

Energy Efficiency Opportunities and Hurdles in Non-Profit Community Facilities

A study commissioned by the Low Income Investment Fund

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Executive Summary

Nonprofit community facilities would substantially benefit from investments in energy saving improvements to their buildings. This report, commissioned by The Low Income Investment Fund, provides evidence that energy efficiency retrofits of nonprofit facilities would increase and improve if financing, energy assessments, and assistance in implementation of retrofit measures were offered as a package.

This report summarizes a study conducted by Pratt Center for Community Development with Bright Power, Inc., to gain insight into the needs, appetite and capacity of nonprofits to implement energy upgrades in community facilities and assess their interest in debt financing of these upgrades. Ten facilities, of varying size and age, were visited, surveyed, and offered energy assessments through existing energy efficiency incentive programs. These ten facilities fell into three use categories:

- 1) family/youth/daycare/senior facilities
- 2) shelter/soup kitchen facilities
- 3) educational facilities.

The majority of the facilities examined appear to be consuming more energy per square foot than comparable facilities in the northeast and would likely be able to reduce energy use and cost significantly with strategic energy upgrades. Further, many facility owners and managers are interested in instituting energy reductions, not only to save cost but because they believe it is in their mission to operate sustainably. However, despite the high level of interest, only a few organizations are implementing energy saving measures aggressively.

Barriers to implementing retrofit measures are related to information, capacity, lack of expertise and limited funding. Facilities managers are generally not aware of the incentive programs already available to them. Many of the organizations in the study are hampered by a lack of staff time and expertise. And, even with programs and incentives taken into account and where relatively small investments would yield quick returns, the upfront cost of implementation remains a barrier.

It is not clear that existing incentive programs cover the gaps for nonprofit facilities. Recent developments in financing products offered (or to be offered) by NYSERDA seem potentially well positioned to assist facilities with small capital needs (notably, Green Jobs Green NY financing which became available in 2011, and On-Bill-Recovery which is to come on line in 2012). Other innovations in financial products, such as energy savings insurance, are promising. Seven of the ten facilities surveyed indicated openness to debt financing of energy conservation projects. Two of those indicated they were likely or very likely to consider such financing. However, most facilities seem to need relatively small sums (\$10,000-\$50,000) to complete energy upgrades that would generate 20-25% savings.

The loan amounts for energy conservation in these facilities are expected to average less than \$250,000, so LIIF must evaluate whether it is economically feasible to underwrite such small loans individually. However, for deeper energy savings it may be that larger loans are needed and warranted.

Even with attractive loan and incentive programs, we expect many nonprofits to struggle to take advantage and implement energy upgrades. A comprehensive technical assistance program that can help facilities manage their energy conservation combined with incentives and financing that responds to needs would significantly increase the number of facilities implementing energy upgrades. LIIF might consider exploring partnerships and new strategies for crafting such packages. Aggregation of facilities into a cooperative for energy services purchasing may be able to provide a self-sustaining way to reduce energy costs, share information and cost-effectively implement retrofit measures.

Introduction

Given that nonprofit community facilities make a profound contribution to New York City's community vitality, operate on thin margins and offer potential to provide a model of energy efficiency for their constituents and neighbors, the Low Income Investment Fund (LIIF) determined to explore strategies to increase energy efficiency retrofits in nonprofit facilities. LIIF commissioned Bright Power and Pratt Center for Community Development to undertake this study to gain some understanding of the needs, appetite and capacity of the nonprofit sector to implement energy upgrades of their properties and to assess these organizations' interest to take on debt to finance such upgrades.

Nonprofit facilities, particularly those that serve low-income neighborhoods, experience continuous financial challenges in maintaining the facilities they own and operate. These challenges have grown during the economic crisis and its aftermath. It is likely that nearly all non-profits with facilities could reduce their costs through energy conservation while benefiting the environment and community. However, facilities managers often cannot focus on saving energy and, may struggle to accomplish even simple energy savings measures even when they do. There are a variety of reasons for this including the lack of a dedicated facility manager, the lack of available funding and the lack of knowledge of programs.

Through this study, Pratt Center reached out to a small number of nonprofit facility property owners and managers in all five boroughs of the city to assess their interest in energy saving measures and to gain an understanding of potential opportunities for energy conservation in their buildings, as well as the barriers. This paper reports back on our findings and offers strategies and facilitation models for achieving energy efficiency in New York City nonprofit facilities, especially in low-income communities.

About LIIF

Founded in 1984, LIIF is a leading national community development financial institution (CDFI) with a strong record of creating life-enhancing opportunities for low-income families and communities. Committed to alleviating poverty and creating healthy and sustainable communities through an array of practical, accessible strategies, LIIF is a steward for capital invested in a range of neighborhood stabilization programs, including, among others:

- Affordable and supportive housing, including transit-oriented affordable housing
- Green finance
- Education
- Healthy foods
- Health care clinics
- Childcare
- Public Policy

Operating in underserved communities LIIF uses innovative strategies to attract private capital to areas that would otherwise be out of reach. Since inception, we have provided over \$1 billion to projects serving low income families and individuals, and these investments have leveraged over \$6 billion in other capital investments in poor communities.

LIIF's work reaches far down the income spectrum to support those most in need. Of the 1 million people served through LIIF's financing and technical assistance, 97% have been low income. LIIF is able to serve this population because of strong relationships with borrowers and communities, and because we have never lost sight of our organizational commitment to helping the poorest of the poor. Deeply invested in communities we serve, LIIF's efforts have powerful impact, generating \$17 billion in family income and societal savings over the years since our founding.

In California, LIIF has been a pioneer in energy financing, creating two funds to finance energy efficiency projects in affordable multifamily housing and community facilities, filling a gap by providing front-end technical assistance and energy assessments and loan capital for retrofits. Recently, Bank of America awarded LIIF \$5.5 million to partner with Stewards of Affordable Housing for the Future (SAHF) to develop an energy efficient retrofit financing program for 2,500 affordable housing units nationally. LIIF is interested in determining whether its resources can be brought to bear in New York City.

About Bright Power

Bright Power is a leading provider of renewable energy, energy efficiency and green buildings solutions for multifamily, commercial and industrial buildings. Their clients include building owners, management companies, developers, contractors, architects, governments and utility companies. At Bright Power, some of the smartest minds in the

energy field take pride in delivering carefully considered solutions that are optimized for financial and sustainability goals.

About Pratt Center

Pratt Center works 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, Pratt Center leverages professional skills - especially planning, architecture and public policy - 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.

The Center was founded at the birth of the community development movement, as the first university-based advocacy planning and design center in the U.S. For over 40 years, the Center has helped community groups to revitalize their neighborhoods, create and preserve affordable housing, build childcare and community centers, and improve their environment.

Pratt Center has been engaged in energy conservation work for many years through a contract with the New York State Energy Research and Development Authority (NYSERDA) to coordinate the Energy Smart Communities program to reach out to building owners of all times to engage them in energy efficiency incentive programs. In addition, Pratt initiated a campaign, now being implemented by community based organizations in all five boroughs, to retrofit one- to four-family homes. As part of that effort Pratt Center has been assisting houses of worship to conduct energy assessments and take steps to become energy efficient.

Objectives of the Study

The objective of this study is to develop a preliminary assessment of the need and opportunity for energy conservation of New York City non-profit community facilities by collecting information regarding their energy consumption and conservation opportunities, interest in energy conservation, and capacity to undertake energy conservation. Specifically, the study seeks to:

Profile the use and energy use of sample nonprofit community facilities.

Non-profit community facilities are different from residential and commercial facilities in their use and energy use; often community facilities incorporate a variety of uses, including residential, office, schools, retail and performance spaces. These differences need to be understood in order to develop targeted strategies to increase energy saving improvements. In particular we need to know:

- How are the facilities used?
- How much are the facilities used?

- Is there any kind of seasonal use that impacts the facility?
- What kind of heating systems do they have?
- What fuel(s) and power sources are they using?
- How do they pay for capital improvements?
- Who pays the utility bills?

Identify potential opportunities for energy conservation in selected non-profit community facilities.

Energy conservation is likely to save operating costs in non-profit community facilities but the extent and nature of the opportunities needs to be known. In particular:

- How widespread and how deep is the interest?
- How much opportunity for savings is there in the physical structure?
- How much investment would be required to achieve those savings?
- Are there conservation measures that most facilities can benefit from?
- How quickly can those measures pay for themselves?

Identify the hurdles preventing non-profit community facilities from implementing and identifying energy conservation measures.

If saving energy is beneficial for these facilities, what has been keeping them from doing it? In particular, to what extent are the following issues barriers:

- Financing availability and applicability of available debt products
- Staff capacity
- Owner/Management buy-in
- Information, e.g., to what extent are the facilities managers aware of incentive programs offered by the state, utilities and federal government?

Another hurdle has become apparent with regards to implementing and measuring energy efficiency retrofits in nonprofit community facilities. Specifically, establishing a facility's baseline energy use, or "benchmarking", for organizations located in buildings that were originally designed and built for other uses. Many community facilities are housed in warehouse, commercial, and light industrial buildings that have undergone a major renovation to convert to another occupancy/use. These building types offer great opportunities for innovative designs and state of the art environments, but they pose a challenge with regards to accurately benchmarking energy use. If the building was previously occupied by commercial or light industrial uses, and in some cases abandoned, the historic energy data will be much different than that of the current community use. Therefore, the past utility bills and energy data from these types of buildings may be irrelevant, and could greatly skew benchmarks and energy and cost savings projections. This may require comparing energy use data from other community facilities of similar size operating in the area.

Identify potential strategies for assisting non-profit community facilities with energy conservation implementation.

We explored the funding and program strategies that are available to nonprofit community facilities and which ones are best suited to promoting energy conservation in these facilities. Are there any new strategies that need to be developed to serve this particular market? In particular:

- What is the appetite and capacity to carry debt?
- What financial strategies would help non-profit community facilities undertake energy conservation work?
- What other kinds of strategies for helping facilities save energy and expense should be considered?
- What resources can facilities typically bring to the table to accomplish energy conservation?

Provide a framework for future lending into energy retrofit projects

We developed a protocol that could be used by lenders in future energy retrofit projects. Drawing on lessons from community facilities in NYC and elsewhere, we propose a three-phase framework to guide lenders, owners and technical providers through the energy retrofit and loan process:

- Assess opportunities
- Finance and implement
- Verify and Operate

We also developed tools for lenders to use to help ensure the success of energy projects and begin to build a data set to support future energy lending.

Review of Incentives Available for Retrofitting NYC Community Facilities

Current incentive programs for retrofits

A number of incentives serve nonprofit facilities, summarized [here¹](#) and below. To date, the incentives picture favors larger and more energy intensive buildings. The most generous incentive packages tend to be for facilities that have an energy demand use average that exceeds 100KW. All of the facilities in this study are below that level. For the facilities in this study, the programs that apply are:

¹ Incentives summary included as appendix B

Utilities

- **ConEdison Small Business Direct Install Program** – provides a free survey “to evaluate lighting, ballasts, fixtures, HVAC systems and more” according to its website. In practice, this is a lighting efficiency survey. The program provides a 70% of installed cost incentive paid directly to the contractor. The facility owner pays only 30% of the cost. To date, this has been the most attractive program offered for nonprofit facilities.

New York State Energy Research and Development Authority (NYSERDA)

- **FlexTech Energy Audit Program** - provides free energy audits for small businesses and not-for-profits. This audit is mostly about lighting improvements for which there are small implementation incentives. However, it does frequently identify additional measures that are worth considering such as appropriate temperature settings for thermostats and boiler replacement when indicated by the age and performance of the existing boiler. All measures identified in the audit are eligible for applicable NYSERDA incentives and financing programs.
- **Existing Facilities Program** – provides pre-qualified incentives up to \$30,000, for energy efficient equipment change outs. Pre-qualified incentives apply to lighting, HVAC, commercial refrigeration, commercial kitchen, gas equipment and other categories.
- **Green Jobs-Green NY Small Business/Not-for-Profit Energy Efficiency Financing Program** - partners with lenders statewide to provide low cost financing for energy efficiency projects. Loans are available for up to \$50,000 with NYSERDA financing up to 50% of the loan at 0% interest. The rest of the loan is financed at market rate. A NYSERDA Green Jobs-Green NY audit is required to access the program. The audit is free to low cost and varies in what it covers. We have seen audits that are comprehensive, though not investment grade, and audits that focus primarily on lighting and temperature control. This is a new program, launched in 2011.
- **On-Bill Recovery Loan Program** – is “coming soon” for small businesses and not-for-profits. This program will allow the financing of energy conservation improvements through the utility serving the facility. Eligible measures are identified through GJGNY audits, which are required to access the program. Financing arrangements are geared to use the savings achieved to pay for the retrofits. This will be a very important addition to the financing options that not-for-profit facilities have.

