



2020

UNLOCKING HIDDEN VALUE IN CLASS B/C OFFICE BUILDINGS

Best Practices for Pursuing Low-Cost, High-Impact Energy Efficiency and Green Leasing Strategies

BY JOEY CATHCART, MONIKA HENN, GREG HOPKINS, AND MARTA SCHANTZ

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Rocky Mountain Institute (RMI)—an independent nonprofit founded in 1982—transforms global energy use to create a clean, prosperous, and secure low-carbon future. It engages businesses, communities, institutions, and entrepreneurs to accelerate the adoption of market-based solutions that cost-effectively shift from fossil fuels to efficiency and renewables. RMI has offices in Basalt and Boulder, Colorado; New York City; the San Francisco Bay Area; Washington, D.C.; and Beijing.



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ABOUT BOMA INTERNATIONAL

Founded in 1907, the Building Owners and Managers Association (BOMA) International is a federation of US local associations and global affiliates. The leading trade association for commercial real estate professionals for more than 100 years, it represents the owners, managers, service providers, and other property professionals of all commercial building types, including office, industrial, medical, corporate, and mixed-use. BOMA International is the partner individuals in the commercial real estate industry choose to maximize value for their careers, organizations, and assets. Its mission is to advance a vibrant commercial real estate industry through advocacy, influence, and knowledge.

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INTRODUCTION & VALUE PROPOSITION

It's time that Class B and C office owners recognize the largely untapped business opportunity to improve the energy performance of their properties. Beyond the more obvious financial benefits of energy cost savings, additional market factors also play into the timing to move on energy efficiency sooner rather than later. Local benchmarking ordinances and building performance improvement regulations, initially targeting larger commercial properties, are now phasing in compliance for smaller properties, which include many Class B and C assets. And although Class B/C office tenants may not pay higher rental rates, owners are likely to lease more quickly than competitors and retain those tenants during lease renewals, when a space is more sustainable and energy efficient (increasing occupancy while avoiding turnover, vacancy, and new tenant improvement costs). Furthermore, for the ambitious owner looking to reposition a Class B or C office asset into an A property, incorporating energy efficiency measures into renovations provides an opportunity to add long-term value via new building systems and improved operational efficiency.

Even with all these benefits, there's a reason that the Class B/C office market hasn't yet wholeheartedly adopted energy efficiency and green leasing into its general business practices—it's at a disadvantage compared to the Class A market. **These properties are information-constrained:** stakeholders operating Class B/C buildings are often so consumed with day-to-day activities that they do not have the time to learn about best practices for energy efficiency, green leasing, or new technologies to improve operations, and they need quick, low- or no-cost options to choose from. **These properties are resource-constrained:** staff working at Class B/C buildings wear multiple hats; rarely do they have dedicated third-party management and/or building engineering

staff with time to focus on identifying, championing, and implementing energy efficiency efforts. **And these properties are funding-constrained:** Class B/C buildings typically do not have large budgets/capital planning funds to invest for large energy retrofits with high up-front costs. A survey of stakeholders with expertise in the Class B/C office market, who were involved in developing this report, identified the top barriers to energy efficiency in this sector as limited working capital to pay for project costs (60%), limited staff capacity to implement (47%), and low priority versus other business activities (40%).

Nevertheless, the business case is strong to unlock hidden value in Class B/C office buildings and portfolios through energy efficiency and green leasing, as highlighted on page 7 below: the time is now for owners to take advantage. Compared to business-as-usual operations, Class B/C properties



could save roughly 15% of their energy costs with a bundle of low-to-no-cost measures, and 35% or more with larger investments that still reap a three-year payback period. That can reduce a property's operating expenses by \$0.26 to \$0.61 per square foot (i.e., \$20,000 to \$46,000 for a 75,000-square-foot building), increase net operating income (NOI) by **1.9% to 4.3%**, and boost property value by approximately **\$4 to \$8 per square foot** (i.e., adding \$269,000 to \$627,000 in value to that same 75,000-square-foot building). With green leases in place, as described later in this report, an owner can recoup its investment with even better financial outcomes for the property: NOI increases of **2.4% to 5.6%**, property value increases of **\$5 to \$11 per square foot** (i.e., \$343,000 to \$800,000), and **0.5% to 1.0%** higher internal rates of return (IRR) over a five-year period.

Class B/C buildings are not making as much progress as Class A assets on capturing financial and other benefits of energy efficiency and green leasing—but they also have the most to gain, by focusing on low-cost, high-impact strategies. In a changing market with evolving tenant preferences, new energy efficiency technologies, and continued policy action to reduce building emissions, buildings implementing energy efficiency can stay ahead of the market. The recommendations and case studies that follow were developed based on both primary and secondary research, including a series of in-depth interviews with a wide range of Class B/C office professionals grappling with these issues on the ground. Recommendations within the two main sections are roughly ordered from lowest cost/effort to highest. This report is intended to simplify and streamline energy efficiency and green leasing opportunities for Class B/C office owners and provide strategies that are appropriately tailored to the reality of the market, anchored around overcoming core barriers for Class B/C building owners.



The Business Case

FINANCIAL IMPACTS FOR CLASS B/C OFFICE BUILDINGS THAT IMPLEMENT...



Energy Efficiency

By implementing a combination of low- to no-cost energy efficiency strategies, properties can achieve 15%–35% energy savings. Compared to business as usual, based on a 75,000 square foot building, that can mean:

\$20k–\$46k

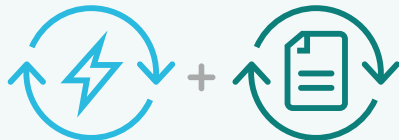
REDUCED OPERATING EXPENSES (\$0.26–\$0.61 per SF)

1.9%–4.3%

INCREASED NET OPERATING INCOME per year

\$268k–\$627k

INCREASED PROPERTY VALUE (\$4–\$8 per SF)



Energy Efficiency & Green Leasing

By implementing energy efficiency strategies with key green lease provisions in place that allow cost and benefit sharing between owners and tenants, property-level financial impacts are even more compelling. Compared to business as usual, based on a 75,000 square foot building, that can mean:

0.5%–1.0%

HIGHER INTERNAL RATE OF RETURN (IRR) over a 5-year period

2.4%–5.6%

INCREASED NET OPERATING INCOME per year

\$342k–\$800k

INCREASED PROPERTY VALUE (\$5–\$11 per SF)

