retrofits is still not a widespread practice. To begin understanding these unique barriers, the proceeding systems map analysis provides a visualization of the market players and links key partnerships and potential solutions based on interview with private, nonprofit, and public sector stakeholders.

[10] Community Preservation Corporation. (n.d.). *UNDERWRITING EFFICIENCY A mortgage lender's handbook for realizing energy and water efficiency opportunities in multifamily housing*. Retrieved from https://www.sallan.org/pdf-docs/CPC_Underwriting_Efficiency_Handbook_Full_Interactive_FINAL.pdf

Systems Map Analysis[11]

Figure 2: Systems Map



A systems map is a visual representation of various stakeholders that interact within a specific environment and how stakeholders interact with each other as it relates to decision-making and influence. The concept of this systems map is to provide a visual representation of the 19 stakeholders that we interviewed and analyze the 66 unique connections that were mentioned throughout approximately 25 interviews. For the purpose of simplifying the systems map, we determined "major hubs" of stakeholders to be based on the number of times that they were mentioned during stakeholder interviews, not based on their market-share or level of policy or financial influence in this space. It is also important to clarify that this systems map is not an organization map and that it is categorized according to common themes that were identified during our interviews. For example, you can see that stakeholders have been categorized according to their sector (Private, Public, Non-Profit, and Other) and each stakeholder is represented by a bubble. The "connections" between the stakeholders are also categorized by three common themes from interviews: "Key Partnerships" meaning relationships with other stakeholders that were described as being important or valuable, "Proposed Solutions" meaning solutions that were proposed in respect to actions or changes that other stakeholders can implement within the space, and "Challenges Identified" meaning not necessarily challenges that stakeholders had with each other, but mutual challenges that stakeholders face together or blockages that are common between

[11] The analyses included in this section are from the "NYSERDA Systems Map Master-List" document shared along with this report.

various stakeholders. The following analysis provides greater detail into some of the major hubs that we identified and the key partnerships, challenges, and proposed solutions identified by various stakeholders during their interviews.

I. Lenders:

a. Private Sector

Permanent+Construction Lenders (Citi Community Capital, Wells Fargo, Capital One)

Property Developers: Banks such as Citi Community Capital (CCC), Wells Fargo, and Capital One all valued their relationships with property developers. If banks have an existing relationship with a specific developer, they are more comfortable lending to them, highlighting the importance of experience and business relationship (Citi Community Capital).

Fannie Mae, Freddie Mac: All of the banks that were interviewed highlighted their relationship with Fannie Mae and Freddie Mac as a hub of important decision-making. Wells Fargo particularly mentioned how Fannie Mae requires annual audits and reporting from the energy savings from the financing of their energy efficiency programs. After a 12 month period, Fannie Mae conducts an audit of the green threshold. It was evident that Fannie Mae provides benchmarking for all banks as it relates to achieving a minimum 15 percent energy savings (Wells Fargo). Fannie Mae's Green Up and Green Up Plus programs were specifically mentioned as important benchmarks for banks to consider in their loan-underwriting process (Capital One). Additionally, Fannie Mae's High Building Performance Report and expense comp database were highlighted as an important tool for banks to consider when analyzing potential energy savings from various appliances (Capital One, Citi Community Capital).[12,13]

Challenges:

Lack of Data/Comps (Utilities): Appraising comps and calibrating utility studies were identified as a major challenge for banks. Banks expressed that they are not comfortable nor have the experience conducting utility studies of energy consumption and proof of data is needed for bankers to understand how to save money and energy (Citi). The lack of publicly available expense comps data, given how appraisals play a major role in supporting utility assumptions, leads to imperfect resources, and imperfect data which private bank lenders cannot rely on (Capital One).

Lack of Awareness (Property Developers): Bank lenders also highlighted a lack of awareness amongst property developers, which is indicative of a lack of demand for energy efficiency retrofit programs and loans (Wells Fargo).

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[12] High Performance Building Report | Fannie Mae Multifamily. (n.d.). Retrieved May 12, 2020, from multifamily.fanniemae.com website: https://multifamily.fanniemae.com/financing-options/specialty-financing/green-financing/hpb-energy-audit-report

[13] Multifamily Loan Performance Data. (n.d.). Retrieved May 12, 2020, from www.fanniemae.com website: https://www.fanniemae.com/portal/funding-the-market/credit-risk/multifamily/loan-performance-data.html

Lack of economic incentive (Property Developers): Incentives for implementing green affordable housing standards are lacking in NY even though developers do want to engage considering that costs are lower in the long-run (Capital One). Government guarantees of energy and cost savings were cited as a method to make underwriting easier for private bank lenders. By way of tax benefits for property developers that engage in energy efficient renovations and meet certain thresholds, private bank lenders can analyze energy efficiencies in a standardized manner (Wells Fargo).

Potential Solutions:

Obligating Annual Reports (Fannie Mae): Capital One in particular highlighted how data standardization by way of an annual report mandate facilitated by Fannie Mae could be a potential solution to address the lack of data challenge highlighted. Fannie Mae anonymizes and publishes its lending data to lenders, if a state of city housing agency obligated an annual report and provided quality control, this would help standardize comps data thereby making it easy to do energy efficiency improvements. The broader and less specific the process of reporting to housing agencies can be, the more helpful it will be for private bank lenders (Capital One).

b. Public Sector

Lenders (HDC, HPD)

Utilities: Government Agencies analyze utility bills portion of Maintenance & Operation for up to a year and take into account expectations for oil prices and electricity rates that Con Edison says they will impose (HDC).

HDC, Mayor's Office, and HPD: Housing Agencies take cues from other public agencies such as the Mayor's Office and HPD when it comes to their decision-making process. In 2016, for example, HDC entered into a Memorandum of Understanding (MOU) with HPD which included obligations to use corporate reserves to fund construction loans for projects eligible under the Green Housing Preservation Program (HDC).[14]

Program for Energy Retrofit Loans (PERL): Developments in HDC and HPD's portfolios are eligible for loans meant to finance energy efficiency through HDC's Program for Energy Retrofit Loans (PERL). PERL launched in the fall of 2012 in collaboration with NYCEEC and assists projects in meeting the legal requirements of NYC's Greener Buildings Plan, Local Law 43, Local Law 84, and Local Law 87.

Banks: Last year HDC underwrote to new construction passive house. HDC usually does not take construction risk and considers that to be the role of the bank which has to be comfortable with underwriting savings. In HDC's opinion, a bank that has never underwritten to savings before needs to be made comfortable and that is a role that HDC can take on (HDC).

[14] Green Housing Preservation Program (GHPP) - HPD. (n.d.). Retrieved May 12, 2020, from www1.nyc.gov website: https://www1.nyc.gov/site/hpd/services-and-information/green-housing-preservation-program-ghpp.page

Green Housing Preservation Program (GHPP) (Property Owners/Managers): HPD's GHPP program provides low to no-interest loans to finance energy efficiency and is a program developed due to local laws. The GHHP program is designed to assist small to medium-sized property owners/managers to improve building conditions and lower operating expenses subsequently ensuring the long-term physical and financial health of their buildings. The scope of the GHHP program achieves a range of 20-50 percent savings and is most suitable for multi-family buildings under 50,000 square feet with high utility usage and costs (HPD).

Challenges:

Data Barriers: It is harder to come by data for existing developments and depends greatly on the state of the building. In HDC's opinion, with more data available, lenders will get more comfortable with underwriting.

Aggressive savings are not cost effective (Property Owners/Managers): Costs associated with aggressive energy saving retrofits, such as replacing boilers with heat pumps, are prohibitive because property owners and managers are concerned about overleveraging. Owners and Managers have reservations about not being able to raise equity and usually it's not just energy efficiency work that needs to be done, but these buildings usually have a lot of other capital work that has to be done as well (HPD).

II. Non-Profits:

Intermediaries (Enterprise Community Partners, NYSAFAH)

Property Developers, Lenders: Intermediaries such as Enterprise provides technical assistance and capacity building training to property developers and lenders. The Qualified Allocation Program (QAP) dictates what has to be green and Enterprise works with developers and lenders to make sure that the Enterprise Green Criteria is applied to their properties, and housing developers meet the associated requirements (Enterprise).[15]

Housing Finance Agencies (HFAs): Enterprise provides technical assistance and capacity building to HFAs, and to lenders and investors across the country. Through the Green Communities Program, Enterprise works with housing agencies that allocate dollars through QAPs to ensure that Enterprise's Green Criteria are applied to their buildings, and housing developers meet the stated requirements (Enterprise).[16,17]

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[15] Point Incentives and Requirements under LIHTC QAP for Family Resident Services in Affordable Housing in Selected States. (2007). Retrieved May 12, 2020, from Enterprise Community Partners website: https://www.enterprisecommunity.org/resources/point-incentives-and-requirements-under-lihtc-qap-family-resident-services-affordable

[16] Enterprise Community Partners. (2020). Retrieved January 31, 2020, from Enterprise Community Partners website: https://www.enterprisecommunity.org/solutions-and-innovation/green-communities

[17] Certification Eligibility. (n.d.). Retrieved May 12, 2020, from Enterprise Community Partners website: https://www.enterprisecommunity.org/solutions-and-innovation/green-communities/certification/eligibility

Challenges:

Not enough capital (Public Housing Agencies, HPD, HDC): According to Enterprise, public housing agencies do not have enough capital in their budgets to pursue this line of work at scale. It is not a matter of them being reluctant to pursue this work, but a lack of enough capital in their budgets to undertake high performance EE renovations (Enterprise).

Incentive Money (HPD, HCR, HDC): One thing to make the EE scope of work possible is if there was incentive capital contributed to the process. HPD can easily underwrite the deal if money flows through an agency or there is greater know-how for what the EE savings are. In addition, HPD/HCR and HDC can leverage the integrated physical needs assessment (IPNA) as a roadmap for EE upgrades. But the current IPNA does not meet aggressive electrification targets; there are no standards to look to. Some data and capacity building through training is still needed alongside standards and mandates to meet EE targets (Enterprise).

Prohibitive Costs (Property Developers/Property Owners/Property Managers): Retrofitting existing properties to meet the passive house standard is the best way to achieve reductions in GHG emissions, however the costs are prohibitive and such retrofits are time intensive which is a bottleneck for most property developers and owners (NYSAFAH).

Potential Solutions:

More incentives/Better data (HPD, HDC): One way to make the energy efficiency scope of work possible is if NYSERDA provided incentive resources to the process. HPD can underwrite a deal if capital flows through an agency or there is greater know-how to determine the EE savings. HPD/HCR and HDC can therefore leverage the IPNA as a roadmap for EE upgrades since Enterprise believes that the current IPNA does not meet aggressive electrification targets and there are no current standards to measure against. Data and capacity building through trainings are still needed (Enterprise).

More financial incentives (Property Developers, Property Owners, Banks): Creating more financial incentives for property developers and owners would help cover high upfront investment costs associated with energy efficiency retrofits. Quantifying both the costs and future savings can provide banks incentives to underwrite projects easily and motivate property developers and owners to adapt to green energy (NYSAFAH).

Incorporation of EE into Agency internal policies and procedures (New York Green Bank): When loans are not enough to cover total costs of a specific project and when underwriting to efficiency will not be enough to cover the full gap to get to passive house/high performance due to high expenses, incentive dollars from NYSERDA or other sources such as the NY Green Bank can bring down the cost of capital flowing through housing agencies. It will ultimately require many layers of grants/incentives and a high degree of inter-agency coordination to meet aggressive climate goals (Enterprise).

Property Developer (Riseboro Community Partnerships)

HPD, HDC, Citi Bank: Riseboro always shares its operating data with HPD and HDC and finds an openness to discussing energy underwriting with other stakeholders. This goes against industry trends of not sharing data, according to Riseboro which believes that the more proof of concept you have, the more property developers will come to the table (Riseboro).

Property Developers: Property Developers should use the City's data, specifically utilizing Local Law 84 for benchmarking. According to Riseboro, historically developers have been the decision makers in this space, but in the next few years there will be more demand for energy efficient buildings which will shift the responsibility away from property developers and into the hands of lenders (Riseboro).

CDFIs/Construction Lenders/Permanent Lenders (CPC)

Lenders, Property Owners: CDFIs such as CPC continue to develop resources for the multifamily ecosystem to provide education about the value proposition of energy efficient, high performance multifamily housing, and associated compliance requirements around new rules and regulations (CPC).

HCR, HPD, Enterprise: The majority of the affordable projects we finance on the construction loan side conform to HCR or HPD requirements for energy savings or design standards. Such projects wind up meeting Enterprise Green Communities standards which require a 30 percent reduction in savings, half of which CPC then underwrites (15-20 percent) off of their underwriting standards (CPC).

Challenges:

Lack of data (HPD, Property Developers): CPC along with stakeholders such as HPD, Bright Power, and Steven Winter Associates, is working on a study focused on highlighting the true costs of Passive House. Many property developers are apprehensive about sharing performance data especially related to costs and it can be difficult to ascertain more than a percentage reduction from baseline. However, stakeholders are becoming more willing to share because property developers who are building to passive house standards are more open to it, and people who have done a few projects already are becoming more confident in the field. Nonetheless, an easy way to share data is missing and a performance and cost comparable database would be very helpful for the multifamily ecosystem (CPC).

Limitations on underwriting to savings (SONYMA, Fannie Mae, Freddie Mac): CDFIs such as CPC are limited in their ability to underwrite to savings because it is unclear if state mortgage insurers such as SONYMA would accept their underwritten savings upon conversion and if they conform to Fannie Mae or Freddie Mac underwriting standards and requirements (limit underwriting to 50 percent of savings) (CPC).

Lack of Comps Data (Property Developers): Comps and greater knowledge of performance associated with different certification standards are important.

Developers need to know what each certification standard requires from them and what metrics are performance-based (CPC).

Lack of financial incentives (Property Developers, Property Owners): Incentives need to be aligned with the needs of property developers in order to facilitate market transformation. Currently, the economics for high performance retrofits, such as building envelope retrofits, are not favorable and financial incentives are needed for property owners to pursue these transactions at scale (CPC).

Potential Solutions:

PACE Financing/Green Standard (Property Owners, Managers): CPC is considering the incorporation of PACE financing to help cover some of the incremental costs of high performance retrofits. However, lenders would need to get comfortable with PACE being senior in the capital stack. Additionally, CPC is also exploring developing a 'green standard' in addition to an existing maintenance and operations standard which can better reflect the realities of energy efficient buildings (CPC).

Non-Profits (Natural Resources Defense Council)

Lenders: Non-profits such as the Natural Resources Defense Council (NRDC) work with lenders to help familiarize them with, and generate demand for, energy efficient projects. NRDC has in the past coordinated within the affordable housing lender network to host webinars and conference calls and establish a knowledge exchange platform around issues of energy efficiency and climate resilience and promote the benefits of energy efficiency (NRDC). Additionally, NRDC hosted a building lending workshop last May in New York which brought lenders together and introduced them to the idea of lending to energy efficiency and underwriting to projected savings (NRDC).

Potential Solution:

Benchmarking (Lenders): Benchmarking to a portfolio of properties would be helpful and it may be effective to have a consultant come in and analyze the energy consumption of a lender's portfolio so that lenders can encourage property owners to engage in EE retrofit projects (NRDC).

III. Tax Syndicator/Equity Financier (R4 Capital, Meridian Investments)

Property Developer, 3rd Party Auditors: It took three or four deals with a specific property developer pursuing higher energy savings and seeing results until R4 Capital achieved a level of comfort where now when they conduct deals, they don't always need to conduct an energy audit. Syndicators such as R4 Capital impress upon property development partners to hire 3rd party auditors to prove the energy savings expectations of a project. During such an audit, R4 analyzes what kind of materials are used, what system upgrades are made, and overall utility costs. Depending on specific utility studies that R4 Capital analyzes, property developers and owners can show that the property is more energy efficient than the norm, then they can get a pick-up on the revenue side. If R4 Capital is aware that the property

developer is conducting extensive energy efficiency retrofits, then they will pick out deals that are the same from a fact pattern perspective (R4 Capital).

Potential Solution:

Tax Credit (Government Agencies): According to Meridian Investments, the State may be better off if instead of issuing a grant for a high performance project, it offered a state tax credit as an investment tax credit based on the cost of the improvements. From a state budgeting perspective, if the State offered a tax credit incentive instead of a cash grant, it might score more favorably in terms of budget calculation purposes (Meridian Investments).

IV. Other Stakeholders (S&P Global Platts, New York Green Bank)

Potential Solutions:

Subsidize Upfront Costs (Property Owners, Managers): Energy efficiency retrofits are expected to lead to higher upfront investment and this incremental cost may not be fully covered by the reduction in expense. Without demonstrable experience proving the expense savings will be achieved, there is a reluctance to make the investment in the front end. In this case, in order to encourage the energy retrofit investment, it would be effective to subsidize the incremental upfront cost. In so doing, the risk of unrealized return on investment is removed from the property owner and transferred to an entity with the expertise and wherewithal to take this risk (S&P).

Incentives and Demonstrated Savings (Property Owners, Managers): At present, achieving high performance retrofits has a high cost premium. Supportive policy changes and incentive programs can help bridge the gap and stimulate more owners to upgrade the energy performance targets of their building renovations, as can the demonstration effect of large building owners leading the way with high-visibility projects (New York Green Bank).

Permanent and Construction Lending

Building on the systems map analysis, Figure 3 below summarizes how private and nonprofit lenders finance debt for existing affordable housing projects. Reviewing the products offered by different lenders provides a snapshot into the financing process for existing multifamily affordable housing projects, including refinancing, acquisition rehabilitations, or rehabilitation projects.

Figure 3: Debt Financing Options Offered by Lenders for Existing Multifamily Lending

	Construction Loan	Permanent Loan
Bank of America	✓	✓
Capital One		✓
City Community Capital	✓	✓
Community Preservation Corporation	✓	✓
Enterprise	✓	✓
NYCEEC	✓	
Wells Fargo	✓	✓

Banks: Private lenders such as CCC and Wells Fargo provide construction and permanent loans for projects on existing multifamily affordable housing. When energy efficiency improvements are involved, lenders such as CCC noted that the conversion from construction to permanent requires a check to see if the expected NOI due to energy savings was met. CCC serves as the permanent lender on approximately half of the properties in their portfolio. If the property does not reach the expected NOI, the property owner or developer may have to find ways to fill the gaps in financing. Meanwhile, Capital One finances permanent loans for projects such as tenant in-place rehabilitations to forgo the costs associated with a conversion from a construction to a permanent loan. Generally, banks offer a suite of construction and permanent loans for existing multifamily affordable housing, with the incorporation of energy efficiency improvements often benchmarked to a Fannie, Freddie, or FHA green program.

