

## ULI Tenant Energy Optimization Program

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# 10 Steps for Multifamily Owners, Operators, and Investors to Achieve Energy Optimization in Residential Units



With up to \$3.4 billion in energy cost savings available to the multifamily market each year, energy efficiency and optimization are top of mind for owners, operators, and investors in multifamily real estate. Achieving these savings requires a multistep approach that can work for residential unit buildouts in existing multifamily buildings and can also be applied, in certain cases, to major renovation projects.

This resource provides owners, operators, and investors with a guide to actionable steps to move toward improved building energy efficiency and achieving some of these notable cost savings.

### What is the Tenant Energy Optimization process?

The Tenant Energy Optimization Program (TEOP) process is a proven, replicable approach that integrates energy efficiency into tenant space design and construction and delivers excellent financial returns through energy conservation and collaboration between tenants, building owners, and service providers. The TEOP Multifamily guide is an addendum to the original 10-step plan for offices and provides a complementary pathway to energy efficiency for owners and residents in multifamily buildings.

### What are the benefits of TEOP?



**It generates substantial measurable savings:** Nearly 21 million people in the United States, or one in six households, live in apartments or condominiums. Energy efficiency improvements in these multifamily buildings have the potential to result in \$3.4 billion in savings per year, or \$162 per person.<sup>1</sup> TEOP for multifamily properties can help owners and investors begin to realize those savings.



**It enhances resident value:** According to a study led by the National Apartment Association, one in four multifamily residents said a unit's energy efficiency has a strong to very strong impact on their decision to rent.<sup>2</sup> After rent payments, utility bills tend to be one of the biggest costs associated with apartment rental.



**It is scalable and replicable:** Multifamily property owners and operators develop utility reduction plans that are implemented either on a unit-by-unit basis at the point of resident turnover or during a whole-building retrofit. Once the process is complete in one unit or on one building, subsequent utility reduction plans are more readily scalable to additional units or a portfolio.



**It is provable:** Energy efficiency improvements have a clear and quantifiable return on investment (ROI) for both the resident and the building owner.



**It is environmentally critical:** Energy use in buildings is the largest source of climate-changing carbon pollution, making this process essential to improving the environmental performance of buildings and addressing global climate change and air quality.

1. Stefan Samarripas, Dan York, and Lauren Ross, *More Savings for More Residents: Progress in Multifamily Housing Energy Efficiency*, Report U1702 (Washington, DC: American Council for an Energy-Efficient Economy, 2017), [www.aceee.org/sites/default/files/publications/researchreports/u1702.pdf](http://www.aceee.org/sites/default/files/publications/researchreports/u1702.pdf).
2. Holly Charlesworth, Paula Munger, and Paul Yoon, "Maximize Resident Engagement with Energy Efficiency" (National Apartment Association, June 2018), <https://www.naahq.org/news-publications/units/june-2018/article/maximize-resident-engagement-energy-efficiency>.

The following 10 steps—from selecting a team to communicating results—can guide building owners and managers through the process of retrofitting spaces for optimal energy efficiency.

## The 10-Step Process

### PHASE I: PRE-LEASE



**Step 1: Select a team**



**Step 2: Baseline and benchmark assets and units**

### PHASE II: DESIGN AND CONSTRUCTION



**Step 3: Set utility use and performance goals for residential units**



**Step 4: Model utility reduction options**



**Step 5: Calculate projected financial returns**



**Step 6: Make final decisions**



**Step 7: Develop a resident occupancy maintenance and operations plan**



**Step 8: Retrofit the unit(s)**

### PHASE III: POST-OCCUPANCY



**Step 9: Execute the resident occupancy maintenance and operations plan**



**Step 10: Communicate results**





### Step 1: Select a Team

Assembling the right team is key to ensuring design and construction go smoothly, and energy and sustainability remain top considerations during decision-making, design and construction, and ongoing commissioning and operations.

