

# COMMUNITY DEVELOPMENT

## WINDOW OF OPPORTUNITY: NEW YORK'S SMALL MULTIFAMILY BUILDINGS, EXPIRING EQUIPMENT, AND CLEAN ENERGY GOALS

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### Key Takeaways

- Units in 5- to 50-unit buildings constitute nearly 20% of the housing stock in New York State, almost 70% of the tenants in these buildings are low- and moderate-income, and more than 1.3 million units in such properties are heated by non-electric equipment that is over 15 years old and nearing or beyond replacement age.
- Electrification of these properties is challenging due to lack of awareness and capacity, monetary issues, complicated government incentive programs, the complexity of retrofitting, and inefficiencies in the market for retrofits.
- To make electrification business as usual, there will need to be increased funding, streamlined and improved incentive programs, widespread proofs of concept, easily accessible technical assistance and education, and a better structured market for retrofits.

# Acknowledgements

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## Introduction

In recent years, 32 states and the District of Columbia have adopted climate plans or are in the process of developing or revising them.<sup>1</sup> These include New York State’s Climate Leadership and Community Protection Act (CLCPA), which, along with New York City’s Local Law 97 (LL97), encourages or mandates substantial greenhouse gas reduction and energy efficiency improvements. Given that buildings account for 30% of emissions in New York State<sup>2</sup> and over 70% of emissions in NYC,<sup>3</sup> achieving this ambitious mix of targets and mandates will require that owners of all property types in New York work toward electrifying their buildings. Retrofits of existing properties will be particularly important, since 80% of all buildings that will exist in 2050 have already been constructed.<sup>4</sup>

Within the universe of existing buildings, certain property types present unique challenges. Housing and real estate experts highlight the electrification of 5- to 50-unit properties as particularly difficult. Ownership is fragmented, with many individual owners that have limited portfolios. At the same time, almost 70% of households residing in these properties are low to moderate income, and thus are often not paying premium rents. This leads to downstream

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<sup>1</sup> Arizona, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Illinois, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, Washington, Washington DC, Wisconsin (<https://www.c2es.org/content/state-climate-policy/>)

<sup>2</sup> Carbon Neutral Buildings. <https://www.nyserda.ny.gov/All-Programs/Carbon-Neutral-Buildings/Carbon-Neutral-Buildings-State-Fair>

<sup>3</sup> Energy Benchmarking: New York City Energy Water Performance Map. <https://www.nyc.gov/site/sustainability/codes/energy-benchmarking.page>

<sup>4</sup> “80% of the Buildings That Will Exist in 2050 Already Exist” – Bringing Net Zero to the Masses. <https://www.propertyweek.com/analysis/80-of-the-buildings-that-will-exist-in-2050-already-exist-bringing-net-zero-to-the-masses/5114832.article>

challenges to electrification, including tight margins, minimal capital reserves, and a lack of economies of scale.

Given that there are well over 100,000 such properties across the state, containing 1.45 million units, electrifying them will be critical for meeting the state's and the city's statutory goals. In addition, over 2 million low- and moderate-income individuals live in these properties, which means that more than one in every five (21%) LMI individuals live in a 5- to 50-unit property.<sup>5</sup> As electrification becomes the market standard, legacy equipment and energy sources will likely become more expensive. Therefore, including properties serving LMI households in the transition is critical to minimize the financial burden on these households.

In addition, the coming years represent a critical juncture for these properties. There are over 1.3 million units in 5+-unit buildings that are heated by non-electric equipment that is over 15 years old. Owners will thus be replacing thousands of non-electric heating systems in the near- to medium-term. If they replace-in-kind with non-electric systems, it will lock in the use of natural gas and oil for heating in those buildings for decades. Alternatively, with proper incentives, they could take advantage of the need to replace aging equipment and install high-efficiency electric systems such as heat pumps. This decision will be made for thousands of properties serving millions of residents within the next five to ten years.

The state has recognized this challenge, and there is movement among policymakers, investors, and developers to address it. For example, \$250 million were set aside in the governor's housing plan for the Climate Friendly Homes Fund (CFHF), which aims to finance the electrification of 10,000 units of multifamily housing through grant-like loans.<sup>6</sup> The goal of the program is to generate proofs of concept, collect data, and raise awareness. The public and private investment necessary to finance the full transition will be a multiple of \$250 million.

This report begins by sizing the overall 5- to 50-unit property market. We use the 2020 American Community Survey (ACS), the 2021 New York City Housing and Vacancy Survey, the NYU Furman Center's CoreData.nyc data, the 2020 Residential Energy Consumption Survey (RECS), and the 2022 Primary Land Use Tax Lot Output (PLUTO) data to examine the geographic distribution, demographic makeup, and heating sources of these properties. We then discuss challenges and opportunities using information gathered through multiple interviews and a roundtable with stakeholders across the industry, including representatives from multiple government agencies,

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<sup>5</sup> See Data Appendix for detailed explanation of how LMI status is determined.

<sup>6</sup> Climate Friendly Homes Fund. [https://communitytp.com/wp-content/uploads/2023/02/Climate-Friendly-Homes-Fund\\_Program-Summary.pdf](https://communitytp.com/wp-content/uploads/2023/02/Climate-Friendly-Homes-Fund_Program-Summary.pdf)

small-property owners, lenders, and developers. We conclude by highlighting examples of existing programs for electrification.

## Sizing the Issue

The property market in New York is diverse, ranging from single-family detached homes to large multifamily apartment buildings with hundreds of units. The 5- to 50-unit subset is a considerable share of this universe. According to the American Community Survey, there are over 100,000 such buildings containing more than 1.45 million units—nearly a fifth of the total units in the state.<sup>7</sup>

**Almost 1 out of every 5 units in New York is in a building with 5 to 50 units**



These properties are not geographically confined. While they are often found in the New York City area, there are nonetheless over 41,000 such buildings outside of New York City, and these contain over 440,000 units.

In New York City, an important category of these properties is those that have rent-stabilized units. According to the New York City Housing and Vacancy Survey, there are over 530,000 rent-stabilized units in this building type,<sup>8</sup> and we estimate that these units are distributed across at least 32,000 properties in the city, though the true number is likely much higher.<sup>9</sup>

Another important subset of these properties, often serving the lowest-income households, is regulated affordable properties—those directly subsidized by the federal, state, or city government. Using the NYU Furman Center’s CoreData.nyc data, we estimate that there are over 8,500 subsidized 5- to 50-unit buildings containing over 140,000 units in New York City. Outside of New York City, we are only able to estimate the number of federally subsidized properties. Using data from the National Housing Preservation Database and the Department of Housing and Urban Development’s Low-Income Housing Tax Credit (LIHTC) portal, we estimate that there are at least

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<sup>7</sup> The American Community Survey categorizes buildings as 5 to 9 units on the low end of the 5 to 50 range, and 20 to 49 units on the high end. Thus, these estimates are for 5- to 49-unit buildings.

<sup>8</sup> The New York City Housing and Vacancy Survey categorizes buildings as 4 to 5 units on the low end of the 5 to 50 range and 20 to 49 on the high end. Thus, these estimates are for 4- to 49-unit buildings.

<sup>9</sup> This number is likely higher given that buildings can have a mix of stabilized and non-stabilized units. Our estimate of properties assumes that all stabilized units are in buildings that are fully stabilized. See the Data Appendix for more on this issue.

1,400 federally regulated affordable 5- to 50-unit properties outside of New York City, which contain over 37,000 units.<sup>10</sup>

Many federal and state subsidy programs have expiration dates when the affordability requirements associated with the subsidy end. In New York City alone, there are over 3,700 5- to 50-unit buildings whose affordability requirements will end in the next 10 years.<sup>11</sup> These properties house more than 57,000 units. It is more challenging to calculate the number outside of New York City.<sup>12</sup> However, according to the National Housing Preservation Database, there are at least 489 federally regulated 5- to 50-unit buildings containing over 11,000 units that have affordability agreements that will expire in the next 10 years outside of New York City. While the loss of affordability agreements might present a challenge, stakeholders suggested that it also provides an opportunity. For example, they explained that the expiration of property-level affordability requirements can coincide with or lead owners to refinance. One of the uses of funds from that capital event could be electrification.

While this demonstrates that there is a meaningful number of subsidized 5- to 50-unit properties, a considerable share of which have expiring affordability requirements, the vast majority of units that house LMI households in 5- to 50-unit properties are not federally subsidized.

Turning to the families who live in 5- to 50-unit properties, they are disproportionately low to moderate income (LMI). According to the American Community Survey, almost 70% of households in 5- to 50-unit properties are LMI, compared to just under 40% for single-family homes.