Non-profits: Nonprofits serve different roles in the financing cycle based on their missions. For instance, NYCEEC provides construction loans.[18] CPC and Enterprise provide both construction and permanent loans in the market for rehabilitation, refinancing, acquisition, and new construction deals.[19,20]

Public sector: The public sector provides financing options for existing affordable housing deals that include debt, tax credit equity, and gap financing. HCR finances through tax-exempt and taxable municipal bonds, awards federal LIHTC and State tax credits, and provides gap project

[18] "Products - NYCEEC." 2020. NYCEEC. 2020. https://www.nyceec.com/products/#greenLoan.
[19] Community preservation corporation, and community preservation corporation. 2017. "Construction Financing | Community Preservation Corporation." Community Preservation Corporation. 2017. http://communityp.com/products/company/construction-lending/construction-lending/.
[20] Interview with Enterprise

financing for preservation and improvement of smaller buildings.[21] NYC HDC and NYC HPD provide financing through taxable and tax-exempt bonds, low-interest loans through GHPP, and some mortgage lending to preserve Mitchell-Lama developments.[22,23]

[21] "Multifamily." 2019. Homes and Community Renewal. 2019. https://hcr.ny.gov/multifamily.
[22] "Term Sheets."2019. NYC HDC. http://www.nychdc.com/pages/Termsheets.html
[23] "Green Housing Preservation Program." https://www1.nyc.gov/site/hpd/services-and-information/green-housing-preservation-program-ghpp.page

Private Lenders' Experience [24]

Based on Figure 3, it seems many private sector lenders provide similar loan products. While these lenders face similar constraints in underwriting to higher levels of EE savings, there are nuances in the strength of these constraints because private financers of affordable housing within the industry including lenders and tax credit equity investors share slightly different levels of experience with underwriting. For the purposes of this study, we interviewed individuals in the affordable housing underwriting groups at Bank of America, Capital One, CCC, and Wells Fargo. We also interviewed R4 Capital and Meridian Investments to understand the perspective of tax equity investors and whether they pose a significant barrier to financing high performance projects. The interviews with these private lenders were conducted with loan underwriters or originators on the institutions' best practices for underwriting to EE savings for high performance projects.

Based on the interviews, affordable housing lenders generally underwrite to about 15-20 percent of EE savings. For many lenders who conduct green financing through Fannie Mae and Freddie Mac programs, these benchmarks correlate directly to the minimum requirement of 15 percent in energy savings.[25] Among banks, the percent of projects in their affordable housing portfolios that incorporate EE components range from less than 10 percent up to 48 percent, assuming a standard haircut of 10 percent. This means that even at the higher levels of underwriting, a project developer or auditor may propose a savings of 58 percent, but the bank will underwrite to 10 percent off of that number as a risk protection measure. The findings also suggest that while there is some uptake in low levels of energy savings in New York's affordable housing building stack, private stakeholders, especially lenders, are unfamiliar with the concept of high performance projects being applied to existing units. To mitigate the perceived risk, many lenders state that the savings for high performance projects must be proven first for them to underwrite higher savings. This seems to create a chicken and egg problem, in which there are not enough passive house standard and high performance buildings across different building types to prove out the savings. However, the threshold for becoming comfortable underwriting such deals is relatively low among some lenders, suggesting that lenders may begin underwriting to savings for high performance buildings once the first few are proven to have successful performance. Nonetheless, most private sector stakeholders agree that banks do not drive the demand for high performance projects, instead noting that developers provide the budgets and scopes for renovating buildings.

Criteria Used by Lenders to Underwrite EE

Although data is often cited as a barrier to underwriting to EE savings, some progress has been made among lenders to provide a clearer picture of energy savings and the risk profile of such projects. The criteria used by lenders to underwrite EE savings includes twelve months of utility bills obtained from past projects. Thus, the degree of comfort with new projects depends on the extent data is available within the lender's own portfolio. For example, CCC focused on collecting, aggregating, and analyzing data in their portfolio for the past 4 to 5 years. Through this internal data set, CCC evaluates new deals based on past performance data for rehabs completed in the same geographic area, similar size, and age. The internal analyses conducted by underwriters

[24] This section summarizes the private sector interviews found in the Appendices
[25] Private sector interviews

at banks vary but typically seek to provide a basic comparison for how the expected savings on a new deal might compare to a similar deal in their portfolio based on historical utility performance. One notable point of agreement among lenders, regardless of whether they have formal internal data sets, is the importance of seeing EE savings proven out in their own portfolios or in the developer's portfolio. Otherwise, lenders find it difficult to use comparables ("comps") that are externally obtained. Other banks that do not have internal data sets rely on a third-party audit or appraisal to determine the level of energy savings to which they may feel comfortable underwriting.

Another factor that private lenders consider is the return from affordable housing deals that incorporate EE. Lenders and developers will question whether they will make enough profit on an affordable housing deal with EE, rather than engaging in a market-based deal. The interviews also reflect a tendency for some lenders to finance projects and underwrite to savings based on Fannie Mae and Freddie Mac standards according to the green lending programs. Many lenders such as Capital One and Wells Fargo praised the program for setting a goal for EE and attribute this minimum requirement as a primary reason for becoming comfortable with underwriting to EE savings. Because private sector lenders seek to maintain their return on projects, many banks believe the framework for underwriting is only going to change once there is consistent proof in the marketplace that a high performance project will perform as promised, be built on time without increasing the probability of construction delays, and stay within the budget. Until then, the lender's motivation for underwriting EE savings is based on government mandates and past performance on buildings to maintain profitability. Based on our interviews, the larger affordable housing lenders also promote the fact that they are recognized as the largest lenders in affordable housing. The reputational benefits seem to provide intangible marketing and corporate social responsibility benefits for the banks. However, the impact of these reputational benefits on internal lending and underwriting criteria is hard to discern, and thus can only be a small portion of banks' motivations for underwriting to high performance projects.

Lastly, many underwriting departments note not only a reliance on data and quantitative analysis but also the nature of relationships within affordable housing lending. Many lenders claim that working with developers that they have previously worked with provides greater comfort in addition to the availability of data. Relationships in the affordable housing field are "sticky" due to the requirements for expertise and reliability, and lenders and developers frequently engage in repeat business where it is mutually beneficial. Relationships based on reputation and past performance between developers and lenders shine a light on the underlying pattern of deal-making in the affordable housing industry. Therefore, the interviews' findings suggest that the current criteria used by lenders to underwrite and borrower-lender relationships do not particularly emphasize EE savings of 50 percent or more attributed to high performance projects.

Criteria Used by Tax Equity to Underwrite EE

LIHTC syndicator R4 Capital provided additional insight into what tax credit equity investors look for when underwriting EE savings. While R4 also uses utility data from existing properties in their portfolio, which spans 37,000 apartment units across the country, their analysis breaks down the efficiency-related savings based on the extent of EE improvements undertaken by the developer to provide a better comparison. R4 also emphasized a need for comparables to be derived from their properties as opposed to external sources. R4 expanded that

they require two portions, an expense side and revenue side projection. Energy audits help prove and underwrite to the technologies used by developers on the expense side. Meanwhile, utility studies help confirm the expected increases on the revenue side. Thus, at least from one tax equity syndicator, there is an incorporation of externally validated projections in addition to the internal data used to project savings on their affordable housing deals.

Barriers to Lending to High Performance Projects

The current barriers identified by stakeholders include a lack of data and technology performance, implementation, and operational risks. The lack of familiarity with high performance projects outweighs many of these barriers. Expanding on these barriers, there are also other challenges that private sector stakeholders mentioned they face. For instance, older buildings may require more renovations to bring a property up to building code before any considerations for energy efficiency are made. R4 Capital emphasized a difference in cost for rehabilitations on an older property from the 1970s compared with one that is 15 to 20 years old. The main barrier to underwriting a higher amount of EE savings for older buildings is that it can become cost prohibitive. The cost/benefit analysis suggests that many of these housing developments are better off starting from scratch by tearing the building down and building a modern construction. The distinction between the costs for a new build or substantial reconstruction on an old property versus a rehabilitation is an important distinction to make given the age of New York's multifamily affordable housing units. In the event that a multifamily unit is torn down and rebuilt, it is critical to engage developers and lenders to ensure that passive house standards are applied.

The passive house model suggests that regular renovations on a building and energy efficiency improvements are not contrasting pieces of work that need to be completed on a building to restore it to building code. Conducting low technology upgrades such as insulation and windows that may already need to be replaced can tackle building code and energy efficiency needs. However, private market participants view the costs associated with achieving a higher level of energy efficiency on an older building as significantly higher. The variability in repairs needed not only for older buildings but many existing multifamily affordable housing buildings means there is also a varying degree of expected energy efficiency savings. Lastly, most private lenders expressed that developers and property owners drive demand for energy efficiency improvements. Of the private stakeholders interviewed, there are no internal company policies that mandate the inclusion of energy efficiency standards, unless mandated by federal, state, or city regulation. Building emissions policies will need to consider the cost-benefit of converting older buildings to high performance buildings.

The interviews identified a significant knowledge gap among private sector actors on high performance projects that manifest in data and non-data barriers. There is an interest in high performance projects, but the interest does not translate into knowledge. Many lenders such as CCC and Wells Fargo have internal engineering teams that provide a check on the technical risks of EE. According to CCC, their engineering team does not possess strong familiarity with passive house or high performance buildings. Because lenders rely on these teams to verify the risk compared to true performance metrics, there is a key opportunity to ease concerns about the perceived technical and operational risks associated with high performance projects.

While affordable housing lenders typically cite data as a barrier to underwriting, some banks have developed a threshold for how much data is needed and how many projects it takes for them to become comfortable underwriting EE savings in more deals. The thresholds for the banks range between one project in their portfolio to three or four. This threshold is not consistent across banks, and therefore, it is difficult to draw general conclusions about the amount of uptake needed in high performance buildings in the market for private banks to become comfortable with the aggressive EE savings achieved. Many private lenders felt comfortable underwriting to savings for deals with similar geographic regions, property size, and age once those thresholds were met. However, while private lenders all use approximately twelve months' worth of utility bills to assist with validating the energy efficiency savings, underwriting departments often cannot verify whether savings are specifically from EE improvements made on the buildings. Furthermore, some banks cited that appraisers cannot access aggregate data for comparable properties on enough high performance buildings to incorporate those findings into their calculations. For banks that rely on appraisals, this prevents them from feeling comfortable taking on the risk of a high performance project. Thus, the main barrier to underwriting to EE savings on high performance projects found through the interviews was still the lack of proof of savings on projects within their portfolios and availability of data on different building types, geographies, and age.

Affordable housing deals made between borrowers and lenders who have worked together before often mitigates implementation risk. CCC noted the benefit of working with developers who had previously worked with the bank to complete rehabs and demonstrated realization of those energy savings in their portfolios. The comfort level grows as the savings can be demonstrated to endure over time. The affordable housing market relies on trust built through past relationships between individual developers and lenders. As such, there is a strong opportunity to leverage existing relationships when encouraging private finance to underwrite to savings for high performance projects.

The non-data barriers relate to the underwriting process and stakeholders involved in helping lenders feel confident in underwriting to savings in high performance projects. For instance, a shared barrier among the private sector lenders seems to be the institutional capacity to understand EE savings, preventing them from underwriting to higher efficiencies. Internal stakeholders outside of the loan underwriter contribute to the operations of the private lender such as the CEOs and executive teams which largely influence the broader direction and internal mandates banks may take on achieving an aggressive underwriting standard. While internal engineering teams may support underwriting benchmarks to help verify savings, CCC noted that their teams are not presently comfortable with high performance projects because these are not common in their portfolio. Moreover, underwriters evaluating transactions are often motivated by the number and size of transactions completed, not necessarily the amount of EE savings achieved. Understanding and proving EE savings underwritten for a deal can take time and effort for underwriters. The additional effort required by underwriters and lack of internal verifications for EE savings compounds the problem of uncertainty surrounding EE savings on high performance buildings.

Lastly, Meridian Investments identified how tax equity investors may pose as barriers to lenders in underwriting to higher savings if they feel that the energy efficiency component of the financing posed a risk to timely construction completion, and therefore a risk to their tax credit interests. Because debt on affordable housing deals is sized after equity, and often syndicated prior to the official issuance of debt, tax equity could limit the debt a borrower could raise.[26] Among the data and institutional barriers to underwriting, the overall knowledge gap on high performance projects that lenders face needs to be addressed with data, while the institutional capacity barriers can be addressed by meeting the lenders' threshold for becoming comfortable with underwriting more projects of a similar size, age, and geography.

What Do Lenders Need to Undertake High Performance Projects?

All market participants agree that supplemental data is needed to undertake high performance affordable housing projects in New York. However, private sector perspectives on data specify the need for data derived from projects in their own portfolio. This distinction suggests the need for private sector lenders, syndicators, and tax credit equity investors to experience high performance projects and see performance data so that they become comfortable underwriting savings for multiple projects.

Delving deeper into the need for lenders and underwriters to base their projections on real world data, the interviews revealed another gap among lenders: lenders lack the technical capacity to disaggregate savings from energy efficiency and routine repairs and maintenance work completed during the course of construction. While there is a natural decrease in energy use from routine repairs and upgrading technology in a building, private lenders perceive the added benefit from energy efficiency technology or a high performance or passive house project itself as still unproven. CCC noted the industry's use of CoStar, a platform that provides a database for commercial real-estate, as successful in providing data for the real estate market. Aside from this data analysis work, at least two lenders stated that in order to take on high performance projects they would need risk mitigating factors and financial protections. One example that consistently came up during discussions with private lenders is a government guarantee. The guarantee would provide an assurance to protect against the risk of underwriting to savings for high performance projects that most lenders have yet to experience in the New York affordable housing market. While it may not always be possible to provide financial risk mitigating factors in the form of guarantees or subsidies, meeting lenders' thresholds on EE projects is important to consider in mitigating the perceived risk and increasing the uptake of high performance affordable housing project rehabs.

[26] This excludes mandatory debt sizing to meet Federal LIHTC requirements associated with 4 percent deals

Other Market Participants

In order to learn how other market participants, in addition to private lenders, underwrite to energy efficiency savings and use creative solutions to overcome barriers to underwrite, we also interviewed a number of nonprofits and quasi-governmental agencies including CPC, Enterprise Community Partners, NYS HCR, NYC HDC and HPD, NRDC, NYCEEC, NY Green Bank, NYSAFAH, and Riseboro. Similar to the private lenders we have interviewed, many other market participants have mentioned both data and non-data barriers when discussing the barriers to underwriting.

Underwriting Mechanisms, Risk Appetite and Portfolios

Many organizations have mentioned the preference to see one to several years of performance data from similar buildings when underwriting. Sources of data that are used include utility bills, insights from in-house engineers, expertise of third-party firms, and benchmark data from their own portfolio. Data on electricity, heating, and water is often analyzed along with future oil prices and electricity rates which could also impact the extent of future energy savings.[27]

A combination of in-house engineering capabilities, plus the expertise of third-party engineering firms help NYCEEC validate and become comfortable with underwriting to energy efficiency.[28] As a mission driven organization pledging to "deliver financing solutions and advance markets for energy efficiency and clean energy in buildings", it would be difficult to imagine not incorporating energy savings into their lending practices. Having sustainability at the core of its mission is something that private banks do not necessarily need to consider and which might explain the lack of underwriting to energy efficiency savings in that arena.

NYCEEC also typically acts as the construction lender, as that tends to be where there is the biggest gap in capital availability. In contrast to a traditional lender who is unable to incorporate the incremental value of energy savings, NYCEEC also provides incremental lending for certain deep retrofits. Additionally, NYCEEC is able to cover a larger amount of the financing - sometimes up to 100 percent for affordable housing projects when factoring in the interest of the added social benefit - and then typically covering 80-90 percent of financing for market rate projects.[29] Again, this mission driven calculus is something that nonprofits are able to take on while traditional banks are not able to.

We have seen approaches to organize, accumulate, and analyze performance data within an organization's portfolio. HCR required the benchmarking of energy use in a portfolio of buildings from two years ago. The agency has also mentioned that initial use of energy in the building, the projection, and the outcome in usage of utility after a year would be important to create a useful database.[30] HDC has been developing a maintenance and operations standard based on the data from its portfolio on historical performance.[31] Some organizations have mentioned the expertise of third-party firms as information used when underwriting. CPC mentioned trusting the

[27] Other Market Participants Interviews
[28] NYCEEC. (2020, Feb 13) In-person interview
[29] NYCEEC. (2020, February 13) In-person Interview
[30] Homes and Community Renewal HCR. (2020, March 27) Phone Interview
[31] Housing Development Corporation HDC. (2020, March 23.) Phone Interview

energy consultants is important because they are likely the most knowledgeable and conservative in estimating cost savings.[32]

While nonprofits and quasi-governmental agencies could have sustainability at the core of its mission, we have also interpreted some characteristics that could limit the extent of aggressive underwriting at the organizations. This includes the organization's obligation as borrower in the bond market and relationships with partners including SONYMA, Fannie Mae, and Freddie Mac.[33] Other factors less related to underwriting also affects an organization's ability to work on high performance projects. HCR has shared with us that the agency does moderate rehabs which would require the upgrade of buildings with tenants in place.[34]

Data Barriers

In terms of data-related barriers, two important factors were mentioned to be helpful when underwriting to savings: (1) energy reports, and (2) comparables on performance and costs. CPC lists energy audits, energy models, feasibility studies, and Green Physical Needs Assessments as 4 types of energy reports that could be useful for the lenders to underwrite in their "Underwriting Energy Efficiency: A Lender Handbook".[35] Although these reports could assist the borrowers, the cost and additional step associated with obtaining them is a potential challenge.

[32] Atalia Howe. (2020 February 18). In-person Interview.
[33] This is a summary of the CPC, HCR, and HDC interviews
[34] Homes and Community Renewal HCR. (2020, March 27). Phone Interview.
[35] Community Preservation Corporation. (n.d.). *UNDERWRITING EFFICIENCY A mortgage lender's handbook for realizing energy and water efficiency opportunities in multifamily housing*. http://communityp.com/wp-content/uploads/2017/05/CPC_Underwriting_Efficiency_Handbook_Full_Interactive_FINAL.pdf

Energy Audit	List of energy efficiency opportunities with analysis on savings and payback. Protocols of the American Society of Heating, Refrigerating and Air-Conditioning Engineers should be followed.
Energy Model	Computerized simulation of the energy consumption of a building. Often used for evaluation of the energy performance of properties or buildings.
Feasibility Study	Could be necessary when implementing projects with more complexity and significant energy savings potential to understand the key considerations.
Green Physical Needs Assessments	Also called an integrated physical needs assessment. Assessment of physical needs from roof-to-basement which combines audit protocols of energy and water.