- **Identify potential team members who will drive energy and sustainability goals and communicate the resulting value.** Team members should include an operations lead, portfolio/asset manager, regional property manager, and the construction team (including the project manager) as well as team members with information technology and marketing/advertising expertise. Choose advisers who have experience in sustainability and are able to recommend architects, engineers, and contractors with expertise in energy modeling and value analysis.
- **Hire external consultants for capabilities not covered internally.** Although you may not need every expertise on a daily basis, identifying additional consultants early and involving them in the planning will save time and money in the long run. For example, the early advice of energy efficiency and sustainability professionals<sup>3</sup> can help in determining incremental cost and calculating baseline energy, key figures that will influence future retrofitting decisions.
- **Educate new team members as the project continues.** A project team normally grows as a project continues. Whenever new team members are added to the project, it is vital to educate them on the project's energy goals to ensure alignment and cohesion.



### Step 2: Baseline and Benchmark Assets and Units

At this point, owners and operators should baseline and benchmark both assets and buildings to better inform the future retrofit strategy. Owners should choose the approach that best fits the company and the asset—all units at once or progressively over time. In the latter approach, some owners and operators may choose to implement small upgrades, such as appliance swaps, while units are still occupied.

- **Identify the multifamily asset and associated residential unit(s).** When selecting the asset to retrofit, consider the entire structure. Although the substantial value of retrofits for multifamily spaces occurs in the residential units, common-area energy upgrades are also beneficial and strongly recommended. Note that for owners with more than one

#### Resource: Energy Star Portfolio Manager

Throughout this guide are numerous references to Energy Star Portfolio Manager. Portfolio Manager is the leading tool, created and operated by the U.S. Environmental Protection Agency (EPA), to help track and measure whole-building energy, water consumption, and greenhouse gas emissions. For those properties located in the United States, Portfolio Manager is the best option for whole-building data aggregation, and additional software or spreadsheets will be required for advanced unit-to-unit benchmarking and aggregation. (See the Appendix for a guide on the information included when using Energy Star.) If your asset is located outside the United States, or if you opt not to use Portfolio Manager, a number of third-party technology providers can still help make this process easier.

#### Access Portfolio Manager here:

<https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager>

3. In some cases, consulting services may be available at little or no direct cost as part of local utility incentive programs that require third-party modeling and validation.



asset, or for those that are still debating which assets or units to choose, benchmarking the building first and then using that information as a baseline for future retrofits and to inform how to proceed through later steps may be helpful.

- **Ensure compliance with mandatory benchmarking ordinances.** U.S. cities are beginning to institute mandatory benchmarking for buildings of a certain size, and an existing building energy model may be available for your subject property. When acquiring an existing property, particularly one that has recently undergone an energy retrofit or other major renovation, ask if such information is available. With an energy model in hand, you can better understand the building's potential before acquisition.
- **Review the history of energy-related capital improvements and upgrades.** A thorough review of previous energy improvements and/or upgrades may help determine which properties or units are most opportune for improvements. It is also important to confirm that already planned improvements are incorporating energy efficiency technologies and strategies.
- **Obtain utility data for each resident unit.** Energy management hinges on the ability to measure the utility use of residents. Following are common approaches to obtaining unit utility information for resident spaces:<sup>4</sup>
  - Manage resident energy use through installed submeters for each unit. In this scenario, owners/operators are the direct utility customer, and residents are required to pay a monthly utility usage bill to the landlord alongside, or included in, monthly rent. Check local and state laws before attempting to choose this option because certain jurisdictions prohibit it.
  - If submetering units is not possible, residents will be direct utility customers and landlords may require utility bill authorization to track resident energy use data. In this case, where logistically and legally feasible, the landlord should include utility authorization and documentation as part of the leasing process. In addition to providing data needed for energy optimization, a landlord's access to utility usage data allows for preemptive identification of potential maintenance issues.
  - If local or state legislation prohibits owners and operators from being the direct utility customer, consider installing separate submeters to track actual energy consumption for each unit. In this case, units would have a utility meter supplied by the utility company *as well as* a submeter owned by the landlord. Assuming this type of submetering is permitted by local law, this arrangement should also be documented in the lease language.
  - In the absence of any other option, consider a rough-estimate calculation of unit-level utility use based on the gross building square footage. For example, total square footage (minus common areas) divided by the number of units in the building (accounting for possible variations in unit size) will deliver a rough estimate of energy use per square foot. In some markets, this whole-building energy data can be supplied in aggregate by the utility company. This rough benchmark can help guide future retrofit decisions.
- **Once resident utility data have been collected, establish a process for ongoing data tracking.** Management of resident utility data can be addressed through energy and environmental tracking software, a utility bill pay service, or even, in the case of smaller buildings, a simple Excel spreadsheet.
- **Benchmark the building in Energy Star Portfolio Manager.** Adding your building and associated energy information into Portfolio Manager will help you understand how the building performs compared with other residential buildings in your city and nationwide. It will also help you set energy performance improvement targets and track your progress (normalized for building size, climate zone, etc.). If initial Energy Star scores are low, a more holistic energy optimization plan may be necessary.

