INTERIM REPORT

# ENERGYFIT NYC

*An easier, quicker & cheaper approach to expanding residential energy efficiency*

PRATT CENTER
FOR COMMUNITY DEVELOPMENT

OCTOBER 2016

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# Executive Summary

In January 2016, the Pratt Center for Community Development launched the EnergyFit NYC Pilot to test an innovative new approach to implementing energy retrofit measures. There are 863,867 one- to four-family homes in NYC, the vast majority of which have not received an energy retrofit. The goal of the Pilot is to increase energy savings in this housing stock through a standardized approach.

**EnergyFit NYC's approach promises to dramatically scale residential retrofits in NYC's dense low- and moderate-income communities by creating standard retrofit packages that can be applied to these hundreds of thousands of homes without costly energy audits and modeling, and without compromising energy savings.**

Pratt Center's approach to energy retrofits is more streamlined than what is currently available for most NYC homeowners. The hypothesis the EnergyFit NYC Pilot seeks to confirm is that homes with similar design and construction should need similar retrofit measures and that these similarities present opportunities to simplify the process. During implementation, the Pilot offered a specific package of common energy saving measures tailored to a particular building type in order to make it easier, quicker, and cheaper for homeowners to save money, while also improving home comfort, health, and safety.

Under most energy efficiency programs available today, an energy contractor has to perform a comprehensive energy audit, run an energy model for each and every building, and then work with the homeowner to help them understand which measures to implement and why. This process can be time-consuming, expensive, and confusing to the homeowner and as a consequence often does not lead to the implementation of an actual energy retrofit. Pratt Center believes that a simplified process for homeowners and contractors can lead to a higher rate of completed retrofits in the one- to four-family marketplace.

## CONTEXT AND BACKGROUND

The timing of the EnergyFit NYC Pilot coincides with New York State's Reforming the Energy Vision (REV) effort, which looks to "help consumers make better and more informed energy choices, enable the development of new energy products and services, protect the environment and create new jobs and economic opportunity."[1] The New York State Energy Research and Development Authority (NYSERDA) seeks to further this mission with a directed focus on low- and moderate-income (LMI) communities through the Clean Energy Fund (CEF). The EnergyFit model not only directly aligns with the goals of REV, the CEF and other associated efforts by the City of New York and local utilities, it also presents a programmatic opportunity to aggregate the positive impacts of energy efficiency work in NYC's small homes to reduce carbon emissions, improve quality of life in LMI communities, and increase the number of jobs for home performance contractors.

EnergyFit NYC builds on Pratt Center's multi-year *Retrofit Standardization Study*, which confirmed that residential one- to four-unit buildings built during a similar time with similar materials require the same energy efficiency upgrades to maximize energy savings and home health and comfort.[2] This consistency shows that for similarly constructed buildings, comprehensive energy audits and modeling are not always a necessary prerequisite to the implementation of energy retrofits, and in fact, can discourage retrofits by lengthening and complicating the required steps.

## THE ADVANTAGE OF THE STANDARD PACKAGE APPROACH

EnergyFit NYC piloted the feasibility of using a standard package of energy retrofit measures to streamline the energy retrofit process and make it:

- **Easier** for homeowners to understand the scope of work included in the retrofit by offering a specific package tailored to building typology with predictable interventions. This minimizes the complexity of energy audits that often include a laundry list of options that can overwhelm and confuse homeowners.

- **Quicker** for homeowners by requiring only a short assessment and a retrofit scope of work that can be completed in one day. This reduces the need for homeowners and tenants to take time off from work and time required in tenants' units. Providing a quick turn-around from beginning to end ensures the homeowner is less likely to disengage in the process.
- **Cheaper** for contractors by reducing soft costs, providing a standardized package offering with a clear price structure, and easing the way for an aggregation model. A standard package can also be set at a price point that is realistic for homeowners to finance and/or the City or State to support with incentives.
- **Scalable and replicable** for cities seeking to dramatically expand implementation of energy retrofits in urban and suburban communities with residential building stock redundancies.[3]

1. **www.ny.gov/programs/reforming-energy-vision-rev**
2. For more information on the Retrofit Standardization Study, go to **http://prattcenter.net/projects/energy-efficiency/retrofit-standardization-initiative**
3. Many cities were built out in waves by developers who repeated the same design throughout a neighborhood.

*Preparing to caulk around a window*

## PILOT METHODOLOGY

Due to the prevalence of the typical New York City row house, the Pilot focused on retrofitting 1- and 2-family, attached, gas-heated, masonry homes built before 1930[4,5] Thirty-two homes received a retrofit through the EnergyFit NYC Pilot. Each home had the same package of work installed, and included:

- three-tiered air sealing and weatherstripping of the residence(s) and the basement
- air sealing and insulating the roof hatch
- air sealing and insulating the attic cavity
- health and safety tests including testing for high levels of carbon monoxide and gas leaks

If needed, homes also received combination carbon monoxide/smoke detectors and other health and safety improvements such as boiler cleanings, ventilation upgrades, and gas leak fixes. Homeowners were required to pay an income-based, sliding scale participation fee of up to $250.[6] All other costs were covered by the Pilot. The standard package was designed to be implemented in one full day's worth of work in order to create an efficient program that would keep costs down for both contractors and homeowners.

## EARLY FINDINGS

Blower door tests conducted the day of the retrofits demonstrated the positive impact of the retrofits on these homes: on average, homes experienced a **29% reduction in air infiltration** (e.g. cool air entering during the winter requiring greater use of the heating system to maintain a set temperature or the reverse for air conditioning). After the winter of 2017, a post-retrofit utility bill analysis will be completed to measure actual energy and cost savings. Over the 12 months following the retrofits, Pratt Center is working with the 32 homeowners who received the retrofit, surveying them quarterly to gather qualitative data and feedback on the retrofits' impact. Based on these efforts, Pratt Center's interim findings are:

- **Similar homes call for similar energy efficiency measures**
- **Homeowners immediately experience the benefits of the standard package**
- **Energy efficiency home improvements are in high demand**
- **Homeowners desire a simple, user-friendly energy retrofit process**
- **A standardized approach can shorten the process from outreach to retrofit completion and bring welcome convenience to homeowners**
- **Resolution of health and safety issues should be part of any energy retrofit program**
- **Contractor feedback has been positive and opportunities to reduce soft costs exist**

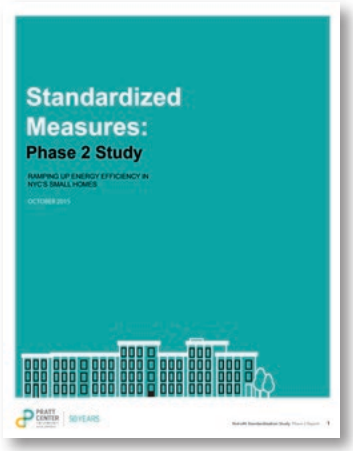
These findings will be further refined after the one-year, post-retrofit utility bill analysis and homeowner qualitative surveying has been completed. Pratt Center intends to release a final report on the Pilot's impact and opportunity for expansion in the spring of 2017.

4. Fifty-three percent of NYC's 1-4 family homes were built before 1930.
5. The standardized approach can be tailored to additional building types, such as three- and four-unit homes, semi-attached homes, wood frame homes, or other dominant building characteristics with additional testing.
6. Pratt Center required a small participation fee as a demonstration of a homeowner's commitment to adhering to the Pilot's participation requirements.

# Pilot Background

EnergyFit NYC builds on Pratt Center's extensive work over the past 10 years in the residential energy retrofit marketplace. Through partnerships with community-based organizations and other collaborators, Pratt Center has first-hand experience with a variety of energy retrofit programs and understands the opportunities and challenges these programs face in achieving homeowner participation. From this work, Pratt Center saw an opportunity to shift the model from every building representing a unique case to a more simplified version that focused on similar buildings with similar needs. Pratt Center's multi-year *Retrofit Standardization Study* (2012-2015) confirmed this hypothesis, demonstrating the consistency in required energy efficiency measures in NYC's small homes built during a similar time and of similar materials.

The EnergyFit NYC Pilot was launched in January 2016 to gather additional data in order to inform the development of a citywide program based on the standard measures approach. Pratt Center believes that the standardized model demonstrated through EnergyFit can be a transformative tool for the City and State's efforts to scale retrofits in New York, particularly for low- and moderate-income homeowners.