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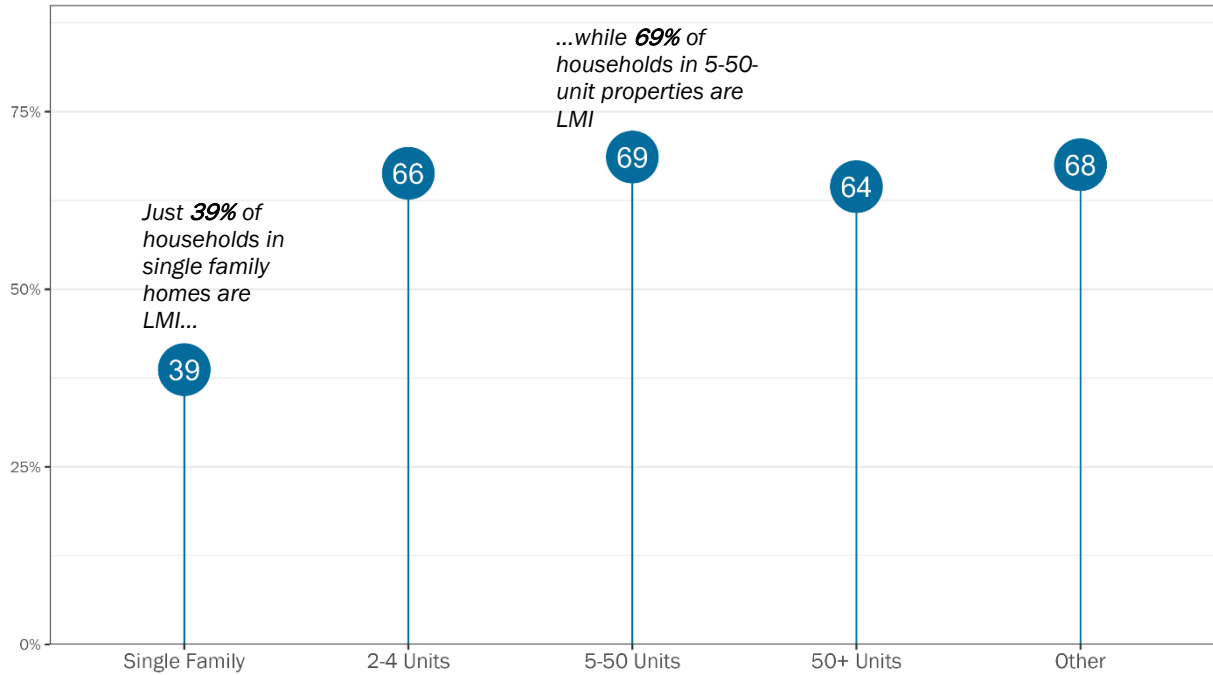
<sup>10</sup> This does not include state or local subsidy programs, such as 421a or J-51, and thus is an undercount of the full subsidized housing stock in New York State.

<sup>11</sup> These data are derived from the NYU Furman Center's CoreData.nyc (<https://furmancenter.org/coredata/userguide/getting-started>). See the Data Appendix for additional details.

<sup>12</sup> First, we only have data on federal subsidies outside of New York City, not state or local subsidies. Second, the Department of Housing and Urban Development's Low-Income Housing Tax Credit (LIHTC) data do not have an expiration date column. Thus, we must use the National Housing Preservation Database for LIHTC in this calculation, which is not as comprehensive as the HUD data.

## Share of Households are LMI by Housing Type

Households that are low to moderate income in given housing types (%)

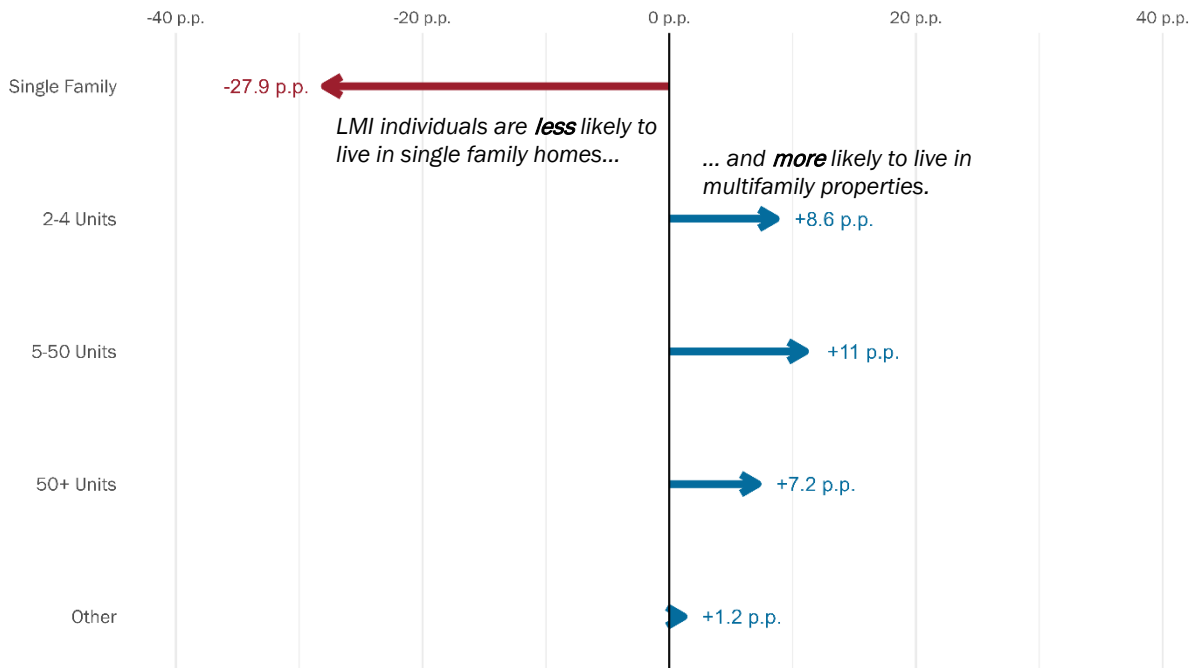


Source: Authors' calculations. Data from 2020 American Community Survey, IPUMS USA PUMA to MSA crosswalk, HUD Section 8 Income Limits.

Similarly, LMI households are more likely to reside in multifamily properties. They are 11.4 percentage points more likely to live in 5- to 50-unit properties compared to their non-LMI counterparts.

## Where do Low- to Moderate-Income Households More Commonly Live?

Difference between proportion of LMI households living in given buildings versus non-LMI households (percentage point difference)



Source: Authors' calculations. Data from 2020 American Community Survey, IPUMS USA PUMA to MSA crosswalk, HUD Section 8 Income Limits.

Overall, more than 2 million LMI individuals live in 5- to 50-unit properties, which is over 20% of all LMI people in the state. Once again, this phenomenon is not confined to NYC; over 500,000 of these LMI individuals live in 5- to 50-unit buildings that are located outside of NYC.

The key focus of this report is the share of these units that will need to be electrified. Using the American Community Survey, we estimate that over 1 million households live in 5- to 50-unit buildings that use natural gas, fuel oil, or other non-electric heating sources.<sup>13</sup> We estimate that this number of households translates to nearly 75,000 5- to 50-unit buildings that will need to have their heating systems electrified.<sup>14</sup> Beyond heating, approximately two-thirds of households in 5+-unit buildings use greenhouse-gas-emitting domestic water heating systems, and nearly three-quarters use natural gas for cooking, according to the 2020 Residential Energy Consumption Survey.<sup>15</sup>

<sup>13</sup> Even for the 270,000 households that live in units heated by electricity, many of the units use inefficient electric resistance heat rather than heat pumps and will need to upgrade their systems in order to comply with state and local mandates.

<sup>14</sup> See the Data Appendix for a full explanation of how this number is estimated.

<sup>15</sup> When using the Residential Energy Consumption Survey, we are unable to filter by 5- to 50-unit buildings. The closest category the survey has is 5+-unit properties.



While these numbers are daunting, there is opportunity. Buildings with 5 to 50 units disproportionately use older equipment for space and water heating. We estimate that over 1 million households that live in 5+-unit buildings are served by central furnaces or steam boilers that are over 20 years old. In other words, over half the units in 5+-unit buildings that will need to be electrified are served by heating equipment that is over 20 years old. This number jumps to two-thirds of units, over 1.3 million in total, when including equipment that is over 15 years old. Similarly, nearly 600,000 households in such buildings are served by non-electric domestic hot water systems that are over 20 years old.<sup>16</sup>

These numbers indicate that many if not most of the small to midsize properties that need to electrify are currently using equipment that is nearing the end of its useful life.<sup>17</sup> This lowers the relative cost of electrifying; rather than replacing functional equipment that has some useful life remaining, owners would simply need to choose to replace their aging equipment with electric heating rather than another greenhouse-gas-emitting system. As of now, replacement-in-kind is the norm; so owners would need some sort of incentive to choose electric systems. This could be a positive incentive or a negative incentive. A positive incentive could be improved financial performance resulting from value streams unique to high-performance electrified buildings. A negative incentive might look like the upcoming ban on new gas hookups in new construction that will begin in 2026.<sup>18</sup>

Overall, units in 5- to 50-unit properties make up nearly a fifth of the housing stock in New York State, house a considerable share of the state's low- to moderate-income households, and are heated by equipment that is nearing the end of its useful life and prime for replacement. In order to achieve New York State's climate goals, and in order to ensure an equitable transition, these properties will need to electrify in the coming years. However, these properties face unique challenges.