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4. Selecting your data collection method early is important because you will soon refer back to these data in later steps.

- **Create green leases for all new leases and/or green lease addendums for existing leases.** As residents turn over, ensure all new lessees are operating under a green lease. The goal is to have all leases be green, using the clauses listed in the box.

### Green Leasing Guidelines and Resources

Green leases should include the following provisions:

- Permission to obtain resident utility data, including a requirement that residents cooperate with any utility's request for authorization to access unit data.
- Opportunity to sign up for utility demand management programs as part of the lease.
- A framework for data transparency between residents and the building owner, including clear, user-friendly instructions for accessing the data online.
- Authorization of automated transfer of whole-building data directly into benchmarking tools, such as Energy Star Portfolio Manager, via web services, which can significantly reduce administrative burdens for both utilities and building owners.
- Continual access for the property manager and/or appropriate contractors/consultants, thereby eliminating the administrative headache of annual access forms. This allows landlords to make upgrades to existing residential units for structural components such as windows, walls, doors, and the like, as well as in-unit equipment, typically ceiling or wall lighting, water heaters, appliances provided by owner, etc.
- Set minimum energy performance standards for major resident-purchased appliances, and consider adding this minimum standard as a line item to annual or scheduled unit inspections.
- Cost recovery of energy efficiency improvements to common areas in common-area maintenance (CAM) charges and/or inclusion of cost-recovery clauses for residential unit energy efficiency improvements in monthly lease payments.
- Any property requirements about waste, recycling, or water use.

### Resources: Online tools and green leasing language

- Square footage mapping tool (free)—<http://areacalculator.sodsolutions.com/>
- Assistance with determining building performance without data or Energy Star score (U.S. Department of Energy Asset Score)—<https://www.energy.gov/eere/buildings/building-energy-asset-score>
- Sample green leases, case studies, and additional leasing resources for green buildings. Although most are written for office buildings, the principles can also be applied to multifamily buildings—[www.greenleaselibrary.com/](http://www.greenleaselibrary.com/)
- A model energy-aligned lease provision—[www.nyc.gov/html/planyc2030/downloads/pdf/energy\\_aligned\\_lease\\_official\\_packet.pdf](http://www.nyc.gov/html/planyc2030/downloads/pdf/energy_aligned_lease_official_packet.pdf)

## Design and Construction



### Step 3: Set Utility Use and Performance Goals for Residential Units

Although multifamily property owners and operators do not always have ready access to resident utility use information, setting goals for residential units remains a critical step in the overall energy optimization of a property. Owners and operators should analyze and set energy performance goals for residential units and communicate these standards with residents upon move-in.

- **Determine utility use baselines.** Once your benchmarking platform is in place (Energy Star or other software for unit-level data), you can determine appropriate baselines for energy and water use. These baselines—either code-compliant, business as usual, or both—will serve as benchmarks against which to identify and measure potential high-performance designs.

- **Leverage the expertise of the team.** The energy, water, and waste experts who joined your team in step 2 should help establish goals for the property.
- **Set goals based on unit-level data.** The utility use baseline calculated in step 2 will consist of either actual use/submeter data or estimated use. Use this figure to set utility use and performance goals going forward, and be sure to communicate it to residents.
- **Build the internal business case as needed.** For those leading this program who may not be in positions of authority, providing senior leadership with case studies demonstrating ROI from efficient residential units will be beneficial. Along with programmatic and aesthetic needs, energy efficiency goals in retrofitting should be presented as a top priority to internal facilities teams and external design and construction consultants.
- **Be realistic about timelines and strategize for the short and long terms.** Remember environmental, social, and governance (ESG) goals and sustainability are important long-term pursuits. Steady incremental performance is key to long-term success.