Federal

- Federal incentives are predominantly in the form of tax credits and are not available to nonprofits due to their non-profit status.
- The American Recovery and Reinvestment Act has been a source of incentives for renewable energy and other technologies and for some energy conservation work. New York City received \$37.5 million, which is being administered by a new nonprofit corporation, the NYC Energy Efficiency Corporation (NYCEEC), which has the mission of reducing energy use in NYC’s buildings. The corporation is expected to focus on large buildings (over 50,000 square feet) at the outset. None of the facilities in our study and

few community-based facilities would meet that threshold. It is not widely known how those funds will become available to nonprofit facility owners/managers. LIIF has had discussions with the NYCEEC about analyzing viable financial models and financing mechanisms for New York City and it will be useful to sustain that relationship.

Emerging Financial Tools and Strategies

There are a number of proven strategies to finance energy retrofits and still more emerging as the private market and government grapple with interventions to increase energy efficiency retrofits (detailed in Appendix A). Notable among them is the new *On-Bill Recovery Loan Program*, which became available in New York State for small homes on January 30, 2012 and is expected to be available to commercial buildings and nonprofits after June of 2012. This program enables buildings to finance retrofits and make payments through their utility bills. Another exciting model is the development of *energy insurance* products to essentially guarantee the energy savings recommended by eligible audits as a way to secure/reduce the risk in energy efficiency financing. One company we are aware of that is using this approach in New York City is Green Equations which is able to give relatively small energy retrofit contracting companies the ability to act as Energy Service Companies (ESCOs). They make financing packages as small as \$150,000 dollars available. This places quality, reduced risk ESCO type services within the reach of nonprofit community facilities if they can be aggregated in small groups of 5 to 10 facilities. Finally, as per a report released on January 1, 2012, new research funded by Deutsche Bank and Living Cities and conducted by Steve Winter Associates is leading to new financial products for energy retrofits where by *energy savings can be considered for the purpose of underwriting loan products*.²

Overview of New York City's Nonprofit Community Facilities

According to the NYC Fiscal Policy Institute, the health and human services and cultural nonprofits comprise the largest sector of New York City's private economy.³ There are a wide variety of nonprofit community facilities spread across the five boroughs of New York City. Together they form an invaluable network of community support, providing learning and recreation programs for children, adults and seniors, food and housing for the homeless, substance abuse counseling and support groups, health, education, legal services and much more.

They are housed in a variety of buildings, from purpose built to rehabilitated, from brand new to turn of the last century, from architecturally modest to historically significant. Some were established as part of the neighborhood settlement movement (beginning in the 1880s and peaking in the 1920s⁴), others by religious groups and still others by groups of

² http://www.db.com/usa/content/en/ee_in_multifamily_underwriting.html

³ http://www.fiscalpolicy.org/FPI_NonprofitSectorNYC.pdf

⁴ http://en.wikipedia.org/wiki/Settlement_movement

concerned citizens who perceived needs in their communities that were not being met and rose to meet them.

The organizations that own and operate these facilities range from small single facility organizations to large multi-service organizations with extensive real estate holdings. They are sometimes members of larger collective organizations such as United Neighborhood Houses. Most nonprofit facilities share the common challenges of tight budgets and overburdened staff, challenges that are likely to grow more significant in the current economic climate.

Nonprofit facilities covered by this study

Facility Name	Borough	Facility Use	Date Built	Gross Floor Area (SF)
Greenwich House	Manhattan	family/youth/daycare/srs	1916	43,000
Bronx Works Community Center	Bronx	family/youth/daycare/seniors	1926	40,000
University Settlement House	Manhattan	family/youth/daycare/srs	1886	40,000
Henry Street Settlement House	Manhattan	family/youth/daycare/srs	1962	30,000
Bowery Mission 227	Manhattan	shelter/soup kitchen	1870	26,150
Project Hospitality	Staten Island	shelter/soup kitchen	2008	16,390
Cuomo Center	Queens	education	1959	13,500
United Community Centers	Brooklyn	family/youth/daycare/srs	1973	12,260
The Point	Bronx	family/youth/daycare/srs	1921	10,000
Bowery Mission 229	Manhattan	shelter/soup kitchen	1814	8,980
School Settlement Association	Brooklyn	family/youth/daycare/srs	1930	5,250

The ten⁵ nonprofit community facilities surveyed through this study range in size from 5,000 s.f. to 43,000 s.f., are single story and multi-story and in varying states of repair and need. All are owned by their managing organization. Some are well on their way towards energy efficiency goals, others have barely begun. Almost all of them see the value of energy efficiency but most lack the financial and staff resources to accomplish it.

Facility Selection and Description

LIIF was interested in studying a mix of facility types representing a range of uses, locations, building types and conditions relevant to energy conservation work in nonprofit community facilities in New York City. Our team considered 50 non-profit community facilities with the intention to select ten for inclusion in the study. A list of these facilities was assembled by Pratt Center and presented to LIIF, which identified a short list of 20 facilities based on a preliminary assessment of their characteristics, which included facility uses, size, age, location, and whether or not the facility had recently completed energy audits or lighting surveys. LIIF was especially interested in the types of projects and organizations that were already in its portfolio. Both the larger and the short list are included in an appendix to this report.

The shortlisted facilities were then emailed a survey (included in an appendix to this report) that posed a variety of questions about energy use and energy conservation needs. Emails were followed up with phone calls to elicit participation.

Of the 20 shortlisted facilities, ten responded to the survey and were subsequently chosen for site visits, further survey questioning and to receive free ConEdison Small Business Direct lighting surveys and New York State Energy Research and Development Authority (NYSERDA) Small Business and Non-Profit energy audits via the Flex Tech Energy Audit Program. Bright Power accompanied Pratt Center for five of the site visits and provided its assessment of opportunities at those facilities. The energy use of the ten facilities is discussed below.

Are these buildings representative?

The facilities in this study represent a good variation in facility size and age, historical and non-historical, repurposed buildings and purpose built buildings, in so far as a ten building sampling can in a sector with over 20,000 organizations.

Use type variation was somewhat more limited and fell into three general categories, 1) family/youth/daycare/senior facilities, 2) shelter/soup kitchen facilities and 3) educational facilities.

⁵ The Bowery Mission facility is composed of two buildings that operate together and share some services, but not all. In charts and graphs we identify them separately.

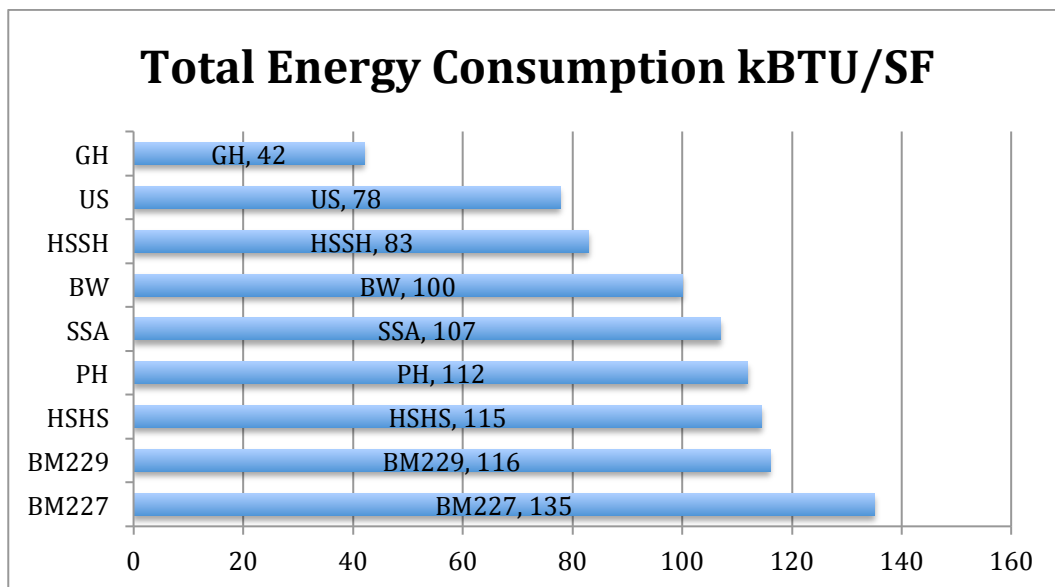
Within the use-types explored, the facilities in the study appear fairly representative compared to the larger selection group from which they were chosen.

Energy Consumption Analysis

Utility account information was gathered from nine of the ten facilities and their accounts accessed on line for consumption data. United Community Centers was unable to provide us with utility information or account access. Its utility bills are paid by a city agency, the Administration for Child Services, and were not available at the time of this study.

Overall, the data set is too limited to draw conclusions about energy use in community facilities. However, some patterns can be observed, which could be confirmed with a larger dataset. The data is useful, however, in identifying potential opportunities among the surveyed facilities.

Analysis of utility bills for chosen facilities



GH	Greenwich House
US	University Settlement House
HSSH	Henry Street Settlement House
BW	Bronx Works
SSA	School Settlement Association
PH	Project Hospitality
HSHS	Heart Share Human Services Cuomo Center
BM229	Bowery Mission 229
BM227	Bowery Mission 227

Utility costs were analyzed on a kBTU per square foot basis, which is the industry-accepted format of comparison of overall building energy use within the same year. The results are presented in the following graphs for all energy consumption together and for individual types of energy.

This chart compares the buildings in our study to each other. It is instructive to note that in the Commercial Buildings Energy Consumption Survey of 2003 the average energy consumption per square foot in the northeast for all fuels in facilities of this type was almost 100 kBTUs per square foot (kBTU/sf).⁶ While this figure is not directly comparable to our data, which is for 2010-11, because of differences in heating degree-days, 2003 was a more severe winter than 2010 or 2011 in the northeast. As can be seen, five of the buildings in our survey used more energy per square foot than the 2003 average. This would suggest that there is potential for savings. The Bowery mission leads the way with nearly 128 kBTUs/sf (average of its two buildings), followed by Heart Share Human Services, Project Hospitality and the School Settlement Association with 115, 112 and 107 kBTUs per square foot energy consumption respectively. Bronx works is right at the average and Henry Street Settlement House, University Settlement House and Greenwich House are the better performers with 83, 78 and 42 kBTUs/sf respectively.

When we take a look at building age, building size, usage profiles, and the types of energy used, we get some explanation for the differences and further understanding of what the opportunities may be.

For example, The Bowery Mission is a very heavily used facility running a shelter 24 hours a day and services for 13 hours a day. There are 80 beds in the shelter and in the winter it opens up a chapel for sleeping with 160 persons being the average overnight population of the chapel. And finally, it runs a full service commercial kitchen out of which it serves six to eight hundred meals a day. It is safe to say that The Bowery Mission is a high consumer of energy at least in part because of the intensiveness of use⁷.

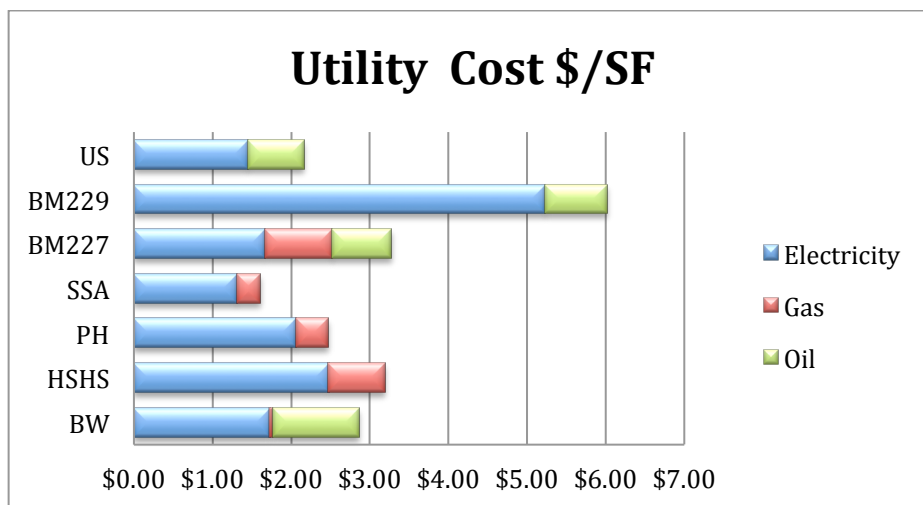
It is harder to explain why Project Hospitality's use is relatively high. That facility is new (2008) and purpose built. It too is a 24/7 facility, but houses only 32 residents and serves only 90 meals a day. Residents of the facility fully occupy it from 3pm to 11pm and are sleeping from roughly 11pm to 7am. The facility is largely empty from 7am to 3pm. Unlike The Bowery Mission, Project Hospitality does not take in additional residents in the winter.