# Pilot Structure

**In order to guarantee efficient and effective implementation of the Pilot, Pratt Center developed a detailed and robust process for every step of the Pilot.**

A summary of the key activities for each step is described below.

## PRE-LAUNCH

Prior to publicly launching the Pilot in January 2016, Pratt Center refined the methodology for the Retrofit Standardization Study and created the necessary infrastructure for tracking data collected for the Pilot. Key steps of the pre-launch phase included:

- *Contractor Focus Group:* Seven NYC-based home performance[7] contractors attended a half day-long focus group to provide input on the Pilot design, price and retrofit scope of work to ensure the Pilot structure was feasible for contractor participation.

7. Home Performance is the industry term for contractors that specialize in improving building comfort and operations primarily, but not solely, through energy efficiency. The New York State Energy Research and Development Authority's (NYSERDA) main energy efficiency program for one- to four-families is called Home Performance with Energy Star®. However, the term home performance in this paper is used as a more general description of the types of contractors Pratt Center engaged with for the Pilot.

- *Building Typology Selection:* Using NYC Department of Finance and PLUTO tax lot data, Pratt Center mapped NYC's one- to four-family building stock, ultimately selecting two-family, attached, masonry homes built before 1930 as the focus for the Pilot. Pratt Center mapped 24,730 such residential buildings classified as B1 or B3 that met these requirements across all five boroughs.[8] This typology was selected due to a combination of prevalence, neighborhood clusters, energy efficiency opportunity, and feasibility to implement the Pilot in a short amount of time. Additional single-family homes that met all other requirements were added post-launch.
- *Eligibility Criteria Finalization:* To ensure the homes receiving the retrofit all had similar characteristics, Pratt Center created a detailed eligibility screening process. In addition to the building typology elements, buildings were deemed ineligible for the Pilot for several reasons, including structural issues such as if they had front "bump-out" additions, peaked roofs, attached garages, or all glass exterior walls. Additionally, buildings needed to be owner-occupied with consistent occupancy throughout the year and have at least one year of energy bills with primarily "actual" energy usage as opposed to estimated meter readings.
- *Building Performance Institute (BPI) Certified Home Performance Contractor Engagement:* Pratt Center issued a Request for Qualifications to a wide number of local home performance contractors, ultimately selecting NYS Energy Audits (NYSEA), a BPI[9] home performance contractor that had significant experience with the Pilot's building stock. Together with CLEAResult, the Pilot's Technical Partner, Pratt Center developed Contractor Guidelines that outlined the exact scope of work to be completed in each home, including a tiered approach to air sealing that prioritized the top-level of the home, followed by the basement with varying approaches for conditioned and non-conditioned basements, and then by additional air sealing tactics if time allowed. In addition, the guidelines provided specifications for air sealing and insulating the roof hatch and attic cavity.
- *Data Collection System Design:* The rigorous, data-heavy eligibility screening process for the Pilot required a clear and organized approach to tracking all the information collected both in the office and out in the field. In order to ensure this was done efficiently, Pratt Center utilized Fulcrum, an online information collection platform, to manage all qualitative and quantitative data collected through a number of "surveys." These included GIS-located surveys used to guide field canvassers in targeting the appropriate homes for door-knocking activities; a simple online form for interested homeowners to apply; over-the-phone intakes; in-home contractor assessment surveys with text and photo data collection done via tablets; retrofit surveys tracking all work done on the home; and other quality control- and payment-related tools.

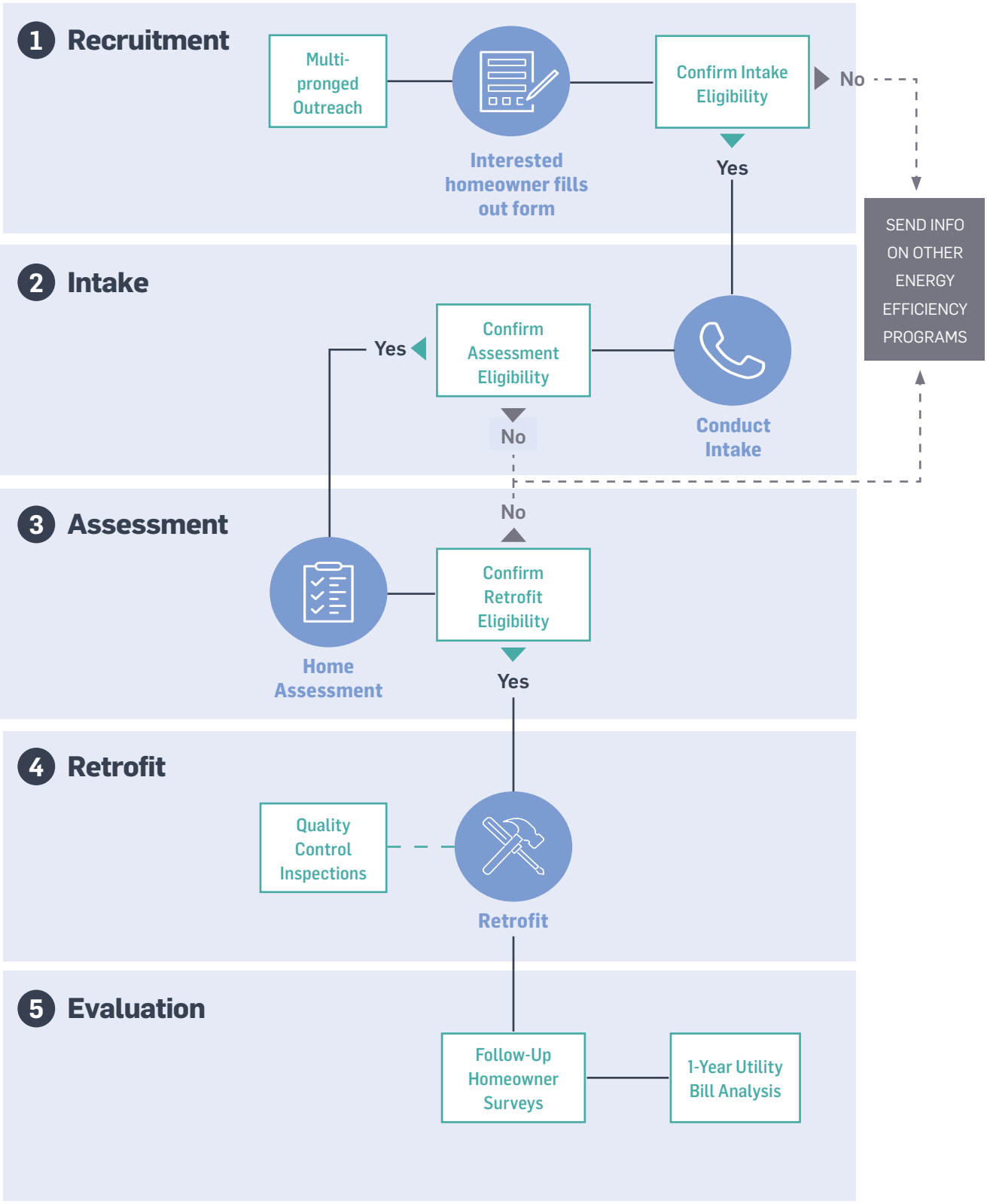
## RECRUITMENT

Pratt Center employed a multi-pronged outreach and recruitment strategy to inform homeowners of the Pilot and the benefit of energy retrofits in general. Utilizing the list of addresses generated from the building typology mapping exercise, Pratt Center mailed postcards to potentially eligible homeowners directing interested residents to the dedicated EnergyFit NYC phone number and the EnergyFit NYC website. These postcards generated the highest number of leads of all outreach tactics. Other successful tactics included employing a team of canvassers to knock on doors in neighborhoods with large clusters of potentially eligible buildings, partnering with community organizations and block associations, and posting on neighborhood listservs. Pratt Center also created a Homeowner Referral system, offering $200 to anyone who referred a homeowner who would go on to complete a Pilot retrofit. Those interested in the Pilot whose buildings did not meet the basic eligibility criteria were provided with information about other energy efficiency programs.

