ELEVATE ENERGY
Smarter energy use for all

Valuing the Financial Benefits of Energy Efficiency in the Multifamily Sector

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Executive Summary

This paper focuses on how efficiency upgrades affect the financial performance of multifamily buildings. It also provides a replicable methodology for similar research to be carried out on Elevate Energy's growing portfolio as well as other multifamily buildings nation-wide. Increasing the energy efficiency of multifamily buildings not only helps owners improve building operation, but also provides a lending opportunity for financial institutions. Energy efficiency program implementers and policy makers who aid in shaping utility Energy Efficiency Portfolio Standards also benefit from understanding the full range of positive effects associated with multifamily energy efficiency improvements. These non-energy benefits (NEBs) can range from improved health to job creation and lower greenhouse gas emissions.

In this study, we analyzed the financial benefits of energy efficiency upgrades in multifamily buildings. We also examined building owners' motivations for investing in energy efficiency. We looked at a group of thirteen buildings upgraded through the Elevate Energy efficient buildings program, formerly known as Energy Savers, and compared them to twenty-one buildings that underwent an energy assessment, but did not complete an upgrade. We also interviewed five building owners who completed upgrades through the program. Interviews focused on learning more about their motivations for investing in their buildings and the financial outcomes they perceive. All of the buildings in this study have naturally occurring affordable rents in low-income neighborhoods.

Based on the quantitative analysis of pre- and post-upgrade data, buildings that completed an upgrade experienced a 1.6% median increase in net operating income ($29.10 per unit), a $0.12 per square foot decrease in gas costs, and a $0.34 per square foot increase in rental income six months to a year after the upgrade. In the interviews, building owners emphasized the impact of turnover costs and associated lost rental income on the success of a building. They also discussed the importance of keeping rent affordable to maintain a core group of stable, happy tenants. Overall, our results highlight the financial benefits of energy efficiency upgrades among owners who choose to complete the improvements.

The paper concludes with specific recommendations for lending entities, energy efficiency programs, and building owners. These recommendations are summarized below.

For lenders offering energy efficiency loan products

- *Utilize sector-wide standards for reporting financial data:* Lenders should work with building owners to improve the quality and consistency of data reported because different owners are likely to have different accounting systems that affect what they record in each expense category.
- *Require energy usage and cost data:* Currently, only energy cost data is required by lenders unless the loan is made through a pay-for-performance model. However, energy prices fluctuate over time and it is important to recognize if, post-upgrade, a building has lower energy costs due to decreased usage and increased efficiency or due to a decrease in the price of energy.

For energy efficiency programs

- *Benchmark financial performance as well as energy usage (pre-upgrade):* This will allow programs to better market the outcomes of their work, but also to advocate for geographically-specific benefit data to the utility cost-effectiveness tests. We recommend that programs collect three years of income and expense data for all buildings that are previously occupied.

For building owners

- *Utilize automated data access platforms:* Whole-building data is essential for building owners. It enables them to benchmark their energy use and to monitor the financial benefits of their efficiency investment.
- *Re-appraise when possible:* An alternative to a pre- and post-upgrade financial analysis is a post-upgrade appraisal. This would be especially helpful if at any point the building owner refinanced the building.

For all stakeholders

- *Track tenant turnover and vacancy rates:* The costs associated with turnover are layered, affecting the financial performance of a building through rental income, utility costs, and operations and maintenance expenses. Lower vacancy rates are an important indicator for neighborhood stabilization and signal to lenders and developers that a community is a less risky investment.

Introduction

Increasing the energy efficiency of multifamily buildings has started to garner nation-wide attention as a way to decrease carbon emissions and meet climate goals. This is in part because multifamily housing stock, defined here as five or more units, accounts for 17% of the nation's household energy usage (RECS, 2009). These environmental goals are just one facet of the many non-energy benefits (NEBs) that result from energy efficiency improvements. Many assert that investing in energy efficiency in multifamily buildings increases the health of tenants (Heyman et al, 2005; Kuholski et al, 2010) and creates jobs (Booz Allen Hamilton, 2009). Another benefit lauded by the industry is the financial advantage to the building owner and tenant (Philbrick et al, 2014). Financial benefits can come in the form of lower utility bill burden for either party, smaller operations and maintenance costs for owners, higher property value, lower capital rates, and lower vacancy rates and turnover costs. All of these benefits were motivating factors for the creation of Elevate Energy's building efficiency program with Community Investment Corporation in 2008, which offers a variety of services that enable building owners to make efficiency improvements in affordable multifamily buildings with five or more units. Services include an energy assessment, financial guidance and financing options for the recommended renovations (through partnership with CIC), support in managing renovation construction, and annual savings reports for two years post-upgrade.