⁶ <http://www.eia.gov/emeu/cbecs/>

⁷ Jon Braman of Bright Power notes that future benchmarking of community facilities might look to create an energy-use per person metric to account for differences in how intensely facilities are used. The main challenge in calculating this metric will be standardizing the definition of a person - since the services provided are so different. Perhaps a concept of Full-Time-Equivalent can be used - further research would be needed to arrive at a workable definition for community facilities given the wide variety of use arrangements observed in this study.

The high energy use of the Heart Share Human Services facility seems to result from the nature of the physical structure and systems, which are antiquated and cobbled together from three buildings that were built separately and at different times. This facility runs Mondays to Fridays from 7:30am to 4:30pm with a few evening meetings and programs. There is almost no use of the facility on weekends. There are no meals cooked at the facility and no residential use. The buildings were built around 1960.

Another way to look at energy consumption is to look at cost per square foot. As might be expected given its high energy use, Bowery Mission's costs for electricity and oil are highest for its two facilities, though it is paying less per kilowatt-hour of electricity than most of the other facilities.

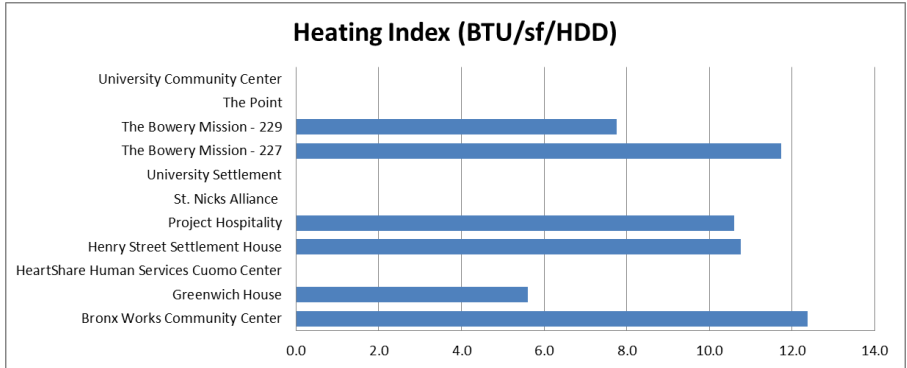
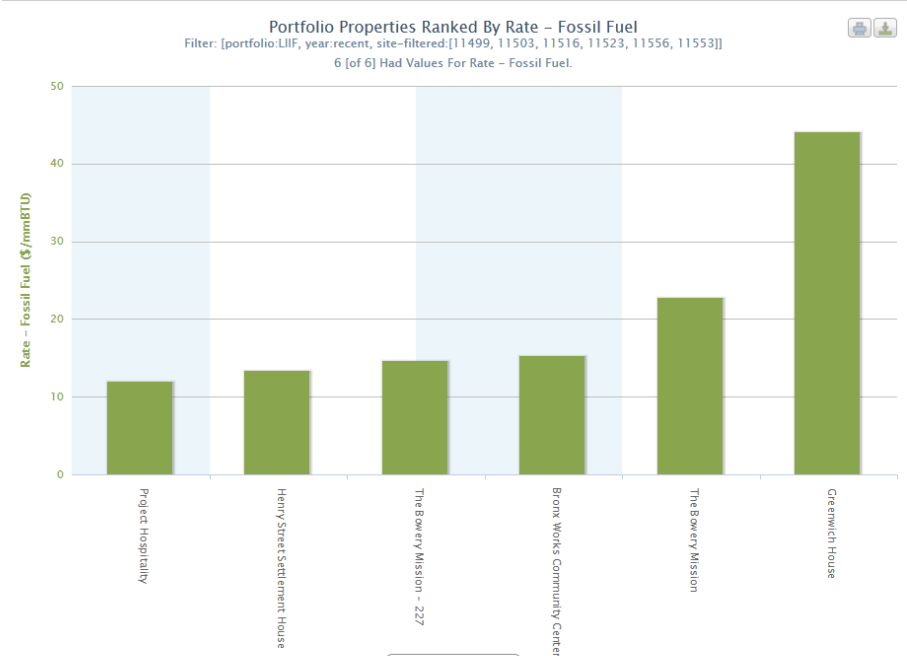


- US University Settlement House
- BM229 Bowery Mission 229
- BM227 Bowery Mission 227
- SSA School Settlement Association
- PH Project Hospitality
- HSHS Heart Share Human Services Cuomo Center
- BW Bronx Works

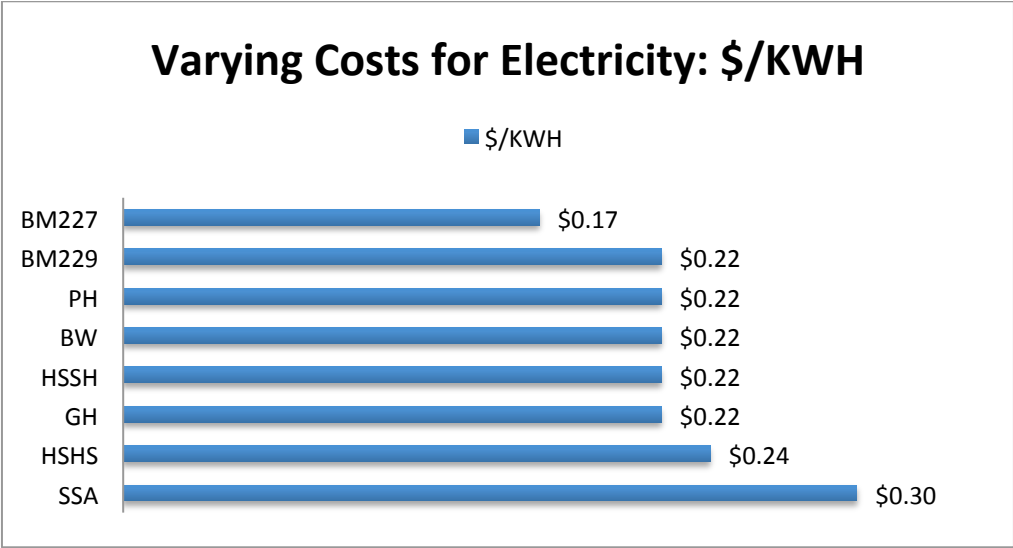
It is worth noting that the three facilities heating with oil are spending two to three times as much to heat as those heating with gas, which is reflective both of inefficient heating and the higher cost of oil vs. gas per unit of energy. The graph below shows heating Index (a weather-adjusted measure of heating efficiency for the properties). For a facility like The Bowery Mission, it might make sense to explore changing from oil to gas for heating. Bronx Works is heating with #6 oil currently, and will be required to change to #2 oil by 2015 due to a new rule announced by the city in April of 2011.⁸ As there is currently a one dollar per gallon difference between #2 and #6 oil, this will significantly increase its heating costs. Bronx Works too may want to consider switching from oil to gas for heating. In addition to

⁸ <http://www.nytimes.com/2011/04/22/nyregion/new-york-city-bans-dirtiest-heating-oils-at-buildings.html>

the price change, switching from oil to gas also provides an opportunity to install more efficient equipment and upgrade heating control and distribution systems.

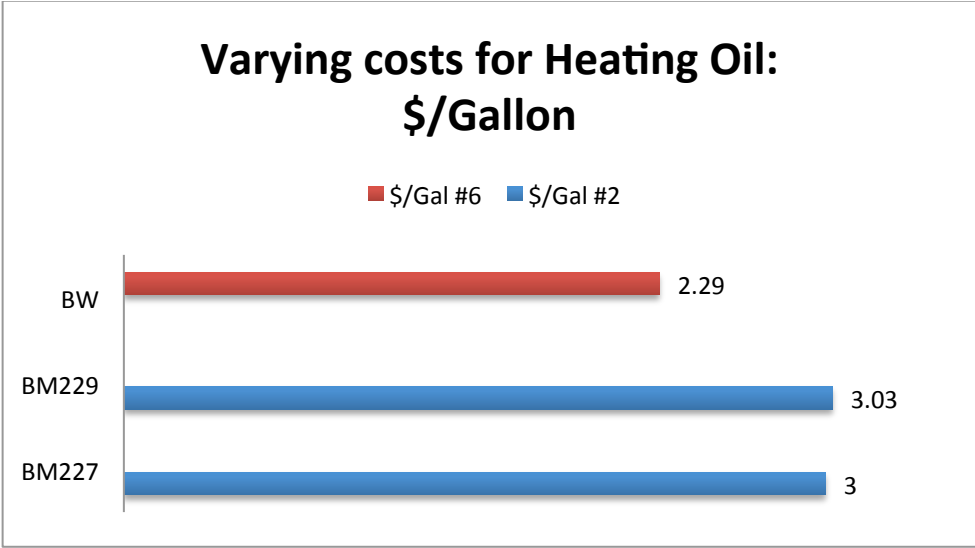


Another factor to take note of is the range of cost per unit of energy purchased among the facilities. For all three energy sources (gas, heat, electricity), cost per unit of energy seems to vary widely. This suggests that letting facilities know what others are paying for their energy could help them better manage and reduce energy costs even without reducing use. It also presents a potential opportunity for a buying club or fuel coop where facilities collectively make energy purchase decisions and use their aggregated buying power to reduce costs.



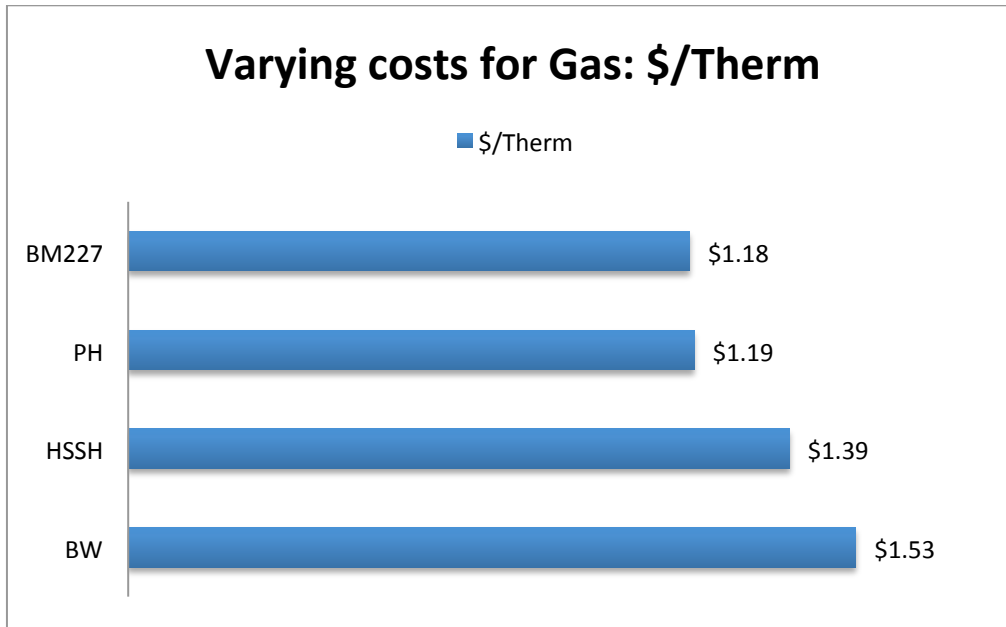
Comparative Analysis of Cost of Electricity

