Using Program Outreach to Advance Regulation and Drive Energy Efficiency

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ABSTRACT

Since 2012, the NYC Clean Heat program has helped over 5,000 buildings convert from the heavy heating oils, No. 6 and No. 4 oil, to cleaner fuels. By combining targeted outreach with individualized technical assistance, NYC Clean Heat proved a successful program for mobilizing the building stock in New York City to take action, save money, and help improve citywide air quality. Driven by regulation with a local law this model encouraged buildings to go beyond compliance and leapfrog to the cleanest available fuel. This program model, which served as a hub of resources for buildings, was recognized for its' success and expanded to address building-wide energy efficiency work instead of solely focusing on heating. This program is called the NYC Retrofit Accelerator and was launched by NYC Mayor Bill de Blasio in September 2015. NYC is the testing ground for this energy efficiency accelerator program, but the model has the potential to be used in cities across the country – and around the world. Many cities and states have resources and incentives for energy efficiency, but getting the work done can be a complex, daunting process for buildings. This program model makes it as easy as possible for building owners and operators to act. This paper will describe the model, including its outreach, technical assistance, and connection to financing, and explore how the model can be adapted by other cities based on their specific needs and serve as a catalyst for achieving higher levels of energy efficiency in cities worldwide.

INTRODUCTION

New York City is a metropolitan area with an old and heavily dense building stock, which accounts for nearly 75% of the citywide greenhouse gas emissions. As a city known for leadership in sustainability, former Mayor Bloomberg and Mayor Bill de Blasio have gone to great lengths to use innovative approaches to solving the climate challenges facing the city. Through the NYC Clean Heat model, the city dramatically reduced citywide air pollution by switching buildings to cleaner-burning heating fuels. Building on that program's success, the mayor turned next to energy efficiency in buildings. These programs, currently only in use in New York, would prove beneficial to cities across the country, and across the globe.

This paper lays out the program model of NYC Clean Heat and its successes, and postulates that the program's basic model could be used as a catalyst for energy efficiency work in any city. By taking the core program elements of: targeted outreach to buildings, individualized technical assistance, and connection to financing mechanisms, we plan to create a toolkit for other cities to create such a program, taking into account and adapting to the unique setting in any given place.

New York City has benefited from NYC Clean Heat, and Mayor de Blasio feels it is a trusted enough program to take its core components and focusing them on energy efficiency

instead of only heating fuels. Buildings are responsible for three quarters of the city's GHG emissions, which means that they are a crucial component of the City's emissions reduction strategy.

By combining outreach to all eligible buildings with as much assistance as the building needs to guide them through the work, and connecting them to any financing they may need, such a program would accelerate the uptake of energy efficiency work. There are many options available for buildings, and what was often most valuable from the program was simply helping buildings make sense of the options. By making a complex process as simple as possible, buildings were more likely to do the work, and more quickly.

NYC Clean Heat was the first step. By taking the successes and lessons learned from this program, which addressed a singular issue, we aim to create a toolkit for other cities to use in spurring energy efficiency work.

HISTORY OF NYC CLEAN HEAT

Black smoke emitted from chimneys was no strange sight in New York City only several years ago. After several studies to understand what produced the smoke, both the City of New York and Environmental Defense Fund (EDF) found that certain heating oils used in buildings emitted highly polluting soot that was acutely harmful to public health. Fine particulate matter (called PM2.5) and chemicals such as sulfur dioxide and metals such as nickel were emitted, and greatly impacted the health of New Yorkers. When inhaled, these pollutants lodge in the lungs and can cause or exacerbate existing respiratory and cardiovascular health issues.

In 2010, Local Law 43 was enacted by then-Mayor Bloomberg to achieve a cleaner air environment. This law requires all buildings – public or private, residential or commercial – in New York City to convert their heating oil to cleaner options such as Ultra-low Sulfur (ULS) No. 2 oil, biodiesel, natural gas, or steam. All new boiler or burner installations must utilize one of the cleanest fuels. The New York City Department of Environmental Protection (DEP) provided regulation in 2011 that introduced phase out dates for heaving heating fuels. By June 30th 2015, all buildings burning No. 6 oil are required to convert to cleaner fuels. This law also mandates the sulfur content in heating oil No. 4 particulate matter reduced by half. Furthermore, all heating oils statewide must contain 2% biofuel. By January 1, 2030 all New York City buildings burning No. 4 heating oils will have to switch to cleaner fuels. On top of that, Mayor Bloomberg set a goal to reduce particulate matter (PM2.5) pollution by 50% in only a few years.

