

ULI Tenant Energy Optimization Program

10-Step Tenant Energy Optimization Process

Overview: 10-Step Tenant Energy Optimization Process

In major urban areas, buildings account for 80 percent of the city's total energy consumption. In addition, tenant spaces are responsible for more than half of a commercial office building's total energy use, and building owners are starting to pay attention, particularly in light of the adoption of energy benchmarking and disclosure regulations in many cities across the country. If all commercial office real estate owners and tenants in the United States reduced energy consumption by 30 percent, the reduction could translate into more than \$6 billion in energy cost savings per year. That kind of impact is hard to ignore.

Yet energy efficiency opportunities in tenant spaces remain largely untapped, in part because of shared energy costs between landlords and tenants, missing economic and performance data, and a lack of understanding of how to design and construct a high-performance tenant space that is significantly more energy efficient than the norm.

How a tenant selects, designs, builds, and occupies space has the potential to make a big difference in its energy usage and operating costs. Enter the Tenant Energy Optimization process—a proven, replicable approach that integrates energy efficiency into tenant space design and construction and delivers excellent financial returns through energy conservation.

The process is detailed in this 10-step Tenant Energy Optimization overview. Three additional resource guides assist building owners, tenants, brokers, and project teams seeking to capture the economic, environmental, and competitive advantages of energy-efficient space.

The resource guides and accompanying tools are available online at: tenantenergy.uli.org

What is the Tenant Energy Optimization process?

The Tenant Energy Optimization process is a proven, replicable approach that integrates energy efficiency into tenant space design and construction and delivers excellent financial returns through energy conservation. The process emphasizes the importance of collaboration between tenants, building owners, and service providers.

What are the benefits?



It generates an attractive return on investment (ROI)—Tenants using the step-by-step design and construction process typically have experienced:

- Energy savings of 30 percent to 50 percent;
- Payback in as little as three to five years; and
- An average annual internal return rate of 25 percent.



It provides a competitive edge—Companies with more sustainable, energy-efficient workplaces enhance their ability to attract, retain, and motivate workers who are healthier, happier, and more productive.



It is scalable and replicable—The process can provide energy and financial savings whether the tenant leases 2,500 or 250,000 square feet. Tenants and service providers who have gained expertise through implementation of the process have demonstrated that there is high potential for transferability beyond tenant office space to other property sectors.



It is proven—Through measurement and verification, tenants are able to demonstrate and communicate energy and financial savings.



It is environmentally critical—Energy use in buildings is the largest source of climate-changing carbon pollution, and tenant spaces generally account for more than half of a building's total energy consumption, making this process essential to improving the environmental performance of buildings and addressing global climate change.

What Is the 10-Step Process?

The 10-step process is an approach to leasing, design, modeling, analysis, execution, and measurement and verification of high-performance space.

By addressing the high-performance opportunities during the early stages of the buildout design process, the project team—consisting of architects, engineers, energy consultants, and other contractors—can evaluate potential energy performance measures (EPMs) and present projected energy and financial performance data to a tenant. Opportunities to save energy exist throughout a tenant's entire lease cycle, and establishing a clear process streamlines the coordination needed to identify the economic case for energy performance optimization.

The process, outlined below, provides actionable steps for tenants, building owners, and project team members as part of a collaborative effort to capture both competitive and economic benefits. Tenants who value high-performance spaces choose to lease and release in buildings with highly efficient central systems and transparent energy-management practices. Therefore, beyond capturing operational savings, building owners that invest in energy efficiency improvements also gain a competitive advantage by attracting and retaining high-value tenants.

The 10-Step Process

PHASE I: PRE-LEASE



Step 1: Select a team

- Use a broker with experience in sustainability.
- Add other team members (architect, engineer, etc.) in subsequent steps.



Step 2: Select an office space

- Choose an efficient base building.
- Negotiate lease terms that allow energy efficiency improvements.

PHASE II: DESIGN AND CONSTRUCTION



Step 3: Set energy performance goals

- Consider overall corporate sustainability commitments and investments.



Step 4: Model energy reduction options

- Develop a Menu of Measures.
- Project performance of different combinations and iterations of measures.