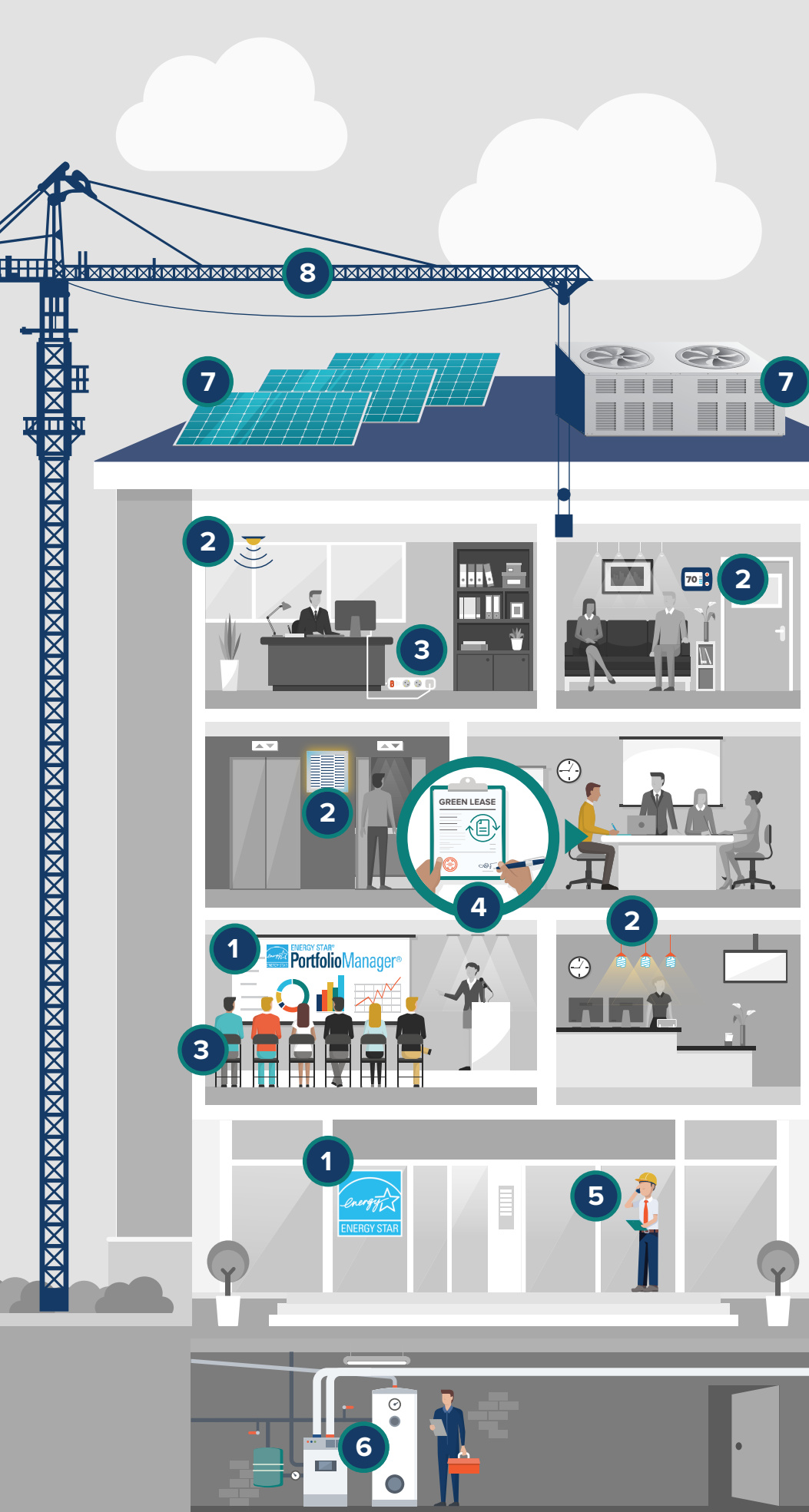
Notes:

Based on US average income and expense figures per square foot for Class B/C office space per BOMA International's 2019 Office Experience Exchange Report (Office EER); 8.0% exit cap rate based on CBRE North America Cap Rate Survey H2 2018.

Assumes gross-leased building with steady occupancy over five-year period and 3% rent growth and expense inflation.

IRR based on implied initial value (year 0) and assuming sale after five years.

Results range based on EE project achieving 15% versus 35% utility cost savings with an assumed target payback period of three years.



Key Building-Level Strategies

The cut-out illustrates key strategies a building owner can take to improve energy efficiency and adopt green leasing in a building and/or across a portfolio, as described in more detail throughout this report. Recommended measures are labeled by number throughout the office and are roughly ordered from lowest cost/effort to highest:

- 1 **COLLECT PERFORMANCE DATA**, benchmark annually with ENERGY STAR Portfolio Manager, and consider certification
- 2 **IMPLEMENT LOW/NO-COST MEASURES** such as LED replacements, optimized HVAC schedules and setpoints, and ongoing preventative maintenance
- 3 **ENGAGE TENANTS** on energy efficiency through their own behavior with plug loads and lighting, and identify tenant efficiency opportunities via a night walk-through
- 4 **INCORPORATE GREEN LEASE CLAUSES** into standard lease forms that document efficient operations, establish efficiency standards for tenant fit-outs, and enable cost recovery for efficiency projects
- 5 **PERFORM AN ENERGY AUDIT** to identify additional cost-effective opportunities for improvement
- 6 **PERFORM RETRO-COMMISSIONING** (HVAC and building automation system) to ensure equipment is working properly and extend its lifespan
- 7 **CONSIDER CAPITAL IMPROVEMENTS** to the roof, HVAC, and envelope, or installation of solar panels, sensors/controls, and higher-efficiency equipment replacements at the end of useful life
- 8 **BUNDLE SUSTAINABILITY IMPROVEMENTS INTO PLANNED REPOSITIONING PROJECTS**

These key building strategies are referenced throughout the report.

STRATEGIES TO IMPROVE ENERGY EFFICIENCY

The introduction of this report highlights three key challenges for Class B and C office building owners—information constraints, resource constraints, and funding constraints—that result in Class B and C office owners completing fewer energy efficiency upgrades in their properties compared to Class A buildings. The following strategies and recommendations are aligned to overcome those constraints, result in lower costs for building owners and tenants, and ultimately uncover hidden value in the real estate assets.

LAY THE FOUNDATION AND ENGAGE STAKEHOLDERS

The first step to a more energy efficient building is understanding the benefits and how to implement the right cost-effective and value-additive projects to a building. Addressing the information constraints common in this class of buildings will help ensure the right knowledge is in the hands of the right stakeholders to make a difference in the property's energy performance.

