report

# Evaluating New York City's Multifamily Building Energy Data for Savings Opportunities

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executive summary

# Evaluating New York City's Multifamily Building Energy Data for Savings Opportunities

# Retrofitting Affordability

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building energy exchange

# New York City's multifamily buildings are a diverse collection of properties that will play a pivotal role in meeting our climate change and affordability challenges.

This report analyzes newly available data in the New York City multifamily building sector to identify which buildings, and which energy efficiency retrofit measures, have the greatest potential for carbon reduction, and how these benefits relate to affordability and the City's climate action plan. Due to a very low vacancy rate and a high cost of maintenance, building owners are primarily focused on the day to day concerns of operating their buildings, and energy efficiency has not been a high priority. As a result, these buildings represent a significant opportunity to save energy, cut costs, reduce carbon emissions, improve comfort, and make a meaningful contribution to a healthier, more resilient, and equitable community.

Since 2010, New York City has required large buildings to report their annual energy and water use in compliance with the 2009 Benchmarking & Disclosure law. This law covers 2.3 billion square feet, nearly half the total square footage of all city buildings. Multifamily buildings represent 1.5 billion square feet, or about half of these covered buildings, and are responsible for 56% of greenhouse gas (GHG) emissions and 51% of source energy use. In 2013, energy auditors visited roughly 10% of these buildings, evaluating actual field conditions and providing energy saving recommendations in the

first year of compliance with the 2009 Energy Audit & Retro-Commissioning law. Our analysis indicates this sample set of audited buildings is statistically representative of the entire 1.5 billion square feet of New York City's covered multifamily buildings, providing critical information on the highest impact, lowest cost retrofit opportunities as well as insights into the audits themselves and the data collection process.

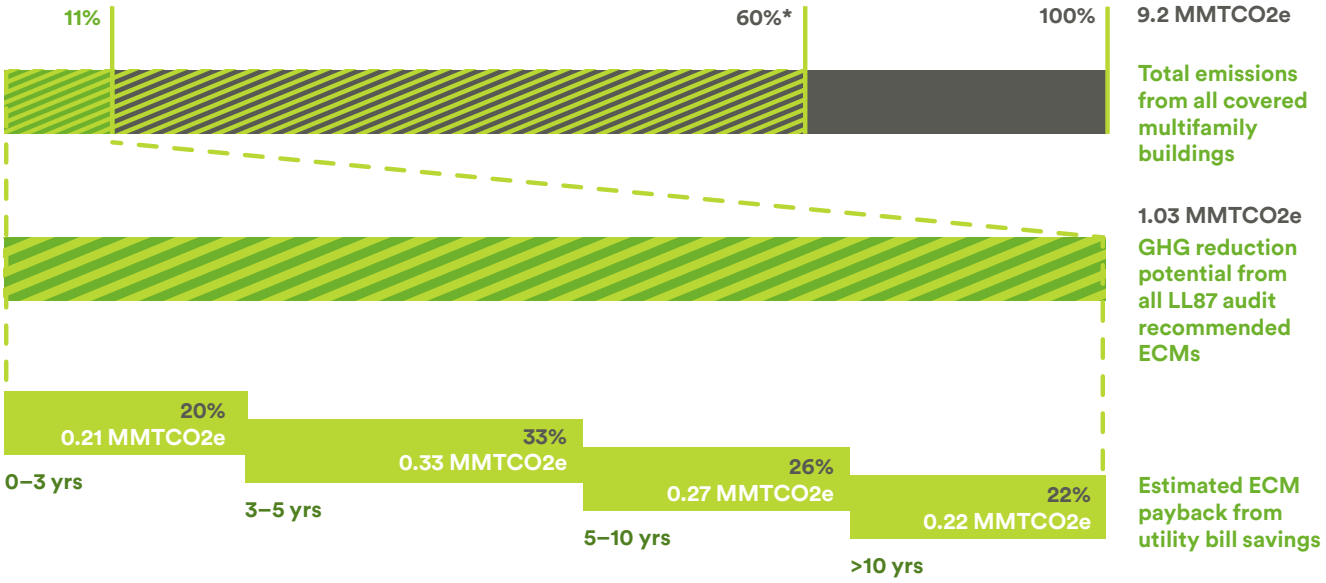
Our study organizes this diverse collection of covered multifamily buildings into twelve segments having similar characteristics and energy efficiency solutions. We study which multifamily sector segments have the greatest energy saving potential; which retrofit measures have the biggest impact and fastest payback; where the buildings with the highest potential for energy savings are concentrated; and how these opportunities relate to affordability.