- BM227 Bowery Mission 227
- BM229 Bowery Mission 229
- PH Project Hospitality
- BW Bronx Works
- HSSH Henry Street Settlement House
- HSHS Heart Share Human Services Cuomo Center
- SSA School Settlement Association



Comparative Analysis of Cost of Fuel Oil

- BW Bronx Works
- BM229 Bowery Mission 229
- BM227 Bowery Mission 227



BM227 Bowery Mission 227
 PH Project Hospitality
 HSSH Henry Street Settlement House
 BW Bronx Works

Facility types

The following chart compares the energy use by type of facility. As would be expected, those facilities that are open for longer hours – shelters – are more intensive energy users. The ten facilities of the study fell into three categories:

Shelter/recovery/soup:

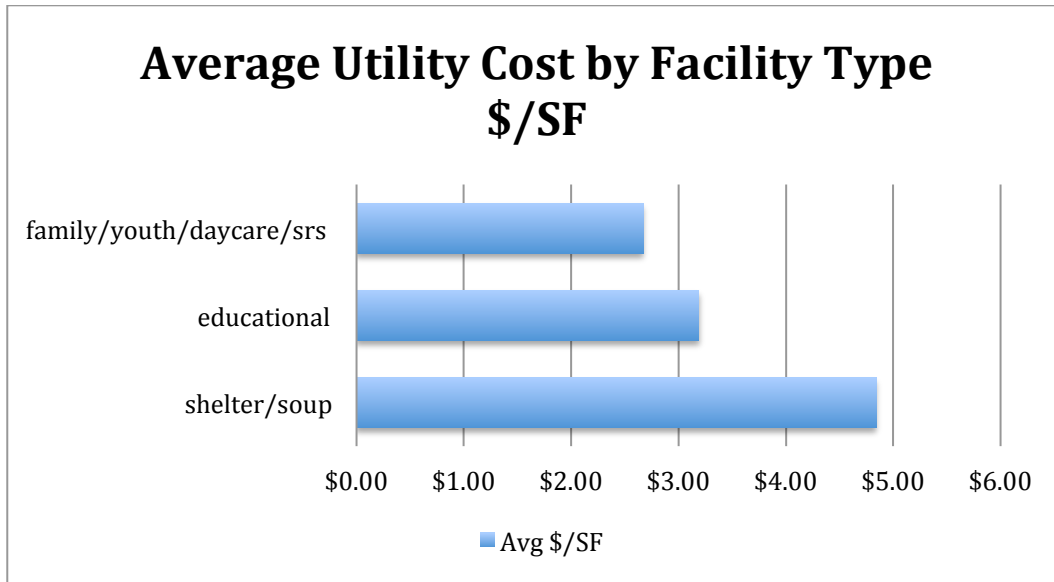
- Bowery Mission
- Project Hospitality

Family/youth/daycare/senior services:

- Bronxworks
- Greenwich House
- Henry Street Settlement House
- School Settlement Association
- The Point
- United Community Centers
- University Settlement House

Educational facility:

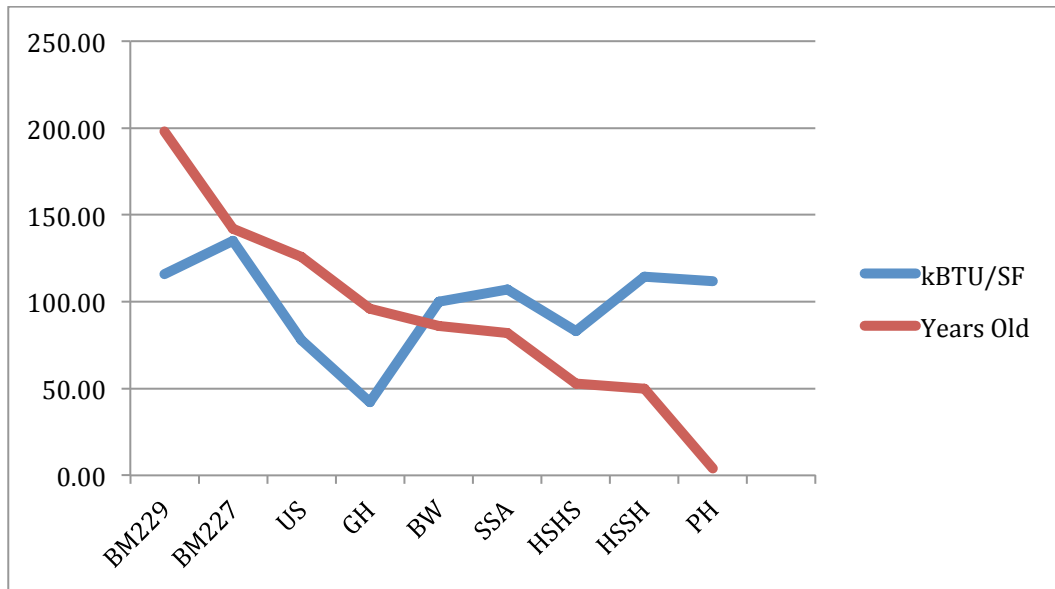
- HeartShare Cuomo Center



It should be noted that the comparison is based on the average of two facilities in the shelter/soup kitchen category, five facilities in the family/youth/daycare/srs category and only one, HeartShare Human Services, in the educational category. Given what we know about usage hours for HeartShare, we can surmise that its building is a poor performer relative to the family/youth/daycare/senior category, where usage is much more intense.

By building age

The following chart shows energy consumption related to building age in years:



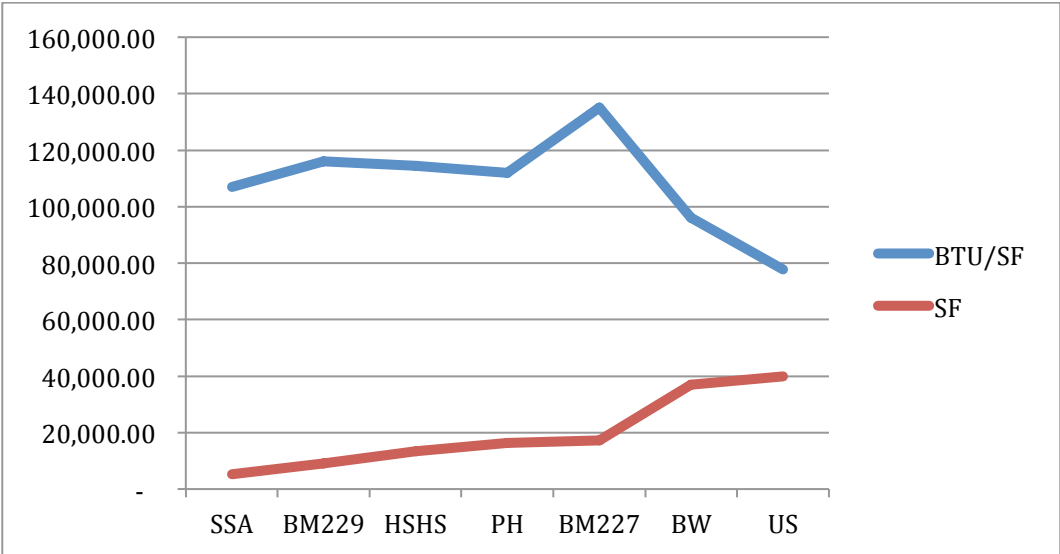
- 1814 **BM229** Bowery Mission
- 1870 **BM227** Bowery Mission
- 1886 **US** University Settlement House
- 1916 **GH** Greenwich House
- 1926 **BW** Bronx Works
- 1930 **SSA** School Settlement Association
- 1959 **HSHS** HeartShare Human Services
- 1962 **HSSH** Henry Street Settlement House
- 2008 **PH** Project Hospitality

When considering all facilities in the study, it is hard to say whether there is a direct correlation between building age and energy usage. The Bowery Mission leads the way with both the oldest and the most energy intensive facilities, however, it has been noted that The Bowery Mission is also the most intensively used facility in the study and belongs to the most energy intensive use group, shelters/soup kitchens. Sadly, one of the newest buildings in the study, Project Hospitality on Staten Island, is also one of the most energy intensive facilities. Again, it belongs to the heavier use shelter/soup kitchen category, but we suspect that a new building could have performed much better.

Among the all-purpose community facilities our small sample suggests that the newer the facility, the more energy intensive. This could be reflective of the transition from more massive to less massive exterior masonry walls as construction technology led to more efficient use of masonry materials and a greater reliance on steel skeletal support structure.

By building square footage

The following chart shows BTUs/SF arranged by building size:



- 5,250 **SSA** School Settlement Association
- 8,980 **BM229** Bowery Mission 229
- 13,500 **HSHS** HeartShare Human Services
- 16,390 **PH** Project Hospitality
- 26,150 **BM227** Bowery Mission 227
- 37,000 **BW** Bronx Works
- 40,000 **US** University Settlement House

Not surprisingly, there does seem to be a correlation between building size and energy efficiency. In general the trend is for greater energy efficiency for larger buildings. This may point to common opportunities for improvements in smaller facilities – which have historically received less attention for upgrades and energy audits. Bowery mission 227 bucks this trend for reasons that are not immediately apparent – likely due to facility use and activity patterns that are unrelated to the size of the building.

Typical Conservation Opportunities

The data analysis indicates that there is room for energy conservation in most of these facilities and there are numerous opportunities and approaches to energy conservation that would work in them. The following is a description of the types of energy saving opportunities that we observed in the facilities studied that are likely to benefit nonprofit facilities generally.

Lighting

Fluorescent Fixture Upgrade

Almost all of these facilities have old linear strip fluorescent fixtures with magnetic ballasts and T12 (1 ½" diameter) fluorescent tube lamps. These can be upgraded with new electronic ballasts and T8 (1" diameter) fluorescent tube lamps. In some cases they should be replaced with new fixtures. The ConEd Direct Install Program makes this change easy and extremely cost effective.

Incandescent Bulb Replacement

Most of the facilities in the study have replaced most of their incandescent bulbs, but we did note incandescent bulbs here and there which could be replaced with compact fluorescents.

Exit Sign Bulb Replacement

All community facilities have numerous exit signs that are lit 24 hours a day, 7 days a week. They are typically lamped with 2 or more 15-watt incandescent bulbs. Exit signs can be retrofitted with LED type bulbs that use a total of 5 watts of power. This is a significant savings and an easy change to make. The ConEd Direct Install program makes it all the more cost effective.

Occupancy Sensors

Occupancy sensors are relatively expensive for the energy they save, but are a worthwhile investment in certain circumstances. Storage rooms, bathrooms and other spaces intermittently occupied could benefit from these sensors. All of the facilities in our study have these types of spaces.

Heating

Four of the facilities show high energy use for heating compared to other NYC buildings (see heating index graph above) and site visits confirmed opportunities for heating improvements in several sites.

Temperature Management

Temperature control is critical for energy savings and for comfort. It is reported that for every degree of temperature reduction, heating energy bills can be reduced by as much as three percent.⁹ Though we did not measure temperature in the facilities in this study, we have done so in other buildings and have seen buildings that overheat by as much as 10 to 15 degrees and where occupants open windows and run air conditioners in the winter to stay comfortable.

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http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12720

Programmable Thermostats

Programmable thermostats, which can be programmed to decrease or increase the temperature in the building or a space at a specific time of day, are an effective way to be sure the building is not being heated more than occupancy/use requires. At a little more than \$100 for a very good programmable thermostat, it is a very cost effective investment.

Thermostatic Radiator Valves

Thermostatic radiator valves (TRVs) can be effective in controlling temperature in buildings with hot water heating systems and with two pipe steam systems. They are not very effective in single pipe steam systems. TRVs do require increased vigilance from maintenance staff, however, and appropriate training and expectations should be set with staff where TRVs are installed.

Outdoor Reset Controls

In addition to programmable thermostats there are more sophisticated heating control systems frequently deployed in nonprofit community facilities, including the buildings of this study. Outdoor reset controls use an exterior temperature sensor to limit boiler run-time based on outdoor temperatures and reduce unnecessary heating. Heat Timers, originally developed for multifamily residential buildings, are a common type of outdoor reset control used in nonprofit community facilities. In Pratt's energy efficiency work in religious facilities we find that the more sophisticated control systems are counterproductive as they are complicated to program and frequently bypassed for manual control of the boilers. We have also found that temperature sensors are incorrectly located in these systems everywhere. However, if used correctly (and often in concert with indoor temperature sensors) these systems can produce substantial savings. Maintenance staffs of the community facilities in the study tend to be more sophisticated than those in religious institutions and for that reason such controls may be more useful to them, especially when they have been trained to use them properly.