Take advantage of local education opportunities

Many organizations and associations provide real estate and energy efficiency resources through webinars, reports, trainings, and in-person events. Depending on the topic, these resources can provide either a high-level overview of energy efficiency best practices or an in-depth review of specific technologies. These events can also help building owners, property managers, and facility engineers

network with peers, learn from others' successes, and identify contractors with experience in energy efficiency. Example organizations to engage include:

- 2030 Districts Network ⁱ
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) ⁱⁱ
- Building Owners and Managers Association (BOMA) International ⁱⁱⁱ
- US Environmental Protection Agency (EPA) ENERGY STAR ^{iv}
- US Green Building Council ^v
- Urban Land Institute ^{vi}

City energy or environmental agencies and/or utility websites also frequently have market-specific resources on energy efficiency. In addition, local chambers of commerce and small business associations may offer educational and/or financial resources for energy efficiency that should be explored.

Lean on the property manager

Owners who don't directly manage their buildings and/or don't have in-house sustainability experts can follow their property management firm's standard operating procedures (SOPs) as a strong baseline for energy efficient practices. When selecting a property manager for their Class B or C office building, building owners should ask property management companies about their experience with energy efficient operations. Because they are regularly on-site, proactive property managers can also identify malfunctioning and inefficient equipment and can provide owners with efficient and cost-saving replacement options.

ⁱ Find a local district at www.2030districts.org/districts.

ⁱⁱ Find a local chapter at www.ashrae.org/communities/chapters/ashrae-chapters.

ⁱⁱⁱ Find a local association at www.boma.org/FindYourLocalBOMA.

^{iv} Find online trainings and resources at www.energystar.gov/buildings.

^v Find a local community at www.usgbc.org/join-center/community.

^{vi} Find a local district council at <http://americas.uli.org/councils/district-councils/locations>.

“If a Class B/C office building owner is focused only on immediate cash flow, they may not understand the value or future cash flow they are missing out on. Property managers need to be pulled out of their day-to-day perspective, support building owners by looking at capital issues, and prove the business case for them through case studies and direct analysis of their properties and available options.”

— Dave Hewett, *SDL Advisors Inc*

1

Benchmark energy consumption

A common saying in the sustainability industry is that you can't manage what you don't measure. Energy benchmarking is the comparison of a building's energy performance either against itself over time or against similar buildings and can be done for free in the ENERGY STAR Portfolio Manager tool. Benchmarking helps building owners understand how usage and costs have changed over time and can also be a way to ensure that energy projects implemented on a site achieve the expected savings.



ENERGY STAR Portfolio Manager:

The EPA's ENERGY STAR Portfolio Manager platform is a free online software tool that tracks energy, waste, and water consumption. It is the world's

leading benchmarking tool, encompassing 40% of US commercial building space. Buildings that achieve a score of 75 or higher (out of 100) are eligible for an ENERGY STAR building certification and plaque to display on their property.

Beyond benchmarking support, ENERGY STAR offers guidance and recommendations on improving energy efficiency in small- and medium-sized buildings. Details on the value proposition, marketing and leasing best practices, tenant engagement, and utility rebates can be found online.¹



Although benchmarking is not as common for Class B and C buildings, the minimal time investment to collect and review energy performance data can yield substantial savings. Simply tracking building performance over time can help identify abnormal energy usage trends quickly. A study from ENERGY STAR Portfolio Manager indicated that across 35,000 buildings, benchmarked buildings achieved an average annual energy savings of 2.4% over a three-year period, with total savings of 7%.² Office property-specific savings were even higher.

However, as a best practice, some companies—like WashREIT, an owner and operator of office, retail, and multifamily assets in the Washington D.C. Metro area—benchmark all properties in ENERGY STAR Portfolio Manager, regardless of asset class.

“Just because a building is Class B doesn’t mean things shouldn’t run as efficiently as possible. Everyone should benchmark their entire portfolio from the start. It is cheap and anyone and everyone can do it. Even if we are the third-party management company, and the owner doesn’t want to pay, we’ll eat that out of our fee. As a company, we feel benchmarking is that important.”

— Tommy Russo, *Akridge*

Understand local energy efficiency regulations

In the United States, at least 31 cities (and counting) from Des Moines, Iowa, to Reno, Nevada, have set energy benchmarking and reporting mandates for commercial buildings, with 15 requiring that buildings meet performance targets or undertake additional actions like energy audits or tune-ups. Penalties for

noncompliance can include fines, so building owners and property managers should stay on top of all current policies as well as upcoming ones that may impact their business. As cities expand their climate action plans, benchmarking policies and other regulations are applying to an ever-increasing section of the real estate market, with many policies now applying to all commercial buildings over 25,000 square feet, and some as small as 10,000 square feet. There are tools available to help owners stay on top of the cities and states requiring building performance practices.³

Spread the word: Pass the information along

Once a building owner understands the value of energy efficiency, it is critical to pass information along to the stakeholders, including tenants, property managers, facility engineers, and contractors. Demonstrating a commitment to sustainability can also motivate property managers and other stakeholders to contribute to the building owner’s goals in their own practices. The more they buy into the benefits, the more likely they are to proactively contribute to improving the asset’s energy efficiency.

For tenants, possible engagement initiatives can include a green tenant guide that outlines all on-site sustainable practices, newsletters, on-site educational programs for holidays like Earth Day, and continuous signage. Green leases can also be used to align owners and tenants on a building’s sustainability practices. Many owners report that by showing tenants the building’s energy efficiency investments and by giving them an opportunity to reduce their own energy costs and positively impact the environment, tenants are happier and more likely to renew their leases.

3

4

“While not necessarily the main driver for tenants, sustainability is one more tool in your toolbox when it comes to getting a lease signed.”

— Brenna Walraven,
Corporate Sustainability Strategies

OPTIMIZE RESOURCES TO MAXIMIZE EQUIPMENT EFFICIENCY AND MINIMIZE COSTS AND STAFF TIME

Many energy efficiency opportunities can be implemented with little staff effort and limited to no financial investment, which circumvents the resource-constrained Class B/C hurdle. Optimizing building operations ensures that equipment operates effectively, lengthening its life span and improving efficiency. These low-to-no-cost upgrades can have fast payback, not just through lower energy costs, but also reducing variability (reducing the number of hot/cold calls from tenants) in equipment performance, reducing repairs and maintenance costs, and ultimately improving the tenant experience.

2

Ensure that the current building and equipment operate efficiently

Class B or C office buildings often operate with limited staff, especially staff with expertise on energy conservation measures. Each of the following measures can help building owners achieve significant and ongoing energy savings across all property types, no matter the on-site/off-site staff mix.

- Upgrade lighting to LEDs and add networked controls/sensors as feasible.
- Keep an eye on the building automation system (BAS), if the building has one, to identify abnormalities.
- Install programmable thermostats in properties without a BAS.