8. Buildings with commercial on the ground floor or more than 4 floors were excluded from the data set. Heating type could not be determined from the PLUTO dataset and were determined in the second eligibility screening.
9. The Building Performance Institute (BPI) offers certifications and standards for the energy efficiency and home performance industries.

FIGURE 1

## The EnergyFit Process




Icons in figure 1 created by Arslan Shahid, naim, Arthur Shlain, Oliviu Stoian from the Noun Project.

*Blowing cellulose insulation into an attic cavity.*

## INTAKE

The Intake process included two steps. First, homeowners were encouraged to fill out an Interested Homeowner Form on the EnergyFit website to determine basic eligibility such as owner occupancy, heating source, length of time in the building, and building façade material. If the answers provided met the Pilot's initial requirements, Pratt Center staff then conducted an in-depth phone interview with each homeowner to gather more details on the building to determine further eligibility for the in-home assessment. Some examples of the information collected included ensuring consistent occupancy in the home (e.g. home not used as an AirBnB), existence of sufficient energy bills to form a pre-retrofit research baseline, no known presence of building health and safety issues (e.g. asbestos, roof leaks, etc.), and no recent major renovations affecting energy use. This conversation also proved crucial in establishing a trusting relationship with each homeowner so that all participants were fully aware of the Pilot's goals and participation requirements along with the complete scope of work that would be performed in their homes. Again, homeowners that were not selected for the next stage of the Pilot received information about other energy efficiency programs.

## ASSESSMENT

In contrast to a full Comprehensive Energy Audit that is a requirement for most energy efficiency incentive programs, the EnergyFit NYC Pilot Assessment was designed to take no more than 90 minutes and did not require energy modeling for individual buildings or a blower door test (blower door tests were performed instead on the day of the retrofit, to track air infiltration reductions for the Pilot, but would not be required in a citywide program). The EnergyFit NYC contractor, NYSEA, performed all of the assessments. The purpose of the assessment was to confirm each building's need for all measures in the retrofit package (e.g. confirming that a building did not have existing and adequate attic cavity insulation) and to conduct basic health and safety tests to confirm the safety of the home for both residents and the contractor on the day of the retrofit. While not part of the Pilot package of measures, the assessment also tracked the number of LED lightbulbs, number of low-flow showerheads and aerators, and length of basement heating pipe and Domestic Hot Water (DHW) pipe wrap needed. This information was entered in real time into the online data collection system and will be incorporated into future analysis (see Evaluation section on next page). In a larger, citywide program, the time needed for the

*Adding cellulose insulation to poorly insulated attic cavity*

assessment could be reduced further as many of the data points captured for the study purposes of the Pilot would not be necessary.

Pratt Center and CLEAResult then reviewed each assessment report through a comprehensive scoring tool and selected eligible homes to receive the retrofit. Some examples of the reasons homes were not selected included buildings that required health and safety corrections that cost more than $400, homes that had asbestos where the contractor could not safely run the blower door test, or homes that had existing, adequate attic insulation and did not need more insulation. Homeowners did have the option to coordinate and pay for health and safety fixes on their own and still participate in the Pilot if all other eligibility requirements were met. All homeowners not selected for a retrofit were provided with information about other energy efficiency programs as well as tips on how to implement simple energy saving measures on their own. A number of the homes not selected stated that they were still interested in participating in the Pilot if the eligibility requirements changed, demonstrating their high interest in energy efficiency.

## RETROFIT

The EnergyFit NYC Pilot standard retrofit package was developed to meet the consistent needs of homes built at a similar time and of similar measures. Each home that received the retrofit received the same package, which included a three-tiered system of air sealing of the residence(s) and basement, air sealing and insulating of the roof hatch, air sealing and insulating of the attic cavity, and health and safety upgrades (see page 17 for further discussion of the package scope). The retrofit package was designed to be completed in one day, minimizing the inconvenience to homeowners of taking time off from work or other commitments. The only exception was if a building had a health and safety issue that needed to be resolved before work could begin, such as completion of a boiler clean and tune or fixing of a gas leak. NYSEA, the Pilot Contractor, also conducted test-in and test-out blower door tests, a critical data point for the Pilot's research purposes, and test-out health and safety checks.

For every retrofit, NYSEA followed the EnergyFit NYC Contractor Guidelines and through the online data collection tool uploaded a post-retrofit checklist that documented the work completed in the home (including photographs). CLEAResult completed Quality Control inspections in half the homes on separate days.

## EVALUATION

Throughout the Pilot, Pratt Center and its partners have engaged in continuous evaluation efforts, refining the Pilot approach as needed (see Scope of Work, page 17). Following each retrofit, Pratt Center conducted a post-retrofit interview with each participating homeowner to gain their immediate feedback on the Pilot. Pratt Center will follow up with quarterly surveys to ascertain if there have been any changes in the building's structure or occupancy that could impact energy savings as well as to gather additional data on homeowners' impressions of changes to their energy use and domestic comfort.

**Following the winter heating season in 2017, Pratt Center will conduct a full analysis of the Pilot's impact based on qualitative homeowner feedback and weather normalized utility bill analysis.**

# Pilot Outcomes

**Through Pratt Center's multi-pronged recruitment approach, a large number of NYC homeowners received information on EnergyFit NYC and energy efficiency in general. In the end, Pratt Center connected with 730 interested homeowners, conducted 414 intakes and 89 assessments and completed 32 retrofits within the first six months of 2016.**

The 89 assessed homes were located in Brooklyn, Queens, and Manhattan. All 32 retrofitted homes were one- or two-family, attached, masonry, gas-heated buildings built before 1930. For more details on Assessed and Retrofitted homes see the **Appendix** (page 30).

One of the EnergyFit NYC Pilot goals was to test this approach specifically with LMI homeowners. Pratt Center tailored many of its outreach and recruitment strategies to this demographic in this effort but due to the Pilot's funding deadline, we expanded recruitment to all homeowners regardless of income level. Ultimately, just under half of the homeowners that received a retrofit self-reported annual household incomes of below $80,000.

**FIGURE 2**

Just under half of retrofit recipients reported annual incomes of below $80K

| HOMEOWNER INCOME* | ASSESSMENTS | RETROFITS |
|---|---|---|
| **$0-$20,000** ($20 fee) | 6 | 1 |
| **$20,001-$40,000** ($40 fee) | 7 | 3 |
| **$40,001-$55,000** ($75 fee) | 7 | 3 |
| **$55,001-$65,000** ($150 fee) | 5 | 3 |
| **$65,001-$80,000** ($200 fee) | 5 | 2 |
| **$80,001 +** ($250 fee) | 49 | 19 |
| **Prefer not to say** ($250 fee) | 10 | 1 |
| **Total** | **89** | **32** |

*Income was self-reported during the intake stage and was not calibrated with the number of household occupants as is typically done to calculate LMI households.

## RETROFIT MEASURES

All 32 homes were selected to receive the retrofit based on the opportunity to install the full package of measures.[10] (See figure 3)

### Three-tiered air sealing and weather-striping the residence(s) and the basement

Air sealing was conducted on a three-tiered basis, which prioritized (1) the top-level of the home, (2) the basement with varying approaches for conditioned and non-conditioned basements, and (3) additional air sealing tactics throughout the rest of the building as time allowed.[11]


### Air sealing and insulating the roof hatch

Typical for pre-1930 construction, all of the homes had a push-up roof hatch providing rooftop access. Roof hatches were air sealed and insulated to limit air infiltration but maintain access to the roof.

### Air sealing and insulating the attic cavity

Attic cavities were sealed along the perimeter and then were insulated to approximately an R-40 value using blown in cellulose.

### Health and safety tests and improvements

Evaluations included (but were not limited to) testing for gas leaks and high Carbon Monoxide (CO) levels. Each home had a $400 health and safety budget to cover improvements, including combination CO/smoke detectors, fixing gas leaks, combustion equipment clean and tunes, and improving ventilation.

10. Two homes did not receive attic air sealing or insulation because, at the time of the retrofit, it was determined that they in fact had sufficient insulation.
11. All homes received the air sealing via the tiered system. Within the tiered system, different measures were completed dependent upon the needs of the home.