The energy assessments cover a range of possible improvements, and recommend cost effective measures specific to each building. Recommended measures may include replacing heating units, installing air sealing measures, altering hot water distribution systems, and adding insulation to the roof cavity. After receiving the energy assessment report, the building owner works with Elevate Energy and CIC staff to obtain the financing and the expert advice needed to make the recommended changes.

This study utilizes buildings that have participated in Elevate Energy's efficient buildings program for multifamily buildings. This upgrade program is run by Elevate Energy and Community Investment Corporation. The majority of the more than 19,000 units upgraded to date are naturally occurring affordable units located in neighborhoods where market rate rents are affordable to low and moderate income households. About one third of the units upgraded through the program take advantage of the Energy Savers loan product offered by the Community Investment Corporation (CIC), a Chicago-based CDFI. This loan has a 3% interest rate and seven-year repayment schedule secured as a second mortgage. While there is an abundance of naturally occurring affordable housing stock, CIC serves a large number of these buildings due to an "inability to finance retrofits for buildings whose senior lenders or investors will not grant permission for subordinate liens. This includes loans backed by Fannie Mae, Freddie Mac, or FHA, and also includes subsidized properties with multiple layers of financing. Owners of these types of buildings are generally unwilling to accept personal recourse for loans made to their buildings" (Markowski et al, 2013).

Accurately valuing the financial benefits of efficiency upgrades is important to a number of stakeholders including financial institutions, policy makers, building owners, and energy efficiency program implementers. Many current financing models rely on holding the capital investment until savings are realized. Other models rely on community development financial institutions (CDFIs) providing low-cost loans to owners that traditional lending firms might consider higher risk because they are not confident that the energy efficiency improvements will provide a sufficient return on investment. It is important for financial institutions to create progressive products that are accessible to a greater number of buildings owners, but it is equally important for energy efficiency program designers to effectively demonstrate the success of their buildings outside of modeled energy savings. Recent research has shown that "there is an astounding lack of information on how efficiency retrofits would affect property (real estate) metrics such as cash flow and value (Pivo, 2014)." An excellent example of how the energy efficiency industry is communicating how energy efficiency "makes good business sense" is the Investor Confidence Project (ICP), an initiative through the Environmental Defense Fund. ICP aims to "reduce transaction costs by assembling existing standards and practices into a consistent and transparent process that promotes an efficient market, while increasing confidence in energy efficiency as a demand-side resource and resulting cash flows for investors and building owners (Investor Confidence Project, 2013)." These standards and practices are packaged as protocols; they currently exist for commercial deals of varying sizes and types, including multifamily. However, ICP's protocols for the smallest financial scope are listed as "less than a million" and up to 500,000 square feet. The typical buildings that Elevate Energy works with have an average upgrade cost of $68,000, or $2,600 per unit. While this is certainly less than a million, we believe there are specific challenges and opportunities within this segment of the multifamily market that need further attention. Put simply, the size of most of these deals is simply too small to interest most financial institutions.

This subject is relevant to policy makers who approve energy efficiency portfolio standards, the primary drivers behind efficiency investment in the U.S. (ACEEE, 2011). The regulators who oversee these standards apply cost-benefit tests to utility-funded energy efficiency programs. Certain cost-effectiveness tests are routinely biased because costs are easy to quantify, and therefore easy to include in the test, but many of the benefits of energy efficiency are difficult to quantify (Neme & Kuschler, 2010). When the non-energy benefits are left out of the equation this leads to underinvestment in energy efficiency programs, particularly those aimed at low income populations, and a lack of flexibility for utilities to design successful programs. Utility energy programs are constrained to those measures that pass cost-effectiveness tests, but some measures, especially those with a longer payback, will not pass.

In this paper we attempt to define the range of financial benefits reaped by multifamily buildings that have implemented energy efficiency upgrades. Specifically, we are interested in investigating whether or not buildings that have gone through the Elevate Energy efficient buildings program, formerly known as Energy Savers, are more financially stable than buildings that have not been upgraded. Signs of increased stability would include increased cash flow, lower expenses, higher occupancy, or increased cash reserves.

Current industry research focuses primarily on how commercial buildings' financial performance is influenced by energy efficiency improvements. A recent report by the Department of Energy's Better Buildings Network reviews more than 50 relevant studies in the commercial space. The report distinguishes between two types of financial benefits: cash flow and asset value. Cash flow is defined as Net Operating Income, which includes benefits to rental income realized through increased rental rates, occupancy, tenant quality, occupant comfort and productivity, and decreased operating expenses and utility costs. Asset value is determined by the net operating income (NOI) divided by the capitalization rate. Therefore, value can increase when income increases, expenses decrease, or a lower cap rate is warranted.