To help buildings with the complex process and accelerate the transition to realize health benefits more quickly, EDF and the City of New York created NYC Clean Heat as a resource for buildings. The Mayor's Office of Sustainability (formerly the Mayor's Office of Long-Term Planning and Sustainability) and EDF launched the NYC Clean Heat Pilot in 2011. The program collected data from various City agencies to create an outreach strategy to reach buildings in need of assistance. By looking at both the areas with the highest density of buildings burning No. 6 or 4 oil, as well as buildings using the most No. 6 or 4 oil, NYC Clean Heat built their outreach strategy around these focal areas.

After working to contact decision-makers at each building, the team would offer free assistance with all the technical matters of the conversion process. If the building needed financial aid, NYC Clean Heat would connect them to various existing incentives or financing mechanisms. Though NYC Clean Heat offered no direct financing, the program worked closely with the New York City Energy Efficiency Corporation (NYCEEC), as well as local utilities

offering incentives such as Con Edison and National Grid, and state entities such as the New York State Research and Development Authority (NYSERDA).

With a program development team and a single Account Manager, the Pilot program strategized innovative methods to provide assistance to property managers and building owners complying with Local Law 43. During the pilot program period, NYC Clean Heat worked to build its pipeline of projects, and gathered over 1,200 properties. The pipeline contained various NYC buildings; from different boroughs, constructed in different years, and funded through different revenues. NYC Clean Heat buildings also included market rate, subsidized, and affordable housing. This pipeline represented 10% of the overall 50% PM2.5 reduction goal. The Pilot program also identified the resources necessary to reach the ambitious 50% reduction in PM 2.5 emissions by analyzing the data available and establishing a pipeline of conversion projects.

NYC Clean Heat pilot program expanded to a full implementation program in June of 2012. The program launched a full website including the interactive Spot the Soot map, which identified every building burning No. 6 or 4 oil in the city. Full implementation also brought on three additional full-time Account Managers to conduct building outreach and technical assistance, and the program began partnering with community and trade organizations in order to maximize communications. The resources of the full program team drove success in part due to the continual evolution of messaging and outreach strategies developed to encourage conversions in targeted buildings. Some of these new initiatives, highlighted in later sections, include:

- Free, online educational webinar series
- ULS 2 Conversion Specialist RFQ and incentive program
- The Property Manager Recognition Program and Program Alert Packages
- Partnering with Mayor's Multifamily Carbon Challenge

RESULTS: PROGRAM EFFECTIVENESS

Key Program Metrics

The NYC Clean Heat program was established as part of PlaNYC's (2007) goal of achieving the cleanest air quality of any major US city, which has been reaffirmed in One NYC (2015). One of the highest impact strategies to achieve this goal is to phase out heavy heating oils. NYC Clean Heat is an accelerator program that was established to reduce the 2011 levels of fine particulate matter pollution (PM 2.5) by 50%; from 746 tons of PM 2.5 to 373 tons. In the most recent New York City Community Air Survey (NYCCAS) report, issued in April 2015, data shows a clear and continued improvement in NYC's air quality. Since 2008, wintertime averages of sulfur dioxide (SO2) have declined by 68%, and annual average fine particulate matter (PM2.5) levels declined by 16%. This has tremendous health benefits, which will be discussed in the NYCCAS section.

Once the original 50% PM 2.5 reduction was achieved, the program launched three continuing goals. The first was to ensure that no buildings remained using No. 6 by the regulatory phase out date of June 2015. The program would also assist at least 1,000 further

conversions off of heavy heating oil, 50% of which must be within targeted neighborhoods or buildings identified as affordable housing (AH)1.

This stretch goal was quickly met, resulting in another stretch goal of another 1,000 conversions to the cleanest-burning fuels (ULS 2, biodiesel, natural gas, and steam), 50% of which should again be AH.