Temperature Settings

Among the simplest of energy conservation measures is the reduction of set temperatures. Daytime settings should be maintained at 68 to 70 degrees in the winter. Nighttime settings can be as low as 55 degrees in the winter. There is no cost to manage temperature settings and a great deal of cost and energy savings to be gained. In buildings where different spaces are used at different intensity, creating separate heating zones can significantly reduce costs.

Boiler Management

Boiler Tuning

Where boilers receive regular maintenance as part of a fuel contract or where management has a service contract separate from fuel purchasing, checking the efficiency of the equipment and making appropriate adjustments can save energy and dollars. However, paying for testing and tuning as a standalone measure has not been found to be cost effective. From a study conducted by the Oak Ridge National Laboratory: "The approach of

tuning up all units as a standard practice...is costly, probably unnecessary, and likely does not produce energy savings in many units.”¹⁰

Boiler Replacement

Boiler replacements are recommended in situations where equipment is deemed to be at the end of its useable life, or when it is being upgraded as part of a fuel switching or larger building rehab project. Boiler replacements are expensive; therefore, there may not be a good energy cost savings case to be made for a boiler that is functioning reliably, regardless of how old. However, boiler replacement should be considered if the boiler frequently malfunctions or requires frequent servicing to keep it going.

Fuel Management

Switch Fuel

Three of the facilities in the study are burning fuel oil for heat. One of them is burning #6 oil, which is mandated to be phased out by 2015 in New York City.¹¹ Number 2 oil is currently running approximately one dollar more per gallon (about 30% more) than #6 oil. Gas is a much cheaper heating fuel than #2 oil. Therefore, a case can be made for switching fuels where heating fuel use is high. There will be some efficiency gain in switching from #2 fuel oil to gas and significant cost savings. The cost to make the change can be high however. A careful analysis of cost and benefit needs to be made. When making this change, it is crucial to install efficient equipment as the incremental cost will likely be cost effective as part of a larger project.

Comparison Shopping (Third Party Suppliers)

As we noted earlier, there is a considerable range in price per unit of energy that is being paid by the facilities in the study, with outliers at both ends. This suggests that better than half of the facilities could benefit from knowing what other facilities are paying for their utilities. It also suggests that there is a role for creating a means by which energy purchasing data can be made available to a group of facilities which would likely lead to more facilities purchasing their energy at lower prices.

Cooling

Temperature management

Temperature Settings

Cooling season temperature should be maintained at or near 78 degrees. In most cases air conditioning should be turned off at night. Excessive air-conditioning was observed in some sites in this study.

Programmable Thermostats

In the same way that programmable thermostats are helpful in remembering to move the maintained temperature of an unoccupied building to lower settings in the winter, they can

¹⁰ [More Energy Myths](#)

¹¹ <http://www.heatingoil.com/blog/mayor-touts-nyc-clean-heating-oil-mandate-at-earth-day-event0426/>

be used to move maintained temperature to higher settings in the summer. The caveat is that this works for central AC systems only. Many of the buildings in the survey depend entirely or largely on window type AC units¹². Window-ACs may have onboard thermostats that can be set appropriately. Staff vigilance can also ensure the units are not run when not needed or at too high a setting.

Equipment maintenance

There is evidence that air-conditioner tune-ups can save money, however, according to an energy consultant and researcher,¹³ in actual practice opportunities for savings are for “only a certain fraction of units” in any given building, and technicians who understand how to measure air flow or refrigerant charge are few and far between.¹⁴

Building Envelope

Roof/attic insulation

Although generally the addition of insulation to existing building envelopes is costly relative to the savings produced, there are two cases in which adding insulation to the roof/attic of a building can be cost effective. One is where there is a relatively easily accessed space between ceiling and roof to which blown in cellulose insulation can be added. The other is in situations where roof replacement is required for flat roofs. In these circumstances a reasonable return on investment can be expected.

We have two facilities where adding insulation to the roof would be feasible in the near term. The Point, which has no insulation in the roof of its industrial building, is undertaking a green roof project that is already funded and will require work on the existing roof. The organization could install additional roof/ceiling insulation at the same time. Greenwich House is also a candidate for blown in cellulose insulation in its roof cavity. Two additional facilities will be undertaking roof work in the future that will offer an opportunity to upgrade the insulation. Bronx Works indicated that it needs new roofing but is not sure when it will be able to fund it. United Community Centers has a proposal to replace its roof, which has been leaking.

Wall insulation

In general wall insulation does not have an acceptable payback period in existing structures where no or minimal renovations are anticipated. Only one facility in our study

¹² An often asked question is whether it is worth it to switch from window ac units to a central system? Much of the time the answer is no. While the equipment is more efficient in central systems, duct losses can eat into that considerably. It is also more likely that central systems will be left to run when not needed. There are certainly problems with window units, the equipment is less efficient, noisy, and drafty in the winter if not properly sealed or removed. Climate makes a difference too. In areas where cooling is needed most of the year, a central system makes sense, though retrofitting to provide it does not unless a major renovation is planned or the ductwork exists for a heating system.

¹³ [Michael Blasnik](#),

¹⁴ [More Energy Myths](#)

would warrant installation of additional wall insulation. The Point occupies a renovated industrial building that has no insulation in the walls. According to Bright Power, because its spaces are relatively large and the walls are mostly accessible, it would be possible to add insulation and a layer of gypsum wallboard on the interior without excessive cost. An exterior insulating system would also be feasible to install and appropriate for the building.

Air sealing

Weatherstripping and sealing of obvious gaps at windows and doors is likely to be worthwhile in all of these facilities. Bright Power has made this suggestion for one of the facilities in our study.

Interior storm windows

Interior storm windows can be a cost effective way to save energy, especially in historic structures. In a study conducted by Lawrence Berkley National Laboratory, interior or exterior storm windows in combination with single pane prime windows perform as well as replacement windows at considerably less expense.¹⁵ Bright Power recommended storm windows as a possibility for Greenwich House and University Settlement House. Both are landmarked facilities and have windows that readily lend themselves to this treatment. One product to consider is the locally produced (Albany NY) [Advanced Energy Panels](#), an interior storm window product that has been used by the New York State Parks Department in some of its historic properties and tested by NYSERDA, for effectiveness. Pratt Center is working with Henry Street Settlement to test the product in its landmarked headquarters. Another product on the market is [Climate Seal](#).

Other

Behavior modification

Although we did not analyze behavior patterns in the facilities we studied, we witnessed many situations where changes in behavior would mean a lot. We have found facilities where management has, over time, permitted employees to have individual printing and refrigeration devices. We have seen commercial refrigerators running but nearly empty. We have seen thermostats set much higher than needed both during occupancy and when unoccupied. Behavior change is not necessarily easy to accomplish, but can save a great deal of energy and cost with little or no expense.

A program of trainings and customized building maintenance checklists could prove useful in ensuring more consistent, energy efficient operation of these buildings in the future. Smaller facilities present a greater maintenance challenge in some ways than larger buildings, which are more likely to have experienced staffs and oversight.

¹⁵ [Measured Winter Performance of Storm Windows](#)

Performance feedback

It is well documented that performance feedback with the ability to compare with others provides a positive feedback loop that changes behavior.¹⁶ Maintenance practices can also be reinforced with performance feedback, and incentives and recognition for building performance. Owners may set expectation of regular energy check-ins with buildings staff and use simple tracking procedures.

Related to performance feedback are the aforementioned differences in cost per unit of energy being paid by the facilities, which suggest that a means of feeding back what other facilities are paying could lead to purchasing energy at more favorable rates by all facilities.

Energy Consumption Reduction vs. Energy Cost Reduction

An important point to recognize when considering energy conservation and energy cost reduction is that there can be measures that significantly impact cost without having an impact on consumption. A prime example within this study is the fairly large discrepancy between facilities on what they are paying per unit of energy consumption. Clearly some facilities can improve their bottom line in energy cost simply by shopping for better rates.

We have also seen facilities that are non-profit and yet are paying sales tax on their energy consumption, from which they are exempt. If a facility is financially stressed or simply not managing bill paying well, there can be late fees. In one facility not in this study we found a meter that was hooked up and read by ConEd but was not registering any power draw. The cost was \$300 a year for the privilege. This suggests that training for building managers might be helpful to the bottom line of nonprofit facilities.

¹⁶ In a [study](#) conducted at the University of Groningen, The Netherlands, published in 1996, it was found that comparative feedback leads to increased energy savings:

“The differential effects of two forms of feedback on energy consumption behavior were examined in two units of a metallurgical company. In one unit, employees received information about energy conservation, had to set goals and received feedback on their own conservation behavior. The same procedure was followed with employees in a second unit, but they also received information about the performance of the first unit. In accordance with predictions from social identity theory and social comparison theory, the results clearly showed that employees in the comparative feedback condition saved more energy than employees who only received information about their own performance, even half a year after the intervention. A remarkable finding was that behavioral change took place with hardly any changes in attitudes or intentions.”

Two additional studies make similar points for residential properties:

- [Comparative Feedback in the Street: Exposing Residential Energy Consumption on House Facades.](#)
- [Motivating domestic energy conservation through comparative, community-based feedback in mobile and social media.](#)

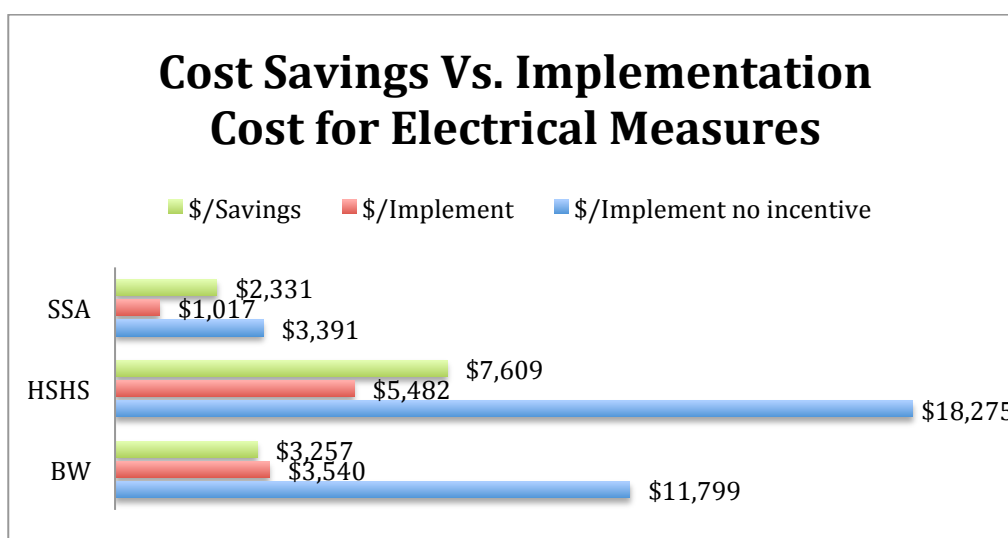
Energy Conservation/Cost Reduction Measures Analysis

The following is an analysis of the energy conservation data we were able to collect from the ConEd and NYSERDA surveys.

Tabulation of audits and surveys

The following analysis of the energy conservation and cost reduction measures is drawn from surveys generated by the ConEd Small Business Direct Install Program and energy audits from the NYSERDA FlexTech Energy Audit program, both of which are currently free to non-profit community facilities. It is important to note that in general, both these audits are limited in nature. The ConEd lighting survey deliberately focuses on electrical measures. The NYSERDA audit focuses on lighting with some recommendations for the heating and cooling systems of a facility. Neither is an investment grade audit, which would be required to completely understand the energy savings opportunities and costs in these facilities.

The audits conducted through these programs, combined with walk through assessment by Pratt Center and Bright Power, provide a reasonable basis for determining available cost-effective energy measures, particularly the less-expensive ones.