Affordable multifamily buildings face unique challenges both in accessing capital to make improvements and in accessing efficiency upgrade programs. One barrier to making efficiency upgrades is a complicated and changing landscape of utility funded efficiency programs. The fluid nature of programs is due partly to the fact that "multifamily buildings are often difficult to place within the context of standard utility rate classes and customer sectors. These classifications were created to ensure rational billing and rate systems, but often hinder the creation of multifamily programs with a whole-building approach (McKibbin, 2013)." Furthermore, inconsistencies in program funding can lead to difficulties in implementing a customer-centric experience.

Table 1 shows the potential financial benefits for building owners who choose to pursue energy upgrades. Adding additional benefits to the conversation, beyond utility savings, may help improve the uptake of energy upgrades in the affordable sector as financial benefits are often hard to come by in this market. Estimates for the monetized value of these benefits vary. Skumatz (2010) estimates that savings for decreased equipment maintenance is $17 to $22 per low-income participant, but does not specify single family or multifamily, per year.

Table 1. Financial Benefits to Multifamily Building Owners

Financial Benefits to Owners
Increase in Net Operating Income (NOI)
Decreased operations and maintenance costs (fewer equipment repairs, reduced tenant complaints)
Fewer costs associated with turnover (advertising, unit maintenance)
Decreased utility bills
Increase in Property Value

This work builds off of Elevate Energy's January 2014 white paper on NEBs in affordable multifamily housing, which highlighted a group of three buildings that underwent efficiency upgrades through our multifamily upgrade program. In this case study, the buildings experienced a 19% decrease in gas use. Because we had access to the owner's annual expense records, we were able to estimate equivalences in other expenses, such as a 25% decrease in rental loss as potential receipts. In this paper, we look at a greater number of buildings in order to quantify how financial performance changes over time for buildings that have gone through our upgrade program and compare those buildings to a control group that did not receive upgrades through Elevate Energy's multifamily program.

Methodology

This is a mixed-methods study composed of expert interviews and quantitative analysis of the buildings' financial histories.

Interviews

We interviewed five building owners who have worked with Elevate Energy to upgrade their buildings. The building owners were chose from a list of owners that had previously indicated that they were willing to be contacted. The owners have upgraded a total of fourteen buildings through Elevate Energy's efficient buildings program; the buildings had a median 24% decrease in gas usage. All interviews occurred in March and April, 2014. They were conducted in person by a member of Elevate Energy's buildings staff who was familiar with the efficiency projects. The owners were asked a variety of questions designed to investigate whether they saw any non-energy benefits to the energy efficiency (EE) work completed in their buildings. They were also asked about their motivation to do the work and the benefits they expected. We were interested in each owner's motivations and reasoning behind making the financial investment. Understanding motivations will enable administrators to better market efficiency programs. Understanding what outcomes the building owners value will lend insight into the types of data the owners would be willing to collect in order to determine whether they were extracting the intended benefits. The interviews were transcribed and uploaded into Dedoose, a qualitative web-based analysis tool.

Using Dedoose, we created ten root codes.

- *Building stability* refers to when building owners explicitly said that they did the energy efficiency work to increase the physical stability of the building.
- *Financial security* indicates that the interviewee stated that they pursued work to reap a monetary benefit (this could be lower energy costs, increased capital, or lower O&M costs).
- *O&M* indicates that the owner stated a desire for "easier operations and maintenance."
- The *rent concessions* node shows how often building owners referenced their subsidized units, if they had any.
- One building owner stated that a benefit of the energy efficiency upgrades was increased *safety* for the tenants.
- *Tenant comfort* and *turnover* were two of the items most cited by owners as a benefit of energy efficiency. Due to the lack of research regarding the cost of turnover in multifamily buildings, we took special note of owners' self-reported turnover *costs*.
- We also coded when interviewees gave us specific examples of how they ultimately spent the money saved through decreased utility costs or other associated savings in *direct investment*.
- *Rent increases* refer to points in the interview when building owners spoke directly about their feelings towards increasing rent.
- *Goals for EE (energy efficiency)* is a broad code that indicates owners expressed concern with the viability of the building before the upgrade.