Driving to a 50% Reduction in PM 2.5 Emissions

During June 2014, NYC Clean Heat exceeded the original goal of a 50% reduction in PM 2.5 emissions. The overall 50.48% reduction in PM 2.5 was achieved by over 4,000 conversions, roughly 3,000 of which were to the cleanest fuels. Exact conversion statistics below. As the program continued to accelerate conversions, the focus shifted from building up the pipeline of projects into completing conversions for the projects already in the pipeline.

Driving to a 100% Reduction in PM 2.5 Emissions

Once the original PM 2.5 reduction goal was achieved, NYC Clean Heat continued to pursue additional PM 2.5 reductions from subsequent conversions. However, with the first LL 43 compliance deadline a year away, focus shifted from overall PM 2.5 reduction to all targeting buildings still burning No. 6 oil. In addition, the program began the goals outlined above for overall conversions and conversions in AH buildings. Progress across all program years and metrics, highlighting the progress in the past year, is represented in the table below.

Figure 1: Program Metrics

	Dec. 2012	Dec. 2013	June 2014	June 2015	Progress from June 2014 to June 2015
Total NYC Clean Heat Systems (properties)	3,590	5,556	5,866	6,652	786
Total PM 2.5 Achieved Reduction (tons)	153.53	294.65	376.55	494.90	118.36
Achieved Reduction from cleanest fuels (ULS 2, biodiesel)	113.61	235.56	310.65	418.84	108.19
Achieved Reduction from Low-Sulfur (LS) No. 4	39.92	59.08	65.90	76.07	10.17

[1] Until June 2014, NYC Clean Heat had tracked a variety of metrics synonymous to "affordable housing" which always tracked closely to the overall Clean Heat population in terms of percentage of completed conversions, conversions to the cleanest fuels, and overall activity but the program did not have a goal related to affordable housing.

Completed Systems	1,470	3,202	4,226	5,904	1,678
To the cleanest fuels	1,200	2,368	3,154	4,472	1,318
To LS 4	270	834	1,072	1,432	360
Remaining No. 6 Buildings	3,793	2,319	1,472	75	-1397

Chart 1 shows the progress of key program metrics against totals. The chart demonstrates when the program reached the 50% PM 2.5 reduction goal and that the program has achieved 98.49% of the No. 6 building phase-out goal.

Chart 1: Program Progress
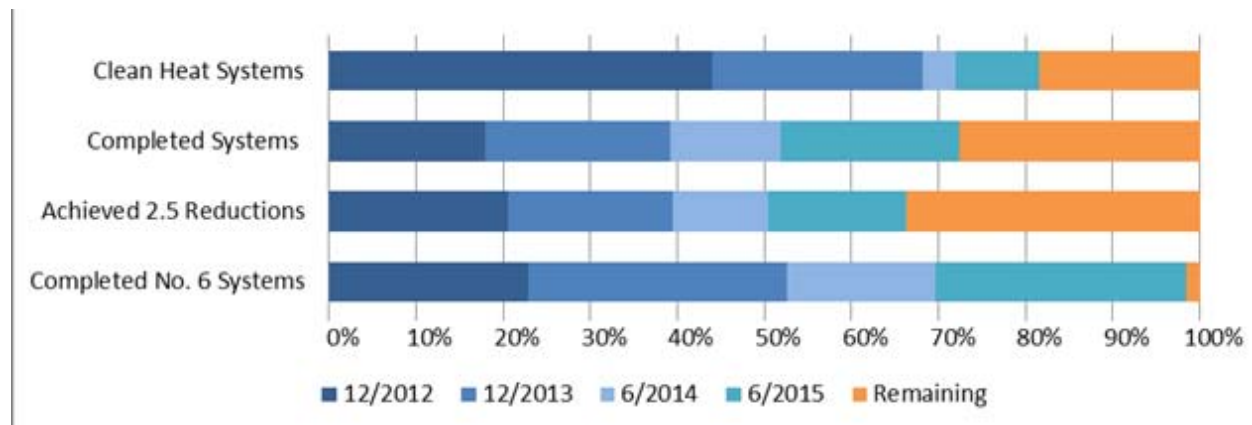
THE PROGRAM MODEL