## Challenges

### Lack of awareness, experience, and capacity

As with any property-level project, the final decision on whether to electrify a building ultimately rests in the hands of the property owner. This presents a particular challenge when it comes to

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<sup>16</sup> These estimates include households living in buildings with more than 50 units.

<sup>17</sup> From Fridge to Roof, How Long You Can Expect 10 Major Home Components to Last. <https://money.usnews.com/money/personal-finance/family-finance/articles/how-long-can-you-expect-your-roof-or-fridge-to-last>

<sup>18</sup> What to Know About NY's Ban on Gas Hookups in New Homes, Apartments. <https://gothamist.com/news/what-to-know-about-nys-ban-on-gas-hookups-in-new-homes-apartments>

electrifying 5- to 50-unit properties. Such properties have smaller owners, oftentimes families that own just one building or that manage three or four at most. Unlike owners of large properties, owners of smaller buildings often lack dedicated teams for specific tasks. Instead, the owners themselves run the operation, with the help of a small general staff or even their own family members.

Without dedicated staff or explicit sustainability goals, which larger owners often have, the owners of these smaller properties are less likely to know about electrification or have the capacity to pursue it compared to larger ones. In addition, they rarely have the knowledge, capacity, or incentive to actively seek out financing for electrification measures.

In theory, this obstacle could be overcome if other actors in the market—such as financial institutions and state agencies—take the initiative and reach out to the owners. However, both lenders and the state face difficulties connecting with the owners of these properties. Lenders have less frequent and deeply established connections with smaller property owners, who generally own a few buildings at most and do not frequently refinance or take out new loans. For state agencies, many of these properties are not rent regulated or regulated affordable buildings, and thus have fewer touch points with the state. In addition, the owners are often less familiar with how to work with the state compared to large owners and, in some instances, are skeptical of state involvement and directives in general.

Even to the extent that owners do know about available grants and products for electrification, stakeholders and small landlords explained that they are far more focused on pressing issues such as basic maintenance and repair. Compared to fixing a leaky roof or replacing a broken appliance, electrification is usually last on a long list of priorities for small to midsize owners, who do not feel that they have the bandwidth to add yet another task, let alone a task as involved and as costly as electrification. Once again, the lack of a dedicated staff compounds this issue.

## Monetary challenges

On a per-unit basis, deep energy retrofits that include electrical system upgrades, efficiency measures, and electrification can cost as much as or more than \$100K per unit, meaning considerable capital is required to electrify. Sourcing those funds can be challenging for these owners, as they may not have capital reserves and cannot self-fund the retrofits.

Taking out loans would be one alternative to self-funding. However, financing electrification is uniquely challenging. Unlike energy efficiency measures such as improved insulation or high-efficiency appliances, which may pay for themselves, electrification can increase a property's utility

expenses due to the cost of electricity in New York and the current utility rate structure. Increased property-level expenses would mean that banks cannot underwrite to savings when considering loans for electrification.

Even if banks were able to overlook the reduced cash flow, many 5- to 50-unit properties are already at the maximum leverage allowable under their financial covenants. Existing lenders on these properties would also have to waive any restrictions on additional indebtedness at the property or sponsor level. While owners of non-regulated properties could in theory raise rents to circumvent these challenges, market conditions do not always allow for that. Regulated properties do not have such an option at all, and many buildings contain rent-stabilized units on which the owners cannot raise the rent. Thus, many of these properties could not take on supplemental debt to fund retrofits even if the lender were willing to make such a loan.

In addition, the small size of the properties and the fact that the owner usually owns no more than a few buildings mean that, even if a property could obtain financing, transaction costs would be high. Not only would transaction costs be high, but every additional dollar in cost would also be proportionally more burdensome to these smaller owners.

### Government bureaucracy, lack of agility

A lack of financing could be ameliorated by government incentives and funding. However, as currently structured, government programs aimed at electrification and retrofits do not work well for 5- to 50-unit properties.

The process to apply for and receive such funding is arduous even for experienced property owners. The applications are complicated, lengthy, and include requirements around auditing, installation, and income verification. Without dedicated staff or experience navigating the process, the administrative costs of applying for these programs can quickly balloon, often becoming greater than the funding provided by the program itself.

One way to overcome this would be to blend multiple programs together. For example, blending a heat pump rebate with an energy efficiency grant could make a project pencil out. However, such blending is difficult. The agencies that administer these programs often do not coordinate, and the funding cannot be easily combined in many cases. Sometimes different funding streams cannot be combined at all. For example, funding for home improvement oftentimes cannot be used on electrification measures.

A final barrier when it comes to the use of government incentives is that owners of properties that are not currently regulated affordable fear that the properties will become regulated if they access

state or city funding. This fear is not unfounded; some programs do require that properties become regulated. For example, this has been identified as a roadblock for the Green Housing Preservation Program administered by Housing Preservation and Development. Relatedly, owners of regulated affordable properties are hesitant given that the properties would likely need to go through a lengthy and potentially costly rent restructuring following electrification due to the higher utility costs that could result.

## Complexity and uncertainty

The above challenges are already prohibitive for most properties. But even if a property owner could overcome them and successfully obtain financing for an electrification retrofit, the retrofitting process itself is complicated and challenging. Construction management, benchmarking and reporting requirements, and ongoing maintenance all pose challenges for small-property owners who are already stretched thin.

In addition, there are a host of technical challenges. While it is outside the scope of this report to lay them out in detail, they include assessing the space around the building for equipment, a need for hot water storage in buildings to maximize the effectiveness of heat pumps, and a need for 240-volt outlets where 120-volt outlets are currently the norm. These are just a sample of the myriad technical challenges that arise during retrofits. While a large development may have the capacity to assess and overcome these challenges, most 5- to 50-unit buildings do not.

There is also a dearth of qualified installers and contractors who can complete these retrofits. This challenge is especially acute for 5- to 50-unit properties. Even to the extent that contractors are available, there are generally two types: small family-owned contractors who want to stay small and large commercial contractors. Small firms have little interest in working with 5- to 50-unit properties. Such buildings are larger than what these firms typically work on and entail more administrative work than what they are accustomed to. On the other side of the spectrum, large commercial contractors look for sizable deals that include large properties and/or many buildings. Their work does not pencil out without scale. They are less interested in working with 5- to 50-unit properties due to their relatively small size and correspondingly high transaction costs. In the end, 5- to 50-unit properties are too large for small family-owned contractors and too small for large commercial installers.

## Inefficiencies in market for retrofits

While the problem is not exclusive to 5- to 50-unit properties, some stakeholders have described the construction provider market for retrofits as broken, and this issue has outsized effects on small to midsize properties. There are four main reasons for the inefficiencies in this market.

### Improper risk allocation

First, there is improper risk allocation in the installation market. Providers can simply pass risk on to the owners, including the uncertainty of whether the new technology will work properly, known as performance risk. This makes owners hesitant to commit to any upgrades where they own the performance risk of components and technologies that they do not fully understand and with benefits that they do not know how to price. Beyond performance risk, there is the equally pressing concern, expressed by many owners, that the new equipment will become obsolete or not meet state guidelines shortly after installation.<sup>19</sup> In this uncertain environment, no owner wants to be the “first mover” and incur the risk that the technology fails or does not meet state standards.<sup>20</sup> This is especially true for owners of small properties, who have virtually no margin for error.

### Information asymmetry

Second, there is an information asymmetry whereby the providers know more about the retrofit than the owners. This information gap is acute for small to midsize property owners who lack dedicated teams and are often already at their maximum capacity. This has led to higher prices and could lead to a “market for lemons”<sup>21</sup> or an adverse selection situation.

In terms of higher prices, the information asymmetry whereby providers have access to more and higher-quality information increases their pricing power. The resulting high prices and pricing unpredictability can undermine the economics of a project.

In terms of adverse selection, owners are often unsure of how to assess the quality and credibility of a provider. Given that uncertainty, they could have an incentive to only pay just enough to hedge against the risk of an unscrupulous or unqualified provider, and this price would fall somewhere between the actual cost of a qualified provider and an unqualified one. This lower price could drive qualified providers out of the market and increase the proportion of lower-quality providers, which,

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<sup>19</sup> This could be ameliorated by the state certifying certain equipment and ensuring that it will qualify regardless of future policy changes.