Financial Analysis

The quantitative analysis was performed in two parts: buildings that received upgrades (test) and a control group that did not. First, we compared the pre- and post-income and expense data of the test buildings that received efficiency upgrades. Elevate Energy's lending partner, Community Investment Corporation (CIC), provided annual financial data through 2012. For the buildings that completed upgrades, we chose a year before the upgrades, median of eleven months, and at least six months after the upgrade had been finished. The second piece of the quantitative analysis compared the 2012 income and expense data of the test buildings to a group of similar buildings that had energy assessments and first mortgages with CIC, but did not complete the recommended efficiency upgrades. This group of buildings, from now on referred to as the control group, is of similar size, vintage, and square footage compared to test buildings (Table 2). One area of potential concern is that there a larger percentage of test buildings that are master-metered. This is not surprising as owners often pursue energy efficiency to decrease the portion of bills that they pay. Because all of the buildings in both groups have mortgages with CIC and received a similar energy assessment by Elevate Energy staff, we believe that they are a reasonable control group. A typical building in the *Energy Savers* portfolio is a U-shaped, three story walk-up. These buildings would be considered low-rise by EPA's ENERGY STAR score, which designates low-rise as one to four stories.

Table 2. Building Characteristics

	Test buildings	Control buildings
N	13	21
Vintage (median)	1920	1928
Units (median)	25	16

Master-metered	86%	55%
Square footage (median)	20,811	16,200
Total expenses (median)	$99,766	$67,061
Average upgrade cost	$59,247	-
Average out of pocket cost (upgrade costs minus rebates and incentives)	$45,549	-

Findings

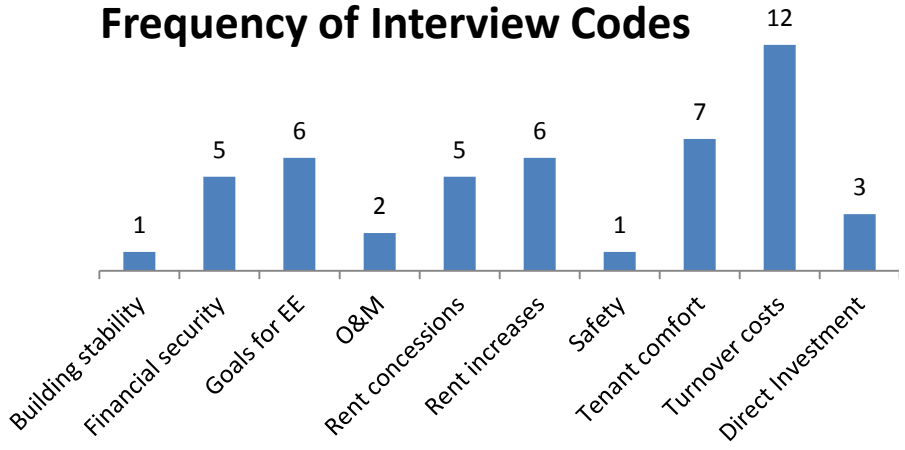
Below is a list of highlights from the findings.

1. The net operating income of buildings that had energy efficiency upgrades increased by 1.6% one year post-upgrade. Furthermore, in 2012, buildings that had energy efficiency upgrades had a higher NOI per square foot than the control buildings in the same year ($4.41 compared to $3.34 per square foot).
2. Following the upgrade installation, gas costs decreased by almost 25% and gas consumption decreased by 17% for buildings post-upgrade in the test group.
3. Rental incomes increased by almost $400 per unit annually in the year after energy efficiency upgrades were completed.
4. There was a perceived reduction in operations and maintenance costs by building owners, but they did not decrease as expected in the pre- and post-upgrade analysis.
5. Turnover costs associated with vacancy and tenant comfort are the primary concerns of buildings owners. Interviewees said they were most comfortable with a vacancy rate under 7%. They also reiterated the importance of keeping rents affordable to maintain a core of stable, happy tenants. They noted that a steady tenant base helps a building whether economic volatility was more valuable than increased rental income.
6. Interviewees also cited that the cost to turn over a unit could range from a few hundred dollars to a few thousand.

Interviews

Five building owner interviews revealed information on their motivations to upgrade their properties. Additionally, we gained insight into how they used the money they saved. While capital expenditures were not included in the financial analysis, we are interested in how energy efficiency upgrades affect the capital

Figure 1. Issues Mentioned by Building Owner



reserves of affordable multifamily buildings. In previous work (Philbrick et al, 2014), the building owner spoke about how he used the savings from his upgrades to cushion the capital reserves, which would then act as a safety net in the event of another recession, roof replacement, or equipment failure. We also heard that a building owner was able to use their savings to replace parking pads. The most cited issue during interviews was turnover cost and the prospect that energy efficiency upgrades would increase occupancy and reduce the burden of re-leasing units (Figure 1).