- Widen HVAC set points on common area set points.
- Walk the building and utilize low-cost handheld tools to obtain valuable building data. Examples of tools include digital thermometers (for envelope leaks or HVAC issues), data loggers (for checking energy consumption of specific equipment, plug loads, or lighting), leak detection tools, indoor air quality meters, and infrared cameras. The local library may have some of these items available to borrow at no cost.
- Installing window shading through shades or window film reduces solar radiation and lowers cooling requirements.
- Conduct regular night walk-throughs to check for inefficiencies such as lights and computer monitors left on, building systems running unnecessarily, or other abnormalities not noticed during the day.
- Avoid deferred maintenance and conduct ongoing preventative maintenance to lengthen equipment life span.
- At equipment end-of-life, replace with a more efficient model instead of a like-for-like replacement.
- Lease language: document the landlord’s efficient operations practices in lease language to ensure that tenants understand expectations.
- Engage tenants to increase awareness of behavioral activities they can implement to save energy, such as turning off lights and unplugging appliances at night, leveraging natural daylight during daytime operating hours, and widening temperature bands to save HVAC.

4



Image courtesy of Compass Properties

PROJECT PROFILE: PRIORITIZING ENERGY EFFICIENCY MEASURES Compass Properties

To overcome the challenges of older buildings and costs to implement energy efficiency, Compass Properties follows the 80/20 rule, where 80% of the performance will generally come from about 20% of the work or investment. Compass recognizes that it can't do all things all the time, but when it does, it has to focus on the most impactful. At Compass, the 20% of initiatives that achieve the maximum amount of value are LED lighting replacements, but only on the lights that are on for more than eight hours a day; timers on all the rest; HVAC setbacks; leases that charge for overtime tenant HVAC use; and separately metered lights and outlets in tenant spaces, which encourage tenants to turn off their equipment before they go home.



Image courtesy of Akridge

PROJECT PROFILE: EQUIPMENT MAINTENANCE AND RETROCOMMISSIONING SAVED ENERGY AND ADDRESSED TENANT COMPLAINTS

1100 Seventeenth Street, Akridge

When Akridge acquired a building that was built in 1963, the number one complaint from tenants was regarding the induction units that provided heating. Instead of replacing the systems, building engineers walked through the property and cleaned and retrocommissioned each unit. Building system tune-ups were a lower-cost option than completely replacing the heating units, and this shows the importance of routine maintenance, because the improvements to this system reduced tenant complaints by 90%.



Image courtesy of The Tower Companies

PROJECT PROFILE: SAVINGS FROM REAL-TIME ENERGY MONITORING Blair Office Building, Silver Spring, Maryland, The Tower Companies

The Tower Companies (Tower) initiated real-time energy monitoring as part of an operational energy management strategy across their commercial portfolio in 2012, including at Blair Office Building, a multitenant Class B/C office building built in 1963. By focusing on operational changes for this program, there has been no need for construction, tenant disruption, or large capital investments. Monitoring has provided its buildings operations teams with better information about energy use and has identified actionable recommendations for optimizing energy use.

Using data from the real-time energy program, Tower was able to identify a handful of energy conservation

measures at Blair Office Building and used a grant from the Maryland Energy Administration to cover part of the up-front costs. Without typical building controls in place at the property, the implemented measures were simple, including breaker-level controls for each floor, variable-frequency drives (VFDs), and the addition of time-of-day scheduling for cooling tower and heating pumps.

With just a \$44,000 investment, the project was able to reduce energy use by almost 30% and return \$50,000 in estimated annual energy savings—less than a one-year payback. Most savings came from reducing unnecessary night load, when tenants were not working in their offices, by over 50%. These measures are also highly replicable across existing buildings without building automation systems or controls.

“At Tower, we implement smart and consistent operational standards across our entire portfolio—regardless of whether or not the building is considered Class A, Class B, or Class C. Our team likes to be challenged and think outside the box to identify energy efficiency measures that make business sense and can be implemented at more than one property, whenever possible.”

— Eugenia Gregorio, *The Tower Companies*

5

Conduct an audit to identify site-specific measures and retrocommission to ensure that equipment functions properly

Energy audits completed by local professionals help building owners identify cost-effective and site-specific energy efficiency improvement measures. Sometimes the local utility or other city agency has funding available to pay for this cost if owners commit to implement some of the recommendations.

ENERGY AUDITS

ASHRAE Level 1 audits are entry-level audits that involve staff interviews, a building walk-through, and review of operating data. Results from this audit are included in a report with energy efficiency measures, including low-/no-cost measures and larger capital improvements. The audit can help identify key areas for improvement and help prioritize improvements.

ASHRAE Level 2 audits include everything in the Level 1 analysis, with additional energy and financial calculations for proposed energy efficiency measures. This level of detail can be helpful to justify a selected project.

ASHRAE Level 3 audits take the capital-intensive projects identified in a Level 2 audit and conduct a thorough analysis using submetered equipment data to create a baseline to track potential energy and operational savings from an energy conservation measure.

6

In addition, regularly retrocommissioning the BAS and HVAC equipment reduces energy waste and ensures that the building is operating as intended. Retrocommissioning studies optimize energy-consuming systems and equipment, identifying no-cost improvements (e.g., changing current practices or reallocating resources), system recalibration (low-cost upgrades that improve the efficiency of current assets but avoid major capital expenditures), and system upgrades.⁴ Given that many Class B/C buildings may go for years without servicing, the value proposition for retrocommissioning is compelling: studies have shown the average cost of retrocommissioning is only \$0.30 per square foot, with average energy savings of 15%–27% and payback periods of only one to two years.⁵





Image courtesy of WashREIT

PROJECT PROFILE: ENERGY AUDIT TO SAVE COSTS AND INCREASE TENANT COMFORT

1776 G Street, Washington, D.C., WashREIT

In January 2017, WashREIT commissioned an energy audit to review current equipment and operations at 1776 G Street, a 270,000 square foot Class B office building originally constructed in 1978. Recommendations from the audit included replacing common area lighting with LED bulbs, installing two VFDs, implementing a more efficient warm-up and cooldown process, reprogramming the air handlers, and programming the building automation controls to optimize cooling tower operations. Within 18 months after these measures were implemented, the building experienced a 252,000 kWh reduction in energy use, \$41,000 in annual electricity cost savings, and 50% decrease in tenant comfort complaints. The building's ENERGY STAR score also rose by seven points.



Image courtesy of Boxer Property

PROJECT PROFILE: PORTFOLIO-WIDE AUDIT TRACKING

Boxer Property

In addition to tracking utility performance, each building at Boxer Property receives an annual in-house ASHRAE-level audit (Level 1, 2, or 3) based on an energy checklist. The audit results are tracked over time through the in-house-developed Boxer Energy Sustainability Tracking (BEST) program, which compares a building's efficiency to internal benchmark standards. The program gives each building a grade based on operations, identifies specific areas of improvement, and conducts simple cost-benefit analyses on each suggested measure. Boxer ultimately selects efficiency measures for implementation based on the financial returns and the utility market (regulated/deregulated). During the annual BEST audit at 507 N. Sam Houston Parkway East in Houston, Texas, the inspector determined that a VFD could be installed to reduce load on the property's main fan and increase its life span. After investing \$9,925 in materials and labor, the project achieved \$9,723 in annual savings, resulting in a one-year payback and 98% return on investment.