<sup>20</sup> The rapid growth in the sales of heat pumps might alleviate some of these first mover fears; heat pump purchases outpaced gas furnace purchases in 2022. <https://www.iea.org/commentaries/global-heat-pump-sales-continue-double-digit-growth>

<sup>21</sup> Akerlof, G. A. (1970). The Market for “Lemons”: Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, 84(3), 488–500. <https://doi.org/10.2307/1879431>

in turn, would further reduce the price that owners would be willing to pay. While not the case today, this feedback loop could hypothetically continue until, in the most extreme form, only unqualified providers remain and owners are willing to pay very little.

### **Improperly priced value streams**

Third, the value streams from electrification are improperly priced. While electrification generates positive externalities such as reduced carbon emissions, the property owners do not see their cash flow improve as a result. When the benefits of a decision (in this case electrification) do not accrue to the decision maker (property owners), there is underproduction (a lack of retrofits).

### **Lack of standardized/off-the-shelf solutions**

Finally, there is a lack of a standardized or productized solution, or what some call the “from scratch problem.” This captures the fact that each time a building owner goes to a provider for an electrification retrofit, there is no productized/package solution. Everything is done essentially from scratch: the providers create an individual scoping plan, they call around for vendors to get prices, and they generally behave as though it is the first time such a retrofit has been done. This incurs costs to the project that could be avoided with the development of standardized solutions and teams ready to install them.

Together, these four factors make the market for retrofits inefficient and cause an “underproduction” of electrification upgrades. They also cause providers to under-invest in their processes and products.

## **Non-electrification challenges**

While they are not the focus of this report, it is worth noting that even outside of the challenges specific to electrification, there are myriad challenges that all properties are facing, especially 5- to 50-unit ones. Small to midsize property owners point to rising prices on every front: the cost of complying with regulations, insurance, taxes, interest rates, labor, unit remediation costs, and materials. On the other side of the ledger, they point to lagging revenue; an elevated number of vacancies and a high rate of non-payment of rent persist even after the COVID-19 crisis. All of this is compounded by the old age and oftentimes poor structural quality of these properties.

# Opportunities

Despite these challenges, stakeholders expressed confidence that certain steps could be taken to bring the electrification of these properties closer to business as usual, as outlined in the table below.

BARRIERS	SOLUTIONS
Monetary challenges	<ul style="list-style-type: none"> <li>• Make electrification confer cash flow benefit</li> <li>• Develop secondary debt product</li> <li>• Increase predevelopment lending</li> <li>• Utilize on-bill financing</li> <li>• Increase support from large financial institutions</li> <li>• Transfer performance risk away from owners</li> </ul>
Insufficient government incentives	<ul style="list-style-type: none"> <li>• Streamline and improve existing incentive programs</li> <li>• Simplify income verification</li> <li>• Allow blending of programs</li> <li>• Create additional incentives</li> </ul>
Difficulty of electrifying <ul style="list-style-type: none"> <li>• Lack of owner awareness, experience, capacity</li> <li>• Complexity, uncertainty</li> </ul>	<ul style="list-style-type: none"> <li>• Generate proofs of concept</li> <li>• Expand access to technical assistance, education</li> </ul>
Inefficiencies in market for retrofits <ul style="list-style-type: none"> <li>• Improper risk allocation</li> <li>• Information asymmetry</li> <li>• Improperly priced value streams</li> <li>• Lack of standardized solutions</li> </ul>	<ul style="list-style-type: none"> <li>• Develop insurance market for retrofits, performance risk</li> <li>• Develop aggregator model</li> <li>• Internalize positive externalities to confer monetary benefit</li> <li>• Have financiers require fast price discovery</li> </ul>

## Increase funding

Given the high cost of electrification and the thin margins, lack of reserves, and expensive capital that owners of 5- to 50-unit properties face, additional sources of low- or no-cost funding are a key leverage point.

### Make electrification confer a cash flow benefit

First, before owners will even consider accessing financing to electrify, they need to anticipate a positive monetary impact from electrification (short of the state imposing an electrification mandate). Similarly, given that 5- to 50-unit properties are already facing tight margins and are frequently at maximum leverage, lenders need to anticipate that properties will generate sufficient cash flow post-electrification to support additional debt. In short, electrification would need to confer some cash flow benefit to make owners willing to retrofit buildings and to make lenders willing to finance such projects. However, due to the high cost of electricity compared to natural

gas in New York State as of 2023, electrification does not consistently reduce energy costs. Thus, there is a need for a cash flow incentive.

Stakeholders, including developers, owners, and financial institutions, emphasized the impact that a tax credit, abatement, and/or exemption would have. One recommendation was to renew the currently expired J-51 exemption and add a sustainability component. Until its expiration in 2022, J-51 was a program that granted both an exemption from increases in real estate taxes resulting from qualified work on multifamily properties and an abatement of up to 8.3% or 12.5% of the cost of the work.<sup>22</sup> Stakeholders suggested that this benefit could be renewed, with either a requirement that renovations include electrification work in order to access the benefit, or, less restrictively, with additional benefits if such electrification work is completed.

Stakeholders also pointed to bills proposed at the state level as examples of what could be done. One example was S943A, which would have created (1) a tax exemption equal to any increase in assessed value for eligible capital improvements aimed at reducing carbon emissions and (2) a tax abatement equal to a share of the cost of the eligible improvement, increasing in value based on the reduction in emissions brought about by the retrofit.<sup>23</sup> This incentive or a renewed J-51 with a sustainability component would be a powerful tool to make electrification retrofits pencil out for small to midsize properties.

Another way to improve cash flow post-retrofit for 5- to 50-unit properties would be a utility break, at least for early adopters. A utility rate set for early adopters at a low fixed rate for 10 years, for example, would provide something that lenders could underwrite to. This is not unprecedented; one stakeholder explained that, at one point, there was a special rate for buildings that used electric heating. Renewing and revamping such a program would be a strong incentive for all building owners, but especially owners of 5- to 50-unit properties. Another option would be to allow electrified and efficient properties to access programs like National Grid's demand response program, which provides a monetary benefit to buildings that reduce energy use when the grid is strained.

Pricing emissions is another opportunity to increase cash flow. While electrification does not consistently reduce utility costs, it does reduce emissions. Thus, if there were a way to monetize reductions in emissions, electrification could generate additional cash flow that lenders could

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<sup>22</sup> J-51 Tax Incentive (J-51). [https://furmancenter.org/coredata/directory/entry/j-51-tax-incentive#:~:text=J%2D51%20Tax%20Incentive%20\(J%2D51\)&text=Affordable%20housing%20projects%20generally%20get,for%20up%20to%2020%20years](https://furmancenter.org/coredata/directory/entry/j-51-tax-incentive#:~:text=J%2D51%20Tax%20Incentive%20(J%2D51)&text=Affordable%20housing%20projects%20generally%20get,for%20up%20to%2020%20years)

<sup>23</sup> Senate Bill S943A.

<https://www.nysenate.gov/legislation/bills/2023/S943/amendment/A#:~:text=2023%2DS943%20%2D%20Summary,approve%20the%20abatements%20and%20exemptions>



underwrite to. Stakeholders suggested that this could be accomplished by fining emissions over a certain limit (as Local Law 97 does), through a cap-and-trade program, or through a tax on emissions.

To capture health benefits, stakeholders recommended pairing public healthcare dollars with energy efficiency funding. This would allow owners to monetize the health co-benefits of electrification. As an example, the New York State Energy Research and Development Authority (NYSERDA) and the New York State Department of Health are currently undertaking the NYS Healthy Homes Value-Based Payment Pilot. This pilot is focused on developing a framework that allows New York’s managed-care organizations to fund residential “healthy homes” interventions as part of their value-based payment arrangements with healthcare providers within the Medicaid healthcare delivery system.<sup>24</sup> This falls more on the funding side rather than on the cash flow side, but programs could be developed to create a cash flow stream funded by health benefits.

### **Secondary debt product**

Once owners have a monetary incentive to retrofit, the next question becomes how and where they will access the financing. For large properties, their size and resulting economies of scale means that there is less need for their primary debt to be streamlined. For these properties, an electrification component could be added to their primary debt without upsetting the economics of the deal.

This is not the case for 5- to 50-unit properties, which receive relatively smaller loans, usually in the range of \$1 million to \$5 million. For the primary debt on these properties, there is and must be considerable scale in the mortgage market to ensure that rates are low enough for the borrowers while also ensuring that lenders make sufficient return to encourage them to lend. This means that the process for obtaining primary debt is and must be quick and streamlined, closer to the market for single-family homes rather than conventional large multifamily developments. This is especially the case if the loan is to be sold to a government-sponsored enterprise. Adding an electrification component to this streamlined primary financing could make the process slower, less efficient, and thus less scalable. Without speed and scale, such loans will not be made at all.