> *"Two of the buildings that needed new parkways where I have parking, I ripped out all the concrete and put new parking pads. They're parking for five cars, so it's a big area that I had to do – around $10,000 at each building. Which let me have the money to do that, just with the increased savings."*
> *-Building Owner A*

> *"That varies dramatically from unit to unit. Depending on the time of the year, depending on how many units we have turning over. So in some cases all we have to do is go through and give a general touch up. We don't even paint the whole unit. You touch up the paint, you clean. But there's other units that we may put in a new kitchen or a new bathroom…and it depends on how long it sits around."*
> *-Building Owner B*

Turnover Costs and Vacancy

Cost associated with the evacuation and re-lease of an apartment is a great burden to building owners in the affordable market. Several of our interviewees stated that they feel most comfortable when the vacancy rate is less than 7%, and some cited less than 5%. These preferences are consistent with the requirements of some lenders. For example, Illinois Housing Development Authority's Affordable Advantage Mortgage requires a maximum of 10% Stabilized Occupied for 90 days prior to the final commitment. The Minnesota Housing Finance Agency mandates that loans must be underwritten at a 7% or less vacancy rate, while in special cases, for example when Housing Choice Vouchers are present, loans can only be underwritten at 5% or less (MHFA, 2014). Furthermore, the cost that it takes to turn over an apartment can vary widely depending on the condition of the unit, how long the previous tenants lived in a unit, and the standard level of maintenance that owners may do in a unit when they have the opportunity (e.g. during turnover). One owner estimated the cost to fill an empty apartment at $900, which includes a cleaning fee and repainting the walls. Another owner estimated that it could be anywhere between $1,000 and $3,000. Multiple owners stated that a vacancy signaled the ability to complete deferred maintenance or upgrades to a unit that wouldn't be possible while the unit was occupied, such as sanding and re-staining floors and upgrading bathrooms and kitchens. These piecemeal upgrades demonstrate a mechanism that owners use to spread upgrade costs over time. It also sheds light on a barrier typical to energy efficiency, especially in the multifamily market – the desire to avoid disrupting tenants' lives. Managing vacancy rates and turnover costs will continue to be a priority for building owners in the future as the American Housing Survey (2013) reported that 33.3% of individuals that rent have moved in the last year.

Financial Analysis

The quantitative analysis was produced with the cooperation of Elevate Energy's lending partner, Community Investment Corporation (CIC). As of September 2014, Elevate Energy has ushered more than 480 buildings through successful energy efficiency upgrades. However, only one-third of those financed the work with CIC. The remaining building owners finance projects themselves or offset costs with utility rebates. The majority of the buildings completed the work between 2012 and 2014. This leaves us with a significantly smaller sample to analyze as the majority of the buildings finished construction after the latest year for which we have financial data, 2012.

Our quantitative analysis focuses on two groups. The test group is composed of buildings that completed their energy efficiency upgrades by June 31, 2012, and the control group is composed of buildings that had an energy assessment but never chose to complete any of the recommendations. Because all of the buildings in both groups have mortgages with CIC and received an energy assessment by Elevate Energy staff, we believe that they are a reasonable control group. The two groups are also similar in key characteristics (Table 2, above). CIC provided us with data regarding the annual income and expenditures for all buildings (Table 3). We then combined the financial data with building characteristics from the assessments. For the test buildings, information regarding the completed upgrades (Table 4) was also included in the analysis.

Table 3. Financial Variables

Variable Name	Description
Net operating income (NOI)	Total income minus total expenses
Income	
Rent	Income produced by unit rentals
Expenses	
Gas	Cost for owner paid gas (weather normalized)
Electricity	Cost for owner paid electricity in common spaces
Water/sewage	Cost for water
Management	Cost for property manager or management company
Real estate tax	Cost of real estate tax
Janitor	Cost of janitor
Repairs	Operation and maintenance costs
Insurance	Cost of building insurance
Exterminator	Cost of pest management
Security	Cost of security system or personnel
Elevator	Cost of elevator maintenance
Other expenses	Any other expenses (should not include capital improvements)

Table 4. Building Data Provided by Elevate Energy

Variable	Description
Square footage	Conditioned square footage
Year built	Year the building was built
Units	Total number of units
Measures	For test buildings, the measures implemented by owner
Measure cost	Total cost of measures implemented

Out-of-pocket measure cost	Total financial burden to the owner after grants and rebates (may have been financed or paid for in cash)
Gas usage	Whole building gas usage (normalized)