#### Resource: Engaging On-Site Staff in Energy Benchmarking

The Better Buildings section of the U.S. Department of Energy provides case studies to help building owners and operators with energy improvement initiatives. In the matter of engaging property managers in energy efficiency activities, see “Engaging On-Site Staff in Energy Benchmarking,” <https://betterbuildingsolutioncenter.energy.gov/implementation-models/engaging-site-staff-energy-benchmarking>.



#### Step 4: Model Utility Reduction Options

To make educated and informed decisions about high-ROI investments in energy efficiency, owners and operators should model utility reduction options and build a menu of energy performance measures (EPMs) that will help inform later improvements. Energy modeling is the foundation of step 4, and owners and operators should find the modeling strategy that works within the company’s financial and logistical parameters.

- **Manage and confirm the available budget.** Determine the budget available to fund the upfront investment in the EPM implementation. As needed, the budget may be divided between common areas and residential units.
- **Complete an energy model of EPMs:** Owners and operators should keep in mind any new or pending state and/or local requirements that will trigger fines to the building owner if energy thresholds are missed.
  - For major renovations, the project team should perform energy modeling at the 50 percent design completion phase. Depending on the size of the space selected and the complexity of the EPMs considered, modeling can be done using an Excel spreadsheet, an energy modeling program, or via the project engineer or energy consultant responsible for construction code compliance. (See Resources for Utility Reduction Modeling.)
  - If retrofitting will take place progressively, one unit at a time, consider modeling a “representative unit retrofit” to establish a strategy and budget that can be replicated throughout the hold period as units turn over.
- **Evaluate individual EPMs against the energy baseline.** By measuring and evaluating individual EPMs against the baseline, owners and operators can better understand savings opportunities and performance against their goals.
- **Create a menu of EPMs, a “menu of measures.”** A menu of measures lists potential efficiency and conservation strategies and should include strategies to reduce energy loads and increase equipment efficiency/longevity.
  - Install submeters or other data transparency technologies to allow regular communication between landlords and residents on utility use. Utility data transparency also

allows owners and operators to identify any areas (building or unit) in need of efficiency upgrades because of increased energy usage.

- If a whole-building retrofit is occurring at the same time as unit upgrades, consider roof replacement using white or reflective roofing or green/vegetated roofing and supplemental building envelope investments such as wall cladding, ceiling/attic insulation, etc.
- Analyze all components of the building, such as windows and shading; insulation; indoor and outdoor lighting and controls; HVAC systems<sup>5</sup>; water heaters, including supplemental hot water equipment or in-unit water heaters; landlord-provided appliances; ceiling fans; landlord-provided in-residence lighting; and water faucets, shower heads, aerators, and other water-flow technologies.

#### Resources: Utility Reduction Modeling

- To better understand the energy use of appliances and utilities, the following resources are available to the public and may assist in energy reduction modeling:
  - Lighting and controls: [www.energy.gov/eere/femp/lighting-energy-conservation-measures](http://www.energy.gov/eere/femp/lighting-energy-conservation-measures)
  - HVAC: [https://www.energystar.gov/index.cfm?c=heat\\_cool.pr\\_hvac](https://www.energystar.gov/index.cfm?c=heat_cool.pr_hvac)
  - Plug loads: [www.gsa.gov/portal/content/178463#10](http://www.gsa.gov/portal/content/178463#10)
  - Appliances: <https://www.energystar.gov/products/appliances>
  - Water fixtures: <https://www.epa.gov/watersense/watersense-products>
- The Department of Energy has two energy modeling options: Home Energy Score (for buildings with two to four units) or Asset Score (for buildings with more than four units). Both of these programs can interact with the Energy Plus<sup>6</sup> model to further customize inputs.
- To identify energy benchmarking ordinances in your community, access [www.buildingrating.org](http://www.buildingrating.org).



#### Step 5: Calculate Projected Financial Returns

Before making any final retrofitting decisions, owners and operators should calculate and analyze the projected financial returns of EPMs. These calculations should account for upfront, one-time fees as well as ongoing costs for maintenance and operations.