Source: (Community Preservation Corporation, n.d.).[36]

In terms of cost, NYCEEC's pre-development loan covers the expense needed to pay for the Integrated Physical Needs Assessment (IPNA) at a 0 percent interest rate and 0 percent fees for a loan amount up to $8,000. For a loan amount over $8,000 and up to $15,000, the fee is $250 and the interest rate is 0 percent. The maximum loan amount is $40,000, and the fee is $500 and the interest rate is 5 percent for a loan amount over $15,000. This predevelopment loan also covers predevelopment activities including other costs needed to meet HPD program and private lender requirements.[37] Credit will be approved for this low-cost bridge loan based on the assurance of takeout financing provided by HPD.[38]

One of the most common pre-development costs that addresses the data piece which NYCEEC helps to finance is the IPNA. The IPNA is a significant study as it is one of the most common pre-development costs that helps to address the data shortfall and which NYCEEC works with HPD under the GHPP. An IPNA is an assessment of a building's capital needs that includes recommendations on energy conservation measures and their likely payback period based on projected energy cost savings.

Support to property owners in obtaining energy reports can also be obtained in the Green Rewards product of Fannie Mae. This product will provide a free Energy Audit that is paid by Fannie Mae. Conditions to receiving this benefit include the commitment of the property owner to implement improvements that are expected to reduce at least 30 percent of annual water and/or energy usage of the entire property. At least 15 percent of the projected savings must come from energy savings.[39]

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[36] Community Preservation Corporation. (n.d.). *UNDERWRITING EFFICIENCY A mortgage lender's handbook for realizing energy and water efficiency opportunities in multifamily housing*. http://communityp.com/wp-content/uploads/2017/05/CPC_Underwriting_Efficiency_Handbook_Full_Interactive_FINAL.pdf

[37] *NYC HPD Borrowers*. (n.d.). NYCEEC. Retrieved May 5, 2020, from https://www.nyceec.com/nyc-hpd-borrowers/#

[38] *NYCEEC Green Predevelopment Loan Catalyzing energy efficiency in affordable multifamily housing*. (2019). NYCEEC. https://nyceec.com/wp-content/uploads/NYCEEC_Low_interest_construction_loan_v_4.3_7.10.19.pdf

[39] *Green Rewards | Fannie Mae Multifamily*. (n.d.). Multifamily.Fanniemae.Com. https://multifamily.fanniemae.com/financing-options/specialty-financing/green-rewards

Practices like the above would be effective to facilitate more borrowers to consider implementing energy efficiency retrofits. However, the other issue is that there is a capacity constraint of property owners. As written in "Green Banks Are Driving Efficiency in Affordable Housing" by Bettina Bergöö, property owners often have limited staff time to look into noncritical projects.[40] This observation connects to the views shared by NRDC, which noted the importance of having a streamlined process for the borrowers and not having an additional step added in the loan process.[41]

The second piece is to have comparables on performance and cost. While energy reports often involve information on how similar assets have performed and realized savings, it is also helpful to have comparables from previous projects on which the lender or developer has worked. However, it could often be the case that there are few projects that have similar characteristics. Also, it would be even harder to get information from projects that have been operating for many years after the energy efficiency retrofit is completed. Furthermore, data will be limited when searching for high performance energy efficiency retrofits especially for tenant-in-place projects.

Data sharing between multiple organizations will be effective to lower this barrier. In fact, there has been progress in this area including the study focused on highlighting the true costs of Passive House that Bright Power, CPC, HPD, and Steven Winter Associates is working on.[42] Additionally, Riseboro shares their operating data to HPD and HDC, and has received positive buy-in from agency lenders and private lenders such as CCC and Chase.[43]

However, there has not been much data sharing in the past because it is not a common practice in the industry. Early in this approach, government entities and non-profit organizations could take the lead in facilitating such data sharing. For example, developers could utilize the City's data including benchmarking buildings that follow Local Law 84.[44] With more data available more developers will consider these projects, and this is important because, according to Riseboro, developers have historically been the decision makers in this space.[45]

Non-Data Barriers

Limited awareness of energy efficiency opportunities and limited access to information on the benefits is a barrier for property owners identified by Bettina Bergöö.[46] The same barrier applies for lenders as well, which limits the implementation of energy efficiency projects, and ultimately underwriting. NRDC coordinates a knowledge exchange platform for affordable

[40] Bergoo, B. (2018, December 7). *Green Banks Are Driving Efficiency in Affordable Housing.* NRDC. https://www.nrdc.org/experts/bettina-bergoo/green-banks-are-driving-efficiency-affordable-housing
[41] Bettina Bergöö. (2020 March 2). Phone Interview.
[42] Atalia Howe. (2020 February 18). In-person Interview.
[43] Riseboro. (2020, March 3). Phone Interview.
[44] "LL84 requires annual benchmarking data to be submitted by owners of buildings with more than 50,000 square feet for public disclosure by May 1." *About LL84*. (n.d.). Mayor's Office of Sustainability. Retrieved May 5, 2020, from https://www1.nyc.gov/html/gbee/html/plan/ll84_about.shtml
[45] Riseboro. (2020, March 3) Phone Interview
[46] Bergoo, B. (2018, December 7). *Green Banks Are Driving Efficiency in Affordable Housing.* NRDC. https://www.nrdc.org/experts/bettina-bergoo/green-banks-are-driving-efficiency-affordable-housing

housing lenders that share the benefits of energy efficiency and the risk of not adopting it.[47] Additionally, the Better Building Lending Workshop was organized in New York in May 2019. This workshop assembled lenders to introduce the idea of underwriting to projected energy savings and lending to energy efficiency.[48]

The need for technical assistance is another theme that has manifested in the interviews. Some lenders and developers, as mentioned above, have limited awareness, knowledge, experience, and information on how to approach high performance and Passive House projects. Enterprise and housing agencies work together to check whether the Enterprise Green Criteria are applied to the building and to ensure the housing developers meet the requirement.[49]

The interviews illuminated the significant role that incentives and success metrics have, with five interviewees citing this as a significant barrier they see in achieving the kind of market transformation sought. Traditionally, the main drivers of the affordable housing industry measure success in terms of number of units built rather than the quality of the units (e.g. energy saving potential, building management systems).

The lack of alignment between climate and sustainability goals, and affordable housing goals means there is typically a large, foregone area of opportunity to develop units that support a higher quality of life. Incentives that encourage the retrofit of high performance affordable housing need to be able to address the traditional developer's perspective of building as many units at as low a cost possible.

The cost calculation of making affordable housing retrofits economic is a challenge for numerous reasons:

a. Buildings owners of affordable housing are unable to raise rents to cover the costs of retrofits and so need to identify other ways to cover this cost of capital

b. Retrofits necessary to reach the level of energy savings to qualify as high performance are extremely costly and there has yet to be a replicable model that demonstrates favorable economics

    i) Building envelope work usually has payback periods of at least 20 years; this is in contrast to lighting retrofits that have the potential to pay for itself within a year[50]

c. Apart from the high performance building retrofits, buildings tend to need a lot of other capital work which ends up increasing the cost per unit of savings that is achieved - making the project cost-prohibitive.[51,52]

[47] Bettina Bergöö. (2020, March 2). Phone Interview.
[48] Bettina Bergöö. (2020 March 2). Phone Interview.
[49] Enterprise Community Partners. (2020, February 25). Phone Interview.
[50] NYCEEC. (2020, February 13) In-person Interview.
[51] Housing Preservation and Development HPD. (2020, March 23). Phone Interview.
[52] Homes and Community Renewal HCR. (2020, March 27). Phone Interview.

d. 50 percent of rent stabilized stock are small building owners and tend to have high income to debt ratios. This means that they do not have the ability to raise enough debt to cover the kind of retrofits necessary for high performance.[53]

The partnership between Enterprise Community Partners and the New York City Housing Preservation and Development for the Landlord Ambassadors Program (LAP) is one way that these organizations are helping stabilize the financial health of struggling affordable housing properties. The program was created to improve the physical and financial health of small-and medium sized multi-family buildings by helping owners implement better building management practices and navigate the HPD GHPP financing process. The LAP acts as a funnel to increase the number of applications to the GHPP program which mandates projects to have a scope of work with energy efficiency measures that are projected to save at least 20 percent in annual energy usage (percent reduction in kBTU).[54]

Programs like LAP in combination with GHHP can be viable solutions to increase the information sharing with regards to financing and implementation of high performance retrofits, but also to purely increase the volume of affordable housing projects that have a high performance component.

Additionally, the role of meaningful and targeted policy cannot be overlooked. Before even considering the mechanism of underwriting to savings, the demand has to come from building owners and this demand has yet to be truly activated. To date, the momentum for energy efficiency upgrades has been significant and a result of years of targeted incentive and policy making; this now needs to be focused towards achieving a previously unheard of level of energy performance.

An example of meaningful policy raised in many interviews was the missed opportunity of Local Law 97 (LL97).[55] The prescriptive compliance pathway for affordable housing undermined what could have been a strong opportunity to stimulate greater demand for high performance retrofit options and financing models. Understandably, increasing the affordable housing stock remains a critical concern for the City and impairing the progress of making more units available is not ideal. What LL97 could have done for the inclusion of affordable housing would have been to outline a financing and compliance pathway for affordable housing so that building owners, developers, regulators and lenders can begin figuring out what compliance looks like from the onset. A gradual phasing in of requirements or an alternative local law mandate with tailored provisions appropriate for affordable housing could have been (or still could be) proposed.

Mandates like LL97 need to have independent pathways, different from market rate as the set of parameters and challenges facing affordable housing development are very different to the ones that face market rate properties. There needs to be designated affordable housing high performance retrofit financing buckets that do not see competition from market rate builds. It seems that without the top down mandate for high performance, there has been extremely limited demand from developers and building owners for high performance upgrades.

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[53] Housing Preservation and Development HPD. (2020, March 23). Phone Interview.
[54] Housing Preservation and Development. (2019). *Green Housing Preservation Program Term Sheet for HDFC Cooperatives*. https://www1.nyc.gov/assets/hpd/downloads/pdfs/services/ghpp-term-sheet-hdfc-coop.pdf
[55] NYCEEC, Enterprise, NYGB, Riseboro

Analyzing Solutions

In order to overcome the barriers involved in affordable housing energy efficiency, we synthesize the barriers faced by all market participants, identify solutions that may help mitigate the collective barriers, evaluate each solution based on the anticipated pros and cons and interviews, and lastly outline areas of opportunity for further study.

Synthesizing the Barriers to Lending in High performance Projects

The interviews revealed that private and nonprofit lenders, public sector agencies, and developers face data and non-data barriers. Data barriers include 1) the inability to verify the savings achieved from high performance projects due to the absence of data on projects with successful deep EE retrofits across different building types and 2) a perceived cost on high performance projects that exceeds savings. The non-data barriers refer to 3) the capital constraints in affordable housing lending and 4) the time and effort needed by underwriters to underwrite to aggressive EE savings. Specifically, they denote the following:

I. An inability to verify the savings: The inability to verify the EE savings achieved from high performance projects was the most common data barrier mentioned by lenders and nonprofit stakeholders. Within the affordable housing energy efficiency market, this barrier will fade as the number of high performance projects increases in New York. The interviews revealed a suspicion of the expected savings of any EE project because lenders and even developers do not have enough experience to validate the savings. The conversations with private lenders made it obvious that the developers who incorporate some form of EE component are repeat players, meaning that they have completed a few past deals and continue doing so. This data is not aggregated or shared yet within the industry to facilitate high performance deals. Even if data was available, it is clear from the interviews there is no guarantee lenders would rely on public data.

In addition to the lack of data on high performance projects, cited by the private and public sector as a reason for a higher risk perception toward these projects, there is also an information gap and technology risk. The information gap is not only the lack of knowledge and experience with high performance projects within banks, but across the industry, public, private, and nonprofit lenders do not have detailed information on how tenants use utilities. Due to the lack of data, some lenders' engineering teams may not feel comfortable with the technology used, and thus cannot provide justification to underwrite to higher savings. Public sector stakeholders noted that current projects in lenders' portfolios that incorporate EE savings may perform better or worse than expected, adding to the uncertainty in savings.

II. Cost that exceeds savings: This barrier refers to the pure economic issue that savings may not cover the total cost of a high performance building, making developers reluctant to consider installing EE retrofits. Our interviewees mentioned various reasons for the high cost of EE projects. For example, one reason is that components needed to achieve passive house standards are still expensive compared to the expected savings. Furthermore, in some areas of New York, the relatively high cost of electricity can offset the savings from EE retrofits such as replacing a gas heating system with an electric heat pump. While

natural gas prices are historically volatile, the current low prices may hinder the introduction of electrification components on affordable housing. Finally, New York State's low vacancy and older building stack represents a portfolio of higher cost projects that private sector lenders may never feel comfortable underwriting.

This barrier is partially a data barrier because the market could find a cheaper alternative once more high performance projects are built in New York State. However, this issue is slightly different from 'inability to verify the savings' in that data is not the ultimate solution. In some cases, the cost can still be higher than savings even if we are able to project those numbers with confidence and efficiently lower the cost of installing with proper know-hows. Lenders noted supply chain constraints for some EE components such as high efficiency windows that may not be produced in the United States, adding significant shipping costs.

III. Capital constraint: This non-data barrier refers to low margins on affordable housing projects, making it difficult for developers and owners to increase leverage to undertake high performance projects without more equity. Some interviewees pointed out that most developers and owners of affordable housing space already have a maximum debt-to-equity ratio to meet their return on equity despite the thin margin, meaning that they tend to have no room for more borrowing. If highly levered projects add debt to undertake high performance projects, this adds risk to the project, so lenders would need to be assured of their performance.

IV. Time burden: Another non-data barrier is that both lenders and developers feel uncomfortable to proceed with an EE project, partly because it requires additional time and effort by the underwriter. The New York market for high performance projects is in a relatively early stage, so lenders who have standardized processes for evaluating EE savings follow simple steps of using comparables in their portfolio to justify the percentage they underwrite, but lenders who do not have this depth of analysis rely on government benchmarks. Thus, determining the EE savings without any portfolio comparables increases the time needed to evaluate a deal. One way this barrier has been minimized is through a government approved auditor that provides expert, third-party verification of the savings claimed in a developer's budget. Affordable housing developers and owners also face a time and effort constraint in finding trusted individuals to help undertake high performance projects. A failure to find the right partner in the affordable housing market may lead to construction delays and performance failures during the lifetime of the project. These completion and performance risks do not only impact the building deal, but also impacts the developer and building owner's reputation within the market and ability to access future capital.

The above barriers must be addressed to increase the uptake of high performance projects in New York. The presence of data must be coupled with the tactical use of information on building type, age, and geography to provide an accurate picture of what EE technology and improvements could help achieve the highest level of EE savings while maintaining a profitable deal.

Illustrative Solutions for Consideration

Interviews mentioned barriers to underwriting to savings, but also contextualized that the market demand for high performance projects, which is driven by developers and building owners, is not high. Thus, the solutions presented below address how to facilitate higher levels of underwriting to EE savings and promote aggressive EE renovations during affordable housing refinancing, rehabilitation, and acquisition rehabilitations.

Performance guarantee

A performance guarantee offered by a government agency or third-party insurer would compensate for the gap between projected and actual savings. A commonly cited solution to building efficiency, performance guarantees mitigate the uncertainty surrounding EE project savings for lenders. It would be effective in removing uncertainty of savings in the absence of data, enabling more developers to pursue high performance projects. Potential providers of guarantees can vary, including private sector actors such as a retrofit manufacturers, a government agency, or an insurance fund. For private players, there is an inherent market incentive to expand their business and potentially provide data analysis to ensure a layer of protection for the building. Some agencies, like the SONYMA Mortgage Insurance Fund (MIF) are legally enabled to act as an insurer and may be able to adjust internal standards to provide guarantees for higher savings. Another private insurer, such as Hartford Steam Boiler, may be able to step in to provide similar services to provide lenders with the risk mitigating factors they require to undertake high performance projects.

Subsidies

By providing a subsidy such as grants or low interest loans, New York State can reduce the cost barrier faced in converting existing multifamily affordable housing units to high performance buildings. Government agencies or agencies such as state or city HFAs can provide subsidies to housing projects for EE components. The subsidy can target the initial assessment such as the IPNA or subsidize the installation of the most expensive retrofits. Specifically, older buildings in New York's building stack would benefit from a subsidy which could subsidize the cost of converting an older building to high performance. A subsidy would also tackle the supply chain issues by subsidizing EE components that achieve higher energy savings beyond the "low hanging fruit" such as LED lightbulbs and insulation that current EE rehabilitation deals already incorporate.

Risk Transfer and Specialization

To tackle the credit constraint barrier, the market will need capital for EE retrofits. One method is to encourage a strategic partnership between developers, equity investors, and private lenders. To private lender's interest, nonprofit players who have taken on greater risk could provide technical expertise to take on high performance projects. Some of the relationships already exist within New York in which nonprofits and private lenders participate in the capital stack for the same deal.

In Chicago's multifamily affordable housing market, the information and credit constraint gap was tackled by a program that brought different stakeholders together, including the nonprofit, Community Investment Corporation, City of Chicago, Bank of America, the MacArthur Foundation, and Elevate Energy. [56] Through the program, Elevate Energy analyzed the improvements that could be made, provided the owner with a free assessment, and completed any forms to obtain the energy efficiency incentives. Elevate Energy also helped mitigate construction risk by identifying appropriate construction contractors, providing oversight during construction, and verifying the savings once complete. The debt and grant funding supported the measures and underwrote the projected savings. The program generally recommends " sealing and insulation, new lighting, efficient boilers, boiler controls, thermostats, low flow water fixtures" and while the program does not necessarily focus on deep retrofits, it did help retrofit 17,500 apartments since 2008 with no defaults on the loans.[57,58] Mechanisms such as this could serve as a model for increasing the uptake of high performance projects in New York.

Ancillary Support for the Energy Efficiency in Affordable Housing

Because most of the current barriers except the 'credit constraint' are common in newer, less developed markets, bridge mechanisms should be provided in order for the early high performance building market to be able to reach its next stage. Technical assistance and data sharing should be integrated into any future solutions to provide ancillary support to lenders.