The pre- and post-upgrade analysis reveals an encouraging picture of how energy efficiency upgrades impact financial performance (Table 5). Results to note include the median decrease of $0.19 per square foot in gas expenditures, which is almost 25%. This was an expected outcome because the efficiency measures installed primarily targeted gas usage. The savings related to gas are the equivalent of receiving almost two months in additional rental income. This could prove incredibly valuable if tenants are not paying on time or if a vacant unit takes an extra month to fill. Electricity costs decreased 14.8%, although they had very little cost per square footage. This is likely a product of the fluctuating cost of electricity, small sample size, and data reporting error. The most encouraging change is a 1.6%, or $0.12 per square foot, median increase in net operating income. This is the equivalent of a $29.10 per unit per year increase. Unexpectedly, repair costs increased by 74%, or $0.32 per square foot. A possible explanation is that an increase in occupancy caused a spike in repairs. Because we do not have occupancy data, we are unable to test this theory. It also might be the result of a building owner reporting a capital expense such as installation of new appliances under ”repairs,” which should only include items such as repainting.

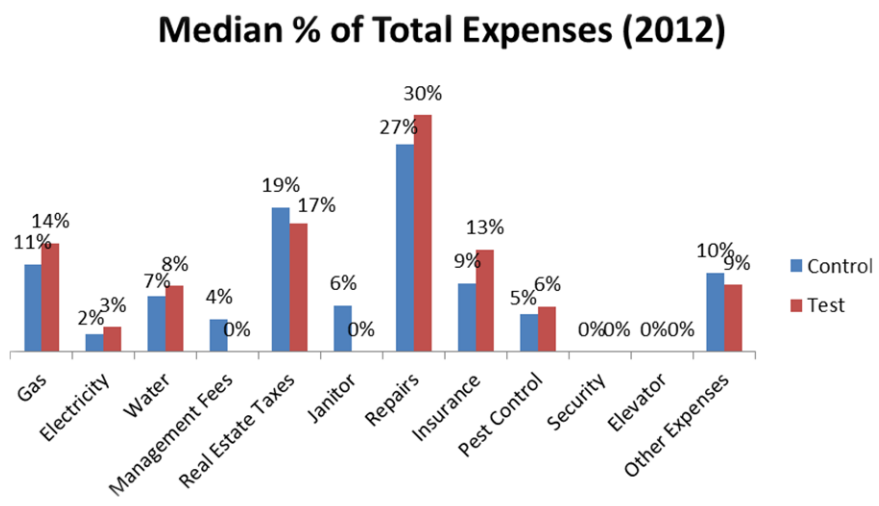
Table 5. Income and Expense Analysis Pre- and Post-Upgrade (Test Buildings) by Dollars Per Square Foot and Unit

	Pre & post years		% Change	$/ft^2 change	$/Unit change
	Min	**Max**	**Median**	**Median**	**Median**
Rental income	$47,820	$701,661	4.8%	$0.34	$399.67
Gas	$850	$57,077	-24.7%	-$0.19	-$106.85
Electricity	$0	$17,053	-14.8%	$0.01	$21.92
Water	$0	$17,053	28.5%	$0.07	$78.67
Management	$0	$38,003	-40.0%	$0.00	$0.00
Real estate	$5,527	$41,800	0.2%	$0.00	$3.33
Janitor	$0	$153,604	-87.1%	$0.00	-$4.84
Repairs	$0	$110,777	74.6%	$0.32	$211.73
Insurance	$3,000	$30,084	-0.8%	$0.00	-$2.25
Pest control	$0	$13,746	14.9%	$0.03	$20.37
Security	$0	$78,222	N/A	N/A	N/A
Elevator	$0	$7,413	N/A	N/A	N/A
Other expenses	$0	$243,571	-13.7%	$0.00	$0.00
Total expenses	$20,087	$426,728	-.5%	-$0.03	-$13.36
NOI	$21,885	$387,424	1.6%	$0.12	$29.10

Due the nature of medians, the sum of individual expenses will not equal the median total expense.

Figure 2 shows how the total expenses of the buildings were spread across each category in 2012. While some categories such as electricity, pest control, and water costs represent a similar proportion of the expenses, others show more variability. For example, real estate taxes make up smaller shares of total expenses in test buildings than control buildings, by two percentage points. In the test buildings, gas costs are 14% of the expenses, whereas in the control group, it made up 11%. This might seem surprising considering the 24.7% decrease in the test buildings' gas cost post-upgrade, but this is likely because of expense areas like janitorial services that take up a significantly higher percentage for the control buildings than the test buildings. Dashes in Table 6 indicate that that the median dollar per square foot for that category was zero.

