REPORT

LLOYD ECODISTRICT

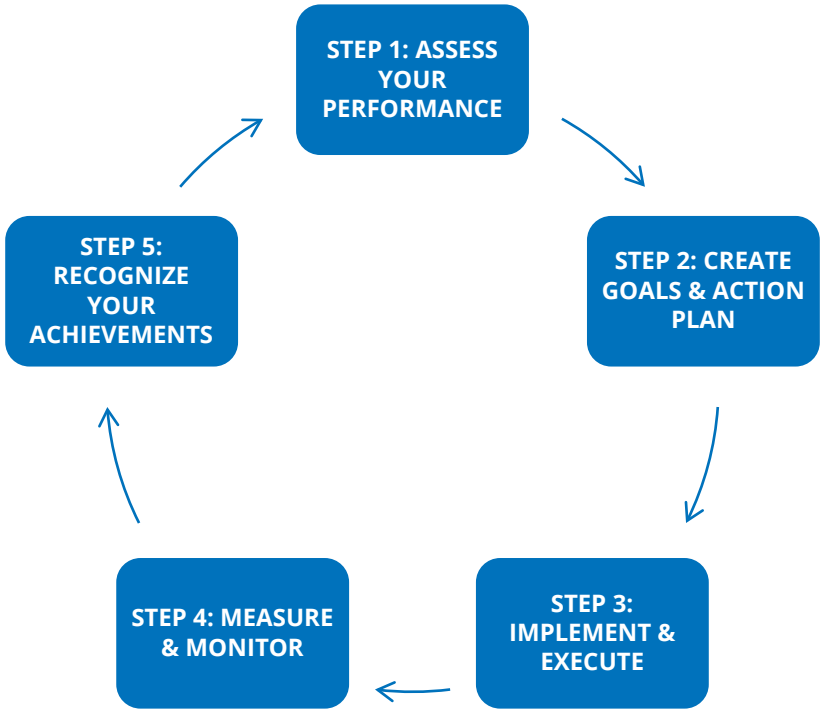
REDUCING YOUR CARBON FOOTPRINT

REDUCING YOUR CARBON FOOTPRINT

BUILDING ENERGY PERFORMANCE

An operationally effective and efficient building is not only more energy efficiency but also supports reducing carbon and can be a healthier and more comfortable environment for the building occupants. Continuous improvement of building energy performance enables you to reduce operating costs, reinvest that savings in your organization and employees, and operate more sustainably while distinguishing your organization as an environmental leader.

Outlined in the following pages are basic steps on how to approach improving building energy performance through effective energy management practices and processes.



Energy Use Benchmarking

Tracking and reporting your building's energy performance is a first step in understanding whether your building is performing as designed and can identify opportunities to make energy efficiency improvements, investments or operational changes that save money, reduce carbon emissions, and improve the building occupant experience.

Begin by collecting energy use data for all major systems and functions in your organization and baseline energy consumption of your building to measure future results of efficiency efforts. At a minimum, collect data by fuel type at an individual building or facility level. If possible, collect data from submeters and use actual, not estimated data that is current and timely.

Use a tracking system to organize your data and benchmark performance over time. Benchmarking allows you to compare the energy use of your building or group of buildings with other similar structures or look at how energy use varies from your baseline. It is a critical step in any building upgrade project because it informs you on how and where energy is used and what factors are driving the energy use.

ENERGY STAR® Portfolio Manager® (ESPM) is a web-based energy tracking and benchmarking tool primarily designed for commercial and institutional buildings. Portfolio Manager helps you track and assess energy and water consumption within individual buildings as well as across your entire building portfolio. After creating an account, you can enter energy consumption and cost data into your Portfolio Manager account to set baselines, assess energy management goals over time, and identify strategic opportunities for savings and recognition opportunities.

For benchmarking performance against an internal baseline, Portfolio Manager allows you to view percent improvement in weather-normalized source energy. Ensuring that the information entered in Portfolio Manager has been done accurately provides a solid foundation for using the data to make informed decisions about energy efficiency improvements. ESPM can also help you track your water and waste consumption now as well.

Technical Assessments & Audits

Energy audits are comprehensive reviews conducted by energy professionals and/or engineers that evaluate the actual performance of a facility's systems and equipment against their designed performance level or against best available technology.

