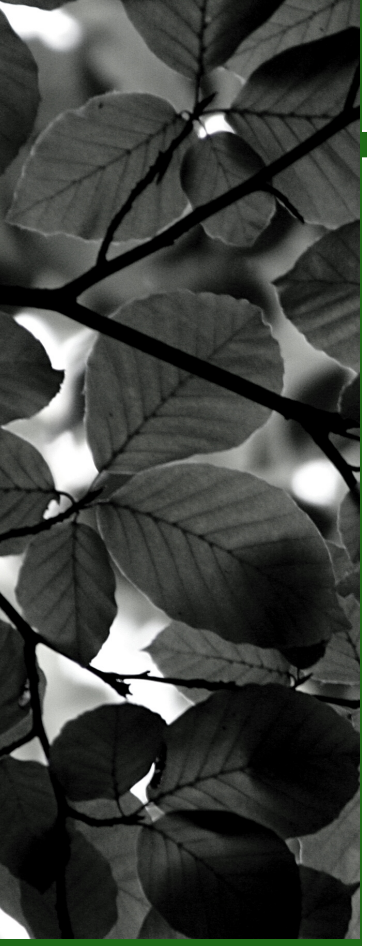


Energy Benchmarking

Best Management Practice Guide

Introduction

Benchmarking is the practice of comparing the measured performance of a device, process, facility, or organization with the goal of informing and motivating performance improvement. This practice promotes stewardship of resources within an organization and supports sustainability goals, like reducing energy use and meeting greenhouse gas emission targets. Energy performance is the most common item to be benchmarked and therefore will be the focus of this document. However, the basic concepts within can be applied to other benchmarking endeavors (e.g. water consumption, materials usages, etc.).

Benchmarking can have annual energy savings of 2.4%.

Benchmarking Basics

By focusing on best practices and sharing information, benchmarking can help a company:

- gain perspective on performance,
- understand energy use,
- find opportunities to improve,
- set reasonable performance goals,
- encourage friendly competitiveness,
- and foster a philosophy of continuous improvement.

The three types of benchmarking are internal, competitive and strategic. Internal benchmarking is used when a company has made improvements and wishes to compare the new performance measure with a previous performance measure. Competitive benchmarking is used when a company wants to evaluate itself compared to others within its sector. Lastly, strategic benchmarking is used when identifying and analyzing world-class performance. This form of benchmarking is used when a company wants to go outside of its sector to evaluate its best practices and performance. In essence when it comes to benchmarking, an entity can choose to compare itself within the organization, to peers, and/or to a world class performance measurement.

Benchmarking improves performance while promoting resource stewardship and supporting sustainability goals.

Need Help...

- *establishing a benchmarking program,*
- *training a team,*
- *or educating employees about benchmarking?*

Contact the
Kentucky Pollution Prevention Center!

Website: www.kppc.org
Email: info@kppc.org
Phone: 502-852-0965

Develop a Plan

A planned approach helps create a more viable benchmarking program. The plan should determine the program's purpose and the intended audience(s). While developing a benchmarking plan, make sure to identify the metrics needed to appropriately communicate the results and recognize the data required to produce those results. The plan should also evaluate the roles of individuals/teams and how data will be collected or converted. Below is a list of items to consider while developing a benchmarking plan.

- *Implementation:* Many use a phased approach. One option is to start with larger buildings, then move on to smaller buildings. Another is to phase in benchmarking via operation/space type (e.g. start in office space, then expand to different operations). Whatever you decide, make sure to identify the size and type of buildings/operations that will be participating.
- *Benchmark:* A benchmark is a standard or point of reference against which your energy usage data can be compared or assessed. Decide which benchmark(s) will be used.
- *Baseline:* A baseline is the measure of the chosen benchmark at some point in time and used to compare performance against itself overtime. A baseline, for example might be comprised of 12 months of energy use data (i.e. electricity, natural gas, etc.) for a particular time period. Future energy use can be compared to the baseline.
- *Units of Measurement:* Convert or collect your energy use data in the units used by the chosen benchmark(s). Correct units will make it easier to compare your data against the selected benchmark(s).
- *Establish a Routine:* To track performance over time, an organization must continually collect data and regularly compare the data against the benchmark(s) (e.g. monthly, annually). Consider how these tasks can up be setup into a new or existing work routine(s).

Engage Others

Outreach, engagement, and communication are vital for successful benchmarking. Start by reaching out to those in leadership. Help establish leadership buy-in by communicating a plan for developing and the benefits of a benchmarking program. Leadership buy-in and participation will ensure the program receives the resources it requires and will also help others see the program as worthwhile.