Technical Assistance

Several stakeholders mentioned the need for technical assistance to help validate energy savings from high performance projects. Strategically, the engineering teams within lending institutions would benefit from technical assistance workshops that provide insights into high performance and passive house projects, projecting energy savings, and providing familiarity with how high performance projects garner such a high level of savings. Technical assistance workshops engaging internal engineering teams can reduce the uncertainty lenders feel when evaluating EE savings. As part of the workshop, developers should also be invited to learn about high performance projects. This combined workshop would also provide an opportunity for developers already using EE to connect with banks. To ensure that participating lenders use the tools they have learned, a follow up survey should be sent out within a year to understand what actions the participants may have taken to apply the concepts and what challenges they still face. By incorporating a reflection portion to the workshop, the state and city governments should be able to understand what technical or institutional barriers persist. Alternatively, NYSERDA could provide a technical assistance consultant that would be available to advise on projects, as a free or low-cost service. This will support developers considering an EE project because hiring a high-paid employee when the demand is not even clear is clearly a burden.

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[56] CIC Chicago. 2015. "Energy Savers - Community Investment Corporation." Community Investment Corporation. June 2, 2015. http://www.cicchicago.com/energy-savers/.
[57] Ibid.
[58] Markowski, Jack, Anne Evens, and Matt Schwartz. n.d. "Community Development INVESTMENT REVIEW 27 FEDERAL RESERVE BANK OF SAN FRANCISCO Financing Energy Efficiency Retrofits of Affordable Multifamily Buildings." https://www.frbsf.org/community-development/files/cdir_vol10issue1-Financing-Energy-Efficiency-Retrofits-of-Affordable-Multifamily-Buildings.pdf.

Data sharing

In an ideal scenario, the government, private, and non-profit sector would engage in a data-sharing platform that provides utility performance data for different building types, technologies used, and savings experienced. The presence of data would not automatically increase the number of high performance projects that banks are willing to underwrite. The availability of data may need to be coupled with other solutions. For example, those who get incentives or services have to agree to participate in the data sharing program. Also, it is important to determine who can operate the data sharing service, and as such a third-party player may provide additional trust in aggregating, managing, and disseminating the information. NYSERDA could facilitate the creation of such an entity or find an existing third-party player. Many market players have started to collect data and providing a one-stop shop for the information would tackle the data gap in the New York affordable housing market.

Evaluation of solutions

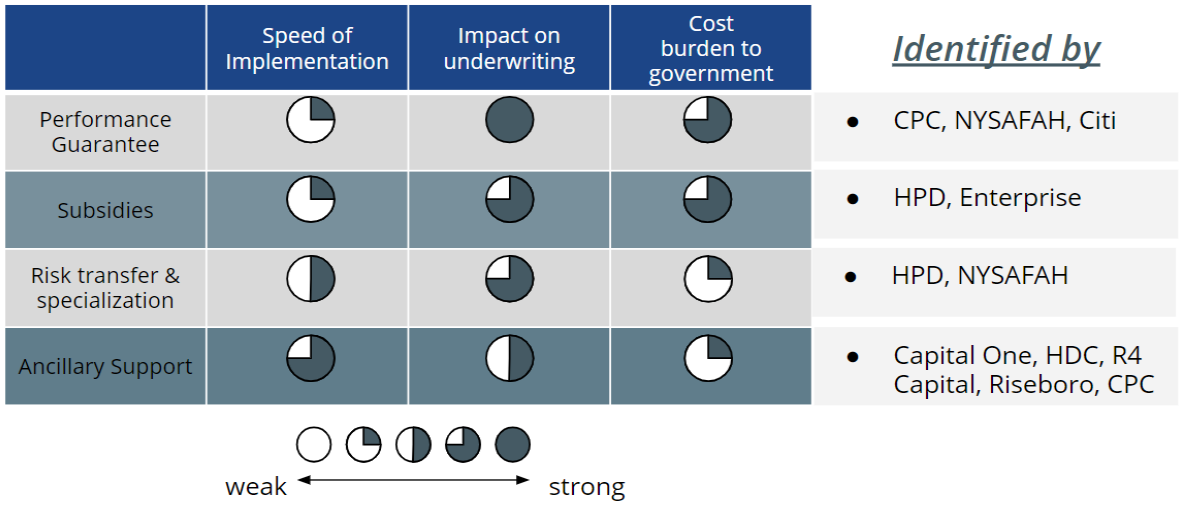
The solutions are evaluated by looking at the pros and cons of each solution and the efficacy of the suggested solution in combating the aforementioned non-data and data barriers. The three criteria used are expected speed of implementation, impact on underwriting, and cost to the government. Lastly, the 'Identified by' column in Figure 4 includes the number of stakeholders that mentioned the particular solution during the interviews.

Speed of implementation

This criterion evaluates how quickly each solution can be prepared and deployed. As shown below in Figure 4, performance guarantees and subsidies are not expected to be the quickest solutions to implement because of the logistical hurdles in approving these policies within state and city agencies and approving budgets to support these solutions. Performance guarantees and subsidies require government entities to engage with other government and public sector players for approvals. Even if a private entity were to provide a guarantee, there is still an anticipated time lag in implementation due to approvals and extensive stakeholder engagement needed to ensure the success of these solutions. Risk transfer and specialization ranks at medium strength for speed of implementation because of the lag in forming partnerships between nonprofit, public, and private agencies to share the risk on high performance projects.

On the other hand, ancillary support such as technical assistance and data sharing rank the strongest among the solutions in terms of speed of implementation because those programs tend not to require additional capital beyond the state and city budget capacities or legislative processes to be executed. In terms of data sharing, Local Law 84 already mandates that buildings over 50,000 square feet submit utility data to the City. If existing data collected by New York State and City agencies, Freddie and Fannie, and third-party lenders and energy services providers can be aggregated and shared to focus on high performance projects, the time to collect and disseminate this information will comparatively be less of a time burden. Current efforts to collect data on high performance projects in New York support this conclusion.

Figure 4: Evaluation Solutions



Impact on underwriting

When evaluating the impact on underwriting, the analysis considers the extent to which implementing the solutions may increase the EE savings underwritten by lenders. Performance guarantees are expected to have the strongest impact on underwriting to higher savings because it directly addresses the uncertainty in future savings. Subsidies and risk transfer and specialization have a quite strong impact on underwriting because they both can provide monetary benefits to reduce the costs to financing deep energy retrofits. Ancillary support scores the weakest compared to the other solutions with respect to impact on underwriting because technical assistance and data sharing themselves are not expected to make structural changes in how lenders view the savings associated with high performance projects.

Cost burden to the government

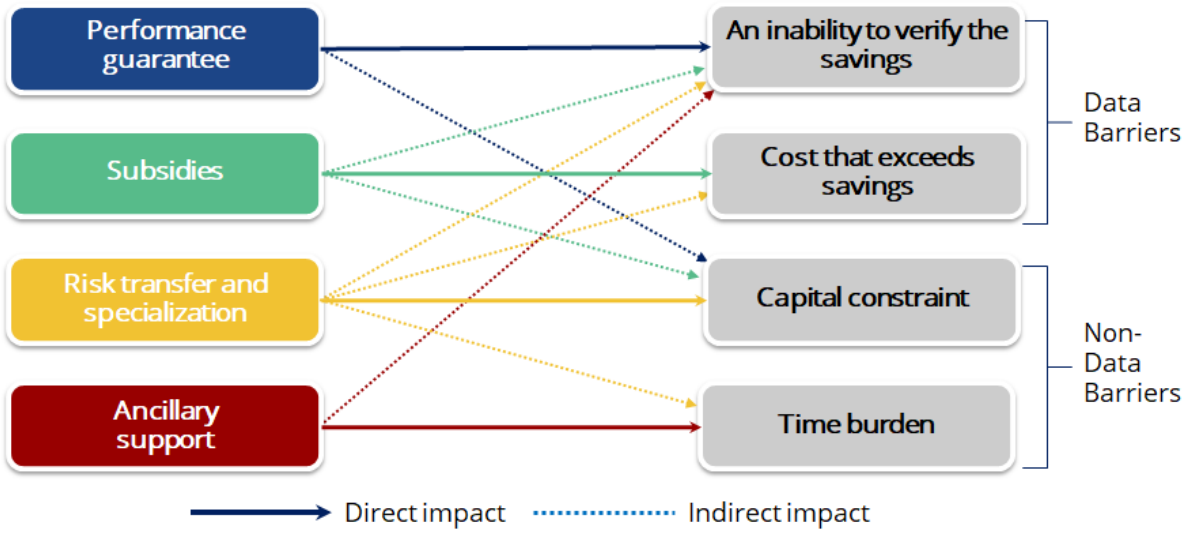
In understanding an anticipated cost to the government, our analysis asks two questions: Does the solution need additional funding beyond the activities in which state and city agencies already engage? If so, who might pay for the cost? Because performance guarantees and subsides would heavily rely on a government budget, they would impose a high cost to government budgets and taxpayers.

Overall, no single solution is uniformly successful for all three criteria. Performance guarantees provided by government agencies and subsidies will incur a cost and potentially take more time to implement, however, once implemented, these solutions will have a strong impact on increasing the uptake of high performance projects. On the other hand, risk transfer and specialization and ancillary support solutions may take time to become impactful on their own but may present less of an upfront burden to NYSERDA to implement. Based on the interviews, lenders do cite ancillary support as a high priority, whether it be via additional data or technical assistance. This suggests that ancillary support services can play a key role in supporting the more direct solutions that increase the underwriting to savings for high performance projects in existing multifamily affordable housing units.

Solutions Addressing Barriers to Underwriting

Figure 5 below shows whether a solution is expected to have a direct or indirect impact on mitigating a barrier. For example, performance guarantees will have a direct impact on the inability to verify the savings along with an indirect impact on the capital constraint barrier faced by many affordable housing projects.

Figure 5: Matching Expected Barriers Addressed with Solutions



Based on this chart, we recommend NYSERDA implement a package of solutions in order to tackle multiple barriers. By combining solutions, multiple barriers to underwriting can be overcome to allow for significant market uptake. Based on this map, a potential effective recommendation would be to begin risk transfer and specialization and ancillary support first. These solutions will ultimately require the support of more capital intensive solutions such as performance guarantees for deep EE underwriting to become common in New York. However, these two solutions are the quickest to implement and comparatively less expensive.

As the State and City look to decrease the carbon impact of affordable housing and include affordable housing communities in the environmental, health, and comfort benefits of high performance buildings, the key factors required to mitigate the barriers include forming relationships within the market to engage and leverage stakeholder's strengths in lending or technical expertise and providing guarantees for savings, whether it be in the form of subsidies, government guarantees, or robust data sets. While data remains a key constraint in achieving a greater uptake of passive house affordable housing units in New York, the relationships and incentives that drive the affordable housing market will determine whether the speed of the uptake of high performance buildings.

Suggestions for Further Study

The following section provides suggestions for further study on topics that came up in our research but were outside of the scope and time constraints of this report including third party insurance companies providing guarantees, PACE financing, encouraging developer partnerships, social impact funds, and a focus on smaller multifamily buildings that may not have access to the same capital as large multifamily affordable housing units.

Third Party Insurance: An insurance company, such as Hartford Steam Boiler Inspection and Insurance Company, may provide a performance guarantee for EE projects instead of a government agency. From an implementation perspective, guarantees offer quick short-term fixes while data is not available. In the long run, private insurance companies may be willing to backstop deep energy efficiency projects to guarantee savings, and serve as a risk transfer mechanism if developers and building owners are unwilling to assume risk of non-performance.

PACE Program: Another way to tackle the capital constraint barrier is through PACE financing. To promote capital for high performance projects, PACE financing can be a means to facilitate government or private entities to utilize super-lien on-bill repayment structures to re-securitize loans for deep energy efficiency projects. This will help property owners and developers who are already positioned at their maximum leverage. However, it is likely that mortgage lenders will not be in favor of PACE financing since their loans would be subordinate to PACE (even if PACE financing is a relatively small portion of the capital stack). A more detailed study will be needed to employ the PACE program to the affordable housing EE space.

A bond program with separate securitization would be an area for further study. By packaging multiple loans for high performance energy efficiency retrofits and selling bonds against it in the secondary market, it would be possible to allocate a significant portion of the responsibility to the bond holders. Separate securitization of PACE financing is another option, however, will still have the issue of other lenders taking a subordinate position, which they often do not prefer.

Encouraging Developer Partnership: Similar to the manner in which P3s encourage the formation of strategic partnerships in order to respond to requests for proposals, NYSERDA could encourage the formation of developer partnerships, potentially between for-profit and non-profit firms with greater EE experience. Potential partners can help to address some barriers, particularly the high-cost barrier by supplying cost-effective retrofits and the capital constraints barrier by investing equity, or through EE expertise. For example, during our Capstone period, we were told that Samsung C&T, which is one of the largest developer companies mainly based on South Korea, has a plan to expand its business to North America focusing on renewable and energy efficiency areas. The other element of partnership is to get developers who specialize in deep EE projects to partner with developers with no experience – providing subsidies for developer partnerships that meet certain efficiency goals would encourage this relationship structure.

Social Impact Investing Funds: Throughout our research we have read about approaches by socially motivated investors that have or could improve the situation of lack of financing for high performance energy efficiency projects. This additional source of support could take the form of

low-cost financing and grants like the case of Energy Savers Loan Fund in Chicago, or guarantees through the Community Investment Guarantee Pool which provides guarantees for organizations working on areas including development or preservation of affordable housing and addressing climate change. The former project is supported by government and philanthropic sources, and the latter was created by nine philanthropic organizations, one nonprofit lender and one health system.[59,60] Although finding the optimal way to sustain or scale the approach seems to be a common task, this could be a valuable source of support for high performance energy efficiency projects.

Small Buildings: Access to capital could be challenging for small buildings which tend to be older with compounding maintenance costs and operate on narrow margins. In the United States, approximately a third of rental housing is in small buildings which have 5 to 49 units within the building. Considering the unique needs of small building owners, it would be beneficial to closely examine how to support them, especially considering capital constraints they face as small building owners. While we were unable to analyze this area in depth, we have found that some organizations have led the support for small buildings. For example, it was written in the CPC 2017 annual report that 78 percent of their loans went to buildings with under 49 units.[61]

[59] Abello, O. P. (2020, February 20). *The Hidden Power of Guarantees in Community Development Finance*. Next City. https://nextcity.org/daily/entry/the-hidden-power-of-guarantees-in-community-development-finance

[60] Markowski, Jack, Anne Evens, and Matt Schwartz. n.d. "Community Development INVESTMENT REVIEW 27 FEDERAL RESERVE BANK OF SAN FRANCISCO Financing Energy Efficiency Retrofits of Affordable Multifamily Buildings."

[61] *CPC's 2017 Fiscal Year Annual Report*. (n.d.). The Community Preservation Corporation. Retrieved May 4, 2020, from http://communityp.com/2017AnnualReport/introduction.html

Appendices

Appendix I: Bank of America

Bank of America is an American multinational investment bank and financial services company. It is the second largest banking institution in the United States and the ninth largest financial services company in the world (by revenue). Its primary financial services revolve around commercial banking, wealth management, and investment banking.

What portion of your existing affordable housing projects includes energy efficiency components? What is the average expected savings that you underwrite? Do you have any high performance projects (50 percent or more underwritten for energy efficiency)?

I would say 90-95 percent of our projects include some form of energy efficiency requirement (i.e. Energy Star efficient materials or appliances or LEED Energy ratings (Bronze /Silver) as required per city and state agencies per their grant and subsidy funding requirements. However we usually don't underwrite these savings specifically because they have to be confirmed in an "as-stabilized" appraisal and appraisers compare the project's operations to other comparable properties, and unless these comparable properties are high efficiency projects as well those savings may not necessarily be factored in their reports.

Can you elaborate in which stage of the financing lifecycle you participate (construction/perm) and whether loans convert automatically from construction to perm?

Construction lenders participate in providing the construction loan during the financing lifestyle and usually provide the short term construction debt and sometimes the long term financing but rarely. Typically construction loans do not convert automatically but have performance related conversion conditions to be refinanced (repaid) by the long term perm lenders who provide 30-40 year term perm loans. These conversion conditions are typically 1) 100 percent lien free completion with Certificate of Occupancy, 2) 90-95 percent physical occupancy for a period of at least 90 consecutive days, and 3) achieving a 1.15x-1.20x debt service coverage (DSC) and/or 1.05x income to expense ratio for at least 90 consecutive days. These conversion conditions are considered stabilized occupancy.

What did it take for your company to become comfortable underwriting to your current level of energy efficiency savings?

We have not necessarily changed anything; we underwrite to the projections made by the developer and supported by the appraisal and on very rare occasions, the energy efficiency reports (if applicable) they submit, that can support their projections.

What conditions do you have for underwriting to energy efficiency savings?

See above answer.

What data is currently used in the underwriting process?

Developer's development budget and operating proforma, plan and cost review report by a Bank hired 3rd party engineer, environmental report, and property appraisal report indicating "as-is" value, "rent restricted stabilized value" and market rate unrestricted rent stabilized values.

What are your maintenance break-downs-NOI breakdowns? How are you breaking down and tracking business as usual projects compared to deals with energy efficiency components?

We are not necessarily doing that.

What are some barriers to underwriting you see other than data?

Currently the COVID-19 issue in regards to construction slowdowns, shutdowns, and lease up projections. Assessing possible construction delays, despite construction projections from the developers as well Banks' 3rd party engineers, a lot of our projects sometimes experience construction delays due to unforeseen site and environmental issues. Another barrier can be project term loan conversion or lease up delays due to a softening in the rental market or delays in developers getting administrative sign-off for the certificate of occupancy for their project. The perception of these aforementioned risks can make underwriting a challenge for some deals.

What would it take for your company to do high performance projects in existing multifamily units?

We don't specifically exclude or include high performance projects however if we were to consider the savings a high efficiency project would create in operating expenses as compared to other comparable projects, there would have to be some form of policy by which real estate appraisers and/or construction consultants can confirm the validity of the projected energy savings.

If a state or city agency provided technical assistance to better inform stakeholders of high performance projects what do you think would be specifically needed?

See answer above. Also maybe there could be some form of insurance energy savings fund that would offer coverage for the operating savings the Bank's would be underwriting to. If the savings are not realized the Fund would make up the difference by paying the lost savings to the Developer who would in turn use the funds to make their debt service payments.

Appendix II: Capital One

Origination Team

As the 6th largest U.S. multifamily lender housed within a top-10 U.S. commercial bank, Capital One draws on specialized expertise in Agency finance – including Fannie Mae, Freddie Mac and FHA – along with the strength of their balance sheet to build the customized financing solutions.

What portion of your existing affordable housing projects includes energy efficiency components? What is the average expected savings that you underwrite? Do you have any high performance projects (50 percent or more underwritten for energy efficiency)?