Energy Assessment

An energy assessment is typically performed by internal staff, a contractor, vendor, or utility company. It includes 1-2 hours of onsite assessment focused on major systems (mechanical, electrical, building envelope, and processes). The 1-page report will include a bulleted list of potential opportunities for energy efficiency and management and is usually free or low cost.

ASHRAE Level I - Walk-Through Analysis

The ASHRAE Level I Energy Audit process begins with a brief walk-through survey of the building that enables the auditor to become familiar with the building's construction, mechanical equipment, current modes of operation, and maintenance practices. The auditor should meet with the owner or operator and building occupants to learn of any special problems or needs of the facility, and to determine if any maintenance problems or practices are affecting the building's efficiency.

Following the site visit, a rough estimate of the approximate energy use breakdown for significant end-use categories, including weather and non-weather-related uses, will be derived.

In addition, low-cost/no-cost energy savings opportunities will be identified, along with estimated potential savings that may result from the implementation of these measures. Finally, any capital improvements that warrant further study, along with an estimate of their potential costs and associated energy savings, will be determined.

Technical Assessments & Audits

ASHRAE Level I - Walk-Through Analysis

The building information will be compiled into a report containing the following:

- Building characteristics and energy use summary
- Quantification of savings potential from changing to a different utility price structure
- A discussion of any irregularities found in the building's monthly energy use patterns, including suggestions about possible causes
- The energy index of similar buildings
- The method used to develop the target indices
- Total energy demand and cost by fuel type for the latest year and preceding two years, as available
- The fraction of current costs that would be saved if the energy index were brought to the target level
- A summary of any special problems or needs identified during the walk-through survey, including possible revisions to operating and maintenance procedures
- A preliminary energy use breakdown by major end uses
- List of low-cost/no-cost changes, along with potential savings from these improvements
- Potential capital improvements, with an initial estimate of potential costs and savings

The completed report can be presented to the building owner in a meeting where next steps, including the potential benefits of conducting a more in-depth ASHRAE Level II Analysis, will be discussed.

Technical Assessments & Audits

ASHRAE Level II - Energy Survey and Analysis

An ASHRAE Level II Energy Audit is an in-depth analysis and utilizes investigation, including data logging or other measurement methods, to verify current operating conditions and comparison to the original design intent.

As a part of the Level II audit, the following tasks should be performed in addition to those conducted in Level I:

- In depth review of operations and maintenance practices and mechanical and electrical installed conditions and determination of upcoming building changes
- Utilizing data loggers or the BAS, as applicable, measure operating parameters and compare to design
- Refine end-use breakdown compiled in Level I
- Create a list of all possible equipment modifications with preliminary energy savings estimates, focusing on only those that are practical
- Review list with owner to determine which modifications should be studied further and prioritize them based on implementation chronology
- Estimate energy cost savings and energy index for each measure, accounting for interaction.
- Estimate costs of implementation for each measure
- Estimate operational and maintenance costs of each impact
- Estimate combined energy savings from implementing all measures
- By measure, financially evaluate based on Owner's criteria such as payback, ROI, etc.
- Create Level II report and meet with Owner to review and discuss measure selection

The Level II report will include a summarization of each major energy end-use and its estimated cost, a building description and inventory of major energy-using equipment, a list of impractical measures and justification for elimination, a list of practical measures following the ASHRAE Guideline Procedures for Commercial Building Energy Audits, a table summarizing the costs, savings, and financial performance of each measure, differences between this and results of Level I, recommended measurement and verification methods for energy efficiency measures, and a discussion of capital intensive measures that may warrant further study.

Stakeholder Engagement Process

It is critical to have a thorough discussion and review of the baselines, benchmark, and audits presented to leadership. Goals can then be established at the appropriate organizational levels and should be formally recognized by senior management as a mission for the whole organization.

The conversation should include a discussion of the report findings and opportunities around capital improvements, scheduling, operations, and maintenance.

The goal is to foster transparency, owner buy-in and create a work plan with recommended actions to initiate operational improvements that might occur in accordance with the goals of key stakeholders.

Possible topics to be unveiled may include:

- Energy assessment and audit findings
- Potential capital improvements if any
- Defined roles and responsibilities
- Recommended operational improvements such as building commissioning
- Recommended internal training and skill building of staff & others
- Recommended communication strategy for staff, partners, occupants & others

Making Things Stick

At this stage it is time to invest in building organizational capacity in best practices, technologies, and operating procedures to set your internal team up for success. Ensure your inventories, policies and processes are in place. Develop strategies in which to address current and future capitol and operational budgets for long term planning.