“Our business is to buy distressed Class B/C properties and turn them into moneymakers through basic energy management practices and larger capital investments like replacing chillers or changing windows, redesign, and [remarketing] the properties. By standardizing operations, like audits across the portfolio, we are able to track our performance accurately over time, and when it gets to the black, we sell it.”

— Rob Hamon, *Boxer Property*

REDUCE CAPITAL COSTS AND IDENTIFY ADEQUATE FUNDING

The financial constraint of limited working capital is generally considered to be the largest barrier to energy efficiency in Class B and C office buildings. Many owners are not interested in taking on debt to finance energy efficiency improvements and would instead prefer to pay for all upgrades out of pocket with a sub-three-year payback period, meaning that projects with larger up-front costs are overlooked no matter the potential long-term savings.



Identify strategies for financing energy efficiency projects

Funding-constrained owners can leverage available incentives or financing programs to reduce or cover up-front costs of an energy efficiency project. Some of these larger capital projects include roof repairs, HVAC replacements, envelope upgrades, solar panels, and major sensor/controls installations.

4

- Cost recovery provisions for energy efficiency upgrades in standard lease forms.
- Local utility rebates and incentives: Utilities across the United States offer incentives to commercial real estate customers who implement efficiency measures such as lighting retrofits, energy audits, and larger capital improvements. Each individual utility lists its specific rebates online, and the Database of State Incentives for Renewables and Energy provides a comprehensive source of information on incentives for building energy efficiency improvements.⁶
 - Some utilities offer on-bill financing, in which they fund the improvements up-front and the buildings pay back the cost over time based on the difference in their monthly energy bill.
- Commercial Property Assessed Clean Energy (C-PACE): This financing structure allows owners to borrow funds off the balance sheet for energy efficiency (and renewable energy) projects and repay the loan through a property tax assessment. This method helps building owners finance the up-front costs of major capital improvements, and because the assessment stays with the property, it can help an owner overcome hold-period or payback-period constraints. More details on C-PACE financing are available from the US Department of Energy.⁷
- Energy service contract model: Through this process, building owners set the financial and performance criteria for a project, and the service provider develops a turnkey solution that meets or exceeds them. The project is paid for via energy and operational savings derived from the project, and the service provider guarantees a level of energy savings. The BOMA Energy Performance Contracting Model provides a process for owners and service providers to implement to achieve energy performance contracting success.⁸
- Service provider financing: Vendors now recognize that creative financing structures can help bring a proposed project across the finish line. For owners who do not want to wait for a utility incentive to come through, some vendors will pay the up-front project costs and accept the utility funds once they've been paid out. Other vendors will take payment from a percentage of the total energy savings.

“In addition to price, potential owners need to have a strong understanding of the property’s life cycle, including regular maintenance costs, future operating expenses, impending replacements or upgrades, and the potential issues these items could have upon exiting. Planning ahead and looking at the bigger picture will save owners in the immediate and long term.”

— Bill Moebius, *Jones Lang LaSalle*

Bundle energy efficiency into broader renovations

Oftentimes, the best opportunities for energy efficiency in a building are at key renovation points, like acquisition, when owners are comprehensively reviewing the building and making investments. For buildings already under management, another trigger is tenant turnover, leading to renovation to support leasing efforts. For example, if common areas are already being updated, an LED lighting changeout is a minor additional expense to bundle into the overall renovation budget.

7

Other major capital investments that can be incorporated during renovations include solar panels or envelope upgrades (e.g., window replacements). Although they are more expensive than the low-to-no-cost measures suggested earlier in the report, these investments can substantially reduce energy use and increase building value.

“When completing a \$2 million project, we added an elevator modification to achieve energy savings. This \$50,000 expense wouldn’t have been justifiable on its own but made sense as part of a larger project. We are always happy to pile smart decisions on top of other decisions.”

— Sheldon Oppermann, *Compass Properties*



Image courtesy of Colliers International

PROJECT PROFILE: INVESTMENT IN REPOSITIONING PAYS OFF

Park Tower, Tampa, Florida, Colliers International

Park Tower is a 37-story Class B high-rise office building in Tampa, built in 1973. Over a 10-year period, Colliers ensured that tenant suites were upgraded upon lease renewal, resulting in substantial energy savings for the tenants. Furthermore, major common space renovations began in 2013 to reposition the building in the local marketplace, including the installation of new, highly efficient chillers; efficient light fixtures; a new energy management system; updated plumbing; and new electric transformers. After completing these upgrades, the building achieved LEED Gold certification, earned a BOMA 360 designation, reduced energy use by 50%, and received an ENERGY STAR rating of 99. With a total investment of \$11 million, \$5 million specifically invested in energy efficiency, \$79,620 was saved in one month alone on energy expenses, and the building was later sold at a significant increase in value.

“Buildings can achieve up to a 30% return on capital investments if they are bundled together.”

— John Scott, *Colliers International*

Energy efficiency in value-add repositioning opportunities

Value-add investments in Class B/C office properties, especially those including energy efficiency improvements, can reposition a Class B/C property into Class A. By integrating new efficiency technologies like new fixtures, HVAC systems, and building automation systems, building owners can improve the overall tenant experience and lower the overall costs of occupying a space, potentially leading to improved occupancy levels.

“Retrofitting Class B and C properties is a way to be smart in a down market as tenants move from B to lower-cost A properties unless there are features keeping them there. Rent may go down, but the real value is lowering tenant turnover. And when it comes to leasing, if a building can be a recruiting tool for a tenant, they are willing to pay more.”

— Kevin Bates, *SHARP Development*



Image courtesy of SHARP Development



Image courtesy of SHARP Development

PROJECT PROFILE: CLASS C OFFICE TO CLASS A AND NET ZERO ENERGY 435 Indio Way, Sunnyvale, California, SHARP Development

SHARP Development conducted a deep-energy retrofit of a 32,000-square-foot 1970s Class C building in Silicon Valley into a Class A net-zero energy office. Energy measures to achieve this include solar panels covering the roof, specially designed south-facing skylights that work with electrochromic glass to deliver natural light, and operable electrochromic windows, skylights, and fans to deliver exceptional thermal comfort.

The finished office building leased up in three months instead of the expected 18 and earned an extra \$2.40 per square foot per year above market rent. The energy cost benefits that resulted from the increased efficiency and on-site solar energy generation were even more significant, reducing operating expenses \$5.40 per square foot per year. Had the building been sold the day it was occupied, the building owners would have recovered the additional \$49.84 per square foot that it cost to achieve net zero and made an additional \$100.29 per square foot.