Targeting Through Data

NYC Clean Heat is a program built on a foundation of data that allowed the account managers to both target buildings for outreach, and assist them in conversion. Data was collected from sources such as the DEP, which held boiler permitting data, as well as the Department of Buildings, Department of Finance, NYPD and NYFD. By creating this extensive data set, NYC Clean Heat could look at the large building stock in NYC with clarity, and track precisely how much pollution buildings were emitting and how much pollution would be reduced when they switched to cleaner fuels. This allowed for a comprehensive strategy to accomplish the ambitious goals set by Mayor Bloomberg, and communicate quantifiable results.

Outreach & Technical Assistance

By identifying the buildings burning the most No. 6 or 4 heating oil, NYC Clean Heat was able to prioritize its focus and realize pollution reduction more quickly, as shown in the

goals described above. By focusing on neighborhoods with high densities of buildings burning this heating oils, the program was able to create immediate health benefits for these neighborhoods. By working with utilities such as Con Edison and National Grid, NYC Clean Heat spurred conversions to natural gas in their service areas.

Another key aspect of the program was communicating goals and results, both to building decision-makers and the general public. The Spot the Soot map showed the sheer density of buildings burning No. 6 and 4 oil in every borough. EDF worked with a company called Carbon Visuals to create graphics showing how much pollution a building emitted in one day, and the reduction when that building converted to cleaner fuels. These helped contextualize the problem for building owners and operators, which helped in the decision-making process, and helped the public to understand why the City was strongly prioritizing this issue.

Though NYC Clean Heat provided no financing directly, there were many financing options and financial incentives available in New York State. NYCEEC, which worked directly with the program, worked to connect buildings with loans and lines of credit. Local utilities offered incentives for converting to natural gas, as well as incorporating efficiency. NYSERDA also offered incentives for efficiency measures taken, conversions to natural gas, conversions to ULS No. 2 oil, as well as the incorporation of biodiesel. NYC Clean Heat worked to assess each building's needs and recommended their best option.

The process of converting requires audits and assessments by building professionals and contractors, working with the building's utility, and filing for various permits with city agencies. Most buildings with larger property management firms did much of this work themselves, but for many buildings without such resources, they were in dire need of assistance. NYC Clean Heat provided the assistance necessary, as much or as little as the building required. Account managers walked building owners through the steps of conversion, coordinating with utilities to ease the process along as quickly as possible. For some buildings the process took months, for others it took years, but the high rate of compliance with Local Law 43 and the rate at which NYC Clean Heat met its goals tells us that many of the conversions moved forward as quickly as they did thanks to program intervention and assistance from the account managers.
The resources of the full program team have been able to drive success in part due to the continual evolution of messaging and outreach strategies developed to encourage conversions in targeted buildings. 2013 saw the launch of five new programs and initiatives:

ULS 2 Conversion Specialist RFQ and incentive program

- Private companies were encouraged to develop incentives and assistance for buildings looking to switch from heavy heating oil to ULS 2 with biodiesel. These companies and their proposed offerings were vetted through a 'Request for Qualification', or RFQ, posted on the City Record. Submissions are still being accepted on a rolling basis.
- Six companies were approved and are now offering unprecedented incentives to help buildings move to cleaner liquid fuels
- For more information, please see http://nyccleanheat.org/content/uls-2-conversion-specialists

Education and events to promote awareness of solar thermal technologies for hot water

- Though the buildings targeted by NYC Clean Heat are generally too large to have entire space heating needs addressed by solar thermal technologies, many buildings in some of the highest impact neighborhoods could cover a majority of their water heating needs with solar thermal.
- A webinar presentation on solar thermal and how it could function for Clean Heat buildings was held in conjunction with the City University of New York (CUNY), the New York City Economic Development Corporation (NYCEDC), and the Department of Citywide Administrative Services (DCAS).
- The program also organized an in-person tour of a solar thermal installation at the St. Mary's Recreation Center in the Bronx, a DCAS installation.