Creating a comprehensive benchmarking plan and clearly communicating it to the team members will also help all personnel understand the specific actions required of their roles, demonstrate the usefulness of the program and show how the data collected drives program impact. Engage others by holding kickoff events and planning regular meetings. Holding a kickoff event will get the project off to a strong start, while regular check-ins will help monitor progress and maintain momentum. Remember to provide training to team members. Training will reinforce the importance of the program and will ensure data quality. Training will also provide opportunities for professional development for those involved.

Tools

A wide variety of tools are available to help companies manage benchmarking data. Tools range from simple spreadsheets to web-based systems and vary depending on capabilities and cost. Selecting a data management tool should be driven by the goals of the benchmarking program. When looking at data management systems, ensure that the system can collect and evaluate the required data. It is helpful to compare the capabilities of several tools or consult a peer. For web-based data management systems, consider working with utilities to implement services that will allow facilities to import energy use data directly from the utility.

ENERGY STAR Portfolio Manager *is a widely used online benchmarking platform from US EPA's ENERGY STAR© program. Portfolio Manager can track more than 100 different metrics pertaining to energy, water, and waste. The ENERGY STAR© Portfolio Manager tool has 18 broad categories, such as health care, education, office, food sales, entertainment/public assembly, parking and warehouses, along with another 80 property types. Most buildings can be scored using Portfolio Manager; those earning a score of 75 or better may be eligible for ENERGY STAR© certification. Portfolio Manager scores are the most commonly used and understood metric for communicating results and receiving recognition. For those just getting started, ENERGY STAR© has developed a benchmarking starter kit and data collection spreadsheet.*

Getting Started Webpage:
https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/get-started-benchmarking

Portfolio Manager Webpage:
https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager

Commercial Buildings Energy Consumption Survey (CBECS) *is a national sample survey, by the US Energy Information Administration (EIA), that collects energy related information on commercial buildings. For this survey, commercial buildings include all buildings in which at least half of the floorspace is used for a purpose that is not residential, industrial, or agricultural. Thus the CBECS includes building types that might not traditionally be considered commercial (e.g. schools, hospitals, correctional institutions, and religious worship buildings), in addition to traditional commercial buildings (e.g. stores, restaurants, warehouses, and office buildings). With data dating back to 1979, users of CBECS's online resources and data include:*

- *Building owners and managers (for benchmarking)*
- *Energy modelers (for forecasting)*
- *Product developers (to gauge market potential)*
- *Government leaders (to formulate policy)*
- *ENERGY STAR© (as the foundation for their rating system targets)*

Website:
https://www.eia.gov/consumption/commercial/

Data Collection

The first step is identifying the data required to measure and communicate results. Look at the benchmark(s) to see what data will be needed to make a comparison. When doing this, it is important to account for all necessary datasets for benchmarking. The main dataset will be usage and production. Additionally, this could include inventorying facilities and gathering basic space characteristic information, cost information, operating characteristics, and energy consumption data. Also consider how to efficiently collect all the data. For example, aid the collection process by establishing clear roles and identifying avenues for data access. Note: Delegating responsibilities may help make data collection more manageable and empower those in the decision-making process.

Quality Assurance

Ensure the data is accurate. Use a verification process to promote accurate and transparent reporting. Consider the following:

- Ensure staff members are trained.
- Filter for unusually high or low energy use intensity (EUI) values compared with the national median EUI values for buildings of specific types, as provided by the Commercial Buildings Energy Consumption Survey (CBECS).
- Scan for gross rounding of values.
- Ensure facility names appear real (e.g. not "sample facility").
- Perform onsite verification.
- Randomly sample utility meter data.
- Establish a protocol for filling in data gaps.

Analyzing Data

Analyzing benchmarking results facilitates data-driven decision-making. The level of analysis required will depend on the detail of the data collected. A few basic analysis techniques include:

- Compare against a baseline.
- Compare with data from others (e.g. ENERGY STAR©'s Portfolio Manager or EIA's Commercial Buildings Energy Survey).
- Use an energy modeling tool to evaluate a facility's energy performance versus potential performance.
- Review department-wide energy performance to identify low-performing areas. Target areas with high energy use and/or energy use intensity (EUIs) values for further analysis.