STRATEGIES TO “GREEN” STANDARD LEASE FORMS

Taking the initiative to invest in energy efficiency can be a challenge when the building owner may not directly recognize the utility cost-saving benefits of that investment; this issue is referred to as a “split incentive.” In the example of a triple-net lease structure, in which tenants are responsible for paying their share of utility and other expenses, a building owner may be less motivated to pay the up-front costs of an energy upgrade if the resulting cost savings will accrue to tenants over time versus the owner’s bottom line. Alternatively, under full-service gross lease structures, where building owners are responsible for covering utility and other expenses, tenants may be less motivated to reduce their energy consumption.

No matter the lease type, adding a few key green lease provisions to modernize standard lease forms can align owners and tenants in their pursuit of energy efficiency and can improve the economics of energy efficiency projects for owners. Green lease provisions lay an important foundation to overcome split incentives and drive more investment into energy efficiency opportunities (from low-/no-cost improvements like lighting upgrades and retrocommissioning to more capital-intensive investments like replacing HVAC equipment or incorporating energy efficiency into repositioning projects). Green leases not only help align the financial interests of building owners and tenants through mechanisms that allow for the sharing of energy efficiency costs and benefits, but they also improve transparency and signal to existing and prospective tenants a commitment to sustainability.

However, much like energy efficiency, broader adoption of green leases in the Class B/C office market has been held back by information constraints, resource constraints, and funding constraints. Green leases are often perceived as being too complex and involving too many options and variations to easily integrate into normal-course business practices. Many

Class B/C owners are unable to dedicate the time or staff capacity to understanding and implementing green lease provisions, and/or don’t want to incur the added legal expenses that come with involving legal counsel to change leases. Generally, in the Class B/C market, leases, management contracts, and other documents tend to be shorter and simpler, with limited legalese. Nonetheless, owners (and their leasing brokers, when applicable) can easily and cheaply incorporate three key components of a green lease, as simplified by the subsections below, to capture the highest-impact benefits: operations, tenant fit-outs, and cost recovery. While there are a number of additional green lease components owners can consider (e.g. addressing recycling programs, sustainable purchasing guidelines, etc), the green lease components recommended in this report were selected in response to Class B/C barriers as well as feedback from interviewees and are intended to specifically support value-enhancing energy efficiency opportunities described above. Following each recommendation is suggested lease language (in italics) that can be incorporated into a building rules and regulations section (or similar) of a standard form lease.

GREEN LEASE LEADERS

The Green Lease Leaders program,⁹ launched by the Institute for Market Transformation and the US DOE’s Better Buildings Alliance in 2014, is referenced throughout this section as a leading authority on green leasing best practices, with a number of tools and resources available online to learn more. Deserving special mention, WashREIT and The Tower Companies, both Class B/C office owners involved in the development of this report, have been recognized as Green Lease Leaders for implementing green leases across their portfolios. BOMA International, RMI and ULI are all supporting partners of the program.

DOCUMENTING EFFICIENT OPERATIONS PRACTICES

Foundationally, it is important for building owners to document guidelines that establish and encourage more efficient building operations—setting expectations for both property managers and tenants. Although there is a wide range of strategies that can be routinely undertaken to improve energy management, owners should at minimum incorporate key low-to-no-cost items highlighted below into SOPs for common areas and base building systems in addition to tenant spaces. All energy management practices undertaken at the property should be clearly written into leases to ensure transparency and alignment of stakeholders.

- **Track and share energy data:** The first step to better management of energy performance is tracking and monitoring the data on a monthly basis. Landlords can do this most easily for building common areas using the EPA’s free online tool ENERGY STAR Portfolio Manager, as mentioned on page 10. In turn, landlords can request annual energy disclosure from tenants whose spaces are separately metered. Although in some cases owners may find it difficult to obtain this data from tenants, utilities across the country are increasingly making whole-building data readily available to owners,^{vii} and in some places, local laws require it.

Landlords should also disclose the building’s ENERGY STAR score to tenants each year, allowing them to better understand their own energy use in the context of the whole building, and improving transparency and communication on energy issues. Adopting these practices not only provides owners with data that can inform future energy-related investment decisions but also helps owners get ahead of looming (or comply with existing) whole-building energy benchmarking requirements that are becoming increasingly common across US cities.

Suggested lease language for data transparency

“Landlord is committed to reducing energy consumption at our facilities. Landlord shall track energy consumption data of the common areas in our properties on a monthly basis. This energy consumption data will be recorded monthly via ENERGY STAR Portfolio Manager or other tracking tools. Data will be used for the purposes of (a) monitoring and improving the energy performance of the Premises and/or (b) measuring the energy performance of the Premises against any agreed targets. Landlord shall provide tenant with the building’s ENERGY STAR score annually. To the extent Tenant obtains electricity independently of the building, Tenant shall give Landlord access to Tenant’s data on energy use for inclusion in Landlord’s annual reports, ENERGY STAR annual rating, and similar purposes. Tenant shall submit on a(n) [monthly, quarterly, annual] basis to Landlord energy [and water] consumption data, including total usage and total charges as they appear on Tenant’s electric, gas, water, and other utility bills, in a format deemed reasonably acceptable by Landlord.”

- **Conduct retrocommissioning and energy audits:** To optimize the performance of existing systems and to identify improvement opportunities, owners should add lease language stating that the building will periodically (e.g., every two years) conduct retrocommissioning and energy audits. For tenants, inclusion of this language signals a commitment to maximizing value. For owners, energy audits provide a more refined understanding of the building conditions and cost-effective upgrade opportunities—and they can often be fully or partially subsidized by local utility incentives.

^{vii} For the full list, see the map at www.energystar.gov/buildings/program-administrators/state-and-local-governments/see-federal-state-and-local-benchmarking-policies.

- **Other energy management practices:** Owners should document in this same lease section any other efficient operations practices they or their property manager(s) already carry out as part of SOPs and/or can easily add to SOPs for purposes of optimizing building performance and signaling this commitment to tenants (e.g., restricting HVAC hours to tenants’ business hours, prohibiting the use of space heaters, cleaning and replacing air filters as often as recommended by manufacturers, using programmable thermostats, and installing lighting controls).

Suggested lease language for commitments to efficient operations

“Landlord is committed to the following energy management practices in base building systems and common areas: conducting retrocommissioning (bi) annually, to optimize energy consuming systems and equipment; conducting energy audits (bi) annually to identify any energy conservation measures; [other practices as applicable, such as restricting HVAC hours to tenant operating hours, prohibiting space heaters, installing lighting controls, etc.]”¹⁰

“At the end of the day, the split incentive has less to do with lease structure and more to do with the expertise of the owner in having a conversation about sustainability opportunities. We’ve found good success coaching property management teams on how to engage tenants, including putting together scripts and showing them how to develop action plans. Engaging tenants through this approach has worked really well (getting [approximately] 80% of tenants to share data). Educating the ‘frontline’ folks who engage with tenants is one of the best ways to get everyone on board with sustainability opportunities.”