Figure 2. Median Percentage of Total Expenses for Each Category



	Dollar per square foot		Dollar per unit	
	Control	**Test**	**Control**	**Test**
Rental income	$7.47	$8.53	$7,334.31	$8,240.42
Gas	$0.42	$0.45	$401.99	$408.27
Electricity	$0.09	$0.10	$85.83	$79.29
Water	$0.26	$0.28	$250.79	$220.85
Management fees	$0.16	$ -	$173.36	$ -
Real estate taxes	$0.68	$0.54	$717.36	$600.11
Janitor	$0.22	$ -	$228.13	$ -
Repairs	$0.98	$0.99	$1,004.24	$766.94
Insurance	$0.32	$0.43	$307.14	$362.79
Pest control	$0.18	$0.19	$191.20	$109.42
Security	$ -	$ -	$ -	$ -
Elevator	$ -	$ -	$ -	$ -
Other expenses	$0.37	$0.28	$376.06	$129.48
Total expenses	$4.91	$4.03	$4,212.23	3,593.22
NOI	$3.34	$4.41	$3,093.83	$4,318.21

Table 6. Comparison of Income, Expenses, and NOI for Control and Test Buildings by Unit and Square Foot (median)

The NOI of the test buildings was $4.41 per square foot compared to $3.34 per square foot for the control buildings (Table 6). While this suggests that the test buildings are more valuable than the control buildings, this type of analysis will need to be performed on a greater number of buildings to validate this finding. Rental income was also noticeably higher on a per-square-foot and per-unit basis in the buildings that had completed upgrades. Both sets of buildings have surprisingly high repairs costs. While it is not uncommon for affordable housing to have higher operating costs, this is higher than expected. Some of the explanation lies in the noise of a small sample size, which cannot be completely cancelled out even

when using the median. For example, one control building had three years of repairs costs below $50,000. Then in 2012, it increased to $800,000. This was a large building with approximately 200 units. It is possible that the building owner reported a capital investment in the repairs column.

A significant point of concern is whether or not building owners were able to accurately report their expenses. In our group of test buildings, owners chronically over-reported their gas costs to Community Investment Corporation. We looked at the self-reported gas cost/square foot and the actual usage that we received from the utility bills. The findings show that actual gas costs were 56% lower than building owners reported. This reporting problem was not only present within the test buildings. On average, the control buildings' actual costs were 58% lower than what they reported. In the analysis, we replaced the self-reported gas costs with the actual costs from the utility.

This discrepancy sheds greater light on the need to accurately measure the financial benefits to buildings that undergo efficiency upgrades. To fuel investment in energy efficiency work, there must not only be transparency in building performance data, there must also be better mechanisms for which this work is valued on the market. The Institute for Market Transformation (2013) notes the impacts of energy efficiency upgrades in property value of buildings using a building with baseline energy costs of $2.50 per square foot and a cap rate of 8%. In this example, modest energy savings of 10% per square foot yields $3.13 in incremental property value per square foot, using the income capitalization approach to value. By aggregating the savings from the utility costs with those from possibly decreased maintenance costs and lower turnover, a building owner has the potential to drastically increase the property value, but only if appraisers are trained to recognize the ancillary benefits of upgrades.

Building Highlights

Year constructed: 1920

Units: 12 one bedrooms, 18 two bedrooms, 2 garden units

Square feet: 23,800

Heating system: Central steam boiler; owner pays heat

Energy efficiency upgrade (2011) included: $55,000

- Boiler replacement
- Main line air vents
- Domestic hot water and pipe insulation

Financials:

- Net operating income increased $4,000 post-upgrade (3.3%)
- Rental income increased by $17,500 (7%)
- Repairs increased from $7,500 to $13,800
- Gas savings of 6.5%

In conclusion, this study yields encouraging indicators that energy efficiency upgrades may increase net operating income, which may offset building owners' primary concern of lost income and costs related to turnover. Furthermore, sustained analysis of building expenses over several years could offer more robust insight into how upgrades affect repair costs and building value.

Recommendations for Best Practices and Future Analysis

During the course of this analysis, we learned many lessons that we believe will greatly improve analyses that makes the case for driving multifamily energy efficiency investments. This project was completed with program data from naturally occurring affordable multifamily buildings in Chicago, IL. If this analysis was completed in a different geography with different building stock and upgrade packages, there is the potential for differing results. Furthermore, if we repeated this analysis next year with a greater number of buildings from our portfolio, we might glean more robust results. However, there are still several recommendations that we can make for future research and best practices for lenders, policy makers, building owners, and energy efficiency program implementers.