The Property Manager Recognition Program and Program Alert Packages

- Social rewards and pressure can be effective ways of stimulating action in targeted buildings. The Clean Heat program has utilized this in the Property Manager Recognition Program, which recognizes property managers that have moved a majority of their portfolio off of heavy heating oils.
- Fourteen property management companies were recognized for their achievements. For more information, please see http://nyccleanheat.org/content/property-manager-recognition-program
- Program Alert packages utilize the Spot the Soot map and other program resources to increase awareness within a single building or property management firm of the public health impacts of burning heavy heating oil.
- Over 70 Program Alert packages were sent out to buildings and property management firms across the five boroughs and received a 25% response rate from some of the largest and hardest to reach building decision makers.

Mayor's Multifamily Carbon Challenge

- Unlike the other initiatives noted here, this program was not initiated by the Clean Heat program. Program and Account Management staff were invited to join the formation of the Challenge as part of the Technical Advisory Group and in efforts to encourage property management firms to join the Challenge. The Challenge launched in November with 10 participating property management firms.
- In addition to these new programs and initiatives, the program continued two proven outreach strategies from 2012: the webinar series and presentations at workshops and conferences. The program organized eight public webinars in 2013 on topics ranging from boiler operation to Local Law 87 – a law that requires buildings over 50,000 square feet to perform energy audits and submit the data to the City of NY. These webinars reached approximately 300 participants, mainly building decision makers and trades. Program Management and Account staff were also invited to present on Clean Heat at a number of workshops and conferences. Highlights include: NYOHA Spring membership meeting, NYSERDA Multifamily Performance Program Partner Summit, CNYC Housing Conference and Expo, and the NYARM Real Estate Expo.

PROGRAM HIGHLIGHTS

Citizens Budget Committee Prize for Public Service Innovation

In February, 2013, NYC Clean Heat along with NYCEEC received and the Citizens Budget Committee (CBC) Prize for Public Service Innovation. The CBC Prize for Public Service Innovation is awarded annually, in alternating years to either a New York City or a New York State agency, to celebrate creative thinking and share government achievements with the public and other agencies.

NYC Community Level Air Quality Survey Report

In two of the most recent NYC Community Level Air Quality Survey reports, the laws phasing out heavy heating oil have been recognized as a critical component to the pollution reduction and NYC Clean Heat has been recognized as a successful program. Former Mayor Bloomberg celebrated the findings of the 2013 report and results of these programs in a press announcement during Climate Week 2013. This report estimated 800 deaths and 2,000 emergency room visits and hospitalizations prevented annually by the improvements in air quality.

As of April 2016, the stats have continued to improve. As mentioned previously, wintertime SO2 have declined tremendously.

- Wintertime averages of sulfur dioxide (SO2) have declined by 68%
- Annual average nitrogen oxide (NO) levels declined by 24%
- Annual average nitrogen dioxide (NO2) levels declined by 21%
- Annual average fine particulate matter (PM2.5) levels declined by 16%

The decline in sulfur dioxide, in particular, is due in large part to the heating oil regulations and work of the NYC Clean Heat program. Sulfur is linked directly to heating oil pollution, so getting rid of the most polluting heating oils has resulted in this tremendous reduction in sulfur pollution. To quote the report itself, "Across the pollutants evaluated in this report, sulfur dioxide has shown the greatest decline, owing to State and Local efforts to phase out high sulfur heating oils through elimination of Nos. 6 and 4 oils, and reducing the allowable sulfur content of No. 2 heating oil" (p. 21).

The change in PM2.5 and SO2, respectively, is illustrated in Figure 2 & 3 below.