**FIGURE 3**

## Installed measures by prevalence

| MEASURES | NO. OF HOMES |
|---|---|
| Exterior door weatherstripping*** | 32 |
| Insulate attic hatch | 32 |
| Insulate attic | 30 |
| Attic (Cockloft) air sealing* | 30 |
| Seal attic hatch | 30 |
| Skylight sealing* | 30 |
| Seal general penetrations to attic cavity* | 29 |
| Seal small openings between basement & conditioned space** | 18 |
| Weather-stripping basement door** | 18 |
| Seal baseboard trim/molding of 1st floor** | 18 |
| Seal any other observed leakage pathways*** | 11 |
| Seal around basement windows** | 10 |
| Seal pipe & wire penetrations (top floor)* | 7 |
| Seal visible rim joist** | 6 |
| Seal recessed light fixtures (top floor)* | 5 |
| Seal exterior basement doors/coal chutes** | 5 |
| Seal pipe penetrations from 1st floor to basement** | 4 |
| Fireplace sealing* | 3 |
| Wall sealing (top floor)* | 3 |
| Seal pipe & wire penetrations (middle floors)*** | 3 |
| Install skylight plexiglass* | 2 |
| Seal chimney flues and vents** | 1 |
| Wall air sealing (middle floors)*** | 1 |

**Measures with an asterisk indicate that it was part of the three-tiered air sealing approach, with the number of asterisks representing the specific tier.*

While the one year, post-retrofit, weather normalized, utility bill analysis planned for Spring 2017 will determine the energy saving impact of the package, the pre- and post-retrofit blower door tests conducted on all 32 homes demonstrates that the package was able to significantly reduce air infiltration in the homes. The average air infiltration reduction was 29%, with four homes achieving reductions of 50% or more. Only four homes had reductions less than 20%, but all homes had at least an 8% reduction. The blower door tests were conducted at CFM 50, a measure of the amount of air entering/leaving a home (i.e. cool air entering during the winter requiring greater use of the heating system to maintain a set temperature or the reverse for air conditioning). Air infiltration reductions do not precisely correlate to energy use reductions, but they are an indicator for tightening a building's envelope and reducing the need for heating in the winter and cooling in the summer. **Figure 4** shows the blower door results for each of the retrofitted homes. Blower door results were not impacted by building volume, despite the range in building size across the 32 homes (see **Figure 5**).

FIGURE 4

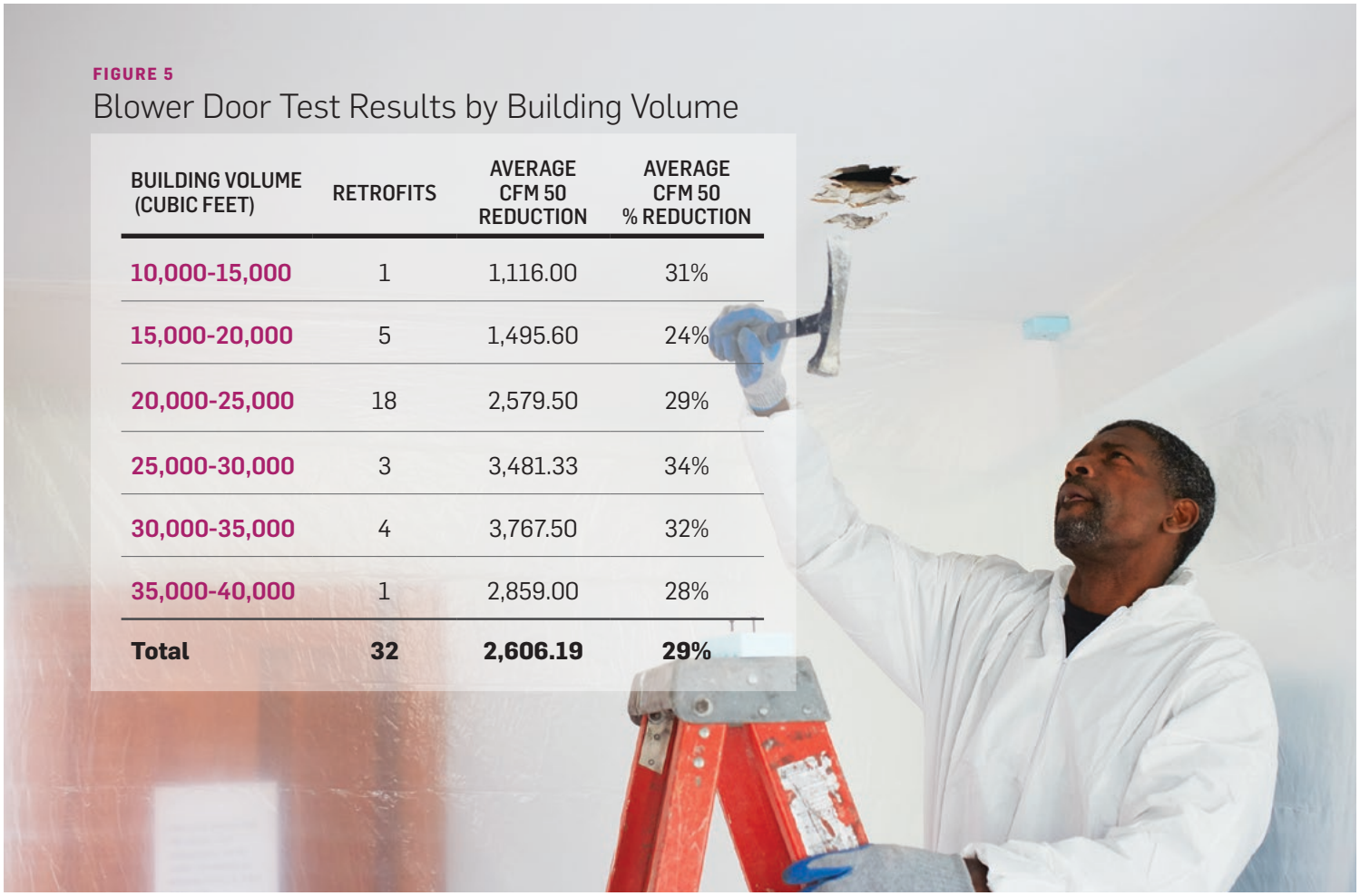
## Blower door test results

| | BLOWER DOOR TEST IN (CFM 50) | BLOWER DOOR TEST OUT (CFM 50) | CFM 50 REDUCTION | % CHANGE IN AIR INFILTRATION |
|---|---|---|---|---|
| **Homeowner 1** | 4,467 | 4,094 | 373 | **-8.4%** |
| **Homeowner 2** | 6,080 | 5,166 | 914 | **-15.0%** |
| **Homeowner 3** | 4,344 | 3,643 | 701 | **-16.1%** |
| **Homeowner 4** | 4,824 | 4,039 | 785 | **-16.3%** |
| **Homeowner 5** | 10,546 | 8,686 | 1,860 | **-17.6%** |
| **Homeowner 6** | 6,478 | 5,057 | 1,421 | **-21.9%** |
| **Homeowner 7** | 7,015 | 5,460 | 1,555 | **-22.2%** |
| **Homeowner 8** | 5,975 | 4,646 | 1,329 | **-22.2%** |
| **Homeowner 9** | 3,303 | 2,560 | 743 | **-22.5%** |
| **Homeowner 10** | 6,688 | 5,144 | 1,544 | **-23.1%** |
| **Homeowner 11** | 6,903 | 5,287 | 1,616 | **-23.4%** |
| **Homeowner 12** | 9,058 | 6,865 | 2,193 | **-24.2%** |
| **Homeowner 13** | 7,070 | 5,320 | 1,750 | **-24.8%** |
| **Homeowner 14** | 9,430 | 7,039 | 2,391 | **-25.4%** |
| **Homeowner 15** | 7,876 | 5,789 | 2,087 | **-26.5%** |
| **Homeowner 16** | 5,426 | 3,986 | 1,440 | **-26.5%** |
| **Homeowner 17** | 9,998 | 7,202 | 2,796 | **-28.0%** |
| **Homeowner 18** | 7,338 | 5,277 | 2,061 | **-28.1%** |
| **Homeowner 19** | 7,170 | 5,150 | 2,020 | **-28.2%** |
| **Homeowner 20** | 8,025 | 5,760 | 2,265 | **-28.2%** |
| **Homeowner 21** | 10,089 | 7,230 | 2,859 | **-28.3%** |
| **Homeowner 22** | 8,404 | 5,992 | 2,412 | **-28.7%** |
| **Homeowner 23** | 3,580 | 2,464 | 1,116 | **-31.2%** |
| **Homeowner 24** | 15,547 | 10,577 | 4,970 | **-32.0%** |
| **Homeowner 25** | 9,561 | 6,502 | 3,059 | **-32.0%** |
| **Homeowner 26** | 8,915 | 5,783 | 3,132 | **-35.1%** |
| **Homeowner 27** | 8,222 | 5,212 | 3,010 | **-36.6%** |
| **Homeowner 28** | 12,170 | 6,144 | 6,026 | **-49.5%** |
| **Homeowner 29** | 7,818 | 3,907 | 3,911 | **-50.0%** |
| **Homeowner 30** | 12,904 | 6,201 | 6,703 | **-51.9%** |
| **Homeowner 31** | 13,277 | 6,178 | 7,099 | **-53.5%** |
| **Homeowner 32** | 12,062 | 4,805 | 7,257 | **-60.2%** |