The vast majority of them have one green standard or another. The most common is Enterprise Green Certification. The minimum underwritten on Freddie Mac programs is 15 percent for energy, but it depends on the capital source and building. The percentage of savings is hard to generalize because there is a wide variety of buildings and markets.

Under the Green Up and Green Up Plus program we may underwrite up to 50-75 percent of projected savings through an energy audit.

Can you elaborate in which stage of the financing lifecycle you participate (construction/perm)? Is the loan conversion from construction to perm automatic?

For moderate rehabs, we do perm loans. A typical scope is $30,000 to $80,000 in acquisition rehabs with new LIHTC. On existing buildings, we go straight to perm financing funded along with tax credits for tenant in place rehabs. Otherwise, you need a relocation plan where tenants are relocated off site. The perm financing is better because we can close directly with perm rather than have a conversion event. Capital one does construction loans for new construction in affordable housing with a conversion event.

What did it take for your company to become comfortable underwriting to your current level of energy efficiency savings?

Even before the Fannie and Freddie green programs were released, we could get energy audits and do it on a case by case basis.

What conditions do you have for underwriting to energy efficiency savings?

We benchmark to the Fannie, Freddie, FHA programs, otherwise we don't make the loan.

What data is currently used by Capital One for underwriting to energy savings?

We use project-specific energy audits and look at the landlord savings. The NOI changes according to utility savings, so we have to connect the electricity usage reduction to a specific bill reduction. This may not always be the case because you have certain unfixed utility charges, so hard to always connect it.

Fannie Mae is very prescriptive about energy or water savings measures, giving very specific guidelines on what you can underwrite savings for. Something that is less clear is the energy audit provider's assumptions, but they are only on site for a day, so it's hard to know the buildings completely. The report is very clear if you look at the Fannie Mae high energy savings report, they are going to estimate energy savings from each specific appliance.

We do not have an internal dataset used for existing family buildings.

What are your maintenance break-downs-NOI breakdowns? How are you breaking down and tracking business as usual projects compared to deals with energy efficiency components?

Fannie/Freddie might be. Not sure about Capital one.

What are some barriers to underwriting you see other than data?

Project data is one obstacle. The primary challenge for appraisers is identifying comps, especially appropriately calibrated comps for utilities. We haven't seen any passive house acquisition rehabs in NYC. Fannie Mae says they will take into account NOI savings, but you will still need to meet their DSCR rate. Fannie wants to check and make sure the loan amount does not decrease by more than 5 percent

There is a high cost incurred to get the gain on EE for replacing steam heat boilers or installing solar for example. The biggest issue is we're not seeing the economic return associated with doing the additional measures that get you from going from 30 percent savings to 50 percent or more. You need to give the market a reason to take on high performance projects. There's also more risk taken on because doing all the new techs, and for some scopes on some buildings, like with a brick wall, passive house isn't achievable within a reasonable budget because you need to reclad and tear everything down.

We've seen passive house for new construction affordable housing, but never for existing affordable housing. It's too expensive.

What would it take for your company to do high performance projects in existing multifamily units?

The measurement of data in a uniform fashion, and providing that data as an expense comparable to the public would be useful.

Appraisals still play a major role in supporting utility assumptions, and appraisals don't start off with great expense comps data. It's not publicly available to them, and they're going to find five properties that they're going to support as expense comps, imperfect resources, and imperfect data. Fannie Mae anonymizes and publishes its lending data to lenders, in exchange for getting assistance at the project level. A state or city agency should obligate an annual report on this and provide quality control to make sure the energy savings are correct. They should standardize the comps data. The idea would be to make it easy to do energy efficiency improvements by providing comps data. To qualify for government programs, you are already collecting information about the

type of building, so the more you make it simple and not specialized, the broader you can make it, the more helpful it will be.

If a state/city agency provided technical assistance, what kind of technical assistance do you think would specifically be needed to promote underwriting to high performance projects in NY?

N/A - comps data would be helpful.

Appendix III: Citi Community Capital

Underwriting Department

Citi Community Capital provides a suite of financial products to help affordable housing developers construct, rehabilitate, refinance, and acquire affordable multifamily housing across the country. They finance both straightforward and highly structured transactions for non-profit and for-profit affordable housing developers, Community Development Financial Institutions, and state and local government agencies.

What portion of your existing affordable housing projects includes energy efficiency components? What is the average expected savings that you underwrite? Do you have any high performance projects (50 percent or more underwritten for energy efficiency)?

About 50 percent of total annual deals are existing deals on rehab properties. About 75 percent of those have some form of energy efficiency with an average of 20 percent savings to historical operating expenses.

Can you elaborate in which stage of the financing lifecycle you participate (construction/perm)? Is the loan conversion from construction to perm automatic?

We do construction lending for new builds and building rehabs. All the players are set at the construction loan phase, which is a phase that lasts 2 to 3 years. This ultimately converts to a perm loan once upgrades are done, but the conversion is not automatic. In deals where we are both a construction and perm lender, we test the property after construction. For example, if we say that once construction is complete, the property will operate at a certain level because of the upgrades and expect an increase in NOI due to energy savings. We test this after construction, and if the expectations are met, we convert it to a perm loan. If we get to the test stage after construction, and the building is generating less than the expected NOI, we can't give full perm loan and the owner has to find ways to fill the gaps.

There are different products, so some properties don't have a conversion event to see if the debt is supported. If we are the perm lender, we typically hang on to the loan for 15 years. We are the perm lender for approximately half of projects and on the other half, we drop off after construction and another lender provides the perm loan.

What did it take for your company to become comfortable underwriting to your current level of energy efficiency savings?

We are now better at collecting, aggregating, analyzing data. Now, we have access to an ocean of data (for 4-5 years we've focused on being able to pull the data points together). Having systems helps us to review our portfolio and to see how much the cost would be. We can do so with an individual borrower.

What conditions do you have for underwriting to energy efficiency savings?

If it's in the same market geographically, it helps. Generally, we feel comfortable when we can find something similar - a comparable property. One project is sometimes enough, but we benefit from having many projects and repeat developers.

What data is currently used?

Changes in utility or electricity usage using projects in their portfolio, but it's still hard to say that an upgrade to a system resulted in a certain amount of savings.

What are your maintenance break-downs-NOI breakdowns? How are you breaking down and tracking business as usual projects compared to deals with energy efficiency components?

We do not track NOI efficiencies. The NOI breakdown is effective gross income minus total operating expenses. Within expenses, there is repairs and maintenance, payroll, insurance, management fees. Under repairs and maintenance, we have expenses for grounds, snow removal, elevator, and cleaning supplies. This is standardized across the industry.

What are some barriers to underwriting you see other than data?

We take a lot of direction from developers. They already have the idea to operate the property, and we just need to confirm that they can operate, build, and get savings. We need incentive from the developer's perspective. We see the deal for the last 3 months in its life, so developers need to focus on EE early on.

One bottleneck is conducting utility studies, which we're not as comfortable with. We need proof in data to understand how to save money and save energy. Fannie Mae recently released an expense comp database across the country, which is helping folks.

People use CoStar a lot. If this exists for utility savings, it would be impactful for the industry. Sometimes it's hard to isolate the savings to just the utilities as there is maintenance and repair, payroll, and overall a property saves money after big rehab.

What would it take for your company to do high performance projects in existing multifamily units?

The most important thing is the proof that it's been done. We can prove out the operations on a project with a building of a similar size, geographic region, and age using historical operations statements and utility bills. If we have a deal with a developer we know well and they want to do it in the same geography that would go a long way because we have a team that has already experienced the building style. If it's the first one we would do, a net zero project for example, we would look to risk mitigating factors such as financial protections.

If a state or city agency provided technical assistance to better inform stakeholders of high performance projects what do you think would be specifically needed?

We have separate engineering groups in the company that engage with third party reports to tell us if the energy efficiency systems make sense and if there's a possibility of serious savings. Our

team is about ten people. They currently don't have intimate familiarity with high performance and passive house projects, more cursory knowledge than strong technological information. Educating this group on new technologies and getting them comfortable with new systems and projects to show expected savings would help.

Appendix IV: Community Preservation Corporation

Atalia Howe, Manager of Sustainability Programs
Danielle Donnelly, Sustainability Associate

CPC is the largest CDFI solely committed to investing in multifamily housing, having invested more than $11 billion to finance the creation and preservation of 196,000 units of quality housing in neighborhoods across New York State and beyond. CPC utilizes deep, strategic relationships with government agencies, local community groups, banks, and other lenders to create customized loan opportunities for customers.

In NYC, how many projects that involve energy efficiency have you provided either construction or permanent financing?

To date, we have provided either construction or permanent financing to 103 projects that involve energy efficiency, equating to nearly 7,000 units of energy efficient housing.

What is the potential of data sharing on performance and cost of projects that have implemented energy efficiency?

CPC, HPD, Bright Power, and Steven Winter Associates are working on a study focused on highlighting the true costs of Passive House. There was limited mechanism for sharing before this. While many developers are happy to share performance data, some are apprehensive to share information especially related to cost. It can be difficult to get more than a percentage reduction from baseline. Recently, more people are willing to share because developers building passive house are more open to it, and people who have done a few projects gained confidence. However, the current situation is that an easy way to share data is missing. A performance and cost comparable database would be very helpful for the multifamily ecosystem (i.e. lenders, developers, building owners and operators, insurers, appraisers, etc.)

How do borrowers find you?

Since 1974, CPC's creative financing solutions have supported critical projects in neighborhoods across New York State and beyond, resulting in wide-reaching physical, economic, and social impacts that improve communities and people's lives. Many of our borrowers are repeat customers. Often, the players who do low-income housing tax credit development or development through HPD finds us.

What do the borrowers need in order to qualify for the loan?

We typically would like to see loan to value of 80 percent and DSCR of 1.25. The average loan amount is approximately $4.5 million.

What are the barriers to underwriting energy efficiency?

Data availability on performance and cost comparables has been a barrier to lenders as there are concerns about the reliability of the performance projected. This is a chicken and egg problem, and the market is stuck in a situation that needs people who take on the initial risk. This is slowly but surely beginning to occur change and recent climate legislation (ex. NYS CLCPA and NYC CMA) is helping to drive market demand for high performance, low carbon buildings.

We believe that the purpose of publishing the Underwriting Efficiency Handbook is to encourage more lenders to incorporate energy efficiency measures into the financing of first mortgages. Were there some changes after publishing the book? Do you think it is helpful to promote more underwriting?

It has definitely been a resource for the multifamily ecosystem. The 'underwriting to savings' language has been adopted widely, and many reference the guide and use it. Also, it has led to wider recognition that NOI can be improved by lowering operating costs through energy efficiency measures.

What are current considerations of your company to promote energy efficiency?

We continue to develop resources for the multifamily ecosystem to educate lenders, building owners and operators about the value proposition of energy efficient, high performance multifamily housing, and requirements for compliance around new rules and regulations.

We are considering the incorporation of PACE to help cover some of the incremental costs of high performance. However, lenders (including ourselves) will first need to get comfortable with PACE being senior in the capital stack. In some cases, it may simply be better to increase the loan amount and be able to sell to Fannie Mae or Freddie Mac on the backend.

We are also exploring developing a 'green' standard, in addition to the CPC standard for maintenance and operations, to better reflect the realities of energy efficient buildings.

As a CDFI, what policy mechanisms would enable you to provide more loans to underwrite energy efficiency savings in multifamily housing?

Energy code is an important policy tool to push high levels of energy efficiency. In 2019, we saw a number of jurisdictions leapfrogging the model energy code to advance local regulations beyond the minimum standards, including a number of codes approaching net zero.

There is also a lot happening at the state and city level to regulate carbon emissions and support the market for clean, renewable energy.

It may be interesting to think about how insurance companies whose bottom lines are being hit by climate change incorporate this risk component in their underwriting.

What are the main ways your company access capital?

CPC funds its loans and equity investments in NYS and beyond through balance sheet capital, warehouse facilities, and lines of credit, one of which is syndicated by 13 banks and public agencies. To date, CPC has invested more than $11B of private and public capital in New York and contiguous states. We also recently issued our first sustainability bond. A sustainability bond combines both social and green bond principals together.

Of your affordable housing projects which have energy efficiency components, what is the average expected savings that you underwrite?

We are limited in our ability to underwrite savings in a few ways. The first, will SONYMA (our state mortgage insurer) accept our underwritten savings upon conversion? The second, do they conform to Fannie Mae or Freddie Mac underwriting standards and requirements (they limit underwriting to 50 percent of savings).

The majority of the affordable projects we finance on the construction loan side conform to HCR (NYS) or HPD (NYC) requirements for energy savings or design standards. Those projects, on the whole, wind up meeting Enterprise Green Communities standards which require a 30 percent reduction in savings. We then underwrite about half of that (15-20 percent) off of our underwriting standards.

We believe your company does both construction and permanent lending. Can you elaborate in which stage of the financing lifecycle you participate? (Is the conversion from construction to permanent loan automatic?)

We are a first mortgage lender financing construction loans (CL) and permanent loans (PL). Conversion from a CPC CL to PL is common but not automatic or required. Borrowers are often able to shop around for the most advantageous permanent debt.

What would you need to undertake and become comfortable with even more high performance (passive house level) projects?

Better comps (comparables) and several reliable years of performance and cost information from buildings similar to the kind we often finance.

What lessons learned or best practices can you share with private sector lenders to further incentivize them to underwrite to high performance energy efficiency projects?

- Comps or some knowledge of performance associated with different certification standards is important—what does each certification standard require from the developer? Are the metrics performance-based?
- Metering configurations and how the owner is looking to recoup the savings from high performance design—are they installing centralized HVAC and reaping all of the benefit of HP? Are they installing unitized systems and passing cost to the tenant but able to collect more rent since utilities costs will be reduced?
- Trusting the energy consultants since they will, likely, be the most knowledgeable and conservative estimator of cost savings.

What is the influence, if any, that partners such as SONYMA have in the underwriting to saving standards and process of your company?

See above. We are limited in how aggressive we are able to be when underwriting high performance because we rely on how our partners perceive the reliability of the performance projected (difficult without comparables to point to)

Appendix V: Meridian Investments

President of Meridian Investments

Founded in 1981, Meridian Investments, Inc. is a Broker/Dealer licensed to sell direct participation programs and other forms of securities. Meridian Investments is a national leader in placing corporate investors in tax-advantaged investments such as affordable housing, historic rehabilitation, alternative fuels, renewable energy, like-kind exchanges, new markets tax credits, and tax credit remarkets.

From your interactions, do you think energy efficiency savings (above 50 percent or more) matter to developers? To tax equity investors?

We work primarily with tax equity LIHTC investors like R4 and some developers. Developers will want to do it. The underwriter assumes a 3 percent annual income increase and 2 percent increase in expenses. Underwriting on these projects breaks even. We assume investors get no cash flow. If you start underwriting to energy savings, developers may want to put more debt on the project. With syndicators and tax equity investors, there's no upside to them. This might be a bigger reason why syndicators don't want to underwrite high performance savings. When cutting a deal with a developer, the tax credit investor is getting a 100 percent return from tax credit.

The syndicator and tax equity investors get one bite of the apple during rehab. Only work done on a project is scheduled maintenance and repairs. You won't find a tax equity deal that's in year 5 of the credit stream where developers can go in and upgrade everything. If you look at LIHTC for tax equity, you have to amortize investments in the income statement (pre-tax). If you assume more residual value, you could slow down amortization. We showed schedules with 0, 50, and 100 percent residuals. The change in post-tax rate of return is only marginally improved.

Could tax equity investors be an obstacle in underwriting deals for high performance buildings?

I can see in a negotiation to put the deal together that the tax equity investor will say great the developer can keep the cash flow but we're not paying them for it. The tax equity investor could limit how much debt the developer can take on the project. The tax equity may assume no energy savings in their underwriting and by doing so restrict the level of foreclosable debt that can be placed on a project.

How can a tax equity investor limit the debt a developer can take on?

When doing underwriting on the front end, the tax equity investor will look at tax credit rents for an individual property. Debt on the transactions gets sized in reverse, so they can limit it if they see significant risk to the tax credits. Debt on a LIHTC transaction is sized based on what the achievable rents can support. The tax equity will scrutinize income and expense assumptions to limit project level debt to reduce their risk. The tax credit investor looks at how much debt a property can actually take on while maintaining a proper DSCR. The tax credit investor also looks at what is driving the cash flows of the property and what the property's expenses are. If a developer can significantly reduce utilities at property level, they can increase cash flow and provide a stronger debt service coverage ratio above 1.15 or 1.20 to add more debt to the deal because cash flow can now support a higher level of debt. Tax equity is focused on debt. If you're

a tax credit property, you're looking at losses in affordable housing. The risk of foreclosure is big for a tax equity investor if they lose a stream of credits, so there's a downside to tax equity. This risk is different than the slight upside from cash flows. Ultimately if there's significant over performance at the property level, the tax equity investor would see some cash flows in years 8, 9, or 10. But at the back end of the deal, the tax equity only has approximately 20 percent of the available net cash flow and residual value in payback at the end.

If a state or city agency provided a third party certification to the underwriting of deep energy savings, would that provide added comfort to tax equity investors?

Tax equity investors are not risk takers and not typically the pioneers in financing. When a new program comes out, it's treated with skepticism. If a state or city agency gave a third-party certification-that would be looked at similarly.

The state would be better off if for example instead of a grant to the project, they offered a state tax credit as an investment tax credit based on the cost of the improvements. This model transfers the energy efficiency from being a cost savings program that the developer wants value on through lenders willing to underwrite, versus a solar panel style investment on the building. If there's a state program that could have a compliance period of 5 years, you're not changing the federal compliance period for the affordable housing deal. From a state budgeting perspective, if the state offered a tax credit incentive instead of a cash grant, it might score more favorably in terms of budget calculation purposes.

Are you seeing more tax equity investors take energy efficiency into consideration for existing multifamily affordable housing deals? If yes, what are the preconditions you look for when assessing the profitability of those EE savings?

If a developer puts a solar hot water heater that qualifies for credits, the tax equity investor would pay for the tax credit generated. They are willing to take this value. If the state had a program like a tax credit, that equity will be included in the underwriting and it would be attractive.

If someone came to you with a building that had aggressive energy savings from passive construction methods or even net zero energy use, what would be the top 2-3 things you would want to see before considering such a deal?

For underwriting on the deal, it will be all about the equipment or technology the developer is using to derive the improvements on the efficiency savings. This is similar to solar with top tier panel providers versus less proven tech providers. Tax equity will respond better if it's better, proven technology. However, the developer looks at it and thinks if he can reduce the monthly energy bill with a well-known expensive product or use a startup product that costs less; they may want the lower cost material.

Are you seeing developers use cheaper technologies?