Our analysis finds over 20 TBTU of source energy savings potential, an 11% reduction in total multifamily building energy use, and 1.03 MMtCO2e, an 11% reduction in GHG emissions. These figures are more significant when one considers that auditors typically focus only on systems controlled by the owner, which in many multifamily buildings represent only 50%–75% of the total building energy use.

Most important, this potential savings would be a first step toward the de Blasio administration's goal of reducing the City's carbon emissions 80% by 2050. It is broadly estimated that achieving this goal will require the building sector to reduce carbon emissions 60% by 2050. If this contribution is distributed evenly across all building types, the energy conservation measures studied here represent approximately 23% of the multifamily building carbon reductions required to meet this aggressive goal.

The auditor recommendations range from simple and inexpensive measures (installing LED lighting and insulating pipes) to more complex upgrades requiring significant capital expense (replacing windows or a boiler). However, 72% of the recommended energy conservation measures have a simple payback of less than ten years, while more than half pay back in less than five years, and 22% pay back in less than three years. Taken as a whole, the recommended retrofits are estimated to cost $2.1 billion, but would generate annual savings in excess of $360 million and

**Figure 1: Scale of GHG Reductions** **This report identifies an 11% reduction in greenhouse gas (GHG) emissions from covered multifamily buildings, if all energy conservation measures (ECMs) are implemented. This chart shows how these savings compare to the City's 80 by 50 goals, and the expected payback.**




* The City estimates that existing buildings will need to reduce GHG emissions by 60% in order to achieve 80 by 50 goals.

have a median payback in less than five years.

The analysis clearly identifies areas of potential focus. Three of the twelve building sector segments, all built after 1946, include more than half of the total identified GHG reductions, and just two categories of the energy conservation measures cited by the auditors represent 50% of the total energy savings potential.

Mapping this information onto the collage of New York City's diverse communities highlights neighborhoods with a greater concentration of affordable housing that also have a greater concentration of buildings with high potential energy savings, such as the South Bronx and central Brooklyn. These insights provide guidelines for a strategic approach to focusing benefits in the communities with the greatest needs.

Achieving these savings, however, will not be a simple matter. Energy efficiency is not a high priority for most property owners, managers, and operators, and those who do focus on energy efficiency often find that the true performance of retrofits has not been sufficiently documented to provide certainty of outcomes. Lack of access to capital is often a serious obstacle as well.

The City's new "Retrofit Accelerator" program will help

**Key Findings**

- Covered multifamily building audits identified a reduction of approximately 11% (20.9 TBTU) in total energy use, and an 11% (1.03 MMT-$CO_2e$) reduction in GHG emissions, generating an annual savings of over $360 million
- Post-War buildings have more than half of the total identified GHG reductions, while representing 43% of the covered MF area, and 40% of the total estimated retrofit costs
- Just two categories of energy conservation measures, Domestic Hot Water and Heating & Distribution, provide 50% of the energy savings potential
- Over 70% of the recommended energy conservation measures have a less than ten year payback through savings on utility bills. More than 50% have a less than five year payback, and over 20% will pay back in under three years
- Several communities, including the South Bronx and central Brooklyn, have a high concentration of affordable housing with buildings that have excellent potential for energy savings
- Future energy audits need to be more aggressive in order to reach our climate action goals. Measured projects demonstrate that a 15%–25% energy savings is possible through comprehensive retrofits

building owners and operators navigate these barriers to unlock energy savings potential. Account managers will provide coordinated assistance to buildings with high potential for energy savings to connect them with training, financial assistance and other resources, increase the number of retrofit projects, and smooth the way for projects already underway. This analysis is intended as an early road map for the Accelerator to identify which types of properties might be targeted in which communities to produce the greatest carbon emissions reductions while preserving housing affordability.

The energy needs and usage of the building sector are enormously complicated and have only recently undergone the sort of broad data collection currently under analysis. Consequently, drawing strict conclusions from such data requires a degree of caution. With this in mind, the report frames some of the current limitations of the available data, and recommends improvements in the annual collection of what promises to be a tremendously important and insightful portrait of New York's vast building stock.

This report lights the path to a more efficient and resilient built environment through careful segmentation of the multifamily market and identification of the most commonly recommended energy retrofit measures, connecting these measures to affordability and ultimately to New York City's climate action goals.