Step 5: Calculate projected financial returns

- Review incremental costs and available incentives.
- Use Value Analysis Tool.



Step 6: Make final decisions

- Determine the optimal package that meets financial (NPV and IRR) and energy performance goals.



Step 7: Develop a post-occupancy plan

- Address needs for performance monitoring and occupant training.



Step 8: Build out the space

- Execute the planned energy efficiency projects.

PHASE III: POST-OCCUPANCY



Step 9: Execute the post-occupancy plan

- Measure and verify performance and perform ongoing maintenance.



Step 10: Communicate results

- Perform ongoing reporting.



Step 1: Select a Team

Assembling a capable team is vital to the success of the rest of the process.

- Choose a broker and/or real estate adviser who has experience in sustainability and is able to recommend architects, engineers, and contractors with expertise in energy modeling and value analysis.
- Determining incremental cost can be difficult and it is therefore important to have consultants on your team who are familiar with this type of analysis.
- You need the right technical expertise to calculate baseline energy use and projected energy savings to make informed investment decisions and to measure actual energy performance after the EPMs are in place.
- Streamline the project budgeting process by having the project manager or architect include the tenant's accounting representative in energy budgeting discussions.
- Know that the team will not be fully assembled before moving on to subsequent steps and that team members will be added as needed later on in the process.

Project managers versed in energy performance will be able to integrate the energy value analysis into the normal design and construction process and keep the project team focused on communicating the energy and financial implications of energy performance decisions.



Step 2: Select an Office Space

Choosing a space within an efficient base building will simplify the remaining steps and allow greater energy savings and financial return.

- Consider spaces that are separately submetered for their energy usage, with good access to daylight and views, healthy indoor air quality, and up-to-date control systems.
- Review the building's ENERGY STAR rating or other energy benchmarking data and past energy-related capital improvements or planned upgrades.
- Review the lease for central-building-system operating expense pass-through provisions, energy-aligned clauses, utility billing structures, and efficiency design criteria. Negotiate lease terms with the landlord that allow energy efficiency improvements.
- Use resources made available by the landlord, including experts dedicated to helping facilitate a tenant's energy management goals.
- Ask if a whole-building energy model is available to share with tenants, especially for buildings that have recently completed construction or have undergone an energy retrofit.

Further information on Steps 1 and 2 can be found in the first resource guide: *Project Initiation Guide: Pre-Lease*.

Buildings with an energy management program and tenant energy platform in place emphasize the landlord's commitment to managing energy performance.



Step 3: Set Energy Performance Goals

Energy goals defined in this step may be high level and reflect overall corporate sustainability targets. The Menu of Measures developed in Step 4 will help refine what level of energy savings and financial return is possible. The project team may return to this step to set specific project goals that align with the defined budget and desired energy savings and financial return.

- Present case studies of energy-efficient spaces with ROI results.
- Determine an appropriate energy use baseline against which to measure potential high-performance designs. The baseline may reflect code-compliant or business-as-usual design and operational assumptions, or both.
- Define energy performance targets, and request that top leadership emphasize energy efficiency as a priority, along with program and aesthetic needs, to internal facilities teams and external design and construction consultants.
- Work with the building owner to obtain information and documentation on the existing conditions, energy performance, and utility data of the building and leased space.
- Determine the budget that is available to cover the upfront investment required to implement the EPMs.

Early internal buy-in from real estate executives and the CFO provides greater success for additional budget allocation to invest in energy measures shown to have a positive ROI.