In terms of LIHTC, it is different because everything is in the tax credit base so there's a disincentive to cut corners. If you cut corners on the front end with lower-grade technology, you reduce the basis for tax credits generated and will have to budget higher replacement reserves, so there's no incentive to pay for lower technology.

For high performance projects, is the risk profile as perceived by Meridian based on the fact that you haven't brokered the deal before or because you haven't seen enough net-zero buildings before?

The bigger issue is the fact that it hasn't been done before. The way the federal tax credit program is set up, you can only pay a certain amount for LIHTC deals for technology even if the technology works. The developer or lender may say you're overspending on the technology and they won't take the performance risk. The material costs in LIHTC have increased significantly. You won't find many developers who want to spend capital on energy efficiency in the deal...if they want to pencil the deal out. Also with recent tax reform, the price paid for a tax credit has gone down because losses are worth less today than 2016 and 2017.

If you had a goal of financing a deep energy efficiency new construction deal, what would you anticipate being the greatest challenge/impasse?

For new construction in NYC the biggest issue, other than the unemployment/recession caused by COVID-19, is the cost to develop on a per unit basis is really high. When a syndicator does a deal in NYC, they basically reduce their fees on the deal. Tax equity investors take a lower return on the deal. Developers take a larger deferred developer fee, paid out in cash flows and residual value. This structure makes the deals work. New York is the #1 or #2 high cost area for affordable housing development in the country, so there is less money to spread around on the deals. This begs the question of whether you spend the extra money for energy efficiency. You won't spend it unless the lender and tax equity will finance you based on your assumptions.

How do you think that challenge could be overcome?

New York State could give bonus points to score higher on the QAP to utilize higher systems and achieve greater energy savings. Another area to look into are 80/20 buildings, or 80 percent market rate units and 20 percent affordable units. There are some with platinum LEED certification.

Appendix VI: R4 Capital

Executive Vice President for Underwriting

R4 Capital is a national affordable housing syndicator founded in 2011. Since May 2012, R4 Capital has raised more than $3 billion of LIHTC equity investments from 90 institutional investors in 21 multi-investor funds and 10 proprietary funds. R4 Capital's portfolio includes 293 properties located in 43 states.

What portion of your existing affordable housing projects includes energy efficiency components? What is the average expected savings that you underwrite? Do you have any high performance projects (50 percent or more underwritten for energy efficiency)?

Acquisition rehab makes up 60 percent of our projects. Of this, 75-80 percent include energy efficiency retrofits that have 20 to 45 percent utility savings underwritten, with an average of 30 percent underwritten. If you factor in cost savings from repairs and maintenance, there is an additional savings of this 30 percent that comes from the energy efficient technologies used. This accounts for about one-third of what is underwritten. About 40-45 percent range are 1970s and 1980s acquisition rehab preservation deals, so there's only so much that can be done with construction until it becomes cost prohibitive.

High performance projects of 50 percent or more savings are fewer and further in our portfolio unless we have a soft subsidy or grant, we can't cover costs. In California, the QAP mandates a minimum 25 percent energy efficiency savings pickup, so we have a few in California.

Can you elaborate in which stage of the financing lifecycle you participate?

We stay with the deal for the mandated federal compliance period. On the underwriting side, the team is involved in the first 60 days of when the deal comes in until it gets closed. R4 services the equity and tax exempt debt on behalf of the investor pool.

What did it take for your company to become comfortable underwriting to your current level of energy efficiency savings?

As more and more data become available about the performance about the underlying product, it makes it an easier and easier sell. Seeing performance data with installed products, even from a 3rd party energy auditor, adds a lot of credence. It took 3 to 4 deals with a developer saying they are going to experience higher energy savings and seeing the results until we achieved a level of comfort where now when we evaluate deals, we don't always need to get an energy audit. We not only look at our deals but deals with other tax syndicators on the affordable housing or the conventional side. They can share their experience based on industry data that they may have access to that we may not.

What conditions do you have for underwriting to energy efficiency savings?

There's two sides - revenue and expenses. On the expense side, an energy audit makes underwriting easier. If you put in low flow plumbing, LED, solar panels, you get a general savings. With low flow plumbing and LED you pick up between 20-40 percent. An energy audit is helpful

because we can benchmark the technology and give it more than the standard 20-40 percent. On the revenue side, utility allowances are based on operating assets. Since utility costs are based on the average, as a landlord, it is your job to get a utility allowance study completed because more and more state housing finance agencies are accepting those, rather than using what the housing agencies are putting out. If you are in a state that allows you to change your utility allowance, we need to see a utility study. Using data in the developer's own portfolio is okay based on what they have already, without requiring an energy audit.

What data is currently used?

We like to see the empirical data. We impress upon development partners to hire 3rd party firms that specializes in energy audits to prove out the energy savings expectations. We look at what kind of materials used, system upgrades being done, and utility costs. We are willing to look at property-specific utility studies when coming up with the utility allowance. If the developer or property owner can show that the property is more energy efficient than the norm, then they can get a pick-up on the revenue side via lower utility allowances (higher net collected rents). The improvements also are net positives for O&M. We do take the repair and maintenance positive into account. There is a top line benefit here, with affordable housing rents being capped, if you can reduce the amount that people are paying in a jurisdiction.

What are your maintenance break-downs-NOI breakdowns? How are you breaking down and tracking business as usual projects compared to deals with energy efficiency components?

We benchmark - on a property that's already operating, we use historical financials in the database. We pull up the first year's numbers (utility cost projection compared to actual) from a dataset that incorporates about 37,000 apartments across the country. We can break it down by spending on rehab and other factors. If we know the developer is doing extensive energy efficiency, we'll pick out deals that were the same from a fact pattern perspective.

What would you need to undertake high performance projects?

There's not enough solid data out there that a lot of people are willing to accept. We really care how the data can be applied to our properties (not comps from other properties). For example, if you put in a top of the line HVAC system, you're going to get a lot more life out of it so it's going to save you a lot more time and materials because it's much more robust.

What are some barriers to underwriting you see other than data?

There is only so much you can do with a high-rise building from the 80s before it becomes cost-prohibitive such that it would be better to do new construction.

What would it take for your company to do high performance in existing multifamily affordable housing?

It depends on what the starting product is. If your starting product has a block wall with a brick facade that was built in 1970, that will look different from a high-rise that was built in the 21st century. We would want to see confirmation from the designer that they've run the calculations,

and they have an energy audit that shows the benefits of the energy efficiency retrofits (such as the insulation add-ins). We need to look at multiple builds, see what the trends are over time (seasonal changes), we like to see 12 months of utility bills. We definitely need an energy audit and someone who specialized in this to help you out because that is what gets people most comfortable because the numbers can't lie.

Appendix VII: Wells Fargo

Multifamily Capital Agency Lending Team

Wells Fargo simplifies financing for customers and supports the creation and preservation of affordable housing, by bringing all financing aspects together under one roof – construction financing, permanent debt, equity investments, and more.

What portion of your existing affordable housing projects includes energy efficiency components? What is the average expected savings that you underwrite? Do you have any high performance projects (50 percent or more underwritten for energy efficiency)?

Under 10 percent nationwide. A lot of our loans have renovations and require the manager or owner to invest money to do repairs and renovations. They may choose to do it in an energy efficiency fashion. The percent which are required to be done within a green program or green repair, that's a very small amount. The owner may be doing energy efficiency repairs after Wells Fargo gives them money, but it may not be required.

The amount underwritten depends on the deal. We do not have a minimum amount of underwritten savings. We will often underwrite no operating expense savings. With Fannie deals, the amount underwritten is up to 75 percent of the calculated savings and 25 percent from the tenant's savings.

Can you elaborate in which stage of the financing lifecycle you participate (construction/perm)? Is the loan conversion from construction to perm automatic?

As a bank we are construction and permanent lenders. For our team specifically (multifamily capital lending) we are permanent lenders. A lot of the green deals we do are LIHTC rehab deals (deals that were originally financed with tax credits over 15 years ago and are up for renewal) and include a number of green efficiencies.

What did it take for your company to become comfortable underwriting to your current level of energy efficiency savings?

Most importantly, our team is a Fannie and Freddie lender. If our partner is comfortable with the energy savings, and we share the risk, it takes a huge burden off. The market has improved and there are 3rd party vendors to provide checks, so we don't get the borrower's estimate on the savings. The third party gets utility bills over several years and analyzes them, which helps us feel comfortable that an expert is involved. Properties have other financial checks and metrics aside from the energy savings that need to be met, so we can only underwrite to savings so far as it is only supplementary to the deal.

What conditions do you have for underwriting to energy efficiency savings?

We ask are we making enough in this, rather than engaging in a market-based deal.

The underwriter will check with another division within WF. If a deal comes in and it's up to green standards and the utility bills are going to be X, then they are going to underwrite to an efficiency. Fannie Mae plays a big role in collaboration with WF.

What data is currently used?

What WF requires if a 30 percent energy/water combined savings, has to include 15 percent in the energy bucket. We will get a 3rd party vendor and look at what they're lending and they will look at 12 months of utility bills for water and energy, and review how the property is operating, developers are going to do the minimum to get to the 30 percent required by WF.

WF will look at the property without any energy savings, they will then underwrite the loans, and can go 5 percent higher based on energy savings. We are allowed to underwrite certain efficiencies to go 5 percent more but no more than that. Then on an ongoing basis, Fannie does require annual audits/reporting from the energy savings from the financing of those programs. After 12 months they have to do an audit of the green threshold. Clients don't want to have to guarantee that they are going to reach the 30 percent because there are too many variables, their only obligation is to put in the energy renovations which all partners agree to. Fannie gets reports for how well the program is working for them.

What are your maintenance break-downs-NOI breakdowns? How are you breaking down and tracking business as usual projects compared to deals with energy efficiency components?

We're not tracking this. It's a big management undertaking to gather this data and every project is different. The underwriting team doesn't have an internal dataset.

What are some barriers to underwriting you see other than data?

Biggest issue is that WF has trouble underwriting efficiencies that have not been proven. When you are financing energy efficiency renovations, we're not going to underwrite a speculative number for EE. There are a lot of changes that can occur before cost savings from EE can be realized, hard for WF to underwrite to an EE in the future upfront. Energy cost could go up, cost of supplies could go up.

Awareness issue- energy efficiency seems to be something that developers are becoming more aware of. Developers' incentives around green affordable housing standards are economic incentives. They want to do it because it's cheaper in the long-run.

What would it take for your company to do high performance projects in existing multifamily units?

Data that is needed is proven efficiencies in similar buildings (HPV report-shows what the efficiencies will be). When we underwrite rent, we look at similar buildings (comparables) and what their rental rate is. For expenses, they do the same thing. What is missing in the EE side, is that there just aren't enough of those types of buildings to show what the cost savings are going to be from the EE renovations.

Government guarantees of savings will be easier for a private lender to underwrite. If a property did EE renovations and received a tax benefit and the borrower had to meet certain thresholds, that would benefit the borrower from a tax incentive that WF would underwrite-that would standardize

the way private lenders will look at energy efficiencies. Best way to do it is to put it into a different model where you don't have financing professionals who are not experienced in energy efficiencies to forecast. WF is not a professional in forecasting.

If a state or city agency provided technical assistance to better inform stakeholders of high performance projects what do you think would be specifically needed?

We have an internal construction management group of engineers and architects who may benefit for informational purposes to learn about analyzing energy efficiency items. These teams check the expected changes or renovations to buildings to ensure the correct expenses are included in overall costs and estimation.

Appendix VIII: Natural Resources Defense Council

Bettina Bergoo, Green Finance Fellow

NRDC is a not-for-profit, tax-exempt membership organization incorporated under the laws of the State of New York in 1970. NRDC combines the power of more than three million members and online activists with the expertise of some 700 scientists, lawyers, and policy advocates across the globe to ensure the rights of all people to the air, the water, and the wild. NRDC's work with the public and private sectors aid the shift to a greener, more prosperous economy and the Green Finance Center helps integrate innovative approaches to finance at every level of work.

Could you tell us about your approach to raise awareness in the topic of underwriting to energy efficiency savings?

We work with lenders to get them to be familiar with and interested in lending to energy efficiency projects. We coordinate within the affordable housing lender network a knowledge exchange platform around issues of energy efficiency and climate resilience. Webinars and conference calls on benefits of energy efficiency and risks of not addressing it has been held.

We also worked to plan better building lending workshops held last May in New York. The workshop got lenders together and introduced them to the idea of lending to energy efficiency and also underwriting to projected savings.

Another consideration is not forgetting about the importance of closing transactions. It is important to consider how to get decision makers such as executives and credit committees to think about the low risk for these deals.

What are some barriers to implementation of energy efficiency projects you see other than data?

One issue is that there is not a lot of incentive for loan officers to take the initial risk. No one gets much credit if it goes well, but there is downside when it goes wrong. Post workshop survey feedback was good but the participants became busy when they went back to their jobs.

Another barrier is that most borrowers do not want another step in the loan process. One idea is to use existing data sources such as IPNA to streamline the process. There is opportunity for utility to have information and letter available for each property to show incentives and opportunities for energy efficiency retrofits. Also, it should be effective to have the incentives and money available in a streamlined way that works well with the lending process.

It is important to think about whether putting data together will change things and examine other barriers. Sometimes the lack of comparables could be an excuse for inaction.

What kind of technical assistance would be helpful to the lenders?

Benchmarking to a portfolio of properties would be helpful. It would be effective to have a consultant come in and look at the energy consumption of a lender's portfolio so that lenders can

approach property owners to do retrofits. Also, to integrate energy efficiency in the lending process, they can look at the loan documents and have them add a "checkbox" that lead to thinking about energy efficiency opportunities.

What would be helpful to further promote implementation of high performance energy efficiency projects?

Anything that gets initial projects done is great especially for publicly supported projects. It will build the track-record, and information collection and dissemination is crucially important. As long as there are good lessons learned, that would be an important component of the challenge. It would also establish relationships. People may not know the other players in the space and who to reach out to so anything that helps to establish those relationships in the space would be a great thing.

Could you share an innovative practice from approaches of Green Banks in underwriting to energy efficiency savings?

Connecticut Green Bank underwrites to O&M savings in some cases. A contractor can do an O&M projected report and look at historical O&M costs and project what they are going to be after energy efficiency retrofits. It is likely to have less O&M and not a lot of developers have talked about O&M costs going up as a result of energy efficiency.

Appendix IX: NYSAFAH

Xingzhi Wang, Data & Research Analyst

Formed in 1998, the New York State Association for Affordable Housing (NYSAFAH) is a non-profit trade association representing the affordable housing industry in New York State. 375 members include for-profit and nonprofit developers, lenders, investors, syndicators, attorneys, architects and others active in the financing, construction, and operation of affordable housing. NYSAFAH advocates affordable housing issues, coordinates stakeholders as a middle man, and organizes events.

What are major barriers to cause developers or property owners to hesitate to invest for energy efficiency retrofits?

One – The project requires a large amount of money. Even though they can use some funding sources to invest in a project, funding sources are less seamless in the process or don't align with the project's funding cycles. For example, the timing of NYSERDA funding doesn't mesh well and line up with the other government funding sources.

Second –They cannot predict what will happen in the future, such as regulation changes, economic situation changes, and innovation of technologies. They do not want to take risks.

Third – This project for affordable housing requires a lot of procedures and paperwork to apply subsidies and tax credit benefits under many federal, state, and city regulations. Major modifications to the housing cannot be made only by owners. These procedures take, on average, 6 or 7 months.

Fourth – When they offer affordable housing, they have to offer minimum standard services. They do not need to consider energy efficiency.

What would be potential ways to overcome barriers?

Energy efficiency retrofits lead to higher upfront investment. Saving operating costs may not cover this upfront investment. So, creating more financial incentives for developers or property owners is one option to change the situation. For example, there are extra costs on managing or operating the project, but these costs are not covered by offered programs. Quantifying both the costs and future savings can give banks incentives to underwrite projects easily and to motivate small developers or property owners towards adapting green energy.

Would you say that retrofitting existing housing to meet the passive house standard is achievable?

Retrofitting existing houses to meet the passive house standard is the best way to achieve the reduction in emission of greenhouse gas where possible. However, it costs a lot and takes a lot of time. Now, developers or property owners do not want to do so. This kind of retrofitting cost in NYC would be significant to meet the passive house standard, even without inserting Energy Recovery Ventilators or having domestic hot water which would cost more. Creating more financial incentives for developers or property owners is important.

Appendix X: S&P Global Ratings

Marian Zucker, Sector Lead, USPF Housing

S&P Global Ratings provides credit ratings, analyses and market insights for a diverse range of community development financial institutions (CDFIs), housing finance agencies (HFAs), public housing authorities (PHAs), and other affordable rental or military housing providers. Analysts at S&P Global Ratings have extensive industry knowledge and the ratings reflect deep understanding of the nuances that drive short-and long-term credit trends nationwide.

Would you say affordable housing is a less risky asset compared to market rate housing?

Affordable housing has relatively low risk as an asset class. Demand for this property type throughout the US significantly exceeds supply. Many affordable housing programs have a vetting process to assure the properties are owned and operated by a qualified entity and may include revenue or capital support from government agencies. These layers of support, coupled with the demand has led to stable performance of these assets in a variety of economic conditions. This is in contrast to market rate housing which involves more risk in attracting tenants.

How would having deep energy efficiency retrofits impact your credit rating/risk analysis?

I have seen more deep energy efficiency projects for new construction and less for retrofits. I would say that it will lead to a lower risk profile because it is more likely to remain profitable even when rents come down because expenses are lower. Also, if a portfolio has lower expenses and a higher NOI, it is more valuable. BUT—there must be proof of the savings in order to underwrite it into the cash flow.

What would be potential ways to overcome barriers to underwriting?

Energy efficiency retrofits are expected to lead to higher upfront investment and this incremental cost may not be fully covered by the reduction in expense. Without demonstrable experience proving the expense savings will be achieved, there is a reluctance to make the investment in the front end. In this case, in order to encourage the energy retrofit investment, it would be effective to subsidize the incremental upfront cost. In so doing, the risk of unrealized return on investment is removed from the property owner and transfer it to an entity with the expertise and wherewithal to take this risk.

Guarantees may not be the best option because there is a possibility that behavior could change such as tenants leaving the window open. When this happens, the guarantee may not be paid.

Appendix XI: Enterprise Community Partners

Senior Program Director, National Green Team

Enterprise is a non-profit pursuing the mission to create an opportunity for low- and moderate-income people, Enterprise has built nearly 585,000 homes and invested $43.6 billion. Their solutions bring together nationwide know-how, partners, policy leadership, and investment to multiply the impact of local affordable housing development.

