Energy Benchmarking

KENTUCKY SUSTAINABLE SPIRITS

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 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 brewery or distillery:

- 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.

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

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 established best practices.

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 for appropriately communicating 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. 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:* Think about converting or collecting 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 involved personnel understand the specific actions required of their roles, demonstrate the usefulness of the program and show how the data collected drives program impact. Additionally, 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 generate 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.

Benchmarking to Improve Energy Performance

The ***Beverage Industry Environmental Roundtable*** (BIER) is a technical coalition of global beverage companies working together to advance environmental sustainability within the sector. Annually, BIER conducts an quantitative and qualitative benchmarking study that examines energy use and provides insight into the energy efficiency performance in the beverage sector. The following ratios are used and collected by BIER's benchmarking study:

- *Energy Use Ratios (EUR):* Calculated ratio of total energy usage (Mega-Joules) to total beverage production. Energy can be calculated from electric and natural gas usage using conversion factors to display units in mega-joules per liter (MJ/L).
- *Emissions Ratio:* Calculated ratio of total greenhouse gas emissions to total production and recorded as grams of carbon dioxide equivalent per liter (g CO2e/L).

With the results of the study, BIER has created international sector specific standards for energy use and emissions. Breweries and distilleries can compare their energy and emissions ratios against BIER's international standards using the table below.

Beverage Industry Environmental Roundtable Benchmarks

Facility Type	Energy Use Ratio (EUR) (MJ/L)	Emissions Ratio (g CO2e/L)
Brewery	1.17	97.63
Distillery	13.32	738.40
Winery	1.71	118.31
Bottling (All)	0.41	37.12

**Averaged from 2013, 2015, 2017 energy and emissions surveys*

Benchmark your data against BIER's Benchmarking Study and analyze trends! To start, download the ***Sustainability Calculator*** *developed by the Kentucky Pollution Prevention Center.*

Website: *http://kppc.org/ksmi/ssb/ssbi-calculator/*

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 the datasets necessary for benchmarking. This could include inventorying facilities and gathering basic space characteristic information, asset information, operating characteristics, energy project timelines, cost information, and energy consumption data. Also consider how to collect all the data efficiently. 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 while developing a data verification process:

- Ensure staff members are trained (one of the best ways to ensure accuracy).
- Look for unusually high or low values.
- Scan for gross rounding of values.
- Ensure facility names appear appropriate and real (e.g., not "sample facility").
- Perform onsite verification (e.i. self or third-party).
- Randomly sample utility meter data.
- Establish a protocol for filling in data gaps (despite best efforts, data isn't always going to be perfect).

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.
- Use an energy modeling tool to evaluate a facility's energy performance versus potential performance.
- Compare with data from others (e.g. ENERGY STAR's Portfolio Manager or BIER's International Benchmarking Study).
- Review department-wide energy performance to identify low-performing areas and also target areas with high energy use intensity (EUIs) values for further investigation.

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.

Additional Resources

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

Beverage Industry Environmental Roundtable
Benchmarking Study and Resources
- https://www.bieroundtable.com/work/benchmarking/

Kentucky Pollution Prevention Center
Sustainable Spirits and Brewing Initiative
- *http://kppc.org/ksmi/ssb/*
- info@kppc.org
- 502-852-0965

Kentucky Division of Compliance Assistance
Kentucky's Sustainable Spirits Initiative
- *https://eec.ky.gov/Environmental-Protection/Compliance-Assistance/Pages/sustainable-spirits.aspx*
- *envhelp@ky.gov*
- *502-782-6189*

Kentucky Divison of Compliance Assistance

KPPC
Kentucky's Resource Center for Environmental Sustainability

Produced by the Kentucky Pollution Prevention Partnership (KP3) thanks to US EPA Pollution Prevention Grant Funding

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 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 to benchmark(s) this 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.

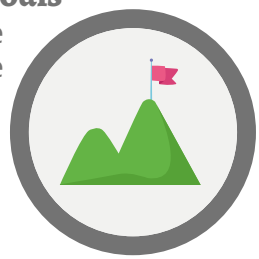
Kentucky Divison of Compliance Assistance
300 Sower Boulevard, 1st Floor, Frankfort, KY 40601
Assistance Hotline: envhelp@ky.gov | 502-782-6189

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

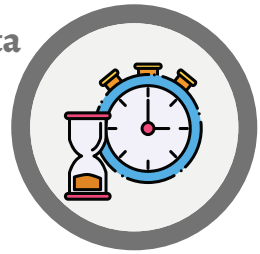
A team will help with workload, idea sharing, and buy-in from all.

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 generate and evaluate the required data.

7.Data Collection

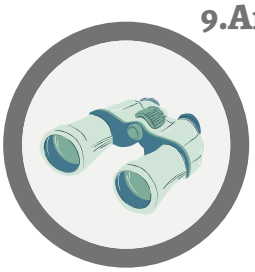
Determine how the data will be collected. Establish clear roles and identify avenues for data access.

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).

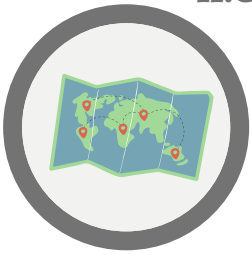


10.Communicate

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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