- **Determine the incremental costs of the modeled EPMs.** Calculating incremental costs can be managed by the project engineer, energy consultant, or construction manager<sup>7</sup> and will help identify any additional costs related to high-performance systems.
- **Engage the electrical contractor in pricing discussions.** When pricing advanced lighting controls or plug load controls, the expertise of an electrical contractor will be particularly important to help ensure accurate pricing and better decision-making around implementation.
- **Use products that optimize the long-term cost of ownership.** Use products proven to be durable and efficient to help ensure the greatest payback for the owner and resident. Where applicable, use Energy Star–certified equipment because those products meet important efficiency and warranty minimums as well as lifetime durability and dependability standards.

5. This is only applicable for buildings that do not provide central air conditioning and rely on window units. Enhanced HVAC controls (programmable thermostats with automatic setbacks or thermostats with supplemental building-wide control) would not be included in utility demand management programs.

6. EnergyPlus is a whole-building energy simulation program that engineers, architects, and researchers use to model both energy consumption—for heating, cooling, ventilation, lighting and plug, and process loads—and water use in buildings.

7. Incremental costs are additional sums, net of cost-avoidance amounts, for high-performance items compared to the original budget for the planned system or equipment (e.g., the estimated difference in cost between high-performance lighting and baseline code-compliant lighting).



- **Consider local utility incentives.** Local utilities often provide incentives or tax deductions to help offset green building and energy design and equipment costs.<sup>8</sup>
- **Conduct a financial analysis to determine annual and lease-term cost impact.** A financial analysis should include the payback period of each individual measure and EPM package under consideration. It should also include the net present value (NPV) and ROI calculations for each EPM package.
- **Consider financing programs to cover upfront capital costs.** Analyze each program and its participation criteria and choose the best options for the asset. (See Resources: Financing Considerations and Opportunities.)
- **Request a report from the design team.** The project design team should compile a report of potential EPM packages and processes, which would include the following:
  - Documentation of the EPM evaluation process and the outcomes of the energy modeling, costing, and financial analyses.
  - Taking into account the project’s energy reduction and financial goals, recommended tiers of EPM packages that could be incorporated into the buildout design. Packages will range from NPV negative (significant levels of energy reduction) to NPV positive (lower levels of energy reduction) and detail a range of payback periods.

The EPM package report should be reviewed by facilities, construction, accounting, and management team members.
- **Confirm the ROI capture method.** Although owners can include cost recovery for existing resident fit-outs, the ROI for upgrading units for a new resident will be difficult to calculate because most, if not all, of the energy savings benefits will go directly to the resident. Potential ROI calculations could include the following:
  - Projected reduction in utility costs for the future resident. This cost reduction evaluation can be used to raise rents to account for utility cost savings for tenants. News of the lower utility rate could also be used in marketing materials to enhance faster lease-up and build resident good will.
  - Analysis of whether a more efficient retrofit will help reduce vacancy rates or result in higher rental premiums.
  - Cost difference vs. “business as usual” analysis to calculate the possible cost premium to the standard investment plan for turning over a particular unit in a multiunit building.
  - Recovery of some tenant energy savings through higher rents or increased CAM charges rolled into rents.
  - Reduction in maintenance costs for more efficient units, for example, reduction in maintenance calls about excessively hot or cold units, equipment failures, or lightbulb replacements.
  - Integration of utility and financial incentives into ROI calculations to demonstrate that energy-efficient residential equipment investments can be managed at the same or lower rate as business-as-usual, less-efficient options.
  - Potential capital expansion for major renovations across multiple units using programs such as Fannie Mae Green Rewards or city and state Property Assessed Clean Energy (PACE).
  - Analysis of potential reductions in the cost of capital for building owners.
  - Commentary on the potential for EPM investments to make buildings more attractive to future tenants and buyers.

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8. Many rebate or incentive programs will require working with a third-party engineer, vendor, or energy service company (ESCO). The ESCO will likely manage a majority of the background work, such as auditing, modeling, and even implementation of the chosen EPMs. Owners and operators should thoroughly vet and validate the savings and associated costs, however, before pursuing improvements in this manner.

## Resource: Financing Considerations and Opportunities

The cost of purchasing technology or equipment in bulk and the associated installation costs will be lower than buying and installing as units turn over. Tackling all of the retrofits at one time may also unlock larger financing programs that could significantly lower the cost of capital and drastically improve ROI.

In some states, programs like Energy Upgrade California and those of the New York State Energy Research and Development Authority (NYSERDA) bundle energy performance measures with common-area retrofits. Other programs found in California, Maryland, and Massachusetts address unit equipment such as lightbulbs, smart thermostats, and the like.