Can you start off by giving us an understanding of your team in the affordable housing space?

Enterprise Community Partners began more than 35 years ago, and our mission is to create opportunity for low-and moderate income people through affordable housing. Our Building Resilient Futures initiative brings together three vital Enterprise programs that collectively work to help protect people, homes and communities through (1) Culture & Creativity to promote creative place making to engage residents and to promote local economic success; (2) Green Communities for over 15 years has provided a framework and technical resources for healthy, environmentally sound affordable homes; and (3) Recovery and Rebuilding we create risk-mitigation resources to help vulnerable communities prepare for, recover, and rebuild after natural disasters.

What is the main role of the policy arm?

Our Policy team works to improve programs that support housing affordability through Federal, State, and Local policy across the country. Our Green Communities team promotes the use of Green Communities and equivalent standards in State Housing Finance Agencies. This is the main way that affordable housing developers secure capital for affordable housing projects.

What areas do you see for development in policy?

One big area of need around Policy, affordable housing, and climate goals is alignment of both climate and housing production goals. New legislation such as CLCPA in New York has aggressive climate and energy efficiency targets. No one in affordable housing is against it - everyone wants quality places that are durable and last a long time. Policy, however, does not seem to marry climate legislation with the targets or goals of housing production or development. GHG or EE reduction targets are unfunded mandates, which is difficult for non-profit developers with limited resources. It is much easier for large commercial and market rate developers to fund these mandates through increased rent. For non-profit affordable housing developers, their income is from capped rent that is limited by regulatory compliance. And operating expenses go up in each year. So, affordable housing developers do not have a lot of cash to do upgrades to meet new standards. In addition, they are usually not allowed to or have restrictions on use of capital reserves.

Today however, affordable housing is exempt from some of these mandates and will get grandfathered in later. Unfortunately, the clean energy funds are abundant today to meet these goals. When affordable housing qualifies or must meet the mandates, the funds may be less to help affordable housing partners. In addition, there is a risk of leaving a huge subset of the highest

need housing and buildings for upgrades, leaving them in further disrepair. The Buildings that need the renovations the most are exempt while commercial and market rate buildings are getting higher certifications and upgrades.

From Enterprise's point of view, what would it take for the players in affordable housing to do a high performance project?

Housing Finance Agencies are focusing on unit production goals, and their dollars are focused on production and creation of preserving and creating new affordable housing units in New York. It is hard to meet NYSERDA's EE targets at the same time, because it could mean taking away dollars for housing production and preservation goals. Unfortunately, today affordable housing is exempt from meeting these climate goals. The infusion of clean energy dollars to meet these goals will be used up by for-profit market rate development. Since a very large chunk of affordable housing deals go through Housing Finance Agencies, it is imperative to marry housing priorities with the Energy Efficiency and Clean Energy priorities. If affordable housing developers were required to meet energy targets, and the funds from Clean Energy sources came through housing agencies, they could meet all of the mandates.

What is the main role of the capital arm?

Enterprise partners with investors and with developers to create and preserve affordable homes across the country. We do this through Debt financing, Equity Financing, and Equity Funds.

What conditions do you think are needed for underwriting to energy efficiency savings?

For affordable housing deals to incorporate energy efficiency, it takes a few layers of capital. First and foremost, incentive or grant like funds are essential to make the full capital stack work. If there is still a need for additional dollars to meet aggressive EE or Clean Energy targets, then consider underwriting to EE. Agencies need to create internal policies and procedures as part of their underwriting processes to include energy efficiency into their considerations. If the project meets this criteria, then the operating costs should be lower, thereby increasing the Net Operating Income, and leaving a bit more room for additional cash flow to do energy upgrades as part of the loan proceeds. However, loans are not enough to cover total costs, because underwriting to efficiency will not be enough to cover the full gap to get to passive house/electrification goals, which is expensive. If incentive dollars from NYSERDA or other sources from Green Banks can buy-down the cost of capital flowing through housing agencies, that would be very helpful to meet electrification goals. It'll take layers of grant/incentive and inter-agency coordination to meet aggressive climate targets.

What is the main role of the programming arm?

We provide technical assistance and capacity to affordable housing developers, housing finance agencies, and to lenders and investors across the country. Through our Green Communities Program, Enterprise works with housing agencies (that allocate dollars through QAPs) to ensure Enterprise Green Criteria are applied to their building, and housing developers meet the requirements.

From your experience, what challenges does the public sector face in doing high performance EE renovations in affordable housing? How do you think this can be mitigated?

Housing agencies are not reluctant, but do not have enough capital in their budgets to do high performance EE renovations. One thing to make the EE scope of work possible is if NYSERDA or incentive money contributed to the process. HPD can easily underwrite the deal if money flows through an agency or there is greater know-how for what the EE savings are. In addition, HPD/HCR and HDC can leverage the integrated physical needs assessment (IPNA) as a roadmap for EE upgrades. But the current IPNA does not meet aggressive electrification targets. There are no standards to look to. Some data and capacity building through training is still needed alongside standards and mandates to meet EE targets.

What do you think is important for the public sector to expedite the underwriting to high performance projects?

Predevelopment money will help things through creative design options and helping with defining and coming up with scopes of work that are do-able. Giving the time and energy needed to create a comprehensive deal is the only way to make it work. Also, technical assistance is essential, as it's hard to understand new technologies like passive house and how to assess risk, and there's a lack of trust in service providers such as energy services companies who might be selling extra things. Inter-agency collaboration would be helpful, and if there was a possibility to create a one-stop shop LMI program to get all the incentive/grant dollars you need in one place. Through this, each entity not only can understand what capital is available to them but also can cover the gamut of costs. For example, NYSERDA/CONED money cannot fill the whole gap, but together their money would stretch further for the LMI market where it's desperately needed. To expedite underwriting to EE, it has to be mandated by the State.

What do you think is needed for the private sector to be involved in underwriting high performance projects?

For the private sector, it is also about mandates and policy levers to move the dial, in addition to CSR/ESG goals.

Appendix XII: Riseboro

Ryan Cassidy, Director of Sustainability and Construction
Kelly Biscuso, Director of Real Estate Development

Riseboro is a non-profit 501c(3) who since 1973 has been offering services designed to support every generation and meet the needs of communities. Riseboro's unique model of holistic community revitalization works by developing neighborhood assets, like affordable housing, to create the foundation for a more vibrant and diverse community. Riseboro is committed to developing affordable housing projects that meet rigorous Passive House standards for energy efficiency and was responsible for the development of the first 100 percent affordable multi-family passive house in the country, Mennonite United.

What portion of your affordable housing projects includes energy efficiency components? What is the average expected savings that you underwrite?

Riseboro is the property manager and owner of the buildings which they develop, which is a good way for the organization to link its energy savings to its cost savings. Riseboro was an early adopter of passive house retrofits in the past 2-3 years, with two classes clearly defined: substantial rehabilitation and tenant in place rehabilitation.

Riseboro's case example is Casa Pasiva, winner of the RetroFitNY grant from NYSERDA. Casa Pasiva, a group of 8 buildings totaling 146 unit which is currently being rehabilitated with the tenants in place while the entire building is converted to Passive House (PHIUS) standard.

Renovation projects with tenants in place typically have a limited scope, Casa Pasiva has a larger than normal scope, and increased cost compared to standard tenant in place renovation work. On the new construction side, Riseboro does not see a cost adder to build Passive House buildings. Riseboro currently manages 200 properties which vary in size, the largest being 100 units while the smallest has 3 units.

Finance Mechanisms for Riseboro:

Same capital stack, construction financing is pretty easy, you have income, you have expenses you have NOI, you generate tax credits and then subsidies, collateral is not really different (going to be non-recourse loans where the building is going to be the collateral), the impact of maintenance operations on NOI which impacts your permanent debt

PACE financing which is new to New York and has been around since the early 2000s, a little bit better than market-based, you put aside efficiency costs and you pay them through your tax bill-essentially a loan project that the City will collect through your tax bill. Riseboro is not sure if in the past 6-10 months anyone has done PACE financing in NYC yet and believes it could be an interesting way to finance EE retrofits.

Are you a construction or permanent lender? Can you elaborate in which stage of the financing lifecycle you participate?
Not a Lender

What did it take for your company to become comfortable underwriting to energy efficiency savings?

Riseboro has achieved upwards of 50 percent reductions from underwriting to Passive House which is considered a good sign for lenders. This has taken multiple years of practice to demonstrate such savings, while seeing savings accumulate year after year.

For Riseboro, "comps" are very important for lenders and equity investors, ultimately there need to be more and more buildings doing passive housing to allow for more points of reference for data collection.

What conditions do you have for underwriting to energy efficiency savings?

Understand three sets of data-modeled energy use (type of model, reliability, etc.); historical performance of similar buildings; standard underwriting and our proposed reduction.

What data is currently used?

The industry trend in real estate is to not share your data, Riseboro always shares its operating data with HPD and HDC, and has achieved good buy-in from agency lenders and private lenders such as Citi and Chase. Riseboro finds an openness to discussing energy underwriting and are among the ones who get the achieved reductions that they ask for in terms of operating savings. However, the industry as a whole doesn't like to share data, if these projects get into development in the past 2-3 years, they can generate operating data that can shift the market, the more proof of concept you have out there, the more developers will come to the table.

No data yet for tenant-in-place retrofits.

Sharing operational data is the best incentive for EE retrofits because it is granular, next step is to streamline if you are going to do a passive house, your lender is going to give you underwriting predictions so they can trust the predictions, you can then allocate your resources to make it better. The developers should use the City's data (local law 84 for benchmarking or all of the buildings going into the new stretch code).

What would you need to undertake even more high performance projects?

Better connection with utilities on rate structure (a high efficiency rate class?), more performance data of high efficiency buildings. Better oversight of current operations of high efficiency buildings.

What are some barriers to underwriting you see other than data?

Historically it's been developers that have been the decision makers in this space. The decision-making power still lies traditionally with the owners and in the next few years you are going to see more demand for these types of buildings which is going to shift the responsibility away from developers and into the hands of lenders.

What lessons learned or best practices can you share with private sector lenders to further incentivize them to underwrite to high performance energy efficiency projects?

Answer is in number 2. Understanding the existing data and taking acceptable risk to build a wider data set. Encouraging wider adoption by incentivizing both developers and contractors to build more efficient buildings. That incentive could be a performance incentive over the life of the building.

Appendix XIII: New York City Housing Development Corporation (HDC)

Trisha Ostergaard, Deputy Director, Credit Risk

HDC seeks to increase the supply of multi-family housing by financing the creation and preservation of affordable housing for low, moderate, and middle-income New Yorkers. HDC accomplishes this by issuing bonds, providing subsidies and low-cost loans. Working in collaboration with many dedicated colleagues across government, nonprofit, and private sectors, HDC continues to foster the development of a more equitable New York by investing in new housing that strengthens the core of our neighborhoods, while also preserving the quality and affordability of our existing housing stock.

Can you give us an overview of your perspective on achieving NYC's climate goals in the housing sector and where you think the current hurdles are?

HDC only started underwriting to EE and only on a case by case basis two and a half years ago. The model is currently a bit of a hybrid which is closer to the private sector lender model than a typical HFA. HPD is the truer version of the public sector/government HFA. HDC ****(see below for my explanation of 4 percent tax credits)issues bonds and considers itself as a "hard lender" as opposed to a "soft lender" where the loan can be forgiven, but with hard lenders there is less flexibility to forgive. HDC is also a hard borrower which means it has to pay bond back interest in the bond market. HDC holds a lot of cash in case the borrower has a problem-may be able to restructure if there's an issue. HDC uses a debt service reserve account and corporate reserves (This money is either Payables – say, interest on bonds due shortly or loan proceeds waiting to be advanced to developers as soon as they submit receipts – or else regulatory or rating agency reserves which we can't touch, or money that belongs to HPD that we are investing on their behalf. Very little of this cash is actually unrestricted AND undesignated, so actually free cash for us to use as we please.)

For EE-HDC has to be really sure the savings are going to materialize. If they underwrite the savings, the borrower can borrow more but has to leave a cushion there.

HDC has engineers and other technical folks within their personnel who can speak to how passive houses will realize savings relative to the maintenance and operating schedule. That is very closely based on historical performance within the last year. Every year HDC develops new Maintenance & Operations Standards (the M&O) which projects looking for financing from HDC must use as their budgeting tool. The standards are based on the historical performance of projects in HDC's portfolio for 15 years or less. HDC drops off older buildings from the calculation every year and brings on the new buildings from the most recent year. When asked to underwrite to savings it's all prospective, and the focus needs to be on supportable data. If a 3rd party says savings will be 70 percent, they take a "huge" haircut off of about 20 percent.

Energy Data:

Data is collected for heating, electricity, and water/sewer. HDC analyzes the utility bills portion of M&O for up to a year and takes into account expectations for oil prices and electricity rates that ConEd says they will impose. Same process is followed for water and sewer maintenance costs.

HDC will take cues from the Mayor's Office and HPD and if this is the direction those two stakeholders want to go in, HDC has to follow suit. However, this may be more slowly than the Mayor's Office or HPD hope because they have to take a "hard lender" perspective.

Rehab Side:

HDC does not see anything as high as 50 percent expected savings. This bond cycle HDC is underwriting 20 percent to passive house standards but not passive house certified. HDC is being asked to underwrite more and will consider it but needs a rationale. Rationale could be qualitative such as a known developer and GC which get things done at a high standard so it would give HDC some comfort rather than making a blanket statement that everything can be done on a case by case basis. Last cycle, HDC underwrote to some savings for new construction passive house when requested. HDC usually does not take construction risk and considers that to be the role of the bank which also has to be comfortable to underwrite savings. If a bank has never underwritten to savings before, HDC has to make them comfortable with it. Everything was done on a "no names basis" and showed the 20 percent savings which is not a large element on the M&O. HDC may have 1-2 years' worth of data on a number of projects with all of them performing at least as well to the savings as we underwrote to if not better.

What barriers do you see to getting these aggressive savings in place in existing multifamily affordable buildings?

Data is a big barrier, it is harder to come by for existing developments and depends on the state of the building. The building could be in terrible shape and have old systems. With more data available, lenders will get more comfortable to underwriting for solar for example.
What is technically possible with current technology is also a barrier.
HDC would not likely retrofit to passive house because it is very expensive.

What would it take to get you to do more rehabs for aggressive EE savings, besides data?

NYC has taken a leap on the policy side with GHG standards for 2024 and 2030 and the Climate Mobilization Act. Housing has five extra years to achieve savings and the engineers are really working hard to figure out how to convert the portfolio to the standards and get anyone who doesn't meet the standards. Goal is to do an IPNA for every project in the portfolio and check capital reserves vs. doing a new loan with them to achieve it. There are not a lot of projects with reserves on hand, therefore they are run on tight margins and regulators don't let you overlend, etc. Qualitative element of how much we can risk, how much wiggle room do we have so we don't wreck the hard borrower responsibilities. Risk perception will inch up slowly from 20 to 25 to 30. The team of engineers helps show how much HDC can really underwrite to if the credit risk folks are "digging their heels in."

Case Studies:

The 147,933 affordable homes created under Housing New York represent a $6.6 billion City investment, which includes City Capital, HDC Reserves, Reso A, and other funds.

Sendero Verde: Largest passive house complex in the country which includes approximately 700 units of affordable housing. HDC contributed $120 million in bond financing and subsidy to the first phase of this dynamic project.

Sustainable Development Bonds are a new category of social investment bonds and the first for affordable housing in the United States. Sustainable Neighborhood Bonds also address environmental benefits, building on the work HDC does through the Enterprise Green Communities Criteria, only comprehensive green building framework designed for affordable housing.

Multifamily Water Assistance Program
The New York City Department of Environmental Protection (DEP), with HPD and HDC are offering a water and sewer credit for eligible HPD- or HDC-assisted affordable multifamily housing projects.

Buildings must demonstrate efficient water usage either through compliance with the Multifamily Conservation Program (MCP) or as evidenced by paying a metered water rate.
(The problem with this program is that the credit is only for one year. A project must reapply each year and there is no guarantee it will receive the credit for a second year. It is impossible to underwrite to savings on this program.)

In 2016, HDC entered into a Memorandum of Understanding ("MOU") with HPD which includes obligations to use corporate reserves to fund construction loans for projects eligible under the Green Housing Preservation Program. HDC has set aside $13,361,000 of its reserves for this purpose.

HDC's subsidiaries:

New York City Residential Mortgage Insurance Corporation (REMIC)

Public benefit corporation. Promotes the production and rehabilitation of affordable housing through issuance of mortgage insurance.

Housing Assistance Corporation (HAC)

Public benefit corporation. Receives money from any source for the purpose of maintaining affordable rentals for low and moderate-income persons

Housing New York Corporation (HNYC)

Public benefit corporation, inactive subsidiary of the Corporation

NYCHDC Real Estate Corp - assist HUD and HPD in preserving distressed housing in HUD's foreclosure portfolio

HDC's Program for Energy Retrofit Loans (PERL):

Developments already in HDC and HPD's portfolios are eligible for loans to finance energy efficiency improvements through HDC's new Program for Energy Retrofit Loans (PERL) which launched in the fall of 2012 in collaboration with the New York City Energy Efficiency Corporation (NYCEEC). PERL assists projects in meeting the legal requirements of the City's Greener Greater Buildings Plan: Local Law 43, Local Law 84 and Local Law 87. (PERL is an old program; I don't think I have seen a project use it since at least 2016. But I'm sure HDC will be developing new programs to help projects meet the new CMA goals.)

****It's not that we have 4 percent debt in the market. The 4 percent I mentioned is 4 percent Low Income Housing Tax Credits ("LIHTC" – pronounced "LIE-tech"). HDC is responsible for the 4 percent credits and HPD handles the 9 percent credits. Basically, the tax credits are a way for the federal government to funnel support to affordable housing locally.

Every year the federal government allocates tax credits to the 50 states based on a formula related to population. Then the state governments allocated the credits around their states. Every year NYC gets a certain amount of tax credits from Albany, 9 percent credits go to HPD and the 4 percent ones come to HDC. Then HPD and HDC "sell" the tax credits. Banks and other taxable investors will pay a lump sum UPFRONT for 10 years' worth of tax credits – that is, the right to write off a portion of their taxes every year for 10 years. We call that lump sum "tax credit equity" and it is an important part of the capital stack for any tax-credit-eligible project.

The 4 percent credits are not as valuable as the 9 percent but they come with a different benefit which is that they allow HDC to issue tax-exempt bonds along with them. Again, there is a complicated formula for the amount of TE funding we are allowed to issue but it should be cheaper funding than taxable so helps projects get built more cheaply. The amount of TE bonds we are permitted to issue each year is known as the Volume Cap. When we've exhausted our Volume Cap, then we just issue taxable bonds.