Stakeholders suggested that a secondary debt product could be used to resolve this issue, rather than financing electrification through primary debt. Primary financing would stay largely

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<sup>24</sup> Sustainable Affordable Housing: Strategies for Financing an Inclusive Energy Transition.  
<https://www.newyorkfed.org/medialibrary/media/outreach-and-education/community-development/fed-affordable-housing-and-energy-transition-final-10-4-22>

unchanged, except for additional documentation specifying that secondary financing for electrification in the future is permissible.

Developing such a product is easier said than done. As described above, before anything else, owners must have an incentive to use the product; electrification would need to confer some benefit, which could come in the form of increased property values, lower insurance premiums, reduced utility costs, government incentives, or some combination thereof. Additionally, there is the question of which actor would create the product. Potential actors include the government, philanthropy, impact investors, the private market, or a mix of each.

Beyond the question of who, developing such a product involves a set of other challenges that are highlighted by the struggles that the Commercial Property Assessed Clean Energy (C-PACE) program has faced in New York. The PACE program provides low-cost financing to property owners to make energy efficiency and renewable energy upgrades and allows owners to pay back the costs over time through their property tax bill. Despite the potential of the program and the abundance of PACE lenders, PACE has barely penetrated the multifamily market in New York. This is the result of two main issues. First, senior debt providers are hesitant to give consent for PACE debt to be added to the properties for which they own the first mortgages, due to concerns over the lien priority and lack of control over the underwriting process for mid-cycle debt. Second, and largely as a result of this first issue, the market for PACE financing remains underdeveloped and inefficient in New York. This leads to interest rates that are somewhat higher than those on first mortgage debt. For smaller properties, it therefore makes more sense to borrow at that lower rate rather than to tap into PACE.

The fact that, despite these challenges, stakeholders nonetheless consistently pointed to the need for a low-cost form of secondary debt that small to midsize properties could access for electrification demonstrates the power that such a solution would have. It would allow primary financing to remain untouched and would provide desperately needed upfront capital to borrowers who are typically not well capitalized.

To reach the potential expressed by stakeholders, the product would need to overcome the challenges facing the PACE program. First, such a product would need to be subordinate to the first mortgage, first mortgage holders would need to agree to consent to it (for example, mortgage documents could acknowledge the requirement to electrify and explicitly note that the first lender will provide consent to new debt under given underwriting parameters), or first mortgage holders would themselves need to be the providers of the supplemental product and make it *pari-passu* or fully subordinate to the existing first mortgage. Second, the market for this product would need to

be efficient and streamlined in order to ensure competitive rates. Alternatively, some mechanism such as state support or impact investing could help keep rates low.

### **Predevelopment and pre-project lending**

Even when otherwise feasible, electrification projects can have long lead times, up-front expenses, and require detailed planning, studies, consulting, and other soft costs before the project can begin. For example, stakeholders explained that, for existing buildings, owners need to collect and analyze data on historical operations, conduct an energy audit, and model energy savings based on proposed measures. While not exclusive of other work, this undertaking can add to the time and cost of a retrofit.

As one stakeholder explained, the exact cost of these steps varies by property (size, location, building type), by project type (retrofit vs. new development), and by the standard being built to. For an example of the importance of location, they explained that analysis and audit work is typically less costly in New York City due to more consistent and higher-quality data on consumption, cost, and performance.

In general, stakeholders estimated that early-stage engineering, architectural work, permitting, auditing, scoping, and other such expenses can come to around 3% to 5% of total project costs for a retrofit of an existing building.<sup>25,26</sup> That said, some stakeholders caveated this by explaining that experienced and organized owners may be able to reduce that cost to as little as 1%.

While the owners of larger properties may be able to front these costs, owners of 5- to 50-unit buildings are unable to front their already scarce and expensive capital. This means that a key lever for ensuring that small to midsize properties can electrify is to ensure that ample predevelopment capital is available. One stakeholder explained that for every electrification project they have completed, such capital was pivotal.

This stakeholder further explained that a challenge with predevelopment capital is that it is generally short term (repaid by construction or permanent loans), relatively small compared to the size of the full project, and somewhat riskier given that it is not secured by a completed building. Traditional commercial lenders look for loans that are longer term, larger, and less risky. According to stakeholders, this mismatch means that mission-focused lenders are well positioned to fill the

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<sup>25</sup> For an example of a large project, the redevelopment of the Greenpoint Hospital campus in Brooklyn is illustrative, with the predevelopment loan totaling around 3.2% of the total project cost. <https://nyceec.com/deal-spotlight/greenpoint-hospital/>

<sup>26</sup> For new construction, predevelopment often looks similar for electric and non-electric properties. However, this depends on the standard being built to. For example, building to Passive House standards can entail more predevelopment activities and more in-depth and expensive modeling. [https://passivehouse-international.org/index.php?page\\_id=150](https://passivehouse-international.org/index.php?page_id=150)

gap for predevelopment capital. Organizations such as green banks, community development financial institutions (CDFIs), community development credit unions, impact investors, government agencies, and the CRA-focused areas of banks will all be necessary to fill this gap.

To ensure that such capital is affordable, especially for 5- to 50-unit properties serving LMI households, stakeholders explained that there will likely need to be subsidies or incentives. For example, government agencies could provide cash incentives that are paid out once the loan is repaid (to ensure responsible underwriting). Alternatively, or in conjunction with such a program, the public sector, non-profits, philanthropy, or impact investors could provide credit enhancements for such lending.

In addition to the need to increase the supply of predevelopment capital, stakeholders stressed that the process of accessing and deploying such funding must be made simpler, more efficient, and less costly. Smaller-property owners simply do not have the capacity to deal with drawn-out procedures and delays. However, as of now, the scoping plan, price discovery, and other predevelopment steps can stretch the timeline from when owners begin to consider electrification to when they can get numbers and prices on the retrofit from at least four to five months to as much as a year. Stakeholders explained that for electrification to be widespread, the process should take just weeks or even a few days. Packaged solutions and building an evidence base through case studies, explained in detail below, will be crucial for achieving this.

### **On-bill financing**

Stakeholders raised on-bill financing as one lever that may be particularly useful for 5- to 50-unit properties. While different states and localities structure on-bill financing programs differently, the overall concept is that customers have energy efficiency or electrification upgrades installed at no upfront cost and then pay for the improvements through a charge on their utility bill. For example, New York State's On-Bill Recovery Financing Program provides low-interest loans used for energy efficiency improvements that owners repay through an additional charge on their utilities.<sup>27</sup>

Programs like this one are especially helpful for owners of small to midsize properties because they extend the repayment period, require no upfront capital, and do not compete with other debt on the property (such as a first mortgage). They can also present energy and cost savings insofar as the financed improvements reduce utility bills by a greater amount than the additional charge added to the utility bill for repayment.

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<sup>27</sup> On-Bill Recovery Financing Program Frequently Asked Questions. <https://www.nyserda.ny.gov/All-Programs/Small-Business-Financing-Program/FAQ>

## **Involve larger financial institutions**

Stakeholders strongly emphasized that no matter how many incentives are offered, subsidies are provided, or other funding levers are pulled, until the largest financial institutions begin putting their weight behind electrification, mass scale cannot be achieved. They emphasized that larger financial institutions could meet their existing net zero commitments<sup>28</sup> by providing lower-cost capital, extending amortizations, and/or committing to provide affordable electrification financing to properties in their portfolios. While the work of non-profits, CDFIs, and green banks has been important, in order to make electrification business as usual, the largest banks must get off the sidelines, meet their commitments, and put their money to work.

Stakeholders suggested that one way to give these institutions an incentive would be to use New York State Community Reinvestment Act credit. The Department of Financial Services already gives “favorable CRA consideration” to banks that engage in financing projects that “reduce or prevent the emission of greenhouse gases.”<sup>29</sup> This could be used to encourage banks to meet their stated commitments by investing in the electrification of small to midsize properties. Housing finance experts suggested that those who purchase such loans could also get credit, which would increase the impact by bringing additional lenders into the space.

## **Streamline incentive programs; simplify regulation**

In general, the process to apply for and obtain support from state and local programs is arduous, time-consuming, and expensive. This difficulty is compounded when an owner must use multiple programs— if blending is even permitted. For cash-limited 5- to 50-unit properties, which typically have small and at-capacity staffs, taking advantage of these programs is, at best, not the path of least resistance. Stakeholders thus stressed repeatedly that from top to bottom and across all programs, applications should be simplified to the extent possible, programs should be made more flexible, and programs should be optimized so that they can be blended at the project level.