Engage in training and advancing your information systems to enable the sharing of successful and effective practices for building energy performance within your organization. It is important to catalog and store information in a centralized system so that you can track, gauge, and monitor progress toward established targets, milestones, and deadlines.

Additionally, the periodic review of the activities outlined in your action plan is critical to meeting energy performance goals.

Facility Teams Process

- Training – operational, procedural, administrative and specialized trainings
- Inventories - best practices for energy management, technologies and procedures
- Regular updates to tracking systems
- Periodic reviews of progress, issues and successes
- Identification of necessary corrective actions

You Can't Manage What You Don't Measure

The Measuring and Monitoring period is the continuous application of strategies set during the implementation and execution phase. Organize data and reports from your tracking and monitoring efforts to evaluate the results and information gathered. Benchmark energy performance to your established baselines and against performance metrics, such as environmental performance and financial savings goals.

Evaluating these results in a formal review process is recommended. Regular evaluation of energy performance and the effectiveness of your initiatives will help you make informed decisions about future energy projects.

Understanding the factors affecting the results will help you identify best practices, new actions to take forward, and set new performance goals.

Commissioning

At this stage you may want to invest into Commissioning for your building assets.

When buildings are designed with a commissioning mindset they are proven to run more efficiently and can reduce the owner's operational costs. When existing buildings have been commissioned research shows owners can achieve savings in operations of $4 over the first five years of occupancy as a direct result of every $1 invested in commissioning—an excellent return on investment."

—Whole Building Design Guide, a program of the U.S. National Institute of Building Sciences

New Building Commissioning

Ensure that the building systems are designed and operated as intended. Development of the OPR & BOD.

Existing Building Commissioning

Develop an understanding of the operation of the building's major energy-using systems, options for optimizing energy performance and a plan to achieve energy savings

Building Analytics

MBCx is an ongoing Cx process with focus on analyzing large amounts of data on a continuous basis.

Acquire

Input Building & Energy Data

Trend Logs

Analyze

Algorithms

Predictive Analytics

Fault Detection

Prioritize

Dashboard

Review Faults

Recommend ations

Reporting

Verify

Monitor Equipment

Energy Costs

GHG

Air Quality

ROI & M&V

Messaging and Story Telling

Share Your Success Stories

Recognizing energy efficiency achievements can help sustain momentum and support for energy initiatives. Consider ways to provide internal recognition to individuals, teams, and facilities within your organization as well as receiving external recognition from outside partners and programs to gain positive exposure for your efforts.

Earn Recognition

Buildings receive ENERGY STAR certification by applying through the ENERGY STAR program. ENERGY STAR certification distinguishes the best performing buildings within their sector with the highly recognized ENERGY STAR. To earn certification, a facility must achieve an Energy Performance Score of 75 or higher on an ENERGY STAR scale offered through Portfolio Manager. Certification is given on an annual basis and verified by a third-party licensed professional engineer or registered architect.

ENERGY STAR Portfolio Manager maintains a searchable directory of licensed professionals that can help building owners verify the information in their building profile.
https://www.energystar.gov/buildings/lp_finder

RESOURCES FOR IMPROVING BUILDING PERFORMANCE

ENERGY STAR Portfolio Manager

Portfolio Manager is a web-based energy tracking and benchmarking tool primarily designed for commercial and institutional buildings. Portfolio Manager helps you track and assess energy and water consumption within individual buildings as well as across your entire building portfolio. After creating an account, users enter energy consumption and cost data into your Portfolio Manager account to benchmark building energy performance, assess energy management goals over time, and identify strategic opportunities for savings and recognition opportunities.

For benchmarking performance against an internal baseline, Portfolio Manager allows you to View percent improvement in weather-normalized source energy.

Energy Trust of Oregon offers cash incentives to organizations that make energy-saving upgrades. Visit Energy Trust's website to find a trade ally contractor and for details on cash incentives that can help you get more from your energy. https://www.energytrust.org/commercial/existing-buildings-oregon-cash-incentives

BetterBricks offers case studies, tools, and resources to help manage and operate your building in an efficient and cost-effective way. Learn more about your building's energy use and develop an action plan to save more. https://betterbricks.com/

PGE offers classroom, on-demand, and webinar training opportunities to learn how to save on energy costs, be more sustainable and work safely around electricity. https://portlandgeneral.com/save-money/save-money-home/special-offers-incentives