Please note, the tax credits are used by HDC only for new construction projects, we don't use them for preservation or retrofits. It is certainly legal to do so, but the tax credits are so valuable and projects are now so expensive to build that HDC made the policy decision only to use them for new construction. We can get preservation deals done using only taxable financing; it is pretty much impossible to get a new construction deal to pencil out if we can't use tax credits as well as tax exempt funding.

Appendix XIV: NYS Homes and Community Renewal (HCR)

Director of Sustainability

HCR is a NY state Housing Finance Agency with a mission to build, preserve, and protect affordable housing and increase homeownership throughout New York State. HCR provides financing opportunities for the new construction, preservation, adaptive reuse, and rehabilitation of quality affordable multifamily rental housing through the state. Financing resources include agency-issued tax-exempt, taxable, and 501(c)(3) bonds, LIHTC, and subsidy loans.

What type of sustainability compliance have you seen in your multifamily project applications? E.g. Energy efficiency? High performance? New build?

HCR works more on improving its portfolio of properties, which are number nearly 300,000 units. There we focus on getting properties already financed by HCR to evaluate energy use and help them lower cost of utilities in operations through energy efficiency (EE) improvements

New buildings and preservation projects coming in for financing have green requirements of national standards for EE to reduce carbon emissions. All new construction projects meet aggressive goals that allow bonds used to finance them to be certified by the Climate bond Initiative (CBI) due to their low carbon emissions criteria.

High performance & Passive house:

We would love to do more high performance. But, there are a couple of limitations, but money to cover the additional upfront cost is major. For example, guidelines for preservation start at a 20 percent reduction in energy costs at a minimum right now. Getting to 20 percent is difficult for us because we do moderate rehabs (defined as upgrading buildings with people in place). Another limitation is that we, as a housing finance agency, are preserving properties as affordable housing. We want to make sure tenants limited income covers a portion that is supplement by public funds. So, we sometimes have to put in "patient money" that has favorable terms (1 percent for 30 years, for example) – in other words, we need to put in subsidy funds for mortgages to cover the amount.

What has HCR's experience with underwriting to savings been, if any?

Current projects for underwriting to savings are done on a case by case basis. We try to get indications that a particular developer has utility costs reduction by using EE (Energy Efficiency) measures/different equipment. We worked with NYSERDA on getting data to show the savings and hoped to identify measures that significantly reduce operating costs. We would have additional ammunition to go to underwriters with proof that a new highly-efficient boiler, for example, will use less energy.

What are the main barriers to underwriting high performance projects?

The major barrier - in the four years I've done this work - is having data that will back up the EE savings. We have been looking for a series of buildings with different types of systems with 1-2 years of information that shows they are consistently using less energy because of the EE measures taken compared to a regular building. For example, NYSERDA incentives for existing buildings

requires consultants from an approved list; then to get funding, consultants provide projections of the future cost savings. During construction the building needs testing and in 1 year afterwards. To create a usable data base, there is would need to be building results with 3 numbers - initial or existing building use in energy, what was projected, and the real outcome in utility use after one year of operations.

We looked at a list of 20 projects in the HCR portfolio that had received NYSERDA INCENTIVES, but the data we got from those records were not conclusive. Some buildings performed better, and some did worse than projected. We were not able to sort it in a way that could give definitive numbers to share with our underwriting staff. So, two years ago, we (HCR) started requiring one portfolio of buildings to benchmark energy use. We want to build the number of properties from the HCR portfolio. This would allow us to go after buildings, who haven't been upgraded in years, to reduce energy use and especially for high energy users. Once the re-construction is done, we want them to report what energy the property uses, so that HCR would have the benchmarking data.

The cost of EE upgrades could be another barrier for affordable housing. In areas like upstate New York, natural gas is cheap. As a result of the cheap gas rates, extensive EE upgrades and plans for electrification are not attractive and does not help contribute to economics of operating these properties. In addition, other things in these buildings need to be replaced – for example, kitchens and bathroom fixtures. Upgrading a boiler to a heat pump would require product to be shipped from abroad or somewhere else that will double the cost to replace. The property might also need to seal around windows, to address building code issues, plumbing or electrical upgrades, and other maintenance improvements. By the time you compile it all the work, it could not be covered by the amount tenants pay and the amount HCR can put in as subsidy with other financing. The cost of preserving affordable housing includes not just building repairs but often refinancing the existing debt on the property. An old mortgage has to be refinanced at low-interest rates, meaning that the capital available for EE upgrades is not enough.

Are there any players in the process that might hinder taking on high performance projects?

Other than underwriters of projects who must make the financing work with available resources, (SONYMA) Mortgage Insurance Fund, has an even more conservative perspective. Their role is to guarantee that the mortgage will be paid. For example, if a mortgage defaults or if we have colder than typical winter or hotter summers, then the property's operational cost is higher, and the mortgage might not be paid, resulting in the potential of loss to mortgage insurance funds. So, the projects that MIF was able to underwrite to savings, had developers who could show that they had achieved energy saving on other EE projects that they operate and therefore providing comfort that this is the saving that property would be able to generate.

What does the capital stack look like? Construction vs. perm lending?

For the capital stack, there is tax credit equity, bonds, long-term mortgages paid off from income from the rent or another funding source depending on the housing type, and subsidies from HCR or other public agency programs. A construction loan is sometimes provided by a private entity like a bank, but they're financing the project until the construction is complete. In closing, HCR funds take out the construction loan with permanent debt financing.

LIHTC: A lot of money that comes through the projects is from Low Income Housing Tax Credits. Through equity partners corporations, institutions and individuals put up equity into the project that doesn't draw from the income of the project. They get the benefit of the tax credits from the IRS.

Long term Mortgages: Most affordable housing properties have LT mortgages with very low-interest rates. When they refinance the debt, the terms just push the repayment out further.

Subsidies: these vary by the project - commercial space in the building help get a subsidy, homeless families get another subsidy, or the income of future tenants might determine which subsidy will be used. HCR projects with these limited subsidies must first focus on health & safety issues, handicap accessibility, and improvements that directly impact tenants comfort.

What partners might you work with in terms of the capital stack? What does that collaboration look like?

We work with

Mortgage insurance companies, NPOs, banks, developers, other public agencies and equity partners (provide funds for tax credits).
Insurance companies (examples include Fannie, Freddie and SONYMA MIF): Many HCR projects use MIF underwriters must demonstrate that project mortgage can be repaid, even in extreme circumstances. Eventually with the benchmarking data on HCR projects we can provide will information on EE projects to provide comparables for their analysis.

Currently, the industry in NY State uses a CPC publications as 'the Bible' for annual operational and averages usage of energy per year in a buildings it has financed. Some of CPC's portfolio are EE, and some are not, making the utility use average number higher. Why not give a grouping of only EE buildings to get numbers from those properties?

Banks: They – for example, Citi bank and Chase - provides line of credit, construction loans or other forms of financing for affordable housing. CPC is also a financial institution and play a major role in the industry, especially with smaller properties.

Developers: They have skin in the game as they undertake the pre-development for developer fees. In HCR deals, they are required to leave part of this fee in the deal in the early years of operations. Many developers won't apply to NYSERDA because of the hoops they must jump through to apply and get the funds into the project. NYSERDA incentives for preservation might provide $600/unit. If a project is 100 units, then that's $60k. Getting $60k for a project that might cost $20M is not enough to justify the effort to obtain the incentive. If you hire an energy consultant, it would cost you just to get the money from NYSERDA, so it's not economical.

NPOs: Many developers of affordable housing are nonprofits, and some are more focused on EE. Riseboro has completed several passive house affordable housing projects. Last year, HCR financed a passive house project that include preservation of existing buildings. The MIF was able to underwrite to projected energy savings on this project because of the NPO's track record.

Equity Partners: Firms that syndicate investments for LIHTC in affordable housing. These funds provide equity into the projects without requiring a return from the project income. Investors receive credit from their IRS tax liability.

Others agencies: We work closely with NYSERDA and are looking for ways to increase the EE standards in HCR projects. When HCR looks at underwriting affordable housing, there is not enough capital to increase EE with current resources and subsidies. A lot of times, the energy savings aren't enough to cover the capital outlay to make the upgrades.

Appendix XV: NYCEEC

Curtis Probst, Co-CEO

NYCEEC is a non-profit finance company that provides innovative financing solutions – including non-recourse debt financing - to help building owners and tenants save money and transform their properties into cleaner and greener buildings. NYCEEC works directly with building owners, contractors, project developers, ESCOs and others to provide financing solutions that increase building cash flow.

Which of your debt products do you underwrite to energy savings if at all? What is the average expected savings?

Assuming that our technical/engineering review validates energy savings estimates, they are included in our underwriting process. There is really no "average" for expected savings, as it depends on building baseline performance and on the measures being considered.

What conditions do you have for underwriting to energy efficiency savings?

We perform a technical/engineering review to validate energy efficiency savings. This is difficult on new construction (which is a very small component of our lending), but usually more straightforward on retrofit projects.

What did it take for your company to become comfortable underwriting to energy efficiency savings?

A combination of in-house engineering capabilities, plus the expertise of third-party engineering firms to help us validate energy savings estimates. Our mission is "to deliver financing solutions and advance markets for energy efficiency and clean energy in buildings" so it would be difficult to imagine that we would not incorporate savings into our lending practices.

For the deep energy efficiency retrofits that the NYCEEC has financed, are you a construction or permanent lender? Can you elaborate in which stage of the financing lifecycle you participate in?

We do relatively few deep retrofits, but we are more likely to be the construction lender. That is typically where there is the biggest gap in capital availability. We could also see ourselves providing incremental lending for certain deep retrofits, where a traditional lender is unable to incorporate the incremental value of energy savings.

What data do you currently use?

One of the most common pre-development costs that addresses the data piece which NYCEEC helps to finance is the Integrated Physical Needs Assessment (IPNA). An IPNA is an assessment

of a building's capital needs that includes recommendations on energy conservation measures and their likely payback period based on projected energy cost savings.

Additionally, for any borrower to qualify for a loan, we normally look at the 5cs of credit: character, cash flow, capital, conditions and collateral. For market rate multifamily projects, we are usually willing to cover about 80-90% of financing, but with LMI multifamily properties, we are sometimes willing to cover up to 100%, because of the social benefits and because these borrowers are likely to have less capital to fund a share of the project, yet we want to see energy efficiency and clean energy financing accessible to all. With market rate properties, this is less of a consideration and we want to make sure that they have "skin in the game" as well, and so we would not normally cover 100% of financing.

Some of the additional metrics that we take into consideration are the expected cost of GHG reductions. We integrate expected GHG reductions with our lending using a metric defined as $\frac{\$\,of\ capital \times years\ of\ loan}{GHG\ reductions}$. Ideally, we want this number to be as low as possible by maximizing GHG reductions, and minimizing the amount and term of capital deployed (allowing us to finance more projects).

What are some barriers to implementing high performance retrofits in affordable housing that you see?

The affordable housing market at the moment is more reactive rather than driving demand for high performance buildings. Building owners generally implement things only if absolutely required since they often have limited resources.

Incentives and developers also play a significant role and these two facets need to be aligned in order to have the kind of market transformation that we hope for. Currently, the economics for high performance retrofits are not favorable, e.g. building envelope work often has extremely long paybacks (sometimes up to 20 years) vs. lighting which can pay for itself in a year. Financial incentives are currently needed for building owners and for developers to pursue these transactions at scale, until such time that the economics improve.

Housing agencies are generally focused on how many units of affordable housing were created and not how much energy was saved. With different incentives, housing agencies may focus to a much greater degree on the energy efficiency of affordable housing properties.

Appendix XVI: NY Green Bank

Kim Erle, Managing Director, Strategy, Impact & Investor Relations
Rosie Wigglesworth
Keely Conway

NY Green Bank is a division of New York State Energy Research & Development Authority (NYSERDA) and is a critical component of Governor Andrew M. Cuomo's Reforming the Energy Vision (REV). NY Green Bank is state-sponsored and serves as a specialized financial entity working with the private sector to increase investments into New York's clean energy markets to create a more efficient, reliable and sustainable energy system. Since inception, NY Green Bank has utilized innovative approaches to financing structures to mobilize clean energy funding activity and private capital in New York State, reducing the need for further ratepayer funding. Unlike grant or incentive payments, NY Green Bank funds are invested at market rates, ensuring that the organization can cover its own costs, while preserving its capital base for continued deployment.

How many energy efficiency retrofit projects has NYGB invested in and what percentage of the portfolio does this make up? What is the average expected savings that you can achieve in your projects? How have your $909.2 million in investments been disbursed (grants, loans, etc.)?

As of December 31, 2019, NY Green Bank has committed approximately $909.2 million in overall investments in clean energy projects across New York State. NY Green Bank has executed nine energy efficiency transactions to date, which equates to 7% of the investment portfolio.

The majority of proposals we have received were for renewable generation (about 70% of the portfolio) rather than energy efficiency.

For the deep energy efficiency retrofits that the NYGB has financed, are you a construction or permanent lender? Can you elaborate in which stage of the financing lifecycle you participate in?

NY Green Bank enters the financing life cycle at a number of different stages. For the energy efficiency projects financed thus far, NY Green Bank has provided both construction and term loan financing, as well as facilities that combine the two. We have also provided a preferred equity investment to finance the construction and operation of an energy efficient lodging property seeking LEED certification.

What conditions do you have for the investments that you make?

NY Green Bank capital is invested at market rates. NY Green Bank also considers a transaction's contribution to financial market transformation and the project's potential for energy savings and/or clean energy generation that will contribute to achieving the State's greenhouse gas (GHG)

emissions reductions goals. We evaluate each proposal independently to ensure we are effectively managing risk in the transaction.

What data is currently used?

NY Green Bank collects data that allows us to track the performance of the project against our required investment criteria: capital mobilization, market transformation and greenhouse gas emissions reductions. For energy efficiency projects, this data primarily includes energy savings from the efficiency upgrades and the associated cost savings resulting from the implemented measures.

What are some barriers to achieving high-performing buildings you see other than data?

At present, achieving high-performing buildings comes at a significant cost premium, particularly for building retrofits (versus new construction). Supportive policy changes and incentive programs can help bridge the gap and stimulate more owners to upgrade the energy performance targets of their building renovations, as can the demonstration effect of large building owners leading the way with high-visibility projects.

From the NY Green Bank's perspective, what are some incentives that may generate demand for deep energy efficiency retrofits amongst building owners?

What are some examples of such regulatory solutions from NY Green Bank's perspective?

New York Green Bank does not comment on regulatory matters.

What would it take for NY Green Bank to do high performance projects?

NY Green Bank is very interested in financing high performance projects. Investments follow good policies and good incentives, and it is heartening to see the introduction of the CLCPA from which we believe investments will naturally follow. However, the market still needs track records and standardization to get more owners and the institutions that lend to their projects to see economically viable pathways for deeper energy retrofits that ensure the economics (such as payback period) are reasonable for the entity procuring the retrofit.

What are specific examples of housing agencies, non-profits, and private financiers that NY Green Bank works with to aggregate demand for high performance retrofits?

NY Green Bank has financed energy efficiency projects at NYCHA and has provided capital to several additional specialty finance companies to support the energy efficiency loans they make. Moreover, NY Green Bank is going to continue funding high performance affordable housing retrofits, and is currently working with a variety of different market actors including housing agencies and non-profit and private financiers who can aggregate demand. We at NY Green Bank are committed to deploying more capital to support deeper incremental energy efficiency measures in projects that might not otherwise undertake them.

Appendix XVII: New York City Department of Housing Preservation and Development (HPD)[62]

Director of Preservation Finance

The New York City Department of Housing Preservation and Development is responsible for developing and maintaining the city's stock of affordable housing. A major directive of HPD is to carry out Mayor De Blasio's plan to build and preserve 300,000 affordable home units by 2026. This is achieved through an array of different programs that rehabilitate distressed properties, provide low interest loans to finance home improvements, facilitate asset acquisition and more.

What portion of your projects includes energy efficiency components? What is the average expected savings that you achieve.

The green housing preservation program (GHPP) provides low to no-interest loans to finance energy efficiency and the program's impetus came from local laws. The program is designed to assist small to mid-sized building owners improve building conditions and lower operating expenses to ensure the long-term physical and financial health of their buildings. The scope achieves a range of 20-50% savings and this program is most suitable for multi-family buildings under 50,000 SF with high utility usage or costs needing EE improvements and that may also require some other rehabilitation.

How many high performance retrofits has HPD financed or secured financing for through the GHPP? Who are your biggest stakeholders/implementation partners in the GHPP?

Is there a way that HPD can incentivize private lenders to underwrite to energy savings through the GHPP? What regulatory changes need to be implemented from HPD's perspective to further incentivize private lenders?

When considering financing high performance projects (20% requirement as mentioned below), does HPD require energy audits? What are you comparing the 20% savings to?

However, aggressive savings are not cost effective at the moment. Costs associated are cost prohibitive because owners are concerned about overleveraging. Owners had reservations of not being able to take out equity (the way they look at loan to value ratios is more creative).

Are you a construction or permanent lender? Can you elaborate in which stage of the financing lifecycle you participate?

What did it take for your company to become comfortable underwriting to energy efficiency savings?

What conditions do you have for underwriting to energy efficiency savings?

[62] HPD stakeholders were unable to return a final interview template confirmation to the SIPA Capstone team in time for the finalization of this report

What data is currently used?

What are some barriers to retrofitting to high performance buildings that you have experienced?

The biggest barrier to entry is that it's not just EE work that is necessary. These buildings usually have a lot of other capital work that has to be done. Building systems are similar in terms of replacing boilers to go to heat pumps and so on but these costs are prohibitive and we end up not seeing much savings.

The construction community is also still learning "what does net zero mean" and building materials are expensive. Additionally, repeat developers like (Riseboro, Lemle & Wolff and Walmar Construction) may have a significant sustainability portfolio but they have less experience with affordable housing.

Another piece that is missing is that small building owners are unable to leverage enough debt. And this is significant because 50% of rent stabilized stock are small building owners. Smaller building owners tend to have high income to debt ratios and therefore are unable to raise enough debt (credit rating that's not good enough etc.) They also tend to not make enough to support themselves. They do not usually have building reserves when we start working with them, there is no expense tracking system and they do not increase rents. (Landlord ambassadors program together with Enterprise to help owners implement better building management practices and package loans for them).

What does it take to undertake high performance projects?

When assessing loan applications, the project scopes of work must reduce a building's energy usage by at least 20%. Almost all buildings also have solar PV involved.

NYSERDA Capstone Systems Map