Figure 1: Particulate Matter(PM2.5) Emissions in 2008 and 2014
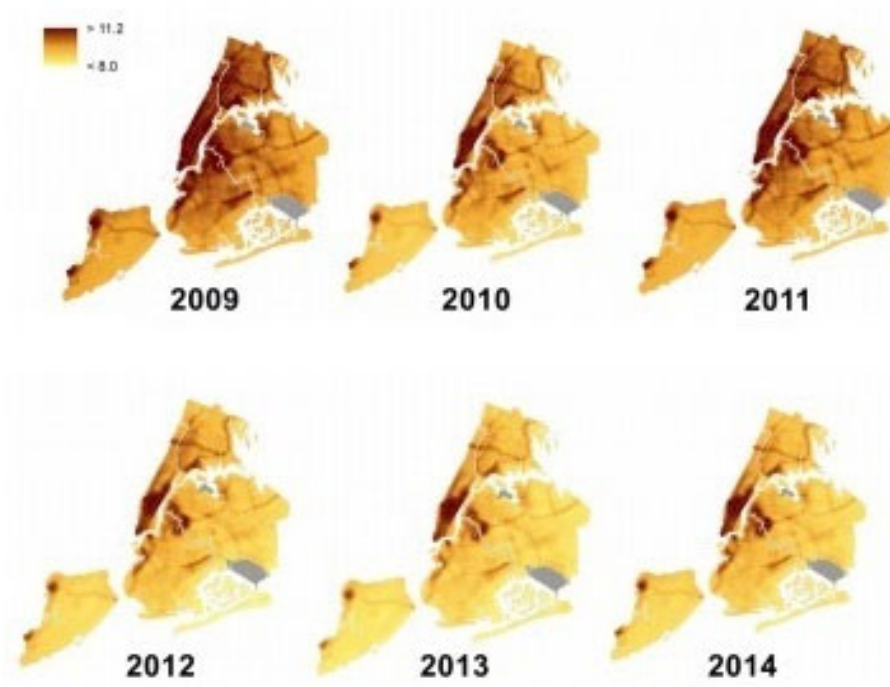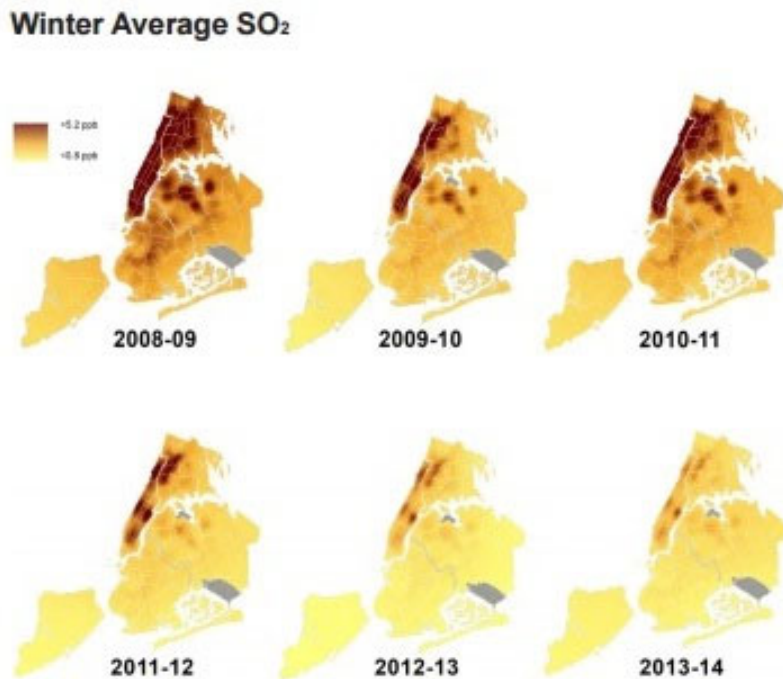

Annual Average PM₂.₅

Figure 3: Sulfur Dioxide (SO2) Emissions in 2008 and 2014

AESP Award

NYC Clean Heat was awarded for Outstanding Achievement in Non-Residential Program Design and Implementation by the Association of Energy Service Professionals (AESP). The award was accepted at the AESP conference in February and then presented to the Mayor's Office at an AESP chapter meeting in March.

EXPANDING THE MODEL

The basic model underlying NYC Clean Heat, as described previously, could be disseminated to cities as a roadmap for catalyzing energy efficiency work. OneNYC, the Mayor's citywide sustainability plan, sets a goal of reducing citywide emissions 80% by the year 2050, and to help achieve this, Mayor de Blasio launched the NYC Retrofit Accelerator in September 2015, during NYC Climate Week, while citing the successes of NYC Clean Heat. Within OneNYC, the NYC Retrofit Accelerator's goal is to spur retrofits in as many as 1,000 properties by 2025, thus cutting citywide GHG emissions by roughly one million metric tons. So far, the Accelerator is building up its pipeline of projects, and the underlying model is continuing

to be honed for peak effectiveness. The foundational model is relatively simple, and could be adapted to many cities around the country – and potentially around the world.