In the analysis of utility costs per square foot, electrical costs emerge as the largest utility cost that any facility has, which is not surprising since electricity is year round and cooling equipment is often driven by electricity as well.¹⁷ From the chart above we can also see that the ConEd Small Business Direct Install Program has a significant impact on electrical energy consumption and makes the measures extremely cost-effective for the properties. Payback periods within the ConEd program are typically less than two years. Without the incentive, payback periods on these measures extend to five to six years, which pushes the limits of what non-profits will tolerate without the incentive, though the measures remain worthwhile.

¹⁷ All of the buildings in our study pay for their heating fuel.

In walkthrough assessments of six of the ten facilities, Bright Power has identified energy savings investment opportunities and applied a very rough assessment of cost and potential benefit. In four of these facilities relatively major work is potentially beneficial. For Greenwich House, switching from ConEd steam to gas is recommended. Switching from oil to gas is recommended for University Settlement House. HeartShare Human Services Cuomo Center has a mechanical system that would benefit from a complete overhaul. The Point would benefit from insulation of the entire building among other measures. In all of these cases projected costs are close to \$100K at the high end, though the range given is very broad. More in depth study and analysis of these buildings is required.

As of the writing of this report, we have received copies of NYSERDA audits for four of the facilities in the study. Three of these audits proposed a few thousand dollars of lighting and temperature control improvements. An audit prepared for Bronx Works, however, appears quite comprehensive and suggests up to \$290,000 worth of work, including boiler replacement, switching from fuel oil to gas and installation of solar photovoltaic panels. The payback period if all measures were implemented would be a little over eight years. The building in question has a few issues others don't have, such as using soon to be banned number six fuel oil and an indoor, heated swimming pool. In addition, this audit was conducted by a different auditor than the other three NYSERDA audits (they are assigned by region). It suggests that the quality and comprehensiveness of the audit may vary across different auditors even within the NYSERDA program.

Opportunities

Savings To Be Had

The information available for this study suggests that nonprofit facilities would substantially benefit from investments in energy saving improvements to their buildings as well as management and behavioral changes.

As noted previously, this study did not include investment grade audits of the participating facilities; therefore, it may be that the audit recommendations missed some energy savings potential, or that major upgrade opportunities are not cost effective within payback criteria of LIIF or the owner. However, the energy assessments conducted via NYSERDA and the ConEd Direct Install Program suggest cost-effective measures for all the facilities that received them. Additionally, Bright Power identified savings opportunities and cost estimates for six of the facilities which corroborate our understanding that nonprofit facilities can benefit from energy upgrades.

High Level of Interest

Based on our survey, building managers at all of the facilities in this study were aware of the desirability of energy conservation both in terms of organizational mission and cost savings. There is a high degree of interest in learning how to benefit from energy

conservation. However, only a few organizations are implementing aggressively while most others are hampered by a combination of a perceived lack of attractive funding/financing options and staff time and expertise.

Willingness to Finance with Debt

Seven of the ten facilities surveyed indicated that they might be open to using a loan product to help them achieve energy conservation retrofitting. Two of those (20% of the total sample) indicated they were likely or very likely to consider such a product.

Challenges

Awareness of Available Incentive Programs

Available financial incentive programs do not appear to be widely used by non-profit community facilities. The ConEd Small Business Direct Install Program provides deep incentives for low-cost measures (it focuses almost exclusively on lighting changes) and is simple to use. However, even this incentive, offering seventy percent of installed costs and a very simple qualifying and implementation process, was not known to or used by most facilities in this study.

Cost

Even with available retrofit incentives, the cost of implementation remains a barrier for many of these facilities, even when modest investments can yield very quick returns. Non-profits often operate hand to mouth and have little room in their budgets either to pay outright for improvements or to finance them.

Lack of Staff Time and Expertise to Manage

Staff time is at a premium for nearly all non-profit organizations. Many organizations lack personnel with facilities management expertise. Even where organizations are fortunate to have dedicated facilities management personnel, capacity may be limited though more progress is likely to be made on energy conservation. Still, many of the measures that need to be implemented require the attention and cooperation of other staff members, which is not always available.

Lack of Staff Buy-in

We have found staff buy-in to be an impediment in some cases. Whether it is due to a culture of individual privilege (personal refrigerators and printers), inability to look beyond their pressing work load or internal competition for scarce dollar resources, staff can be averse to change, behavioral or otherwise.

Lack of Shared Information on Utility Cost

Among the more remarkable things we have noted in this study is the difference in utility rates that facilities are paying, with some facilities paying much higher rates than others (and even some organizations paying different rates in their own facilities). This seems to suggest a gap in information about the lowest utility rate. It also suggests that sharing other useful information for accomplishing energy conservation might be needed and is not readily available.

Lack of Shared Information on Utility Consumption

Similarly, we observed a wide range of energy performance among facilities. Although diversity of uses makes it challenging to benchmark energy performance, better access to information on energy usage benchmarks and efficiency could help all sites understand energy opportunities at their sites, and work to set attainable goals for energy performance. Property staff need a mechanism to track energy usage on an ongoing basis in order to ensure installed measures perform up to expectations.

Potential Strategies

As LIIF is increasing its exposure as a catalyst for energy efficiency upgrades among nonprofit facilities and other building types, the CDFI may want to consider the following options:

Financing

Considerations in the development of loan products:

As previously noted, seven of the ten facilities in the study indicated that they might be open to a loan product to help them achieve energy conservation retrofitting. Two of those (20% of the total sample) indicated they were likely or very likely to consider such a product. Additional market research is needed given our small sample, but it appears that a minority of facilities, would, at the face of it, be prepared to take on debt except on the most favorable of terms.

Offering/marketing loan products in combination with NYSERDA GJGNY Program

NYSERDA, through its Green Jobs Green New York program provides low interest loans for energy improvement projects up to \$50,000. This product is relatively new in New York so we do not have data about uptake yet. This program requires a lending institution to coordinate the NYSERDA loan, which covers 50% of the cost of energy conservation measures, with a market rate loan that it provides. It is possible that LIIF could be the coordinating lender, coupling its low interest rates with NYSERDA's 0% interest rates to provide a very enticing loan package for retrofitting. Loan amounts for this program are expected to average less than \$250,000, so LIIF must evaluate whether it is economically feasible to underwrite such small loans individually.

Coupling low interest loans with Energy Savings Insurance

LIIF is also in a position to offer low interest loans independent of the NYSERDA program that might be attractive to the facilities in this study. By coupling financing with newly available energy savings insurance products, LIIF might be able to reduce its exposure and offer attractive products.

Expectations for pay back

Most of the facilities indicated that energy conservation measures need to pay for themselves very quickly: five years at the most with a strong preference for three years or less.

Creating a pooled loan fund/program to finance energy retrofits

Given that individual loan amounts to finance green retrofits for community facilities are expected to be small (less than \$250,000), LIIF should consider creating a pooled loan fund to finance a collection of community facilities under the same umbrella.

Technical Assistance

Non-profit community facilities are in great need of technical assistance to accomplish much needed energy conservation. LIIF and Pratt Center have been able to provide such assistance through grants. There is a huge need for grant funding to continue and increase to support CBOs in the process of becoming energy efficient.

Information sharing

There is strong indication in this study that an intermediary with knowledge of all aspects of energy conservation and the ability to help plan, organize and monitor energy conservation efforts for nonprofit facilities would be useful and likely to increase energy efficiency upgrades. Such an entity might be a nonprofit or for-profit ESCO specializing in small facility energy conservation. It could also be a technical assistance hub established by a nonprofit.

Energy coop or buying club

Pooling the purchasing power of nonprofit facilities through an energy services buying club, fuel coop or joint energy services manager that offers energy efficiency services in addition to collective fuel /electricity purchase could lower the energy services costs for nonprofit facilities and, potentially free up funds to make energy improvements. Collective energy buying is particularly promising as a means to initially aggregate facilities together, reduce energy costs and engage organizations in energy retrofitting.

An article published in the New York Times, July 30, 2011,¹⁸ describes a group of 11 religious congregations that aggregated their purchasing power. In the first year they collectively saved nearly \$100,000 dollars. As word spread, the group expanded to 40 religious facilities and there are plans to extend the energy savings to individual congregation members. There are also plans to take a slice of the savings revenue.¹⁹

¹⁸ https://www.nytimes.com/2011/07/31/science/earth/31churches.html?_r=2

¹⁹ [Coming Together to Pray, and Also to Find Reduced Rate Energy Deals](#), NYT July 30, 2011

Such an entity could be formed in New York City and include both religious and secular non-profit entities. Once a purchasing revenue stream is developed the entity could expand into energy conservation services that would further enhance the ability to fund the centralized expertise and support that could be so valuable to these facilities.

Such an aggregation concept could then have sufficient capital needs to qualify for lenders like LIIF or financing alternatives like those provided by Green Equations, both of which need project capital requirements of \$100,000 or more to bring financing to the table.

Education

To overcome staff buy-in issues, there will need to be an education strategy. Such a strategy would identify staff members with interest and the respect of the organization to be trained for an energy/environmental stewardship role.

We are not aware of environmental stewardship training programs aimed at nonprofit facilities of all kinds, but there are two that are aimed at faith-affiliated institutions that are worth taking note of.

- **Green Faith** is headquartered in New Jersey and provides training programs for religious facilities of all denominations. Its fellowship program runs for 18 months and provides students with three three-day residential sessions in varied settings, conference calls, mentoring, an email list serve, a Facebook group, networking opportunities and written assignments before and after retreats. The program is aimed at developing committed environmental stewards within congregations.
- **The Isabella Freedman Jewish Retreat Center** offers a Jewish Greening Fellowship, a yearlong training fellowship that “provides intensive training, grants totaling up to \$20,000, and organizational support to New York area JCCs, camps, synagogues, health and human service organizations, and day schools with the goal of making their facilities more efficient and operations more sustainable while raising awareness of environmental issues and engaging members and constituents.”

A similar program developed for secular non-profit community facilities could be highly beneficial. It could become part of the services offered by the above-mentioned ESCO entity, a technical assistance program offered by a non-profit or by the above described energy buying collective. Such a program could be key in making sure that non-profit community facilities are successful in their efforts to save energy and become sustainable.

As we have noted, the facilities in the study would benefit from information exchange on best practices. Information gathering and sharing will help tune all facilities to the best practices and price points available within the group. This would also relieve limited staff time and fill in expertise. An ESCO, non-profit technical service provider, or energy services club could serve as a valuable hub for the gathering and redistribution of data and information from and to participating facilities with the net result of better energy management by all.

A turnkey strategy

Given the challenges noted among the ten facilities studies, a comprehensive strategy that addresses all the challenges simultaneously would likely be most effective. As a stand-alone measure, even a very attractive loan product or incentive product will not be likely to achieve energy savings at scale. We believe that a strategy that reaches out to nonprofit facilities and makes it both easy and financially feasible and cost-effective within five years will be most likely to succeed. That is, by coordinating audits, financing, incentives, education/information sharing and implementation for nonprofit facilities, significant increase in energy efficiency retrofits could be achieved. Moreover, such coordination could achieve economies of scale that will lead to stronger purchasing power and a discount in implementing energy retrofits and related services.

A Protocol for Energy Retrofit Lending

Principles for successful energy loans

Given the range of challenges described in this report and others, we perceived a need to define a clear process for energy retrofit projects that can be followed by building owners, community organizations and lenders alike. There are many examples of successful energy retrofits and energy loans, but also many issues that can arise: realizing late in the process that energy savings do not justify investments, missed opportunities to reduce utility costs, actual savings falling short of projections, lack of technical expertise, complications with changing weather, occupancy and energy prices, etc.

We developed a framework for energy retrofits based on three principals to help increase the chances of success over the long-term:

- ***Loan into projects that are likely to succeed***
 - Gauge owner interest, history and other incentive opportunities before conducting an energy audit
 - Use benchmarking data to select properties with best opportunity
 - Energy usage thresholds
 - Energy spending thresholds
 - Conduct an energy audit to determine a cost-effective retrofit scope and project savings
- ***Create a protocol to guide all involved parties***
 - Establish clear communication points with owner
 - Establish auditor requirements
 - Provide contractor oversight
 - Conduct a thorough hand-off and training to building staff
- ***Require energy data transparency***
 - Collect utility data to guide lending and document results
 - Monitor utility consumption on an ongoing basis
 - Use actual utility consumption data to hold owner, auditor and contractors accountable
 - Build a dataset of project results to guide future lending

Protocol and tools for energy lending

In-keeping with these principals, we developed a three-phase framework to help guide lenders, owners, consultants and contractors through the energy retrofit project. By defining a clear process with responsibilities, thresholds and guidelines for each step, lenders can increase the chances of successful projects with a good return for lenders and owners. The full protocol is included in Appendix *C – Energy Loan Protocol and Tools* and summarized below. The protocol includes the recommended party to lead each step (e.g. lender, consultant, owner), thresholds required to progress from one step to the next (e.g. energy usage and spending that justifies an audit), and typical soft costs for technical assistance throughout the process.