FIGURE 5

## Blower Door Test Results by Building Volume

| BUILDING VOLUME (CUBIC FEET) | RETROFITS | AVERAGE CFM 50 REDUCTION | AVERAGE CFM 50 % REDUCTION |
|---|---|---|---|
| 10,000-15,000 | 1 | 1,116.00 | 31% |
| 15,000-20,000 | 5 | 1,495.60 | 24% |
| 20,000-25,000 | 18 | 2,579.50 | 29% |
| 25,000-30,000 | 3 | 3,481.33 | 34% |
| 30,000-35,000 | 4 | 3,767.50 | 32% |
| 35,000-40,000 | 1 | 2,859.00 | 28% |
| **Total** | **32** | **2,606.19** | **29%** |



Statistical t-tests were analyzed to determine if any of the installed air sealing measures had more measurable impacts on air sealing results than others. While the sample size of each measure type was not sufficient to conclusively show the impact of most of the measures, Attic (Cockloft) Air Sealing and Sealing General Penetrations to the Attic Cavity were found to have had a significant impact on CFM reduction. Houses with these measures installed had over a 1000 CFM greater reduction than those that did not. This is especially important because these are the measures that complement attic insulation. When a contractor installs insulation, they typically must create an access hole to the attic cavity. While this may not make sense when doing simple air sealing work, the air sealing that can be done while that cavity is open has now been shown to have a significant impact on the overall achievable infiltration reductions. Therefore, when pairing air sealing and insulation work together in these buildings, the overall impact is greater than what one would see by doing only one or the other.

**The average air infiltration reduction was 29%, with four homes achieving reductions of 50% or more.**

# EnergyFit NYC Pilot Final Scope of Work

The EnergyFit NYC Pilot is an extension of Pratt Center's Retrofit Standardization Study. As part of the Study's first phase completed in 2014, Pratt Center identified a "Starter Package," a standard set of measures applicable to all 22 two-family buildings in the Study's data set, which consisted of air sealing the residences and basement, air sealing and insulating the roof hatch, replacing incandescent lightbulbs with LEDs, installing low-flow showerheads and aerators, insulating basement pipes, and health and safety testing and upgrades. A variation on this package included attic air sealing and insulation, a measure that is widely known to have a significant impact on energy savings. However, within the Study sample, the need for attic insulation was only found in a smaller subset of buildings and as such was not included in the Starter Package.

When the EnergyFit NYC Pilot began, Pratt Center sought to confirm the opportunity to implement the Starter Package during its first 15 Assessments.

These initial assessments demonstrated that in fact, the need for attic insulation was much greater than originally thought. Of the 89 Assessments completed, 30% of homes were found to have no attic insulation, and 51% had poor attic insulation (defined as insulation estimated to be under R-10).

Additionally, through the Intakes and the Assessments it became evident that many homeowners had begun replacing their incandescent lighting in the two years since the original Retrofit Standardization Study was conducted. While many homes still had incandescent lights that should be replaced, the need for LED lighting was less universal. To accommodate the higher priced (and more widely needed) attic insulation and to ensure that a consistent scope of work was installed in each home, Pratt Center opted to modify the package of measures in the Pilot.

Ultimately, it was decided attic air sealing and insulation would replace the lighting, showerheads, aerators and pipe wrap from the package to have a consistent scope of work in each home and to better assess savings associated with tightening the building envelope, which all of the homes required. Additionally, savings associated with lighting, pipe wrap, and low-flow fixtures are widely agreed upon, and further research was less critical. However, in recognition that these measures can still have a significant impact on a building's energy use, the need for these measures was tracked in each assessment and will be incorporated into the final evaluation. The range in need for these measures was wide. For example, in the 89 homes that received an assessment, there was the opportunity to replace some incandescent lightbulbs per home. However, while the need averaged 30 incandescents per home, it ranged from 0 to 86 (with a median need of 6) with 90% of assessed homes needing at least four bulbs replaced. In the final post-retrofit analysis, planned for Spring 2017, Pratt Center will factor in the expected savings (using Deemed Savings from the New York State Technical Resource Manual) these measures would have had on the retrofit package had they been installed in the homes that needed them. This will help inform potential variations or additions to the Pilot's package of measures.

**Ultimately, it was decided attic air sealing and insulation would replace the lighting, showerheads, aerators, and pipe wrap from the study package to have a consistent scope of work in each home and to better assess savings associated with tightening the building envelope, which all of the homes required.**

## HEALTH AND SAFETY

While the goal of most energy efficiency programs, including EnergyFit NYC, is to reduce energy usage and carbon emissions, an equally important benefit is resolving health and safety issues of which homeowners may not be aware, and which can be quite dangerous. During the assessments, NYSEA evaluated each home with health and safety testing outlined by the Building Performance Institute's (BPI) 1200 Standard. The BPI 1200 standard requires testing for the presence of gas leaks and checking for the presence of asbestos-like and mold-like materials and the need for ventilation and CO/smoke detectors. In addition, NYSEA tested the combustion equipment (i.e. boiler, furnace and/or hot water heater) for spillage and draft, two issues that can lead to high carbon monoxide levels but can almost always be resolved by a simple clean and tune of the combustion equipment.

The most prevalent safety finding was the need for CO/smoke detectors: eighty-four percent of Assessed and Retrofitted Homes were in need of at least one of these detectors; twenty-seven percent of the assessed homes needed these detectors and also needed a clean and tune, demonstrating the urgency to install CO/smoke detectors as CO levels in those homes were above acceptable levels and homeowners were unaware. During the assessments, NYSEA identified 10 gas leaks. **Figure 5** shows the distribution of the various health and safety issues identified in the Pilot and the number of building occupants affected by the issues.

**FIGURE 5**

Distribution of health and safety issues identified in the Pilot

| | 89 ASSESSMENTS | | | 32 RETROFITS | | |
|---|---|---|---|---|---|---|
| **HEALTH AND SAFETY** | **COUNT OF BUILDINGS** | **PERCENT OF TOTAL** | **NO. OF OCCUPANTS** | **COUNT OF BUILDINGS** | **PERCENT OF TOTAL** | **NO. OF OCCUPANTS** |
| Asbestos-like materials | 16 | 18% | 71 | 2 | 6% | 12 |
| Clean and tune | 25 | 28% | 107 | 10 | 31% | 55 |
| Gas leak | 10 | 11% | 44 | 4 | 13% | 20 |
| Mold-like materials | 2 | 2% | 11 | 0 | 0% | 0 |
| Ventilation | 12 | 13% | 59 | 4 | 13% | 20 |
| CO/Smoke (houses needing 1+) | 75 | 84% | 327 | 28 | 88% | 141 |
| None (excluding CO/Smoke) | 42 | 47% | 175 | 16 | 50% | 71 |
| At least One (excluding CO/Smoke) | 47 | 53% | 214 | 16 | 50% | 87 |
| Need CO/Smoke & Clean and Tune | 24 | 27% | 103 | 10 | 31% | 55 |

## HOMEOWNER FEEDBACK

Pratt Center conducted follow-up interviews with each of the 32 homeowners that received a retrofit. Sixty-nine percent of homeowners reported in post-retrofit interviews that they or their tenants immediately noticed differences in their comfort level in their home. These included mentions of the building's temperature level feeling more comfortable without the need for interventions such as AC or heating, a reduction in draftiness and even at times smells from neighboring buildings no longer bothering them.