## **Simplify income verification**

Stakeholders provided specific examples of changes they felt would be particularly impactful. One example was to streamline affordability checks for incentive programs. For many programs, owners must conduct tenant-by-tenant income verification. This is challenging for owners, since it requires that they ask for sensitive information such as Social Security numbers and pay stubs. Even when tenants are willing to comply, collecting all the information is time-consuming and difficult. It is an

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<sup>28</sup> Beyond Commitments: Reaching Net Zero Targets in the US Banking Sector. <https://www.erm.com/insights/beyond-commitments-reaching-net-zero-in-the-us-banking-sector/>

<sup>29</sup> Summary of CRA Opinion Letters [https://www.dfs.ny.gov/apps\\_and\\_licensing/banks\\_and\\_trusts/cra\\_opinions](https://www.dfs.ny.gov/apps_and_licensing/banks_and_trusts/cra_opinions)

order of magnitude more difficult when tenants do not trust the owner with such information or do not want the improvements done at all. Even if an owner can collect the information, there is a chilling effect; no owner wants to spend the time and money to collect the information and then find out that they are just under the eligibility threshold to qualify for a program. Thus, many owners choose not to apply. A solution that the New York State Low-Income Energy Task Force is considering is to create a single database that pools information that state agencies already have in order to determine the eligibility of tenants in given buildings. This way, an owner could simply apply for a given incentive, the administering agency would check the tenants against the database, and eligibility would be determined. According to stakeholders, this would represent an enormous savings in time and costs and make owners, especially smaller owners with less capacity, more likely to take advantage of electrification programs.

### **Allow blending of programs**

Another concrete proposal stakeholders put forth was to permit more flexibility and blending of incentive dollars. This means that home renovation and improvement programs should broaden eligible activities to include electrification work, and that electrification incentive programs should allow spending on health and safety measures, such as lead remediation or mold removal, and basic maintenance, such as roof replacements and leak repairs.

For the former, there are existing programs that address home repairs, especially for properties that serve low- and moderate-income households. There is funding from the New York State HOME Program, the Community Development Block Grant program, and the Weatherization Assistance Program, among other sources. While setting up new programs is challenging (though necessary), in some cases new money is not required. Instead, these programs can be enhanced to include both additional funding for and requirements to meet electrification goals, add renewable energy sources, or make energy upgrades.

In the long term, new programs (and the expansion of recently created programs) will be necessary. However, for 5- to 50-unit buildings, new electrification incentive programs are not enticing when there are more pressing unmet needs. For example, many of these properties need health and safety repairs as well as basic maintenance and replacements before electrification can be completed. Such repairs and improvements typically do not qualify as eligible scopes of work for electrification programs, despite being necessary prerequisites for such a retrofit. Thus, stakeholders recommended that existing and future electrification programs include the flexibility to fund basic health and safety building repairs and improvements. Alternatively, properties that

receive electrification funding could be automatically qualified for health and safety programs. Most likely, a blending of these policy adjustments would be necessary.

All of this relates to a key point that stakeholders across the industry highlighted. While electrification should not be delayed until every other property-level project is completed, in order to harness the full value proposition of electrification, it should be bundled with basic maintenance and repair, health and safety investments, and weatherization and energy efficiency upgrades.

## Generate proofs of concept

One challenge that stakeholders raised repeatedly was the uncertainty around retrofitting for electrification and the hesitancy to be a “first mover.” In order to make retrofits economical and reach scale for small to midsize properties, there needs to be a set of clear packaged solutions that property owners can follow depending on their building type. One stakeholder estimated that upward of 80% of affordable buildings could be covered by four or five models. In an ideal world, there would be a standardized set of energy-reduction methods and retrofit steps for each of these models. Owners could determine which model their building most closely mirrors and then simply follow the guidelines for retrofitting that building type (adjusting as necessary for the unique characteristics of their building).

Stakeholders suggested that the agency or actor responsible for administering the funding of retrofits could be the one to develop and offer these “how to” guides. This could be NYSERDA, a CDFI, or some coalition of funding groups. These actors could work together to create several demonstration models that would help owners see various types of sample projects, how to source improvements, and the anticipated benefits of such improvements.

However, proofs of concept are necessary to reach a place where a state agency, non-profit, or other group could develop this set of models with corresponding packaged solutions that building owners could consult. For building owners to learn what measures and steps will be necessary and to build a body of evidence for given building types, a range of buildings will need to go through the retrofit process. In other words, there is a need for early adopters.

In addition to allowing for the creation of such a set of models and packaged solutions, retrofitting a meaningful number of early-adopter 5- to 50-unit buildings would:

- Demonstrate the feasibility and establish the low risk of retrofits, which would provide building owners with confidence in the performance of these still relatively new systems;
- Reveal best practices for installation, financing, equipment, and other key areas for which there are open questions;



- Demonstrate where there might be remaining technological gaps or gaps in financing; and
- Give policymakers, financiers, owners, and other actors clear examples of how electrification works, its benefits, and its challenges.

Stakeholders indicated that NYSERDA programs continue to be pivotal in creating these case studies and examples. They suggested that programs such as Retrofit NY, Buildings of Excellence, and NYS Clean Heat should continue, be expanded, and be optimized with the specific aim of creating models that can be generalized for different building types. In addition, programs such as the Climate Friendly Homes Fund and the Clean Heat for All Challenge, discussed below, aim to provide these early case studies.

### Provide technical assistance, education

As discussed above, small-property owners do not have time to spend weeks, months, or a year investigating the costs and benefits of a retrofit, looking for qualified providers/installers, or applying for several funding sources. To accelerate the process, they need assistance in understanding and accessing predevelopment capital, planning and scoping the retrofit, implementing the upgrades (including finding qualified providers/installers), and conducting ongoing maintenance and management.

However, as of now there is no singular “one stop shop” where these components of retrofitting can be sorted out.<sup>30</sup> To alleviate the burden, stakeholders recommended creating a single resource that would provide guidance on topics including:

- Calculating current emissions and how to reduce them;
- Choosing which measures should be applied;
- Determining cost of upgrading now versus deferring;
- Identifying organizations to connect with in order to stage a financing plan;
- Identifying financial resources and understanding how to access them; and
- Identifying qualified providers for given areas and building types.

One program that approximates this and that could be built upon is the Regional Clean Energy Hubs Program. According to NYSERDA, these clean energy hubs “provide information to individuals...and affordable housing owners about the benefits of the clean energy economy, ways to reduce energy use and costs, and how to make more informed energy decisions.”<sup>31</sup> In addition

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<sup>30</sup> This is not to say no such support exists at all. For example, NYSERDA offers technical assistance through its FlexTech program. It also published the Empire Building Playbook, which provides a process guide for owners of large buildings who are interested in low-carbon retrofits.

<sup>31</sup> Regional Clean Energy Hubs Program. <https://www.nyserd.ny.gov/All-Programs/Regional-Clean-Energy-Hubs>



to the support the hubs already provide, answers to the above questions could be collected, streamlined, and systemized by the state, which would then push them down to these regional hubs to disseminate among owners.

While these hubs are a good starting point, stakeholders noted that those who understand affordable housing finance and those who have hands-on experience with financing and running 5- to 50-unit properties need to be involved with or help train the energy hubs. The hubs need to be able to help owners of affordable 5- to 50-unit properties determine scope, access funding, find providers, and so on. Having hands-on experience doing these steps is crucial. One example of a road map designed by those with experience in affordable housing is the Multifamily Portfolio Carbon Emissions Roadmap Tool, developed by Stewards of Affordable Housing for the Future.<sup>32</sup>

Relatedly, while this report focuses primarily on owners, training and technical assistance must be provided to lenders as well, so that they can understand how to underwrite electrification projects for small-balance properties and how to get the money out the door.

## Address inefficiencies in market for retrofits

While the inefficiencies in the market for construction providers and retrofits affects all buildings, it is especially problematic for 5- to 50-unit properties. As discussed above, there are four principal causes:

1. Improper risk allocation;
2. Information asymmetry;
3. Improperly priced value streams; and
4. Lack of standardized/off-the-shelf solutions.

### Fix improper risk allocation

To address improper risk allocation, stakeholders recommended re-allocating risk from inefficient risk-averse small building owners and their lenders to insurers that can more cost effectively model, price, and spread risk. This can reduce friction between parties, enable more efficient project delivery, reduce transaction costs, and reduce risk premiums. Ultimately, while risk could perhaps be mediated by an insurer, stakeholders suggested that performance should be guaranteed by the provider. The providers have more knowledge and expertise, and carrying the risk of non-performance would give them an incentive to invest in their processes and products.