Additional financing mechanisms to consider:

- Property Assessed Clean Energy (PACE)
- Fannie Mae Green Rewards



### Step 6: Make Final Decisions

After calculating projected financial returns, it is time to choose the best EPM package based on available and calculated data.

- **Confirm financial resources are available to cover the cost of the EPM packages under consideration.** When evaluating your range of resources, be sure to factor in any state or local incentives or alternative financing mechanisms.
- **Decide which package of measures makes sense.** Depending on how you calculate ROI, your cost recovery strategy for investments may change. Analyze the lease term or projected hold period of the asset based on the project's articulated financial, energy performance, and sustainability goals.
- **Direct the design team on which EPMs to incorporate.** After the project team makes the final EPM decisions, ensure timely communication of that decision to all design and construction teams and applicable vendors. Ensure that submeters are a part of these decisions if building owners have decided to submeter the space in some capacity (recommended). Also consider pending state or local regulations that may require submeters to be in place before this unit/building is ready for the next planned retrofit.



### Step 7: Develop a Resident Occupancy Maintenance and Operations Plan

Before buildout is complete, develop a resident engagement plan and associated communication resources. Maintaining communication after the units have been retrofitted will be critical to the ongoing success of the building's energy efficiency and sustainability.

- **Designate an on-site energy manager.** This person should be either a member of the property management team or a representative of building ownership. The energy manager will ensure that equipment is monitored and adjusted to maintain operating efficiency and manage the daily and seasonal schedules for heating, cooling, and lighting the building and common areas.
- **Develop a plan to collect utility data.** Make sure the plan covers unit measurement and verification and includes the collection of electronic meter data by space or, at a minimum, by floor. Collecting data by end use is also beneficial.<sup>9</sup>

9. This could include monthly electricity consumption (kWh) and demand (kW) for every submeter or residential unit; 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 10-minute trend of all HVAC fan speed commands/power over each two-week seasonal period.

- **Establish residential unit monitoring plans.**
  - If the residential unit is permanently metered by the time of occupancy, define a protocol for regularly collecting and analyzing energy performance data.
  - If it is not feasible or cost-effective to monitor the residents' actual energy consumption, measure the whole building's performance relative to stated energy goals and calculate the average per-unit impact on overall building energy reduction.
- **Schedule commissioning and retrocommissioning of base systems.** Once EPMs are installed, commission the systems to ensure everything is running properly and according to specifications/manufacture's warranty. During the post-occupancy phase, plan to schedule retrocommissioning on all base building systems, such as HVAC and chillers, and major in-unit energy systems, including water heaters and energy management controls like programmable thermostats. This should be done at least every three years, but more frequently if systems are not delivering expected results.
- **Develop a resident training and communication plan.** Communication plans should include items such as the following:
  - Scheduling and purpose of retrocommissioning: for example, to increase longevity of systems and ensure highest level of energy efficiency possible.
  - Targeted utility use goals for residential units. Explain the reasoning for the goals, and offer tips and suggestions on how residents can achieve the stated anticipated energy savings and goals.
  - Resident-wide energy reduction competitions, waste or recycling drives (e.g., electronic waste, battery, or cell phone recycling drives), or other events focused on energy and sustainability.
  - Suggestions for energy-smart choices when replacing non-owner-supplied appliances in units. Raise awareness of best-in-class technology, utility incentive programs, and the ROI on resident's energy bills for Energy Star-certified appliances.
  - If the owner/manager is directly collecting data on and/or managing resident energy use, share these data with residents on a regular basis in a way that encourages them to take action for energy efficiency (for example, a monthly statement or an online portal where they are encouraged to log in once a month).



#### **Step 8: Retrofit the Unit(s)**

Regardless of the retrofit phasing—unit by unit or a whole-building upgrade—ensure all EPMs are installed properly and ongoing communication and training are underway.

