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TRANSFORMATION

VALUING ENERGY EFFICIENCY

122 North Elm Street
Greensboro, North Carolina

Summary

Self-Help's 88,000-square-foot office building in Greensboro, N.C., is a leading example of how energy modeling can be used to identify and plan retrofits over time. A 2011 energy evaluation identified potential retrofits that if fully undertaken would reduce energy use by 26 percent. Self-Help has implemented many of these measures, including a comprehensive lighting retrofit and upgrades to its HVAC system with a total investment of $50,926. Within a year of the retrofits, the property achieved a 6.4 percent energy cost reduction, equivalent to $8,111 in annual energy savings and a 19 percent reduction in site energy use. In addition, the savings created a better environment for tenants and contributed directly to net operating income, creating immediate capitalized value that represents a multiple of 1.8 times the original investment. Over a projected 20 year duration, the project will yield an unleveraged internal rate of return (IRR) of 18 percent, an annual return on investment (ROI) of 13 percent, and a net present value (NPV) of $80,818.

"Every year we get more effective at implementing energy efficiency measures to reduce cost, manage energy risks, and do our part to address climate change."

—Melissa Malkin-Weber, Sustainability Director, Self-Help Credit Union

Lessons Learned

- Older buildings designed without efficiency in mind can be upgraded to improve performance without repositioning.

Figure 1: **122 North Elm Street in Greensboro, N.C.**

- Significant progress on efficiency is possible through steady improvement in the context of capital improvement plans and operating budgets.
- Lighting retrofits often offer strong returns on investment and immediately improve occupant comfort.
- Utility rebates and other public funds can sometimes offset a significant fraction of the cost of energy modeling efforts and retrofits.
- In secondary and tertiary markets, cutting utility costs is especially impactful to the bottom line. (Greensboro rents are below $15 per square foot.) When market conditions prevent robust rent growth, energy efficiency can present the best opportunity to improve bottom-line value.

Background

Self-Help is a Durham, N.C.-based non-profit organization that provides financial services and community-centered investment throughout North Carolina. The organization's Self-Help Ventures Fund has significant real estate holdings, with a portfolio value of approximately $100 million across 18 properties and 750,000 square feet of space. Self-Help's long-term investment strategy is a best practice for locally-owned buildings and investors holding small- and medium-sized portfolios—property types that constitute a large share of the U.S. commercial building stock outside "24 hour" markets.

When it comes to efficiency, Self-Help's portfolio benefits from a few factors. Self-Help's longer holding periods allow the company to make investments with lower returns on investment (ROI).[1] Additionally, leases at the Greensboro Self-Help Center are structured to be full-service, which means the owner pays all energy and water bills, eliminating the split-incentive that often hampers landlord investment in efficiency.[2]

1 Because of its commitment to long-term holds, Self-Help targets can include investments with lower ROIs than some owners. Even short paybacks (2 to 3 years) can be disqualifying for property and asset managers who might place capital elsewhere in the building or portfolio. The use of third-party capital or consideration of the leveraged payback of these investments, off-balance sheet impacts, and corresponding valuation improvements can shift calculations considerably.

2 These leases are full-service gross leases. They encourage efficiency investments by landlords, but don't address the portion of the split incentive problem relating to tenant behavior. In larger buildings owners and tenants may additionally benefit from installing separate or sub meters for the tenant to pay for the costs of the electricity to power equipment in their tenant spaces. See www.greenleaselibrary.com for more.

Building Information

Owner: Self-Help

Location: Greensboro, NC

Building Type: Mixed-Use Retail and Office

Size: Ten stories; 88,000 square feet

Year Built: 1971

In this lease structure, efficiency gains translate into avoided utility costs, which accrue directly to landlord's net operating income (NOI), where it contributes to property value. As a developer and owner revitalizing North Carolina's mid-sized cities, Self-Help is able to use these savings to make money and preserve an affordable rent structure for local and civic-minded businesses. The success of this model has allowed the company to contribute to the renaissance of central business districts from coastal Wilmington to the mountain city of Asheville, N.C.

Built in 1971 and located in downtown Greensboro, 122 North Elm Street is one of a number of commercial buildings constructed for local banks during the 1970s. Self-Help has owned and operated the property since 1998, and it currently houses 21 office tenants, all of which are non-profit organizations. Like most commercial office buildings, 122 North Elm Street is not a trophy asset. Instead, it is a representative example of the large stock of B-class commercial office buildings that make up the skyline of most U.S. cities. As such, it offers lessons for how cost-effective retrofits can enhance value without negatively impacting rents for value-conscious tenants.