**— Brenna Walraven, BOMA Fellow,
Corporate Sustainability Strategies**

ENERGY EFFICIENCY STANDARDS FOR TENANT FIT-OUTS

Building owners should also include lease language establishing minimum efficiency standards for tenant fit-outs. Ensuring the initial installation and use of efficient systems and appliances within tenant spaces can dramatically reduce tenant energy consumption over the life of the lease, in turn lowering operating costs for the building. This could be as simple as requiring efficient LED lighting and ENERGY STAR certified appliances, but could also include sub-metering tenant energy use, installing plug load controls, and/or fully meeting the criteria of the ENERGY STAR Tenant Space requirements.¹¹

Tenants will likely be open to the inclusion of these requirements given the opportunity to reduce their occupancy costs over the lease term. In addition, tenants will likely be even more agreeable to minimum efficiency fit-out requirements if language committing



the building owner to efficient operations is already included in the lease (i.e., per the previous section), showing that the building owner has “skin in the game.” To mitigate tenant pushback during lease negotiations, softer language such as “tenant agrees to cooperate” can be a good substitute for strict requirement language such as “tenant must” to build buy-in between owners and tenants. Additionally, to preempt potentially wasteful tenant behavior, this section should encourage best practice routines for tenants, such as turning off lights and unplugging appliances at the end of each workday, leveraging natural daylight during daytime operating hours, and widening temperature bands to reduce HVAC consumption.

Suggested lease language for efficient fit-outs

“Tenant shall comply with minimum fit-out standards for various areas such as: efficient lighting fixtures (e.g., all exit lights to be LED, occupancy sensors), appliances (e.g., all appliances to be ENERGY STAR rated), interior finishes (e.g., water-based, low VOC paints), plug load (smart strips to eliminate vampire loads), efficient water fixtures (flush and flow), etc.”¹²

“Any and all Tenant Improvement Work and/or Alterations will be performed in accordance with Landlord sustainability practices that the Tenant has accepted as part of the lease agreement, namely the leased space fit-out must meet Environmental Protection Agency’s ENERGY STAR Tenant Space criteria.”¹³

“We have found our green lease guidelines to be a useful tool that helps us to better engage and educate tenants, design and construction teams, brokers, attorneys, and others from the beginning of the relationship. Our goal is to provide standards that add clear value for all stakeholders and are not difficult to follow, which in turn helps our team meet short- and long-term energy efficiency goals.”

— Eugenia Gregorio, *The Tower Companies*



ENERGY EFFICIENCY PROJECT COST RECOVERY

First costs associated with implementing energy efficiency projects, especially in cases that require large capital expenditures (e.g., major systems and equipment replacements), can be challenged by budget constraints and split incentives. However, a core provision of green leases offers a mechanism through which building owners can recoup their up-front investment in energy upgrades from their tenants over time. In doing so, energy efficiency cost recovery language opens the door to pursuing energy retrofit projects with improved economics.

As a simplified example, a building owner might replace HVAC rooftop units (RTUs) with a significantly more efficient model for a total project cost of \$20,000.¹⁴ With green lease cost recovery language in place building-wide, that owner can collect reimbursements from tenants each year of over \$1,300 (i.e., the RTUs' up-front cost amortized over their 15-year useful life) while that equipment is in use—meaning that property's NOI receives a boost over time, not only from reduced operating expenses but also from higher tenant pass-throughs.

Although negotiating cost pass-through language in leases can be contentious, when it comes to energy efficiency, this language can be structured in ways that provide a win-win for owners and tenants. Pass-through cost recovery language has been key in moving the real estate industry toward green leases because it allows building owners and tenants to share the cost and benefits of efficiency improvements. Given its fundamental importance, including an energy efficiency cost recovery provision is a prerequisite for building owners aiming to qualify as Green Lease Leaders.¹⁵

To ensure buy-in from tenants, building owners should provide assurances that capital costs passed through are fair. There are a few different methods to do this. Common compromises include passing through only capital costs required to comply with legal requirements or passing through only the costs of projects that reduce operating expenses (in some cases, passing through only the amount of savings realized in a given year).¹⁶ Additionally, capital costs can be recovered on the basis of either the useful life of the equipment installed or the payback period of the project. Although amortization on the basis of payback period typically results in faster cost recovery for owners, Generally Accepted Accounting Principles indicate that capital costs should be—but are not required to be—amortized on a useful life basis.¹⁷ Tenants are likely to more readily agree to the latter given that this option spreads cost recovery over the period in which the equipment is used, such that tenants are effectively paying a share of the costs while they enjoy the resulting benefits during their lease term.



Suggested lease language for energy efficiency project cost recovery

“Capital expenditures and capital repairs and replacements shall be included as Operating Expenses provided such capital repairs or replacements were necessitated by a change in Law occurring after the date of this Lease or were intended to have cost-saving benefits over the Term and amortized costs of same over the useful life of the improvement in accordance with generally accepted accounting principles or with respect to cost savings, over the payback period of such improvement.”¹⁸

“Landlord may include the costs of certain capital improvements intended to improve energy efficiency in operating expenses of tenant space. The amount passed through by Landlord to Tenant in any one year shall not exceed the prorated capital cost of that improvement over the expected life-cycle term of that improvement [and shall not exceed in any year the amount of operating expenses actually saved by that improvement]. Interest/cost of capital can be included.”¹⁹

Other Examples:

- *PlaNYC Energy Aligned Clause language²⁰*
- *BOMA Green Lease Guide energy cost recovery language²¹*
- *California Sustainability Alliance—Green Leases Toolkit²²*

“Across our portfolio, we’ve converted leases to green leases and have been finding that incorporating pass-throughs for energy saving projects does not meet much resistance because tenants generally don’t want to object to smart investments that conserve energy and save the property money. If there’s real pushback, we know they aren’t the right fit for our property. We need our relationships to be win-win or there’s no deal.”

— Sheldon Oppermann, *Compass Properties*

OPTIMAL TIMING TO IMPLEMENT GREEN LEASE PROVISIONS

Incorporating the high-impact green lease provisions described above can most easily be done by adding language to the standard lease form. The most opportune time to integrate green lease components is when signing on a new tenant via the standard form or when renewing an existing tenant (in the latter case, these provisions can be added via a short lease amendment). Building owners can more easily make the case for energy efficiency cost recovery language and other provisions by detailing the mutual benefits—in business terms—over the lease period to avoid resistance from tenants, given that tenants are unlikely to argue with the opportunity to reduce their all-in occupancy costs.