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<sup>32</sup> The Multifamily Portfolio Carbon Emissions Roadmap Tool. <https://sahfnet.org/resources/multifamily-portfolio-carbon-emissions-roadmap-tool>

### **Fix information asymmetry**

To address the information asymmetry whereby providers know more than owners, stakeholders recommended an “aggregator model.” This is a model wherein a single entity (or a consortium of entities) acts as a sourcing agent and connects a number of similar buildings, creates a scope for all the buildings based on the particular building type, and then bids out the contract for all the buildings to a provider. This model confers several benefits. First, the aggregating entity can focus on obtaining the expertise necessary to properly assess providers and gauge performance risk, which balances the information distribution between owners and providers. Second, it increases owners’ bargaining power, which is important given the relatively low bargaining power small owners typically have. Third, it provides for scale, which both encourages small providers to invest in themselves so they can similarly scale projects and entices large commercial providers that may ignore a retrofit for a single 5- to 50-unit property. Stakeholders envisioned an aggregator that could include a financial solutions company, a consulting firm with expertise in energy retrofits, and a state agency like NYSERDA. For inspiration, stakeholders recommended looking to places like Ithaca, where the city’s intention to purchase electrical appliances in bulk could reduce costs by 30%.<sup>33,34</sup>

### **Fix improperly priced value streams**

To address the “underproduction” of retrofits caused by the inability of owners and lenders to properly price value streams, stakeholders suggested several solutions. Reallocating risk away from the owner and on to insurers was one method stakeholders proposed. This would allow owners and lenders to price anticipated benefits, especially improvements in tenants’ quality of life and the resulting reduction in vacancies and delinquencies, given that insurance could pay out if the benefits did not materialize.

Another method that stakeholders proposed was to put a price on emissions, to establish a cap-and-trade program, or to tax emissions. They felt that this could allow owners to monetize the social and climate benefits of reduced emissions.

As discussed above, there could also be a framework that allows buildings to monetize the health co-benefits of electrification, which is another as-of-now underpriced value stream.

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<sup>33</sup> Ithaca’s Crazy Plan to Be Our First All-Electric City. <https://www.rollingstone.com/politics/politics-features/ithaca-all-electric-carbon-neutral-green-new-deal-1234696466/>

<sup>34</sup> Another example that stakeholders pointed to was Solar United Neighbors. <https://www.solarunitedneighbors.org/about-us/vision-mission/>

This is a non-exhaustive list of potential opportunities to properly price the value streams that electrification creates. Together, quantifying and monetizing previously unrecognized value associated with deep energy retrofits can offset construction costs and unlock additional capital. For example, NYSERDA estimates that for a generic market-rate multifamily building in New York City, monetizing these value streams could contribute to an 18% improvement in annual net operating income. This would have measurable impacts on available financing:

For a typical 34-unit market rate project in NYC, with a total project budget of approximately \$5 million, this could unlock between \$1.0 and \$2.8 million in private financing (approximately \$30,000 per unit at the low end)...<sup>35</sup>

### **Fix lack of standardized/off-the-shelf solutions**

The key solution stakeholders proposed to help address the lack of packaged or productized solutions from providers was to have lenders and financial institutions require that owners quickly obtain a final price from providers. This could be done either by refusing to lend to owners who cannot obtain prices quickly or by adding a surcharge. By requiring this “fast price discovery,” lenders would give building owners an incentive to contract with providers that have more productized/off-the-shelf solutions and who can give price estimates quickly. This, in turn, would give providers an incentive to invest in productizing their solution, which would reduce costs, lower risk, and decrease the time it takes for a given property to retrofit.

## **Make electrification business as usual**

Stakeholders stressed that there is a general need for increased demand and mass adoption. As demand grows and electrification becomes the new normal, costs will come down as best practices are discovered, as the price of equipment such as heat pumps comes down, and as more installers and qualified providers enter the market. In other words, if actors in the space can kick start the market for the necessary components of electrification, it will lead to a self-reinforcing cycle whereby new technology and processes are developed, demand increases, companies move into the space, competition takes hold, and prices come down.

This is especially relevant for 5- to 50-unit buildings. While larger properties may have the capacity or scale to experiment with one-off solutions, small and midsize properties will begin electrifying at scale only if it is a relatively inexpensive and mass-adopted process.

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<sup>35</sup> Financial Products to Unlock The Value of Deep Energy Retrofits: A Feasibility Study (Executive Summary). Obtained from <https://www.nysesda.ny.gov/All-Programs/RetrofitNY-Program/Resources-and-Reports>

# Market-Making Pilots and Initiatives

State, city, and private organizations recognize these challenges and are making efforts to develop case studies, gather evidence, and uncover best practices. Two such programs were elevated by stakeholders: the Climate Friendly Homes Fund and the Clean Heat for All Challenge.

## Climate Friendly Homes Fund

The Climate Friendly Homes Fund (CFHF) is a \$250 million New York State initiative that aims to replace older and less-energy-efficient systems with all-electric, high-performance heating, cooling, and hot water heating systems in multifamily properties serving LMI households. Housed under Homes and Community Renewal (HCR) and administered by the Community Preservation Corporation, the CFHF provides up to \$24,200 per unit (structured as grants or 0% interest forgivable loans) for NYS properties that are:

1. Regulated by HTFC/DHCR/HFA or another public agency; and/or
2. Located in a low-moderate income qualified census tract as defined by the U.S. Department of Housing and Urban Development (HUD); and/or
3. Located in a disadvantaged community as defined in New York State's Climate Leadership and Community Protection Act.<sup>36</sup>

The CFHF's goal is to retrofit at least 10,000 units of multifamily housing in economically disadvantaged communities in the coming years. By doing so, it hopes to build an evidence base, uncover best practices, and spread awareness of the need to electrify and the feasibility of doing so.

The program has a few distinguishing features. First, the funding is specifically mid-cycle financing and cannot be combined with construction financing. The program is not intended to be used for total package renovation, but instead is meant to focus on buildings that are in generally good physical and financial condition, but that need additional capital to finance electrification. That said, some grant funding and rebates can be paired with the financing. This focus ensures that funds are distributed quickly and efficiently by making the process simple and fast.

Second, technical assistance is built directly into the funding. Construction monitoring services, energy auditing, and assessments of property condition are 100% covered for eligible closed projects. Properties are required to sign a restrictive covenant that holds them responsible for the

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<sup>36</sup> Climate Friendly Homes Fund. [https://communitycp.com/wp-content/uploads/2023/02/Climate-Friendly-Homes-Fund\\_Program-Summary.pdf](https://communitycp.com/wp-content/uploads/2023/02/Climate-Friendly-Homes-Fund_Program-Summary.pdf)

maintenance of the systems, compliance with annual program reporting, affirmation of system maintenance including tenant engagement, and notification to HCR in the case of refinance, sale, or material alteration.<sup>37</sup>

Third, the CFHF helps connect owners with NYS Clean Heat-approved installers or NYSERDA-approved contractors. Buildings can use contractors that are not included on these approved lists, but they must be approved by the program.<sup>38</sup> Once approved for this program, such contractors could be used for future funded projects.

The program is intended to be a laboratory. As discussed in the opportunities section, it aims to create case studies, build an evidence base, and uncover best practices for electrifying small to mid-size multifamily properties. In addition, it aims to build awareness among owners of such properties, increase the supply of qualified contractors, and signal to the market that the state is investing in this space and that these properties are a key component in attaining the electrification goals set out by New York State. While 10,000 units are a small portion of the overall market, the lessons learned from these retrofits may help kick start a mass market, which is ultimately necessary for adoption by all owners and operators of multifamily housing across the state.

While stakeholders uniformly praised the initiative, some suggested ways in which similar initiatives could be adjusted in the future. For example, one stakeholder suggested creating similar programs in conjunction with first mortgage financing and tapping major lenders with their vast networks for implementation. Once again, large financial institutions were highlighted as potential movers, motivated by their stated climate objectives.

## Clean Heat for All Challenge

Another relevant program that stakeholders highlighted is the Clean Heat for All Challenge. Initially announced in December 2021, this program is a partnership between the New York City Housing Authority (NYCHA), the New York Power Authority, and NYSERDA. It aims to spur innovation in fossil-fuel-free heating and cooling equipment by positioning NYCHA, and the more than 2,000 residential dwelling buildings in its portfolio, as an early adopter of the technology. It encourages manufacturers to develop a “packaged cold climate heat pump that can be installed through an existing window,” with the promise that winners will be awarded contracts to install the technology

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<sup>37</sup> Climate Friendly Homes Fund. [https://community.com/wp-content/uploads/2023/02/Climate-Friendly-Homes-Fund\\_Program-Summary.pdf](https://community.com/wp-content/uploads/2023/02/Climate-Friendly-Homes-Fund_Program-Summary.pdf)

<sup>38</sup> Climate Friendly Homes Fund – Frequently Asked Questions. [https://community.com/wp-content/uploads/2023/02/Climate-Friendly-Homes-Fund\\_FAQs.pdf](https://community.com/wp-content/uploads/2023/02/Climate-Friendly-Homes-Fund_FAQs.pdf)

in NYCHA buildings.<sup>39</sup> If the technology developed from the challenge works, NYCHA plans to deploy it at over 50,000 apartments in the next 10 years. Essentially, the program leverages NYCHA's purchasing power to give manufacturers an incentive to develop a new product that works for multifamily properties. The ultimate plan is to invest \$263 million in these heat pumps, and in August 2022, an initial \$70 million investment was announced to purchase 30,000 of them.<sup>40</sup>

This program was spurred by the experience that NYCHA had attempting to install split-system heat pumps in a small number of units in a single building. The cost was far above the replace-in-kind cost, it took a considerable amount of time, and it required 5 to 10 in-unit visits, which was impractical and burdensome for the residents. It also required hiring outside plumbers, electricians, and other contractors, which raised costs and slowed down the process.