Step 4: Model Energy Reduction Options

- Define a Menu of Measures, which are efficiency and conservation strategies to be analyzed and considered. The Menu of Measures can be categorized by strategies that address lighting; heating, ventilating, and air conditioning (HVAC); plug loads; and data centers. Examples of common measures can be found in pilot project case studies. Additional ideas can be obtained through experienced team members and in publicly available resources, such as the following:
 - Lighting: www.energy.gov/eere/femp/lighting-energy-conservation-measures
 - HVAC: https://www.energystar.gov/index.cfm?c=heat_cool.pr_hvac
 - Plug loads: www.gsa.gov/portal/content/178463#10
 - Data centers: https://www.energystar.gov/products/low_carbon_it_campaign/12_ways_save_energy_data_center
- Have the project team perform energy modeling at the 50 percent design development phase. Depending on the size of the space selected and the complexity of the EPMs being considered, modeling can be done using an Excel spreadsheet or an energy modeling program such as the Department of Energy's open-source eQuest software.
- Evaluate individual EPMs against the energy baseline.
- Prioritize EPMs to
 - Reduce loads;
 - Increase equipment efficiency; and
 - Address occupant behavior through controls or automated technology.
- Create several sets of measures ("packages") that account for the interactive effects of various EPMs, and finalize the feasible packages.
- Determine the projected energy-use savings impact of the EPM packages to both the tenant space and base building.

Energy modeling is a tool that can be used in design evaluation, energy incentive and potential tax deduction filings, and ongoing energy performance measurement and verification. The model allows a quicker, iterative, and more transparent evaluation of energy measures. Modeling costs depend on the space, the final scope of work, and the specific building site.



Step 5: Calculate Projected Financial Returns

- Determine incremental costs for the modeled EPMS, which can be done by the project engineer, energy consultant, or construction manager. Incremental costs are additional sums (net of cost-avoidance amounts), compared with what was already budgeted for the planned system or equipment (e.g., the estimated difference in cost between high-performance lighting and baseline code-compliant lighting).
- Conduct a financial analysis using the Value Analysis Tool to determine annual and lease-term cost impact, taking into account potential incentives and tax deductions that may be available to offset green building and energy design and equipment costs. The financial scorecard should include the payback period of each individual measure and package of EPMS being considered, together with net present value (NPV) and ROI calculations for those packages.
- Request a report (the Value Analysis Report) from the design team that includes the following:
 - Documents the EPM evaluation process and the outcomes of the energy modeling, costing, and financial analyses.
 - Recommends tiers of EPM packages that could be incorporated into the tenant's buildout design, taking into account the project's energy reduction and financial goals. Packages will range from being NPV negative (often with more significant levels of energy reduction) to NPV positive (with generally lower levels of energy reduction). Each package will also represent a range of payback periods.
- The project's design, facilities, construction, accounting, and management teams should review and discuss the Value Analysis Report.
- Engage the electrical contractor in pricing discussions, especially when pricing advanced lighting controls or plug load controls, to ensure accurate pricing and better decision making for implementation.

Further information on Steps 4 and 5 can be found in the second resource guide: *Energy Value Analysis Guide: Design and Construction*.



Step 6: Make Final Decisions

- Confirm financial resources are available to cover the incremental first costs of EPMS, including allocation of tenant improvement allowances; potential local, state, and federal energy incentives; possible external financing sources; and the tenant's internal capital resources.
- Decide which tier of energy performance makes sense over the lease term based on the project's articulated financial, energy performance, and sustainability goals.
- Direct the design team to incorporate selected EPMS, submetering, and commissioning into the construction set.



Step 7: Develop a Post-Occupancy Plan

- Coordinate registration and filing for potential energy incentives, and review potential tax deductions.
- Designate an energy manager to monitor and adjust equipment to maintain operating efficiency.
- If the tenant space is not (or will not) be permanently metered by end-use, define and execute a protocol (based on IVMVP, the International Performance Measurement and Verification Protocol) to measure and verify the actual energy performance of the new space after occupancy.
- If the tenant space is permanently metered by end-use, define a protocol for regularly collecting and analyzing energy performance data.
- Regardless of whether the tenant space is temporarily or permanently metered by end-use, make sure the plan covers measurement and verification steps and includes the collection of electronic meter data by space/floor at a minimum, and end use if possible, such as the following:
 - Monthly electricity consumption (kWh) and demand (kW) consumed for every submeter;
 - One hour of electricity consumption (kWh) trend data consumed for every submeter available for a two-week period in the heating season, cooling season, and shoulder season (six weeks total over the year); and
 - Ten-minute trend of all HVAC fan speed commands/power over such two-week periods.
- Commission lighting, HVAC, and energy controls to ensure optimal settings for comfort and energy performance are in place.
- Develop an occupant training and communication plan to ensure implemented measures are used properly.