For lenders offering energy efficiency loan products

Utilize sector-wide standards for reporting financial data

Lenders should work with building owners to improve the quality of data reported. Different owners are likely to have different accounting systems that affect what they record in each expense category. Capital expenditures are the "total monies spent on non-recurring capital expenditures such as asphalt/parking, concrete/masonry, water heaters, range/cooktop/ovens, dishwashers, glass, blinds/draperies, sidewalks/curbing, vinyl, pool, new carpet, washers/dryers, club amenities, fitness equipment, etc.," (NAAHQ, 2013). While many building owners may know that these types of incidentals are considered capital expenses, they might not always account them as such. For example, the interviewee who noted that the cost of turning over an apartment might be as high as $3,000 due to kitchen upgrades might mark that as maintenance costs if it was only done on one or two units per year.

Additionally, if the owner chooses to have another individual complete the form in any given year, that person may not approach the process with the same assumptions as the owner. It is important that the expected standards are effectively communicated to the building owner.

Require energy usage and cost data

Currently, only energy cost data is required by lenders unless the loan is made through a pay-for-performance model. However, energy prices fluctuate over time, and it is important to recognize whether an upgrade is producing savings based on decreased usage or a decrease in cost. Over time, financial institutions will notice trends in terms of which measures are the most cost-effective for a particular building type or geographic area. This will allow lenders to more appropriately judge the risk of energy efficiency loans.

For energy efficiency programs

Benchmark financial performance as well as weather normalized energy usage (pre-upgrade)

Energy efficiency program administrators and regulators need to better understand the financial benefits to the buildings that they serve. This will not only allow for more effective program marketing, but also add geographically-specific benefit data to the utility cost-effectiveness tests. Therefore, we recommend that programs collect three years of income and expense data for all

buildings that are previously occupied. Three years might seem burdensome, but it will allow for greater understanding of some of the ebb and flow in a building's expenses, and enable defensible documentation of program benefits.

For building owners

Utilize automated data access platforms

There is an increasing interest in utilities providing automated data access platforms for building owners to access whole building data. Whole building data is essential for building owners to be able to benchmark their use and to monitor the financial benefits of their efficiency investment. Commonwealth Edison, in Chicago, has provided access through the Energy Usage Data System (EUDS) since 2008, and they are working with their sister utility in Pennsylvania to spread this practice.

Re-appraise when possible

An alternative to a pre- and post-upgrade financial analysis is a post--upgrade appraisal. This would be helpful if at any point the building owner refinanced the building. As evidenced by the interviews, building owners make the decision to upgrade their building because they expect that it will have positive consequences on the cash flow of the building and the satisfaction of their tenants. It is only fair that the upgrades be accurately incorporated in the appraisal. Encourage the appraiser to use the "Residential Green and Energy Efficient Addendum" provided by the Appraisal Institute (2013). This is especially important for buildings in distressed neighborhoods where higher property valuation could lead to lower cap rates and more competitive loan rates for other building owners who want to invest in the neighborhood.

For all stakeholders

Track tenant turnover and vacancy rates

The one recommendation that will positively affect all stakeholders is to document and track tenant turnover and vacancy rates. Not only was this the most cited concern by building owners, but the costs associated with turnover are layered, affecting the financial performance of a building in many ways. Vacancy rates are an important indicator for neighborhood stabilization, and lower vacancy rates signal to lenders and developers that a community is a less risky investment. If tenants stay in their unit longer, for example 24 months instead of 12 months, building owners do not lose as much potential rent while spending money to fill the unit.

Table 7. Example of the Effect of Occupancy on O&M

	Occupied units	Income	O&M
	20	$ 192,000.00	$15,000
	24	$ 230,400.00	$19,000
Percent changed		20%	27%

Consider the most extreme situation of a building that is completely empty and then becomes 100% occupied. Every single expense will increase. This would be an easy occupancy shift to see in a building's accounting trail, but detecting the

change in occupancy becomes more difficult as vacancy decreases. Consider a 25-unit building that has five units open one year, a 20% vacancy rate. Then after efficiency upgrades, that decreases to only one unit unoccupied, a 4% vacancy rate. All units are leased at $800 per month and the cost of turnover and continued maintenance for one unit is $1,000 per year. In this example, the turnover costs for the four newly occupied units, $4,000, are added to the annual O&M costs, $15,000. Therefore, despite the fact that this building saw a 20% increase in rental income, it also saw a 27% increase in O&M costs (Table 7). However, O&M also often includes minor HVAC repairs and supplies. If, through the upgrade, a building owner replaced a highly inefficient furnace, we would expect to see a decrease in the $15,000 maintenance costs in addition to the $4,000 increase due to turnover. It is then possible to see no increase in O&M costs if the efficiency decreases cancel out the greater costs due to turnover. This not only highlights a need to create clear definitions of what expenses should be allocated to each category, but also the difficulty in extrapolating vacancy information from income and expense data.

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