"There was a **big drop in my energy usage this summer,** despite it being hotter than last summer."

"We noticed **how much less frequently we used our AC** this summer than last."


**"I didn't realize how much cold air was coming in from the attic space.** I had replaced my windows thinking that would do the trick but it didn't. This project really helped and **my tenants are not complaining anymore!"**

"The Pilot has **made me start thinking about other ways I can green my life.** It's easy to talk about energy efficiency but it is hard to know how it will really impact you until you do a project like this."

**"I learned so much about my home.** I had no idea there was even an attic space that could be insulated."

# Eligibility restrictions used in the Pilot would not be replicated in a larger, citywide program

Pratt Center opted to restrict eligibility in the Pilot to one- and two-family, fully attached, gas heated masonry homes built before 1930 to establish a full data set of buildings with similar characteristics. However, the standardized approach and the EnergyFit protocol could translate to other typologies such as three- and four-family buildings, buildings with a differing attached status or homes with electric or oil heat. Wood frame homes could also be considered for the standardized approach. Similarly, most of the secondary eligibility criteria utilized for the Pilot that were the main reasons a homeowner was not selected to move to the next stage were due to the Pilot's specific research protocol and would not be inhibitors in a larger, citywide program. These include:

## ESTIMATED ENERGY BILLS

The number one reason besides not meeting the basic eligibility requirements (1-2 units, attached, masonry, gas heated homes built before 1930) that homeowners were ineligible to participate in the Pilot was a lack of actual meter readings on their utility bills. In order to complete the planned post-retrofit analysis, it was critical to only enroll homeowners who had energy bills showing actual meter reads, as opposed to estimated bills, for at least one year prior to the retrofit in order to have accurate baseline data. Many homeowners had numerous estimated meter reads, which would have limited Pratt Center's ability to accurately account for the retrofit's impact on the post-retrofit usage of the building. However, in a larger, citywide program, estimated billing would not pose the same challenge since post-retrofit analysis would not be required for each home. Therefore, estimated bills would not preclude a homeowner from moving forward with a retrofit. Additionally, National Grid and Con Edison are in the process of installing or planning to install remote meter readers, further reducing the likelihood that this will be an issue in a larger program, even if post-retrofit analysis was incorporated.

## ASBESTOS

The EnergyFit NYC Pilot focused on buildings built before 1930, many of which still have asbestos. While most asbestos in these homes is either hidden behind walls and ceilings and/or in an undisturbed state around basement pipe wrap, Building Performance Institute (BPI) guidelines prohibit blower door tests to be performed in homes where there is a risk of asbestos particles becoming airborne. Blower door tests, while not required for the retrofit, were critical for research purposes as a main preliminary data point of the retrofit's impact prior to the full post-retrofit utility analysis one year later. While guided blower door air sealing is helpful in achieving air infiltration reductions, in a full roll-out of the program, the blower door numbers would not be required and the guided air sealing unnecessary as the air sealing approach has already been tailored to the specific building type.[12]

## INCONSISTENT/INSUFFICIENT OCCUPANCY

Several homeowners who were interested in participating in the Pilot had either recently moved into their home or did not consistently use their second unit but kept it available for interim guests (e.g. AirBnB). Both of these scenarios would limit the establishment of a clean, baseline data set for the Pilot's final analysis. Similar to the issue with estimated energy bills, this type of analysis is not likely to be needed in a larger program. Recent or planned renovations, recent installation of solar panels, and other home improvements that impact energy use would also not likely limit a homeowner's participation in a future program.

Two of the reasons that prevented Pratt Center from selecting a home to move forward from assessment to retrofit that would remain if a future program maintained the same scope of work was the presence of adequate existing attic insulation and insufficient access to the attic cavity to install insulation. Twenty-one percent of homes that had an assessment were ultimately deemed ineligible because of adequate existing insulation. Six percent needed insulation, but there was not a cost-effective way to install it within the Pilot's budget due to the limited access points. Seventy-three percent of homes that received the assessment needed attic insulation and had sufficient attic access, demonstrating the value in including attic insulation in the standard package.

12. Pratt Center and NYS Energy Audits attempted to identify a reputable asbestos removal contractor to confirm the presence of asbestos in certain homes where asbestos-like material was found, but were not successful in the limited timeframe available for the retrofits to be completed. Future programs that wish to include blower door tests would likely need to have an asbestos contractor on retainer to perform asbestos abatements in a timely manner.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# Preliminary Findings

**Despite New York City and New York State's ambitious policies to dramatically reduce carbon emissions and energy use, existing energy efficiency programs have had limited traction in the city's one- to four-family building stock, a set of homes that account for 17% of New York City's carbon emissions.**

In recognition that many of the current programs:

- do not meet the needs of urban homeowners and the specific housing stock they live in,
- are too expensive for most moderate-income homeowners who cannot afford the costs of retrofits, even when accounting for available subsidies,
- require an energy audit, a prerequisite that is time-consuming, confusing and often a hurdle homeowners cannot move beyond,

Pratt Center designed the EnergyFit NYC Pilot to test a different, improved approach. The primary objectives of this Pilot are: (1) to greatly increase the number of home energy retrofits in the one- to four-family residential marketplace, (2) to enable homeowners to easily and efficiently reduce energy consumption and costs and address health and safety issues, (3) to reduce soft costs for contractors to facilitate job creation and incentivize more contractors to join the energy retrofit marketplace, and (4) create a model that can be expanded to a citywide program.

EnergyFit NYC seeks to bypass the need for a comprehensive energy audit and energy modeling by offering a standardized package of energy efficiency and home improvement measures based on building typology. By streamlining the process, this offering makes it:

- **Easier for homeowners** to understand the scope of work included in the retrofit by offering a specific package tailored to building typology with predictable interventions. This minimizes the complexity of energy audits that often include a laundry list of options that can overwhelm and confuse homeowners.
- **Quicker for homeowners** by requiring only a short assessment and a retrofit scope of work that can be completed in one day. This reduces the need for homeowners and tenants to take time off from work and time required in tenants' units. Providing a quick turn-around from beginning to end ensures the homeowner is less likely to disengage from the process.
- **Cheaper for contractors** by reducing soft costs, providing a standardized package offering with a clear price structure, and easing the way for an aggregation model. A standard package can also be set at a price point that is realistic for homeowners to finance and/or the City or State to support with incentives.
- **Scalable and replicable for cities** seeking to dramatically expand implementation of energy retrofits in urban and suburban communities with residential building stock redundancies.

Based on the experience during the six months of the Pilot's implementation and the interim analysis of the data gathered to date, the preliminary findings are:

1

## Similar homes call for similar energy efficiency measures

The Pilot confirmed the underlying hypothesis that necessary energy efficiency measures were consistent in buildings built during a similar time of similar materials. By focusing on one- and two-family, attached, masonry, gas-heated homes built before 1930, the Pilot proved that there was overwhelming consistency in the need for the measures included in the retrofit package. The final analysis will conclude the exact range of energy and cost savings retrofitted homes experience, but the air infiltration reduction data indicates that the retrofit had a positive and significant impact on tightening the building envelope in every home. While blower door tests are not a one-for-one indication of energy savings, a 29% average in air infiltration reduction is an encouraging data point.

more recently built homes as well, demonstrating demand across multiple building types. EnergyFit's offer of a deep subsidy to cover the cost of the retrofit is likely a large contributor to the high demand. However, homeowners across income bands sought to participate, including low-income homeowners who are already eligible to receive free retrofits through existing programs,[13] moderate income homeowners who have some incentive options through NYSERDA's Assisted Home Performance with Energy Star® but still struggle to afford the discounted rates, and those with higher incomes who could arguably afford to pay for the retrofit but are lacking the time or information on how to pursue home energy efficiency work or lack confidence in finding trustworthy contractors.

2

### Homeowners immediately experience the benefits of the standard package

In addition to saving energy, the retrofit package was designed to make homes more comfortable by reducing draftiness and the need to overheat some rooms to compensate. In follow-up interviews with participating homeowners, almost all reported improved comfort in the home immediately after the retrofit.