Energy Loan Protocol: Phases and primary steps

- 1) **Assess opportunities:** use utility benchmarking and qualifying survey to identify sites with the best energy opportunity, and that are likely loan candidates. Conduct energy audits where warranted to develop a specific scope of work and project future energy savings.
 - a) *Property Intake and Benchmark*
 - b) *Pre-audit screen*
 - c) *Energy Audit*
 - d) *Determine scope of work*

- 2) **Finance and implement:** Put together a financing package that can be repaid through energy savings, taking advantage of incentives, owner contributions and other sources as applicable. Install upgrades with proper oversight to ensure energy provisions are implemented as designed to achieve expected savings.
 - a) *Spec and bid work*
 - b) *Make loan*
 - c) *Install ECMs*

- 3) **Verify and Operate:** use utility benchmarking to measure the actual utility savings resulting from the retrofit. Monitor utilities for the life of the loan to ensure performance meets expectations and address issues as they arise.
 - a) *Post-install Inspection*
 - b) *Hand-off to building staff*
 - c) *Year 2 inspection*
 - d) *Ongoing M&V*

The following supplementary tools are also included in Appendix C – Energy Loan Protocol and Tools

Energy Audit Report Guidelines. A simple guideline for a comprehensive (ASHRAE Level II) energy audit, highlighting key information that a lender needs in order to assess the potential for an energy loan.

Energy audit review and Loan Sizing Checklist A checklist to be used by a lender in reviewing an energy audit, and developing a financeable scope of work based on energy audit findings.

Conclusions

This study suggests that non-profit community facilities of a variety of building and use types can benefit from energy conservation. Most of the facilities in our study appear to exceed the average consumption of similar building use types in the northeast. All of the facilities managers we interviewed were interested in energy conservation though their reasons varied. In every case, cost savings is important, but many of them believed it was part of their organizational mission to do so as well.

At the same time, the majority of the facilities have not done as much about energy conservation as they could with some having done very little at all. There are numerous reasons that individually and collectively conspire to undermine their best intentions.

Upfront cost, even modest cost, is clearly a problem. Therefore, a low interest loan program might help mitigate this, but not as a stand-alone intervention. As much as cost, staff time, expertise, buy-in and reliable information and shared knowledge are critical factors that will contribute to the success of energy conservation and cost savings measures. Additionally, while financing options are of some interest to these facilities the perceived risk of borrowing money on the expectation of energy savings is a deterrent. Energy savings insurance might mitigate that risk and make financing products more attractive.

All of this suggests that a 'turnkey' approach where a facility is assisted to access financing, energy assessment, incentives, information and assistance in implementation would be helpful to many nonprofits. Further, the potential for bundling facilities together for the purpose of buying fuel, sharing information, and aggregating for the purpose of both borrowing and reducing costs in retrofit implementation is very promising. An ESCO, energy services club or cooperative specializing in these types of facilities could serve that purpose. The concept of an energy services club or collective is particularly interesting. Such an entity would be member driven and able to tap savings in energy costs through membership fees to support a modest staff that can be the coordinator of information, expertise and effort. It can be an aggregator of capital need to attract financing and it can be the provider of supportive education.

Should these ideas be of interest, additional research to compile more complete data on energy cost savings potential in these facilities, the development of a business plan built off the cost savings potential data and assessment of the potential barriers to such an

approach would be recommended next steps. Pratt Center is interested in further collaboration to accomplish these objectives.

List of Appendices

- A. Financing Approaches
- B. Summary of Incentives Programs
- C. Energy Loan Protocol and Tools

Appendix A

FINANCING APPROACHES

There are a number of other approaches to providing financing and retrofits.

Energy Services Companies (ESCOs)

Energy Services Companies came into being during the oil crisis of the 1970s when a Texas company, Time Energy, introduced a device to automate the switching of lights and other equipment to regulate energy use. When they found that prospective customers doubted their energy savings claims they decided to offer to install the device upfront and ask for a percentage of the energy savings. The result was the basis for the ESCO model. Today ESCOs are big business with annual revenues of 3.6 billion dollars in 2006.²⁰

ESCOs tend to work with large clients, which insures that the energy savings opportunity can offset the transactions costs.²¹ The significant challenge in bringing the ESCO model of energy conservation to non-profit community facilities is the small size of the savings opportunity relative to the effort required to achieve it.

ESCO contracts assume one of two forms. Guaranteed Savings Contracts (GSCs) and Shared Savings Contracts (SSCs).²² Both types of contracts allow the contracting party to implement energy conservation measures without upfront investment. This is particularly important for non-profit community facilities with volatile funding streams and limited staff resources.

Guaranteed Savings Contracts (GSCs)

With GSCs the ESCO accepts a fixed-payment schedule based on anticipated energy savings and is responsible for paying the difference if the implemented measures fail to generate the anticipated savings. In this type of plan the risk for contracting party is lowest.²³

Shared Savings Contracts

SSCs divide the energy cost savings between the ESCO and the contracting party according to an agreed upon formula. The ESCO is compensated only if the project energy savings materializes. Frequently the ESCO share of savings will be greatest at the beginning of the contract period and taper off towards the end.²⁴

Risk in the ESCO Model

Guaranteed and Shared Savings Agreements have been around since the 70s and have a mixed track record. Litigation has been a too common result of these agreements as parties argue over what has been promised and delivered. It is critical to these agreements that the

²⁰ [Energy Service Company](#)

²¹ [ESCOs and Energy Performance Contracting](#)

²² [ESCOs and Energy Performance Contracting](#)

²³ [ESCOs and Energy Performance Contracting](#)

²⁴ [ESCOs and Energy Performance Contracting](#)

contract be well written and clearly delineate the methods for measuring savings potential and verifying performance. All important variables must be delineated up front including changes in utility costs, variability of weather, changes in building usage and any other factors that may affect the actual savings achieved.²⁵

Financing Options

There are a variety of financing products being tested across the country. A [report](#) released in October of 2009 by the Southwest Energy Efficiency Project details a number of them.

Private Sector Loans with/without Public Capital

In this approach a third party lender, often utilizing government capital, originates and services the loans. An example is the [Keystone Home Energy Loan Program](#) (HELP) in Pennsylvania. An additional feature of this program is a five percent loan loss reserve created through grant funds from utilities and the Pennsylvania Energy Development Authority. This program has worked particularly well in emergency replacement situations such as boiler failure in the heating season.²⁶

On-Bill Utility Loans

Utilities provide the loan capital and the contractors to install efficiency measures. The cost is recovered through an itemized charge on the customer's utility bill. These programs come in two forms: (1) an on bill loan made directly to a business, government, institution or homeowner; and (2) an on-bill energy service charge that stays with the property regardless of ownership. Examples of utilities offering these loans are [Manitoba Hydro](#), [Sempra Energy](#) and [United Illuminating](#). This approach works well for small businesses and homeowners with modest energy efficiency projects.²⁷

New York State enacted on-bill financing legislation in 2011. The program is rolling out to 1-4 family homeowners as this report is being written. It is not presently clear whether and when the program might be extended to include other types of buildings.

Property and Local Government Fee-based Financing

Local government becomes the lender to a property owner. In some programs the property owner is required to take a lien on the property to secure a loan (Berkeley CA and Boulder County CO). The owner repays the loan through "an adder placed on the property tax bill."²⁸ In others, a lien is not required but failure to pay results in a default on the property tax bill (Babylon NY).²⁹ These mechanisms are only available to property owners and are most appropriate for larger scale retrofits.³⁰

²⁵ [ESCOs and Energy Performance Contracting](#)

²⁶ [Recent Innovations in Financing for Clean Energy](#)

²⁷ [Recent Innovations in Financing for Clean Energy](#)

²⁸ [Recent Innovations in Financing for Clean Energy](#)

²⁹ [Recent Innovations in Financing for Clean Energy](#)

³⁰ [Recent Innovations in Financing for Clean Energy](#)

Risk Management Through Energy Savings Insurance

In January 2002 a paper by Lawrence Berkeley National Laboratory discussing energy-savings insurance as a means of risk management for energy efficiency projects was published by Elsevier Science Ltd. The abstract reads as follows:

Among the key barriers to investment in energy efficiency are uncertainties about attaining projected energy savings and potential disputes over stipulated savings. The fields of energy management and risk management are thus intertwined. While many technical methods have emerged to manage performance risks (e.g. building diagnostics and commissioning), financial methods are less developed in the energy management arena than in other segments of the economy. Energy-savings insurance (ESI)—formal insurance of predicted energy savings—transfers and spreads both types of risk over a larger pool of energy efficiency projects and reduces barriers to market entry of smaller energy service firms who lack sufficiently strong balance sheets to self-insure the savings. ESI encourages those implementing energy-saving projects to go beyond standard measures and thereby achieve more significant levels of energy savings. Insurance providers are proponents of improved savings measurement and verification techniques, as well as maintenance, thereby contributing to national energy-saving objectives. If properly applied, ESI can potentially reduce the net cost of energy-saving projects by reducing the interest rates charged by lenders, and by increasing the level of savings through quality control. Governmental agencies have been pioneers in the use of ESI and could continue to play a role.³¹

This relatively new development in risk management is promising. We are aware of one company, Green Equations, which is utilizing energy savings insurance products to reduce risk in energy efficiency financing. As described in the abstract above, Green Equations is able to give small energy retrofit contracting companies the ability to act as ESCOs and deliver a product within reach of smaller customers. Financing packages as small as \$150,000 dollars have become available. This places quality, reduced risk ESCO type services within the reach of non-profit community facilities if they can be aggregated in small groups of 5 to 10 facilities.

³¹ [Risk transfer via energy-savings insurance](#)