Energy Modeling

In July 2011, the Greensboro property received an Measurement and Verification (M&V) report and energy model completely paid for by the North Carolina State Energy Office at a cost of $23,783. The report identified a suite of potential retrofits, including lighting upgrades, the addition of insulation to wall panels, a digital HVAC management system, and other measures which the report projected would result in a 26 percent reduction in the building's energy usage.

Since then, Self-Help has undertaken many of these recommendations, including a lighting retrofit and upgrades to the HVAC system. However,

some of the report's proposed measures were not deemed cost-effective. For example, the report proposed insulating the building's exterior wall spandrels—pre-cast concrete panels that contain uninsulated 2-inch by 5-inch cavities. The report estimated that filling these panels with blown-in cellulose at a cost of $48,000 would yield annual energy savings of only $1,129. Due to the long payback of this measure, the owner chose instead to invest in energy efficiency measures elsewhere within the building. Insulating walls in completed office buildings can be a financial challenge, and may best be accomplished when tenants turn over or when a building is substantially over-hauled and repositioned.[3]

Building Improvements

Lighting Upgrades. In June 2011, Self-Help undertook a comprehensive lighting retrofit at a cost of $49,147, which the 2011 M&V report estimated would deliver annual energy savings of $7,097 and a simple payback of less than seven years.[4] Self-Help received a state grant of $40,591 for the project, lowering the effective cost to $8,556 and the simple payback to under 15 months.

In the building's common spaces, the lighting retrofit reduced the overall number of fixtures and included the replacement of T8 lamp fixtures with lower wattage T5 lamps with reflectors. In total, 111 lighting fixtures were installed in the lobby and an additional 36 were installed in corridors. Additionally, occupancy sensors were installed in restrooms, conference rooms, copier/supply rooms, and breakrooms, as well as photosensors

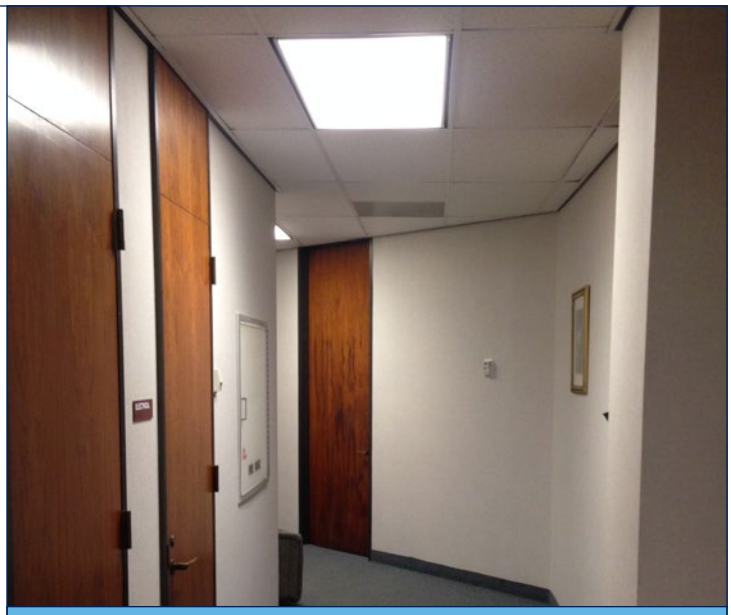


Figure 2: **A lighting retrofit included installation of T5 fixtures with reflectors and an overall reduction in the number of fixtures in tenant common spaces.**

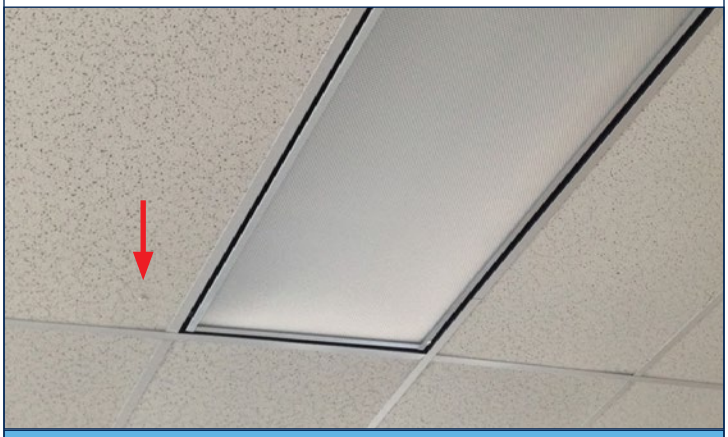


Figure 3: **The project installed occupancy sensors in the bathrooms, conference rooms, and other infrequently used spaces. This project also included photo sensors in conference rooms (indicated with a red arrow).**

in conference spaces. T5 lamps were chosen at the time of the retrofit because linear LED fixtures were not deemed cost effective. Due to a recent drop in the price of these fixtures, the company is likely to use LED fixtures for future retrofits elsewhere within its portfolio.