Communicating Results

It is important to communicate the results in a manner appropriate to the audience. The information needed by facility managers versus financial decision-makers will likely take different forms (i.e. sharing results with and recognizing the achievements of those involved with the process). Make sure to use and understand the language/metrics used by the each target audience. For example, it is helpful to incorporate results into existing reports so data-based decision-making is integrated with current practices. Make sure to also determine whether the benchmarking data must be publicly disclosed and, if so, the mechanism through which the information will be made available.

Recognition Opportunity...
Kentucky Excellence in Environmental Leadership (KY EXCEL) is a program that recognizes environmental achievements throughout Kentucky.

*For details, contact **KY EXCEL!***

***Email**: envhelp@ky.gov*
***Phone**: 502-782-6189*

Continuous Improvement

Benchmarking results can help decision makers prioritize and plan for additional assessments and continuous improvements. These may include operational improvements, capital improvements, or both. This is especially useful to help companies with defined energy reduction goals to identify and prioritize projects for investment. When doing so, keep in mind, that relatively low-cost operational improvements can save on both maintenance and energy costs. A few best practices to consider when developing an action plan include facility energy assessments, installing sub-metering, developing a plug load management program, incorporating demand reduction strategies, and establishing load management/equipment shutdown policies. Other items to consider including in an action plan are mechanisms for tracking progress, communicating results, and sharing knowledge.

Summary

Benchmarking is the practice of comparing the measured performance with the goal of informing and motivating improvement. A planned approach is best to ensure the results can help decision makers prioritize effective projects for continuous improvement.

Additional Resources

ENERGY STAR©
Portfolio Manager

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

U.S. Energy Information Administration
Commercial Buildings Energy Survey

- *https://www.eia.gov/consumption/commercial/*

Kentucky Pollution Prevention Center

- *www.kppc.org*
- *info@kppc.org*
- *502-852-0925*

Keys to Benchmarking

Benchmarking is a way of discovering what level of performance is currently being achieved. Below are six keys to ensuring success.

1 Data

Develop a baseline by collecting energy use data. The baseline will be used to track a facility's energy use against itself over time, thus should be comprised of at least 12 months of data.

2 Benchmark

Choose a benchmark. A benchmark is a standard or point of reference against which your energy baseline/data can be compared or assessed.

3 Summarize

Compile, convert and summarize your energy use data into the units used by the chosen benchmark(s). Ensure accuracy by setting up a data verification process.

4 Compare

Compare your data to see how your facility stacks up against the selected benchmark(s).

5 Routine

Setup a routine. Collect data and compare it to the benchmark(s) at a regular frequency (e.g. monthly, annually) to track performance overtime.

6 Improvement

Benchmarking results can help decision makers plan for continuous improvements. These plans may include operational improvements, capital improvements, or both.

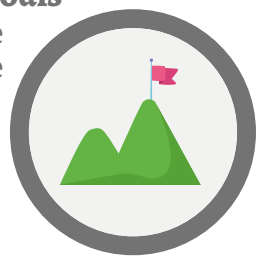
Kentucky Division of Compliance Assistance
300 Sower Boulevard, 1st Floor, Frankfort, KY 40601
Assistance Hotline: envhelp@ky.gov | 502-782-6189

Benchmarking Framework

Starting a benchmarking program can be overwhelming. To help you succeed, below is a simplified framework for such a program. NOTE: The framework is a cycle, so repeat as needed.

1.Establish Goals

Develop a list of measurable outcomes that can be realistically be achieved.



2.Secure Buy-in

Ensure the program receives required support by securing buy-in from leadership.

3.Build a Team

A team will help with workload, idea sharing, and buy-in from all.

4.Select a Benchmark

A benchmark is a standard against which your data can be compared.

5.Identify Data

Identify what data and metrics will be required to compare your facility to the benchmark(s).

6.Benchmarking Tools

Data management tools range from simple spreadsheets to custom-designed web-based tools. Make sure that the tool can collect and evaluate the required data.

7.Data Collection

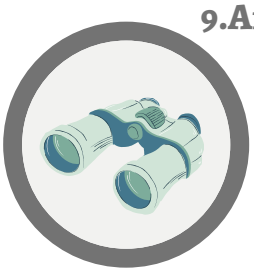
Determine how the data will be collected. Establish clear roles and identify avenues for data access.

8.Data Verification

Ensure the data is accurate. Use a verification process to promote accurate and transparent reporting.

9.Analyze

Compare data to bench-mark(s).



10.Communicate

Share the results in a manner appropriate to the audience.

11.Continuous Improvement

Make and implement an action plan in an effort to improve performance.

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