- **Select a knowledgeable contractor who understands green building and energy/sustainability.** Ensure your chosen contractor understands the expectations for residential in-unit access, including proper notification, access constraints, and customer service commitments.
- **Monitor construction to ensure the selected EPMs are executed properly.** Ensure selected EPMs are properly integrated and that new equipment is properly commissioned with appropriate continuous measurement and verification systems in place.
- **Ensure that your contractor provides all necessary information for equipment operation.** Building owners and operators should have access to all equipment manuals and requisite training, as well as equipment warranties. Ensure the contractors or vendors have trained the facilities and property management teams on proper use of equipment.
- **Ensure that all residents have access to in-unit appliance manuals.** Leave copies of all applicable appliance manuals in the unit during turnover and maintain copies in the leasing office.
- **Ensure that meters are readable and synchronized with the building's energy management system.** Meters should be digital and connected to an energy management platform.

- **Consider adding automation for certain aspects of the unit.** Unit automation can include motion sensors for lights in closets or pantries, default setback controls for programmable thermostats, demand management programs, landlord thermostat control during off-peak hours, and landlord control of water heaters for demand management.



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### Step 9: Execute the Resident Occupancy Maintenance and Operations Plan

After completing the resident unit or building retrofit, teams will be ready to execute the resident occupancy and maintenance plan.

- **Measure and verify performance.** Revisit occupancy plans, recalibrate submeters, and perform ongoing equipment maintenance and adjustment regularly. These activities should always occur at resident turnover; however, if possible, a quarterly or annual maintenance and adjustment program should occur throughout resident occupancy.
- **Carry out communications and training activities for residents, property managers, and facilities teams.** Regular communication and training will improve engagement with and commitment to behaviors consistent with achieving utility performance goals. Train teams on proper use and maintenance of the new energy-efficient technology and appliances. Train residents on the use of smart thermostats, including system operation and resources for troubleshooting and issues. Provide training information at resident move-in, and make sure it is easily and regularly available thereafter.
- **Provide residents with dashboards and other tools to view the energy performance of their unit.** In addition to seeing one's own unit performance, the ability to view monthly data benchmarked against neighbors' data or a regional baseline may have a socializing effect that can help drive efficiency. Some technology providers currently in the market can supply these types of resident dashboards.
- **Raise awareness of any new rebate programs for upgrading energy-efficient equipment.** Upgrade rebates could include items such as appliances (resident supplied), lights, or smart thermostats. In addition, residents may be interested in the potential ROI found when replacing old equipment with the more energy-efficient options.



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### Step 10: Communicate Results

Building out a space and ensuring efficient operations are critical components of energy optimization, yet regular communication among all parties is critical to ensuring continual energy savings and sustainable real estate.

- **Work with leasing agents to highlight the energy and sustainability features of units.** Supply leasing agents with the data and information necessary to communicate the value of the high-energy efficiency units during tours and in marketing efforts. Place energy efficiency fact sheets in units when residents move in.
- **Before lease execution, ensure residents understand the regular maintenance requirements.** Maintenance will surely occur during the term of the lease. Communicate these expectations and note the schedule and purpose of any pending maintenance on in-unit systems before move-in.
- **Perform ongoing reporting of energy and water performance.** When performing energy and water performance measures, provide these efficiency reports to residents.
- **Publicly share the energy value analysis.** Document the energy and sustainability features in residential units through case studies, marketing, and media outreach.
- **Expand the value of a high-performance buildout through reports and publications.** Promote energy and sustainability features through testimonials, corporate sustainability reports, trade publications, videos, and social media.

- **Motivate residents to further reduce energy use.** Consider building-wide competitions, energy dashboards, or interactive displays educating residents on in-unit and common-area energy and sustainability initiatives.
- **Earn recognition for the space by applying for certifications.** Potential energy-related certifications include LEED (Leadership in Energy and Environmental Design), Energy Star, IREM (Institute of Real Estate Management) Multifamily, and Green Lease Leaders.

Owners, operators, and investors in multifamily real estate have a collective stake potentially worth \$3.4 billion in the energy efficiency of their buildings. Although achieving maximum energy efficiency may seem like a daunting task, the 10 steps outlined in this resource will provide practical and actionable guidance to all stakeholders—owners, operators, and residents—as they navigate the process of retrofitting spaces for optimal energy efficiency.