Appendix B – Summary of Incentives Programs

BUSINESSES+NON-PROFITS

ENERGY EFFICIENCY RETROFIT PROGRAMS



ANNUAL ELECTRIC BILL	PROGRAM	SUMMARY
Average Monthly Peak Demand Under 100kW	NYSERDA FlexTech Energy Audits	<ul style="list-style-type: none"> • Small Businesses and Not-For-Profits (Statewide): FREE energy audit report. • State and Local Government (Only SBC Paying Customers): Energy audit fee \$100 for state and local government with 10 employees or less; \$400 for greater than 10 employees. Energy audit report will help businesses and facilities identify energy efficiency measures that will help reduce energy cost. Apply online at http://www.nyserdera.org/programs/energyAuditForm.asp Contact: Region 3 Counties: Bronx, Westchester, Orange, Rockland, Long Island Daylight Savings . Frank Lauricella 845-291-1275 . email: flauricella@daylightsavings.us Region 4 Counties: Kings, Queens, Staten Island, New York, Lond Island EME Group . Brendan Liffey 212.529.5969 . email: bliffey@emegroup.com
	ConEdison Small Business Direct Installation	Free energy survey. Energy-saving devices installed for free: CFLs, low-flow aerators, high pressure rinse sprayers, water heater thermostat setback. Houses of worship, private schools, day cares, and other non-profits also eligible. Contact: 1.800.332.3333 http://www.coned.com/energyefficiency/businessdirect.asp
Average Monthly Peak Demand Over 100kW	NYSERDA FlexTech (Engineering Analysis)	Cost-sharing incentives are available to eligible participants for the following types of studies: General Energy Feasibility Studies and Technical Support • Peak-Load Reduction and Load Management • Industrial and Process Efficiency Analysis • Data Center Efficiency Analysis • Energy Procurement Strategies • Energy Efficiency Retro-Commissioning • Long-Term Energy and Carbon Management • CHP & Renewable Generation Project Classifications • Peak-Load Reduction Plans. Contact 1.866.697.3732 http://www.nyserdera.org/programs/flextech.asp
	ConEdison Commercial & Industrial Rebate Program	Incentives are available for purchasing and installing specific high-efficiency equipment in existing facilities. ConEdison is committed to helping your business become more energy efficient. The Custom Program offers performance-based incentives for cost-effective, energy-efficient technologies not included in the program. Contact: 1.877.870.6118 http://www.coned.com/energyefficiency/ci_program_rebates.asp
All Businesses	NYSERDA Existing Facilities Pre-Qualified Incentives	Incentives available on dollar per unit basis for energy-efficient equipment. Up to \$60,000 in Pre-Qualified Incentives (\$30,000 – Electric, \$30,000 – Natural Gas) per facility per calendar year. National Fuel Gas customers using less than 12,000 thousand cubic feet per year can receive a maximum natural gas incentive of \$25,000 per facility per calendar year. Contact 1.866.697.3732 http://www.nyserdera.org/programs/Existing_facilities/
	NYSERDA Existing Facilities Performance-Based Incentives	Base incentive for New York Downstate is \$0.16 kWh for electric efficiency measures. While incentives are based upon the amount of electrical energy saved in one year, the total incentive cannot exceed the lesser of \$2,000,000 or 50% of the Project cost. Project cost may include equipment, labor, and engineering expenses. Contact 1.866.697.3732 http://www.nyserdera.org/programs/Existing_facilities/electric.html
	NYSERDA FlexTech Benchmarking Pilot	For facilities of 50,000 square feet or more, NYSERDA offers \$7000 of assistance for benchmarking. NYSERDA will cost-share 50% of additional costs above \$7000. Contact 1.866.697.3732 http://www.nyserdera.org/programs/flextech.asp
	ConEdison Oil to Gas Conversion	Rebates are available for eligible customers in ConEdison gas territory who want to upgrade from oil to natural gas heating on a firm rate (minimum gas usage is 4,000 therms annually) or interruptible rate (minimum gas usage is 8,000 therms annually). Contact: 1.877.741.4330 http://www.coned.com/sales/naturalgas/comm_indust.asp
	National Grid Commercial Program	National Grid provides technical assistance for energy efficiency for a fee. The program provides an energy assesment report and recommended measures, as well as access to rebates for equipment. Contact: 1.800.843.3636 https://www.powerofaction.com/nybgasaudit/
	National Grid Large Industrial Gas Program	The program provides technical assistance and incentives for natural gas measures to new and existing facilities. A free preliminary energy study is eligible for business with gas usage over 12,000 dekatherms per year. National Grid will share 50% of the cost of a more detailed engineering study and provide investment level recommendations. Contact: 1.800.843.3636 https://www.powerofaction.com/industrialgas/
	National Grid Heating and Hot Water Rebate	National Grid rebates include furnaces, condensing unit heaters, infrared heaters, steam boilers, hydronic boilers, condensing boilers, and hot water heaters. Contact: 1.800.843.3636 https://www.powerofaction.com/nybgasnatheat/
	Federal Tax Deduction for Commercial Buildings	Up to \$1.80 per square foot of new or existing commercial buildings that save at least 50% of the heating and cooling energy that meets ASHRAE Standard 90.1-2001. Partial deductions of up to \$.60 per square foot can be taken for measures affecting the building envelope, lighting, or heating and cooling systems. http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US40F&re=1&ee=1

Appendix C – Energy Loan Protocol and Tools

Energy Audit Review Checklist

Project overview and scope of work

1. **What type of project is it?** (pick one)
 - a. substantial rehab
 - b. adaptive reuse
 - c. energy retrofit only
 - d. green¹ retrofit only
 - e. energy and green retrofit
2. **Is there a scope of work table with recommended measures, costs, and projected energy and cost savings?**
3. **What cost effectiveness metrics/ criteria are used (e.g. payback, lifecycle savings, SIR, IRR, ROI)?**
4. **What assumptions are built into the scope of work?**
 - a. Energy prices: Electricity: _____ Gas: _____ Oil/Propane: _____
Water: _____ Other: _____
 - i. How do prices compare to typical local prices?
 - ii. How do prices compare to historical prices at the site (see Savings projection review)
 - iii. For electricity - is the rate an 'all-in' rate including kWh and kW (demand)?
 1. If an all-in rate is used - is facility billed for kW? If so, ask if savings projects take demand into account.
 - b. Assumed energy price escalation _____
 - c. Discount rate _____
5. **What types of measures are included?** (pick all that apply)
 - a. Envelope
 - b. Cooling
 - c. Heating
 - d. Ventilation
 - e. Appliances
 - f. Pumps and Motors
 - g. Renewable energy
 - h. Health and Safety
 - i. Cogeneration
 - j. Green and sustainable (e.g. green roof, recycled materials, Indoor Environmental Quality)

¹ "Green" is used to mean non-utility green features (e.g. recycled materials, indoor environmental quality, sustainable sites features).

k. Operations and Maintenance

6. What costs are included in cost estimates?

- a. Equipment costs (full costs)
- b. Equipment costs (incremental costs for efficient equipment)
- c. Labor costs for installation
- d. Ongoing maintenance costs

7. What types of savings are included in the projections? (pick all that apply)

- a. Energy savings (electricity, gas, oil, propane)
- b. Water savings
- c. Maintenance savings
- d. Avoided equipment replacement
- e. Other _____

8. Is measure interactivity included in savings projections?

9. Is it a complete package or are there alternative scopes suggested?

- a. Single package
- b. Alternatives:
 - i. _____
 - ii. _____

10. Compare package options:

Package	Total cost	Annual savings	Payback	Other considerations / benefits
TOTAL - all recommended measures				
Energy and water saving measures				
Green items without quantified savings				
Health and safety				
Operations and maintenance				
General renovation				

11. What scope is recommended by auditor/ owner based on desired/ cost-effective improvement to the property?

- a. Which measures are included _____
- b. Total recommended scope cost _____
- c. Rationale for limiting scope _____
- d. Notes:
 - i. Do not to include incompatible measures (e.g. alternate heating upgrades)
 - ii. Consider funding renewables separately
 - iii. Consider whether to group energy and non-energy items

12. What incentives are available to help with project costs?

- a. Utility rebates and programs _____
- b. State energy programs _____
- c. Renewable energy incentives, rebates and programs _____
- d. What must be done to secure incentives _____
- e. Total scope cost after incentives _____

Savings projection review

13. Is historical utility data available? (check if provided)

- a. At least 12 months electricity _____ Includes estimated or modeled data_____
- b. At least 12 months gas/oil/propane _____ Includes estimated or modeled data _____
- c. At least 12 months water _____ Includes estimated or modeled data_____

14. What is the projected % savings on current utility spending (may already be included in scope of work table)?

End-use	Current spending	Project savings	Savings %
Cooling			
Heating			
Non-seasonal electricity			
Non-seasonal fossil fuel			
Water			

- i. 5-20% = normal and often feasible
- ii. 20-50% = high but possible if current performance is very bad: double check
- iii. 50%+ = requires significant renewables or very bad current performance : double check assumptions and ask for clear justification from auditor

NOTE: can do % savings be fuel (e.g. % electric savings) but end-use (heating, cooling, non-seasonal) is more accurate. For schools, looking at school year usage vs. summer.

15. Is projected usage after retrofits realistic (may already be included in scope of work)?

Energy metric	Current	Post-retrofit	Attainable?
Energy utilization Index			
Cooling Index			
Heating Index			
Non-seasonal electricity Index			
Non-seasonal fossil fuel Index			
Water Index			

(Use EnergyScoreCards or Portfolio Manager to see if projected post-retrofit energy usage is attainable. If it is unrealistically low - double check assumptions and calculations.)

16. Are detailed measure descriptions included in the report?

17. Which measures could be put to bid based on audit report vs. require design or further study?

- a. Ready to bid _____
- b. Require further design/ study _____

18. What are key assumptions for savings projections?

- a. Always check:
 - i. Current occupancy and use of building _____
 - ii. Projected occupancy and use of building _____
- b. For any high savings projections identified in question 14 and 15, confirm assumptions such as:
 - i. Current equipment efficiency and use, including:
 - 1. Lighting fixture type, count and assumptions for run-time
 - 2. Heating equipment (e.g. boiler/ furnace) efficiency, capacity and load assumptions
 - 3. Cooling equipment SEER/EER, capacity and load assumptions
 - ii. Weather data assumptions
 - iii. Building size assumptions

Loan sizing checklist

- 1. Follow usual LIIF process for reviewing loan recipient and risks.**
- 2. Can the recommended scope be financed based on utility savings?**
 - a. Scope cost _____
 - b. Loan term _____
 - c. Annual loan payment _____
 - d. Projected annual savings _____
 - e. Annual savings must be 10% > loan payment to be feasible.
- 3. If not, can scope be adjusted to be financeable?**
- 4. What level of uncertainty does auditor assign to savings projections?**
- 5. How will utility price escalation affect owner cash-flow?**
 - a. Has owner budgeted for utility cost escalation over term of loan?
 - b. Will utility savings outweigh increased utility payments?
 - c. How will third-party supply agreements impact utility prices?
- 6. What changes could reduce projected utility savings?**
 - a. Construction issues
 - b. Equipment failure
 - c. Maintenance or staff issues
 - d. Occupancy use changes
 - e. Staff changes
 - f. Other funding streams
 - g. Upcoming regulation

Energy Loan Protocol

Focus on **Community Facilities** but can be used for other building types

red text=possible additional resource

Phase	Step	Checklist	Requirement	Lead	Soft Costs	Resource
Assess opportunity	<i>Property Intake and benchmark</i>					
		Identify target pool		LIIF/local consultant		Project Tracking spreadsheet
		Collect basic property information	Organization pays utility bill	LIIF		Qualifying survey
		Gauge interest in upgrades and loan	Interested in both upgrades and loan	LIIF		Qualifying survey
	<i>Pre-audit screen</i>					
		Utility benchmark	>\$30,000 in annual utility spending	ESC		EnergyScoreCards and Detailed Survey
		Meeting with decision maker		LIIF or consultant		Template agreement/ statement of interest?
		Brief site visit (optional)		Consultant		Detailed survey
	<i>Energy Audit</i>					
		Conduct energy audit	ASHRAE level II, BPI certified	consultant	\$5,000-\$15,000	Energy audit report template
<i>Energy Audit review and determine scope of work</i>						
	Complete energy audit review checklist		LIIF		Energy audit review checklist	
	Review audit questions with consultant		LIIF/consultant		Energy audit review checklist	
	Decide on recommended scope	Scope cost >\$50,000	LIIF/owner			
Finance and Implement	<i>Spec and bid work</i>					
		Prepare specifications for ECMs		consultant	\$5,000-\$10,000	
		Pre-bid walk-through for contractors		consultant		
		Get bids for all work	at least 3 bids for work >\$10,000	consultant		
		Choose contractors and finalize scope/cost		owner/LIIF		
		Adjust savings projections if needed		consultant		
	<i>Make loan</i>					
		Size loan based on energy savings		LIIF		Loan sizing checklist
		Follow LIIF's existing underwriting criteria		LIIF		
		Establish clear gaurantee/ M&V methodology		LIIF/ESC		M&V/ savings guarantee approaches
<i>Install ECMs</i>						
	Sign contracts for ECMs		owner		contract review checklist	
	Inspect during construction	for complex retrofits or major rehabs	consultant	varies widely		
	Install ECMs		contractor			
Operate and Verify	<i>Post-install inspection</i>					
		Conduct post-install inspection		consultant/LIIF	\$5,000-\$10,000	post-install checklist
		Commissioning complex systems		consultant		
		Resolve install issues/ make final payment to contractor		owner		
	<i>Hand-off to building staff</i>					
		Provide manuals and documentation to building staff		contractor		
		Train building staff to operate new equipment		consultant		training recommendations
		Start monthly utility monitoring		LIIF/ESC		EnergyScoreCards
	<i>Year 2 inspection</i>					
		Inspect equipment operation		LIIF/consultant		year 2 checklist
	Calculate year 1 savings		LIIF/ESC		EnergyScoreCards	
	Meet with owner and staff to address any issues		LIIF		Project Tracking spreadsheet	
<i>Ongoing M&V</i>						
	Ongoing utility monitoring in shared tool		LIIF/Owner/ESC	\$500/yr	EnergyScoreCards	
	Account for changes in weather and occupancy		ESC		EnergyScoreCards	
	Establish check-in points through loan term	annual or quarterly	LIIF/ESC		EnergyScoreCards	