***"It was very apparent how much more comfortable we were in the house than before. That is reason enough to do a retrofit."***

3

### Energy efficiency home improvements are in high demand

The high response rate from Pratt Center's outreach indicates great interest in the marketplace for assistance with home improvement and lowering energy use and costs. EnergyFit NYC outreach focused on low-income communities and homeowners of one- and two-family, attached, masonry, gas heated buildings built before 1930. Nonetheless, interested homeowners included those in three-and four- family buildings, semi-detached and detached homes, wood framed homes, electric and oil heated homes and

4

### Homeowners desire a simple, user-friendly energy retrofit process

Clear, transparent communication and an easy-to-understand process are key elements to the successful execution of an energy efficiency program. Many homeowners during the intake stage stated that they had intended on tackling draftiness and energy efficiency in their home for quite some time but either did not know who to contact or what to do. Some reported that they had tried to participate in other energy efficiency programs but felt they were too complicated or felt uncomfortable with the lack of transparency in pricing of

13. There are currently several programs, including NYSERDA's Empower program and the Weatherization Assistance Program, that offer energy efficiency retrofits (of varying scope) free of charge to qualifying, low-income homeowners.

***"It happened quicker than I thought, with not too much administrative burden. I like that it wasn't a long lengthy process."***

measures when the programs only allowed for a quote from one contractor. The straightforward nature of the Pilot, including an upfront description of the work that would and would not be performed in the home, made it easier for homeowners to quickly decide if they wanted to participate in the Pilot. Even those homeowners who recognized that there were many simple energy saving measures they could undertake themselves such as changing light bulbs or caulking around leaky areas had not done so, and others who were less likely to take a DIY approach did not have a "go to" contractor for this type of work. The pre-determined nature of the standardized package eliminated several decision points, contributing to a more simplified process.

Pratt Center's initial screening process enabled staff to follow up by phone with only those homeowners who met the Pilot's basic eligibility. That subsequent intake conversation followed by timely, consistent and informative communications as a homeowner moved through the stages of the Pilot proved critical in forming a trusting relationship with the homeowner and ensuring client satisfaction. In post-retrofit follow-up, homeowners highlighted that the Pilot's transparent and timely customer service, including the professional and on-time contractor that was verified by Pratt Center, were favored features of their participation. This demonstrates that detailed interaction with the homeowner at each stage is critical to homeowner engagement.


5

## A standardized approach can shorten the process from outreach to retrofit completion and bring welcome convenience to homeowners

A major complication in most of the current programs is that there are many steps between a homeowner expressing interest in energy efficiency and that homeowner actually going forward with the retrofit. By eliminating the energy audit, implementing a semi-automated screening process and having a clear progression of decision-making, Pratt Center was ultimately able to reduce the time from a homeowner filling out the online Interested Homeowner Form to that homeowner receiving a retrofit to just three days. A key contributor to the short process was the online app Pratt Center used in each step including to identify potentially eligible homeowners to have the intake call with and for NYSEA to upload their assessment report so Pratt Center and CLEAResult could quickly and easily review and select qualifying homes for the retrofit. Since many of the usual steps (e.g. finding an energy auditor/contractor, conducting the energy audit, performing individualized

energy modeling, reviewing and understanding the recommended measures and costs from the audit, applying for a loan, etc.) were not part of the Pilot, a homeowner was able to quickly get to "Yes." Similarly, since the assessment took only 90 minutes and the retrofit one day, homeowners needed to take fewer days off work to participate, another obstacle in other programs, especially for lower-income homeowners.

***"As soon as the attic was insulated we didn't need to have our heat on. The house was noticeably warmer."***

Pratt Center had initially hoped to reduce this timeline even further by having the assessment and the retrofit take place on the same day. However, the number and breadth of the health and safety issues that need to be resolved before a full retrofit crew begins the work in a home will almost always require there to be some time, even if just a day, in between the assessment and the retrofit. However, some of the quick measures that were taken out of the Pilot (see page 17) but likely could be added to a larger program–such as LED light bulbs and low-flow water fixtures–could be installed during the assessment, limiting the amount of time needed on the day of the retrofit.

A big obstacle in the existing market-based programs is financing. Since all but up to $250 of the retrofit cost was covered by the Pilot, homeowners did not have to consider or apply for a loan. If the timeline is to remain short in a larger program, an easier and streamlined financing process than what is currently in the market will have to be introduced.

6

## Resolution of health and safety issues should be part of any energy retrofit program.

Excluding the need for CO/smoke detectors, which are simple to install and relatively inexpensive, half of the homes (both assessed and retrofitted) had at least one health and safety issue. In some cases, these issues were easily resolved by NYSEA, but in others, it required a service call by NYSEA's sub-contractor. Still, in others, such as for the abatement of asbestos-like materials, roof leaks, or venting that required puncturing the roof, it required a professional that was not under contract for the Pilot. A large-scale program, even with a standardized approach, will still need to include a plan for resolving these health and safety issues promptly so as not to exclude a large swath of buildings from participating.

7

## Contractor feedback has been positive and opportunities to reduce soft costs exist.

Prior to finalizing the Pilot design, Pratt Center hosted a focus group with seven local Home Performance Contractors, all of whom saw the potential for a greater number of retrofits in NYC through a standardized approach to retrofits. The contractors identified high soft costs as a major detractor to having a more robust crop of Home Performance Contractors in the City, especially compared to other areas of the state. Specifically, contractors considered energy audits (and the accompanying required energy modeling) as deterrent loss leaders and "doing business in NYC" costs, which fall into the same category of costs associated with traffic, looking for a parking spot, parking tickets and other costs accrued by traveling across the five boroughs.

***"The work was completed in one day with very little disruption and continuous communication about the process. Everyone involved did what they said they would do when they said they would do it. It was seamless."***

The Pilot sought to address these issues through program design. Eliminating the need for individual auditing and energy modeling and replacing it with a pre-set package of measures tailored to a particular building type cut down on the aforementioned soft costs. Reducing the number of home site visits the

contractor had to make to complete a retrofit cut down on the "doing business in NYC" costs. Eliminating the required blower door test during the assessment could allow for even further reduction in these costs if the contractor's assessor could travel to sites by public transit since they had limited tools to carry. One other way that costs could be cut is through aggregation of projects, which minimizes travel time and outreach costs for contractors. The Pilot showed that there is a great deal of opportunity for aggregation with clusters of interested homeowners coming from the same neighborhoods and often, the same street within a neighborhood.

In the Pilot, Pratt Center was responsible for all the homeowner recruitment and screening, providing NYSEA with "clients" without them having to conduct any marketing efforts. While it is likely that contractors would play a more active role in recruiting their own clients in a larger program, having a clearly defined and priced product to offer that can be completed in a short timeframe, with limited decision points for the homeowner throughout the process, will likely keep these soft costs to a minimum. Feedback from contractors confirmed that this simplicity would help them sell the program.

# Next Steps

**Over the next eight months, Pratt Center will periodically follow up with the 32 homeowners who received retrofits to gather feedback on the Pilot's impact.**

During these surveys, staff will discuss the homeowner's perception of changes in their energy use and home comfort as well as inquire of any modifications to the building that may impact energy use, such as any home repairs, occupancy changes, or new energy-intensive purchases. Pratt Center will also be tracking monthly usage to ensure actual readings are submitted for analysis.

After the winter heating season of 2017 has concluded, the research team will conduct a weather normalized, post-retrofit utility bill analysis on each of the homes to quantify energy use and cost savings. In the Spring of 2017, Pratt Center will release a report with its comprehensive analysis of the Pilot's impact and the opportunities to use a standardized approach to retrofits as a means to scale energy-efficiency projects in the one- to four-family building stock in New York City. This report will look at the cost-effectiveness of the package and its overall applicability to the one- to four-family market.