#### Resource: Multifamily Building Certifications to Consider

**LEED for Multifamily Buildings**—<https://www.usgbc.org/leed/rating-systems/residential>

**Energy Star**—[https://www.energystar.gov/buildings/owners\\_and\\_managers/existing-buildings/find\\_resources\\_your\\_property\\_type/energy\\_star\\_multifamily\\_housing](https://www.energystar.gov/buildings/owners_and_managers/existing-buildings/find_resources_your_property_type/energy_star_multifamily_housing)

**IREM for Multifamily Buildings**—<https://www.irem.org/certifications/for-properties/irem-certified-sustainable-property/csp-Multifamily-Requirements>

**Green Lease Leaders**—<https://www.greenleaseleaders.com/>



For reference, when using EPA's Energy Star Portfolio Manager, multifamily owners and operators should gather the following information to benchmark a property<sup>10</sup>:

- **Community name**
  - **Community address:** This should be the physical location of the property, not a corporate office.
  - **Year built:** This is the year in which your property was constructed. If your property has undergone a complete renovation that included gutting and rebuilding the interior, then you can indicate the date of this renovation as the year built.
  - **Gross floor area (GFA):** GFA is the total property floor area, measured from the principal exterior surfaces of the building(s). Do not include parking. Please note that GFA is not equivalent to your net rentable area (NRA). NRA includes only residential units. Using NRA will result in an inaccurate energy-use intensity and a lower Energy Star Score.
    - Include in GFA the following: lobbies, residential units, common areas, meeting rooms, break rooms, atriums (count the base level only), restrooms, elevator shafts, stairwells, mechanical equipment areas, basements, and storage rooms. The property manager may already have this data; if not, check city records, blueprints, or maintenance records.
    - Do not include the following in GFA: exterior spaces, balconies, patios, exterior loading docks, driveways, covered walkways, outdoor play courts (tennis, basketball, etc.), parking, interstitial plenum space between floors (which house pipes and ventilation), or crawl spaces.
  - **Total irrigated area:** Irrigated area is the amount of outdoor vegetated area that is supplied water regularly, measured in square feet, square meters, or acres. Typically, this includes landscaped areas that are irrigated with or without an automatic irrigation system along with areas regularly watered by hand. If you have vegetated areas that were specifically
- xeriscaped to require no water at all, these may be included in your total. However, you cannot include hard/unvegetated surfaces such as patios, decks, or driveways. This will also help calculate a “Water Score,” which is a useful metric to understand how efficiently your property uses water in comparison to others.
- **Occupancy percentage:** This is the number of occupied units, divided by the number of total units (e.g., 60 occupied units ÷ 100 total units = 60 percent occupancy).
  - **Parking:** You have two options when it comes to entering parking.
    - The first, recommended approach is to submeter your parking and exclude its energy and GFA.
    - If that approach is not possible, you should benchmark your parking with your building and include its energy use and GFA as a separate use type (not as part of the initial self-reported GFA when setting up the property).
  - **If applicable, include ground-floor retail space data using the following guidance:**
    - If the retail space is an individual retail store with a minimum of 5,000 square feet and has an exterior entrance for the public, it should be a separate use type entered as “Retail” after the property is created.
    - If the preceding conditions are not met, then you should do one of the following, depending on the size of the retail:
      - If the combined total of these retail stores is 25 percent or less of the total property GFA, then this square footage (and number of workers and computers) should be added to the main Property Use (Multifamily).
      - If the combined total of the retail stores is greater than 25 percent of the total property GFA, then you should break out this retail into a separate Property Use of “Other—Mall” (a subcategory under Retail -> Mall).
    - GFA of any retail space should be tracked by the property management company.

10. More information can be found at <http://energystar.gov/multifamily>, and a complete list of multifamily-specific FAQs can be found at <https://portfoliomanager.zendesk.com/hc/en-us/sections/202232807-Multifamily-Housing>.

The preceding information will help guide multifamily owners and operators in the process of benchmarking properties using Energy Star Portfolio Manager. Several additional scenarios, however, may be of interest and are detailed in the following resources and FAQs:

- A **more detailed guide** on setting up your property in Energy Star Portfolio Manager
- A guide on **how to benchmark a campus** if you have multiple buildings on your property
- **How to proceed if you do not have whole-building data**
- **Requirements to receive an Energy Star Score** and gain better insight into the energy performance of your property in comparison to others
- **Requirements to earn Energy Star certification for your property**
- An **overview of financial incentive programs** for multifamily properties



*This resource was created in partnership with the National Apartment Association (NAA).*