Step 8: Build Out the Space

- Select a contractor that is experienced in installing high-performance measures.
- Monitor construction to ensure the selected EPMS are installed and properly integrated with one another.
- Ensure meters are readable in electronic format and connected to an energy management platform.

Post-Occupancy



Step 9: Execute the Post-Occupancy Plan

- Measure and verify performance and perform ongoing equipment maintenance, as necessary.
- Coordinate operations training after installation for any specialty technologies to ensure optimal operation of equipment for highest energy savings.
- Provide operational tips to facilities managers and tenants to make certain equipment is being used correctly.
- Carry out communications and training activities to improve occupant engagement and commitment to behaviors consistent with achieving energy performance goals.
- Recalibrate submeters regularly, according to the manufacturer's guidance.
- Adjust the plan as needed based on actual performance.

Further information on Steps 7, 8, and 9 can be found in the third resource guide: *Measurement and Verification Guide: Post-Occupancy*.



Step 10: Communicate Results

- Perform ongoing reporting of energy performance internally, externally, and with the landlord to provide documentation of energy efficiency efforts.
- Expand the value of a high-performance buildout beyond the quantifiable economic benefits by promoting the evaluation process and results through testimonials, corporate sustainability reports, trade publications, videos, and social media.
- Highlight the high-performance space while recruiting prospective employee talent and prospective tenants.
- Document the energy value analysis, or write a project case study to spotlight industry leadership in public relations and media outreach.
- Motivate occupants to reduce energy use daily through incentives and tools, such as tenant energy dashboards on the organization’s intranet and website.
- Earn recognition for the space by applying for EPA’s Tenant Star program.

You Understand the Tenant Energy Optimization Process: Now What?

In addition to this overview, more guidance is provided in a three-part series of resource guides that advise building owners, tenants, brokers, and service providers seeking to capture the economic, environmental, and competitive advantages of energy-efficient space.



Overview
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Resource Guide I
Project Initiation Guide: Pre-Lease



Resource Guide II
Energy Value Analysis Guide: Design and Construction



Resource Guide III
Measurement and Verification Guide: Post-Occupancy

About the Urban Land Institute

The mission of the Urban Land Institute is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide. Established in 1936, the Institute today has more than 39,000 members worldwide representing the entire spectrum of the land use and development disciplines. ULI relies heavily on the experience of its members. It is through member involvement and information resources that ULI has been able to set standards of excellence in development practice. The Institute has long been recognized as one of the world's most respected and widely quoted sources of objective information on urban planning, growth, and development.

About the Center for Sustainability

The ULI Center for Sustainability is dedicated to creating healthy, resilient, and high-performance communities around the world. Through the work of ULI's Greenprint Center for Building Performance, the ULI Urban Resilience Program, and other initiatives, the Center advances knowledge and catalyzes adoption of transformative market practices and policies that lead to improved energy performance and portfolio resilience while reducing risks caused by a changing climate.

Acknowledgments

Case Study Participants

The foundation of ULI's Tenant Energy Optimization Program is a ten-step process that, when implemented in ten pilot fit-out projects, yielded impressive energy and cost savings. Pilot projects applying this process were carried out in tenant spaces occupied by Bloomberg L.P., Coty Inc., Cushman & Wakefield, Estée Lauder Companies, Global Brands Group, LinkedIn, New York State Energy Research and Development Authority (NYSERDA), Reed Smith LLP, Shutterstock, and TPG Architecture. Case studies documenting their experiences were written to inform tenants, building owners, real estate brokers, project managers, architects, engineers, contractors, and energy consultants.

Project Director

ULI's Tenant Energy Optimization Program builds on the energy efficiency retrofit project conducted at the Empire State Building under the direction of Wendy Fok, principal of OpDesigned LLC. From 2011 to 2016, Fok led the development of a portfolio of tenant buildouts to create a financial and design template to incorporate energy efficiency in tenant spaces. Fok has been a key contributor to the standards set forth in the Energy Efficiency Improvement Act of 2015 (S. 535), which created the national Tenant Star framework. A registered architect, she received her degree from the University of Texas at Austin with real estate executive education from Harvard Business School.

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