# Conclusion

**New York City's small homes present a singular opportunity to help both New York State and New York City achieve their goals to reduce carbon emissions and energy consumption, preserve affordable housing and create jobs.**

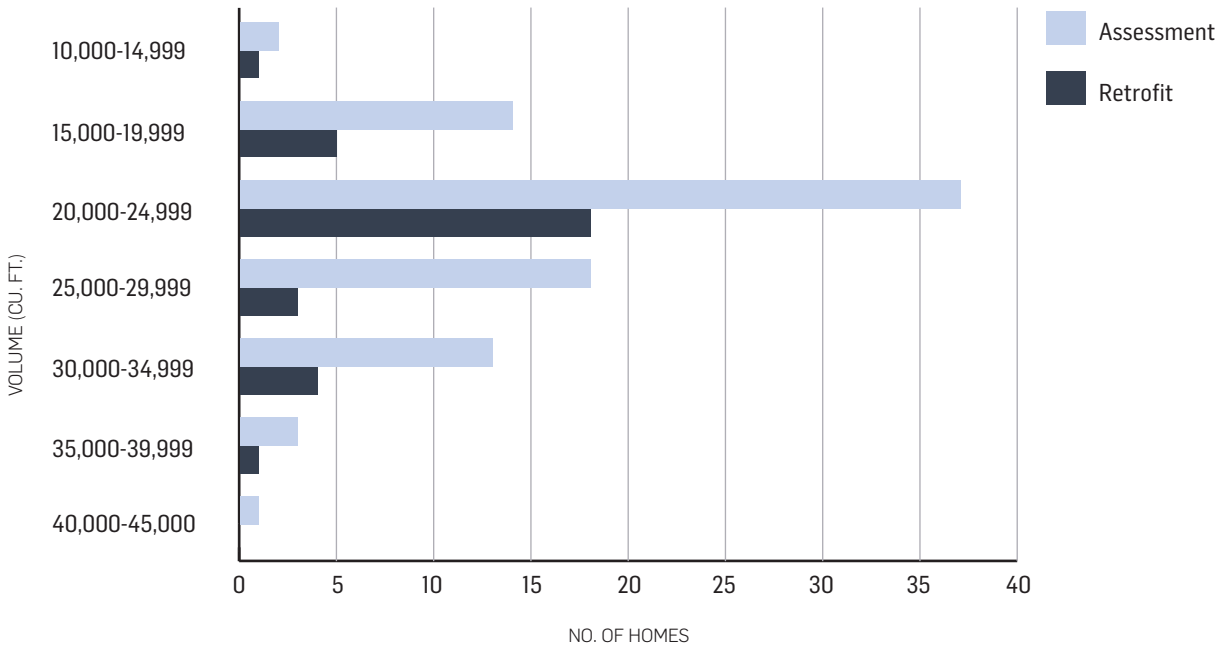
There are over 863,000 one- to four-family homes in NYC, about two thirds of the city's building stock. These small buildings house about 37% of the city's residents and together generate approximately 17% of the city's carbon emissions. If even half of these homes are retrofitted to reduce energy use by up to 20%, the potential savings to homeowners and the substantial emissions reductions would position this programmatic solution as a formidable ally of New York State's Reforming the Energy Vision (REV) strategy.

The EnergyFit NYC Pilot seeks to capitalize on the considerable redundancy in New York City's building stock to increase retrofits in one- to four-family homes by testing a standard package of energy efficiency measures in structurally similar dwellings. If proven effective, the standard package could be replicated at scale in a more efficient, cost-effective manner than is currently possible and catalyze the dramatic expansion of residential energy efficiency adoptions in communities across New York City and New York State. Pratt Center looks forward to completing the analysis of the Pilot's retrofitted homes by Spring 2017 and publishing EnergyFit NYC's complete findings to advance a strategic agenda for the standardized measures approach.

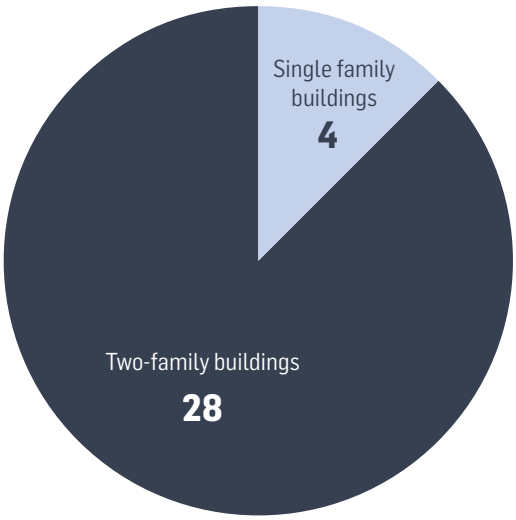
Under the auspices of the REV effort, the City, State, utilities and other stakeholders are looking for new approaches to energy retrofits that expedite the New York retrofit market, provide a vehicle to engage low- and moderate-income communities and support the development of local contractors. EnergyFit NYC offers a promising approach to meeting all of these goals.

# Appendix

## BUILDING VOLUME DISTRIBUTION




## HOME RETROFITS BY NUMBER OF UNITS




## HOME ASSESSMENTS AND RETROFITS BY NUMBER OF OCCUPANTS

| TOTAL NO. OF OCCUPANTS PER BUILDING | NO. OF HOME ASSESSMENTS | NO. OF HOME RETROFITS |
|---|---|---|
| 1 | 1 | 0 |
| 2 | 14 | 3 |
| 3 | 12 | 4 |
| 4 | 27 | 7 |
| 5 | 13 | 6 |
| 6 | 12 | 7 |
| 7 | 4 | 2 |
| 8 | 3 | 1 |
| 9 | 3 | 2 |
| | 89 | 32 |

| HEATING SYSTEM TYPE | ASSESSMENTS | RETROFITS |
|---|---|---|
| Furnace | 26 | 11 |
| Steam Boiler | 31 | 11 |
| Hydronic Boiler | 34 | 12 |
| TOTAL* | 91 | 34 |

*Note, three assessments had both a boiler and furnace. Two of these went to retrofit.

| AIR CONDITIONING TYPE | ASSESSMENTS | RETROFITS |
|---|---|---|
| Central Air (ducted) | 7 | 2 |
| Central Air (ducted),Ductless Mini-split | 1 | 1 |
| Central Air (ducted), Window AC | 4 | 1 |
| Central Air (ducted), Window AC, Ductless Mini-split | 0 | 0 |
| Ductless Mini-split | 3 | 1 |
| Window AC | 58 | 20 |
| Window AC, Ductless Mini-split | 8 | 2 |
| No Air Conditioning | 8 | 5 |
| TOTAL | 89 | 32 |

| AIR CONDITIONING USAGE | ASSESSMENTS | RETROFITS |
|---|---|---|
| Always | 13 | 4 |
| Frequently | 31 | 10 |
| Occasionally | 35 | 12 |
| Never | 1 | 0 |
| Not sure | 1 | 1 |
| No Air Conditioning | 8 | 5 |
| TOTAL | 89 | 32 |

# Acknowledgments

Year-1 of the EnergyFit NYC Pilot was generously funded by the New York City Council and Council Speaker Melissa Mark-Viverito in the NYC Fiscal Year 2016 budget. Additional funding support for Year-1 was provided by NYC Councilmembers Robert Cornegy and Brad Lander.

Pratt Center thanks Citi Community Development, David Rockefeller Fund, LISC New York City, Mizuho USA Foundation, New York Community Trust, NYS Pollution Prevention Institute, Rockefeller Brothers Fund, and State Farm for supporting earlier phases of this study.

Pratt Center gratefully acknowledges the contributions of Eco-Strategies Consulting, CLEAResult and Bright Power, Inc to this Pilot project. Home performance services were provided by NYS Energy Audit. Pratt Center also thanks all the homeowners and tenants who participated in the Pilot.

The assistance of Pratt Graduate Fellows and Interns Kellan Cantrell, Abigail Ellman, Ellie Musgrave, Samudyatha Mysore, Rebecca Pryor, Sarita Rupan, Sonke Schmacker and Renae Widdison is greatly appreciated.

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ENERGYFIT NYC
BRINGING SAVINGS, HEALTH AND COMFORT HOME

PRATT CENTER
FOR COMMUNITY DEVELOPMENT

The Pratt Center for Community Development has worked for the past 50 years for a more just, equitable and sustainable city for all New Yorkers by empowering communities to plan for and realize their futures. As part of Pratt Institute, we leverage professional skills – especially planning, policy analysis, and advocacy – to support community-based organizations in their efforts to improve neighborhood quality of life, attack the causes of poverty and inequality, and advance sustainable development.

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