HVAC Retrofits. In January 2012, Self-Help initiated a multi-year program to retrofit the building's HVAC system. The company's investments included three-way control valves for penthouse and basement air handling units (AHU). Completed

3 It is noteworthy that the report also identified measures that improve occupant comfort at the expense of energy efficiency. Among other small measures, the report recommended fixing the air damper in the air handling unit to allow it to achieve code-recommended ventilation requirements.

4 A simple payback describes the amount of time it takes energy savings to recoup the initial investment in efficiency measures. In the event a retrofit is financed, a leveraged payback is a more appropriate measure for calculating payback. In both cases however, the immediate value implications of higher net operating income should be considered.

at a cost of $17,500, this improvement regulates the amount of chilled water flowing through the AHU cooling coils. Additionally, the old motor and controls for the penthouse AHU return fan were replaced with a new efficient fan motor and controls at a cost of $12,000, which allow the fan to work in step with a high-efficiency supply fan that was already in place. Finally, the company has pilot tested the installation of variable air volume (VAV) kits in existing mixing boxes, beginning on the property's eighth floor at a cost of $12,870. The cost of these HVAC retrofits totaled $42,370.

Tenant Awareness Campaign

The owner also undertook a tenant awareness campaign, including flyers and quizzes designed to engage building users and office managers.

Results

Property performance showed a noticeable improvement upon conclusion of the improvements. Weather-normalized energy use in 2012 declined 19 percent from the prior year, producing over $8,111 in annual energy savings. These savings were tracked using the Environmental Protection Agency's Portfolio Manager, a free online tool that property and portfolio owners can use to monitor energy use within their portfolio. The tool provides energy use intensities (EUI, or the amount of site energy used per gross square foot), and annual utility costs. The tool can also provide an EPA ENERGY STAR Score, which benchmarks the building's energy use against similar asset types. In this case, the ENERGY STAR score can be used to compare the Greensboro building's performance against that of other office buildings. The retrofits improved the building's ENERGY STAR score from 33 to a 55, a significant jump in performance. While it falls short of an ENERGY STAR certification—which requires a minimum score of 75—these improvements represent a significant down payment on achieving that performance level and lift the building into the top half of its peers. (ENERGY STAR is calibrated so that the average building scores a 50.) As the company continues to make investments in the property, it expects to reap additional savings from new retrofits and realize synergies between new fan motors and controls already put into place.

Projected savings match up closely with expectations in the energy model. Annual savings in 2012 show strong savings resulting from both the lighting and HVAC upgrades.

Figure 4: **A new return fan and controls were among a package of HVAC retrofits installed in early 2012.**

Efficiency Measures

- **Lighting Upgrades** including reduction of overall fixtures, installation of T5 fixtures, occupancy sensors in restrooms and common spaces, as well as photos sensors in conference spaces.
- **HVAC retrofits** including controls for basement and penthouse air handling units, high-efficiency AHU return fan and controls, and variable air volume kits in some office spaces.

Financial Performance and Property Value

Among other highlights, this project demonstrates that owners can improve property performance of buildings built in in the 1960s and '70s through smart improvements to lighting, HVAC, and other operational measures. Low rents should not be

considered a barrier. This retrofit shows that improvements to efficiency can be profitably made in an office market with sub-$15-per-square-foot rents and price-sensitive tenants. According to REIS, a commercial real estate market analyst, the asking rent in the Greensboro–Winston-Salem submarket averaged $16.33 per square foot at the time of the retrofit, with 122 North Elm Street's cost-conscious non-profit tenants paying rents in the submarket's lowest quartile.