For buildings with multiple tenants on different lease renewal schedules, it can be complicated and/or impractical to coordinate and implement building-wide green leases all at once. Modifying existing language midlease is possible but significantly more challenging because tenants are unlikely to be amenable to renegotiation during their lease term. Instead, owners can consider drafting a memorandum of understanding as a work-around with tenants to encourage collaboration and establish important building energy considerations. Setting expectations and making tenants more aware of goals is likely to increase acceptance of lease terms and encourage conservation-oriented behavior.²³

BOMA’s Green Lease Guide

For more than 30 years, BOMA International has provided the industry with a comprehensive model lease agreement that is considered the “standard” for commercial leases. In 2005, BOMA first “greened” its model lease to provide a step-by-step guide for how to execute a lease with sustainability attributes. Last updated in 2018 to reflect the latest sustainability best practices, BOMA’s Green Lease Guide is now available free of charge on BOMA.org thanks to a generous grant from Yardi.

CONCLUSION

Class B/C office owners stand to benefit significantly from implementing energy efficiency improvements, and even more so when key green lease provisions are in place. The strategy recommendations described in this report are tailored to the unique needs of Class B/C owners and are intended to overcome widespread limitations when it comes to information, capacity, and funding:

- **Lay the foundation:** To better understand the energy efficiency opportunities available, tap into local educational and professional networks, lean on experienced property managers, and start benchmarking building energy data.
- **Optimize resources:** Prioritize actions that don't require much staff effort or investment—for example, retrocommissioning to fine-tune equipment, engage an energy audit to identify cost-effective upgrades, and focus on the range of fast-payback, low-hanging fruit measures on page 11.
- **Reduce the cost burden:** For more capital-intensive projects, first offset up-front costs through utility incentives, then spread the balance through options like on-bill financing, C-PACE, or energy performance contracts; where possible, bundle efficiency into broader renovations.
- **Modernize standard lease forms:** Improve the economics of efficiency projects and engage tenants by adding three key provisions to lease forms and renewal amendments: documenting efficient operations practices, efficiency standards for tenant fit-outs, and efficiency cost recovery mechanisms.

By pursuing a combination of these low-cost, high-impact strategies, owners can see increases in property NOI of over 5% and value increases in the hundreds of thousands of dollars—not to mention other benefits like improved tenant retention, easier compliance with regulations, and upside from repositioning opportunities. With this simple and streamlined menu of energy efficiency and green leasing solutions, it's time for owners in this sector to start capitalizing on the untapped potential of their buildings.



ENDNOTES

- 1 “ENERGY STAR for Small- and Medium-Sized Office Buildings,” ENERGY STAR, accessed November 13, 2019, www.energystar.gov/buildings/owners_and_managers/existing_buildings/resources_your_property_type/small_med_office.
- 2 *Benchmarking and Energy Savings*, ENERGY STAR Portfolio Manager, October 2012, www.energystar.gov/sites/default/files/buildings/tools/DataTrends_Savings_20121002.pdf.
- 3 “Building Rating,” accessed November 13, 2019, www.buildingrating.org; “State and Local Policy Database,” American Council for an Energy-Efficient Economy, accessed November 13, 2019, <https://database.aceee.org/city/benchmarking-disclosure>.
- 4 *Energy Efficiency Lease Guidance*, Natural Resources Defense Council Center for Market Innovation, 2011, p. 4, www.nrdc.org/sites/default/files/CMI-FS-Energy.pdf.
- 5 *Advanced Energy Retrofit Guide: Practical Ways to Improve Energy Performance*, US DOE Building Technologies Program, September 2011, pp. 50–51, www.pnnl.gov/main/publications/external/technical_reports/PNNL-20761.pdf.
- 6 “Database of State Incentives for Renewables & Efficiency,” accessed November 13, 2019, www.dsireusa.org.
- 7 “Better Buildings Financing Navigator,” accessed November 13, 2019, <http://betterbuildingsinitiative.energy.gov/financing-navigator/option/cpace>.
- 8 “BOMA Energy Performance Contracting Model,” BOMA International, accessed November 13, 2019, www.boma.org/BEPC.
- 9 “Green Lease Leaders,” accessed November 13, 2019, www.greenleaseleaders.com/about.
- 10 *Green Lease Leaders Reference Guide for Landlords*, 2018, www.greenleaseleaders.com/wp-content/uploads/2018/08/Green-Lease-Leaders-Landlords-Reference-Guide.pdf.
- 11 ENERGY STAR Tenant Space: Eligibility and Criteria, accessed November 13, 2019, www.energystar.gov/sites/default/files/tools/Charter%20ENERGY%20STAR%20Tenant%20E2%80%93%20Eligibility%20and%20Criteria_062217_v2%20.pdf.
- 12 “Green Leases Toolkit,” California Sustainability Alliance, accessed November 13, 2019, https://sustainca.org/green_leases_toolkit/tools.
- 13 *Green Lease Leaders Reference Guide for Landlords*.
- 14 *Business Case for Proactive Rooftop Unit (RTU) Replacement*, Better Buildings, 2015, https://betterbuildingsinitiative.energy.gov/sites/default/files/attachments/ARC_Business_Case.pdf.
- 15 *Green Lease Leaders Reference Guide for Landlords*, p. 8.

¹⁶ *Green Lease Guide: A Guide For Landlords And Tenants To Collaborate On Energy Efficiency And Sustainable Practices*, BOMA, 2018, p. 20, www.boma.org/GreenLeaseGuide.

¹⁷ *Ibid.*

¹⁸ Andrew Feierman, *What's in a Green Lease? Measuring the Potential Impact of Green Leases in the U.S. Office Sector*, Institute for Market Transformation, May 2015, www.imt.org/wp-content/uploads/2018/02/Green_Lease_Impact_Potential.pdf; Brandywine Realty Trust Overcomes the Split Incentive Barrier and Obtains Tenant Utility Data, US DOE Building Technologies Program, October 15, 2012, https://www1.eere.energy.gov/buildings/publications/pdfs/alliances/brandywine_case_study_10-15-12.pdf.

¹⁹ *Green Lease Leaders Reference Guide for Landlords*.

²⁰ *The Energy Aligned Clause*, PlaNYC, October 3, 2012, www.nyc.gov/html/gbee/downloads/pdf/eac_overview.pdf.

²¹ *Green Lease Guide*.

²² “Green Leases Toolkit.”

²³ *Green Leasing: An Effective Tenant/Landlord Strategy for Energy Efficiency*, A Better City, December 2014, pp. 7, 19, <https://www.abettercity.org/docs/abc-rpt%20green%20leasing%2012%2014.pdf>.