By contrast, NYCHA has installed 12 of these window heat pumps as a pilot so far, with plans to install an additional 24 in the coming months. The heat pumps themselves cost just \$1,700 to \$2,200, and the installation can be done by in-house maintenance crews in 2 to 3 hours, after just 40 minutes of training. To improve effectiveness, NYCHA is also replacing windows, which increases the rough estimate of per-unit costs to around \$15,000. Even still, this is much lower than the cost of previous retrofits on a per-unit basis.

Given that these heat pumps use considerable amounts of electricity, one challenge that NYCHA has identified is the National Electric Code. Depending on the efficiency of the units, the building type, and the existing system, NYCHA may need to upgrade the electrical systems of some properties. This can increase the per-unit costs to over \$40,000. While high, the cost is still well below the cost of other deep energy retrofits, which have run as high as \$100,000 or more per unit. One way to avoid the need for electrical upgrades would be to make envelope improvements. By increasing insulation in this way, one could use 6,000 BTU heat pumps rather than 9,000 BTU ones, making it much less likely that electrical system upgrades would be necessary. Whether electrical upgrades or building envelope improvements are more cost effective will vary building by building.

Stakeholders highlighted this program as the sort of market-making and proof-of-concept-generating initiative that will bring down the cost of equipment and installation, uncover best

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<sup>39</sup> NYCHA, NYPa and NYSERDA Announce Global Innovation Challenge to Decarbonize NYCHA Buildings Using New Heat Pump Electrification Technologies. <https://www.nypa.gov/news/press-releases/2021/20211220-decarbonize>

<sup>40</sup> Governor Hochul and Mayor Adams Announce \$70 Million Initial Investment to Decarbonize NYCHA Buildings as Part of Clean Heat for All Challenge. <https://www.governor.ny.gov/news/governor-hochul-and-mayor-adams-announce-70-million-initial-investment-decarbonize-nycha>

practices, create examples that owners can follow, and increase confidence in the performance of these technologies. They explained that, by spurring the creation of a mass marketable heat pump solution and by revealing best practices for installation and maintenance, NYCHA will make owners more confident that performance risk is low, that the cost is acceptable, and that there is a road map for how to install such equipment on a practical basis. NYCHA is aware of this benefit and plans to make its findings widely known among other public housing authorities, other cities, and building owners at large.

## Conclusion

To meet the climate goals and mandates laid out by New York State and New York City, buildings will need to electrify. The coming years present an opportunity given that over 1.3 million units in 5+-unit buildings are heated by non-electric equipment that is over 15 years old and thus prime for replacement. However, electrification presents unique challenges for 5- to 50-unit properties, given their tight margins, minimal capital reserves, and lack of economies of scale. To overcome these challenges, stakeholders and experts in the field recommended increasing funding streams, streamlining and improving incentive programs, generating proofs of concept, increasing access to technical assistance and education, and creating a better structured market for retrofit providers.

## Data Appendix

### Quantitative data sources

To estimate the number of units by building type and the number of buildings, we pulled data from the 2020 American Community Survey (ACS) using the Tidycensus package.<sup>41</sup> We supplemented this with the 2022 Primary Land Use Tax Lot Output (PLUTO) data for New York City, which contains lot-level data, including information on building type.

To calculate the number of low- to-moderate income households in the state, as well as the energy use of the buildings they live in, we pulled 2020 microdata from the American Community Survey, using the Tidycensus package.<sup>42</sup>

To calculate the number of regulated affordable properties, we used three sources. For non-NYC non-LIHTC federally regulated affordable properties, we used the National Housing Preservation Database. For non-NYC LIHTC properties, we used the Department of Housing and Urban

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<sup>41</sup> tidycensus. <https://walker-data.com/tidycensus/>

<sup>42</sup> tidycensus. <https://walker-data.com/tidycensus/>

Development's Low-Income Housing Tax Credit portal. For all regulated properties in NYC, we used the NYU Furman Center's CoreData.nyc data.

To calculate the number of 5- to 50-unit properties with affordability agreements that expire in the next 10 years outside of NYC, we used the National Housing Preservation Database (NHPD). We could not use HUD's LIHTC portal given that it does not include the expiration date. It should be noted that NHPD does not count LIHTC properties in exactly the same way as HUD's portal does. Thus, caution should be exercised when comparing this number to the above estimate of the count of all non-NYC subsidized properties. For New York City, we used the NYU Furman Center's CoreData.nyc data. One point to note is that many buildings in the data have multiple subsidies with affordability requirements. Thus, to calculate when affordability requirements would end for those buildings, we took the latest year that one of their subsidies expires. For example, if a building had subsidy A expiring in 2027 and subsidy B expiring in 2030, we would consider the affordability requirements for that building to expire in 2030.

To calculate the number of rent-stabilized units and properties, we used the 2021 New York City Housing and Vacancy Survey.

To calculate the age of heating equipment for households, we used the 2020 Residential Energy Consumption Survey.

## Estimating number of buildings

The ACS does not report the number of buildings in each census tract. Instead, it reports the number of units within given building types. For example, Tract A might have 3 units in single-family homes, 100 units in 10- to 19-unit properties, and 200 units in 20- to 49-unit properties. To estimate the number of buildings by type in a tract like this one, we divided the number of units in the tract by the midpoint of the units in that given building type. For example, for tract A we would divide the 3 units of single-family homes by 1, the 100 units in 10- to 19-unit buildings by 14.5, and the 200 units in 20-to 49-unit properties by 34.5. This generates an estimate of 3 single-family homes, 7 buildings with 10 to 19 units, and 6 buildings with 20 to 49 units. This is a noisy estimate. First, the midpoint, though a sensible choice, is still arbitrary. For example, in Tract A, instead of dividing the number of units in 10- to 19-unit buildings by 14.5 to get 7 buildings, we could have divided by 10 and estimated 10 buildings or divided by 19 and estimated 5 buildings. In addition, these estimates are subject to measurement error, since they are derived by the Census Bureau from survey data. Our estimates of the number of buildings by type should therefore be taken as just that, estimates. While the overall magnitude is likely sensible, there is meaningful room for error around the precise point estimate.



Similarly, the NYC Housing and Vacancy Survey dataset reports the number of units in particular categories (such as “rent stabilized” or “private, unregulated renter”). It does not report the number of buildings. To estimate the number of buildings, we divided the number of units in given groups by the midpoint of the units in that building type. For example, we divided the number of rent-stabilized units in 10- to 12-unit buildings by 11 to estimate the number of buildings. As above, this leads to a margin for error, given that the midpoint is an arbitrary choice. In addition, given that buildings can have a mix of stabilized and non-stabilized units, this is a floor estimate and likely an undercount of the true number of buildings, since it assumes that all rent-stabilized units are in buildings where all units are stabilized. For example, if the survey reported that there were 100 stabilized units in 50-unit buildings, our estimate would be that there are two 50-unit buildings with 50 units of rent-stabilized housing each. However, it could be that there are four 50-unit buildings with 25 rent-stabilized units each, or even fifty 50-unit buildings that each have 1 rent-stabilized unit.

## Determining LMI status

We classified a household as low to moderate income if its reported income was less than 80% of the area median income (AMI). To determine AMI, we followed a procedure similar to that used in the *NYSERDA Low- to Moderate-Income Market Characterization Report*.<sup>43</sup> The authors used the Homes and Community Renewal (HCR) area median income estimates, which are themselves based on the limits issued by the U.S. Department of Housing and Urban Development (HUD). To compare household income to these limits, we cross-walked public use microdata areas (PUMAs), which is the geography at which one can obtain ACS microdata, with metropolitan statistical areas (MSAs), which is the geography at which HUD publishes its income limits. Adjusting for household size, we then compared the reported income at the household level to 80% of the AMI of the MSA in which the household lived. For those households that live outside of MSAs, we compared their income to 80% of the family median income of the PUMA in which they reside.<sup>44</sup>

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<sup>43</sup> NYSERDA Low- to Moderate-Income Market Characterization Report. <https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2017ContractorReports/LMI-Market-Characterization---Full-Report.pdf>

<sup>44</sup> We use family median income because that is what HUD uses when establishing its thresholds. <https://www.huduser.gov/portal/datasets/il/il22/Medians-Methodology-FY22.pdf>