Taking into account the submarket's other fundamentals, such as a 20 percent vacancy rate and the fact that many office properties sold at prices below their replacement cost, Greensboro is a tenant's market, and that limits an owner's ability to pass along costs or make demands of tenants. In this environment, cost-effective investments in tenant comfort and efficiency represent significant opportunities to improve asset performance: helping keep tenants in place and cutting energy costs to improve NOI.

The most immediate value that can be attributed to the retrofit is the value of avoided energy costs, which creates bottom-line value. In recent transactions, going-in capitalization ("cap") rates on office properties in Greensboro range from 7 percent to 10 percent, interviews with local experts suggest 122 North Elm Street's cap rate would fall into the upper portion of this range.

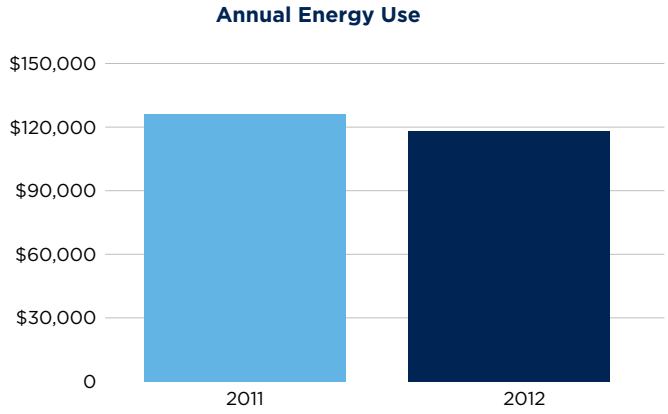
Using a 9 percent cap rate, the value creation via the income capitalization approach to value due to avoided energy costs is $90,122 ($8,011/.09).[5] Comparison of the value creation to capital invested can be presented in two scenarios, one where the state rebates are included and another where they are excluded. Accounting for the impact of the grant, Self-Help effectively invested a total of $50,926 in HVAC and lighting retrofits and realized a multiple of 1.8 on its investment through income capitalization of energy savings alone. The retrofit also achieved an unleveraged 20 year IRR of 18 percent[6], using a 5 percent discount rate, a net present value (NPV) of $80,818 and an annual return on investment (ROI) of 13 percent.

In addition to capitalization of added NOI achieved via utility bill savings, a new appraisal on the building would show additional value creation in a detailed discounted cash flow (DCF) model. A full DCF would model property performance and account for other adjustments to the building. For instance, lower capital reserves, as a consequence of completing the retrofit, would improve the building's operating statement by reducing the need to reserve funds for replacement. The energy savings are expected to be durable, as the projected lifetime of the

Property Improvements	2011	2012	Improvement (%)
Normalized Site EUI	92	74.3	19%
ENERGY STAR Score	33	55	67%
Annual Energy Cost	$126,133	$118,022	6.4%

Figure 6: **Property Performance Highlights**

Figure 5: **Annual energy costs of 122 North Elm Street**



5 Income capitalization, one of three appraisal methodologies for commercial buildings, is a straightforward calculation, where net operating income is divided by a market capitalization rate (cap rate) to determine value. Under this methodology, avoided energy costs accrue directly to NOI, which translates into value. Income capitalization is often more appropriate than discounted cash flow (DCF) analysis when the lifetime of the improvement measures are long, as is the case for this property. This direct capitalization of energy savings assumes "all other factors being equal."

6 This accounts for the fact that electric prices have risen 3.2 percent annually statewide over the last five years according to the Energy Information Administration (EIA).

new HVAC equipment and lighting components are 30 and 10 years, respectively. As part of the program, other adjustments might be possible, including changes to expected rent growth and tenant retention due to the improvements to lighting, which has resulted in improved tenant spaces. The appraiser would likely substantiate these adjustments with market observations and calls to tenants to confirm improved tenant satisfaction.

Conclusion

The retrofits to Self-Help's 122 North Elm Street facility demonstrate that building performance for 1960s and '70s-vintage construction can be improved, as evidenced by the building's 6.4 percent energy cost savings and significant improvement in its ENERGY STAR score. The annual energy savings of $8,111 contributed significantly to asset value in excess of the cost of the retrofits, leading to a more productive asset. Self-Help intends to replicate the success of this project at this building and elsewhere in the portfolio.

Key Results

- Weather-normalized Energy Use Intensity (EUI, or site energy use per gross square foot of building area) decreased by 19 percent
- Reduced energy costs (6.4 percent) with additional savings possible with completion of VAV retrofits
- Annual energy savings of $8,111

Written by John Miller, Institute for Market Transformation.

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