The toolkit for the model will be a guide for other cities looking to accelerate energy efficiency work, to create a program of their own. The combination of focused outreach, individualized assistance for technical issues, and access to financing simplifies the work for buildings, making them more likely to do it and do it well. Cities around the world are proving to be leaders in adapting for climate change, and this toolkit will allow them to motivate their building stock to become more energy efficient.

Every city is different, and each city will require individualized reshaping in order to be successful. Ideally, a city would have several elements already in place to be ready for the application of the model, some of which include: existing benchmarking laws, and governmental leadership such as an Office of Sustainability or a city sustainability plan. Cities that fit this criteria are, for example, Atlanta or Los Angeles. These are cities with existing laws tracking building energy use, and strong municipal leadership. Governmental commitment is key to the execution of the program, as city offices would ideally house the program and manage its implementation, which will require staff and funding. In New York City, the goodwill of the City Council was instrumental in securing funding within the City budget, as well as working to promote the program citywide. A willing mayor and a supportive city council will go a long way toward smooth adoption of the program and support of the work.

APPLICABILITY

Earlier it was suggested that markets with local laws tracking energy use would be logical targets for engagement but the opportunity to apply this model exists in many markets. Key criteria for model adoption include sponsorship from a champion organization, availability of data to support the project, and supportive market conditions. The depth at which this criteria exists will vary from market to market.

Ideally a champion organization will be a governing agency with the ability to establish laws or influence the establishment of laws. Other potential champion organizations include utilities, community organizers, and energy or environmental advocates. Such an organization should be prepared to spend time developing, establishing or cultivating other key criteria. A champion organization is the first key to establishing the model in the market.

Data has been a key driver in moving the model forward in NYC and building level data is essential to evaluating market potential and targeting energy efficiency. Data from benchmarking, energy audits and utility usage data are three categories of data that should be prioritized ahead of any other data. Other available market data should be identified and incorporated if it creates value in model. Examples of data that should be reviewed for incorporation include public records, information that can be derived from public sources such as FEMA Flood map and private data available from market actors.

To identify a market with supportive market conditions, a review of existing market conditions should be undertaken. This activity is typically led by the champion organization or a partner. This review should examine all influencing factors including; the state of energy efficiency policy, building codes and associated adoption rate, workforce knowledge of energy efficiency and resources to support, conduct and implement energy efficiency. The state of the market should be considered closely before engaging in this model.

Is your city prime to launch a model like this? While there is potential for the model in every city those municipalities with a commitment to energy efficiency, sustainability or environmental policy are top candidates. This commitment may emerge outside of the policy realm and be characterized by a large number of benchmarked buildings or regulation that require energy reporting. Finally, a commitment to supporting energy efficiency through the presence of funding or a mechanism to support funding is equally important.

CONCLUSION

Cities around the U.S. and around the world are proving to be leaders when it comes to climate change adaptation. For dense urban areas, a significant portion of this work is connected to buildings. As one of the largest, most dense cities in the U.S., New York City is committed to reducing building energy use, and therefore GHG emissions. Learning from the successes and challenges of the NYC Clean Heat program, the NYC Mayor's Office has launched the NYC Retrofit Accelerator program to help buildings become more energy efficient.

What is being done in NYC can be useful to cities across the country, and we intend to communicate lessons learned. We will aim to create a website of resources for buildings, and experts willing to speak with any interested parties. By sharing lessons learned, cities across the U.S. can take advantage of the groundwork laid down by NYC Clean Heat and the NYC Retrofit Accelerator.

Though each city is unique, the experts at EDF and ICF can adapt the model to the needs of any particular city. Just as the NYC Retrofit Accelerator works with individual buildings to balance their resources and their needs, the program model will work to fit each city to ensure effective implementation and catalyze energy efficiency work nationwide.