Energy Benchmarking Toolkit

The mission of the Greater Cincinnati Green Business Council is to inspire the business community to deliver a better social, economic and environmental future

Overview

The Greater Cincinnati Green Business Council has developed this guide to help area businesses:

- Use the U.S. Environmental Protection Agency's free Portfolio Manager tool to establish a benchmark, or baseline measure, of their energy consumption.
- Take advantage of existing incentives and programs to save energy and money while helping the environment.

About the Greater Cincinnati Green Business Council

The Greater Cincinnati Green Business Council is composed of some of the leading companies in Greater Cincinnati. The Green Business Council aims to inspire the business community to deliver a better social, economic and environmental future through sharing best practices and collaborating to drive and accelerate sustainable development in the region. The Green Business Council is driving the Greater Cincinnati business community to be the sustainability leader in America. More information on the Greater Cincinnati Green Business Council can be found at **www.gcgbc.org**

Note on Internet addresses

This guide provides Internet addresses for selected resources. For convenience – and since Internet addresses can change over time – a list of these links is maintained on the Greater Cincinnati Green Business Council's website at www.gcgbc.org.

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Benefits of Energy Benchmarking

Improving your building's energy performance is a journey, and benchmarking is your first step. It's how you identify your starting point so you can realize important benefits, including:

- **Reduce near-term energy expenses.** Improving your building's energy efficiency immediately reduces its energy consumption and its monthly energy expenses. And, when properly maintained, energy efficiency improvements can help keep your energy costs low for years – or even decades – into the future.

- **Reduce exposure to future energy price increases.** Energy prices go up and down depending on many factors but generally are projected to increase over the long term. The more you reduce your energy consumption today, the less risk you face if energy prices rise in the future.

- **Improve the environment.** Much of the energy used in our region's buildings comes from coal and natural gas. Burning these fossil fuels leads to the production of carbon dioxide and other pollutants. By using energy more efficiently, fewer greenhouse gases and other pollutants are produced. This lets us all breathe easier and helps reduce the risks of climate change.

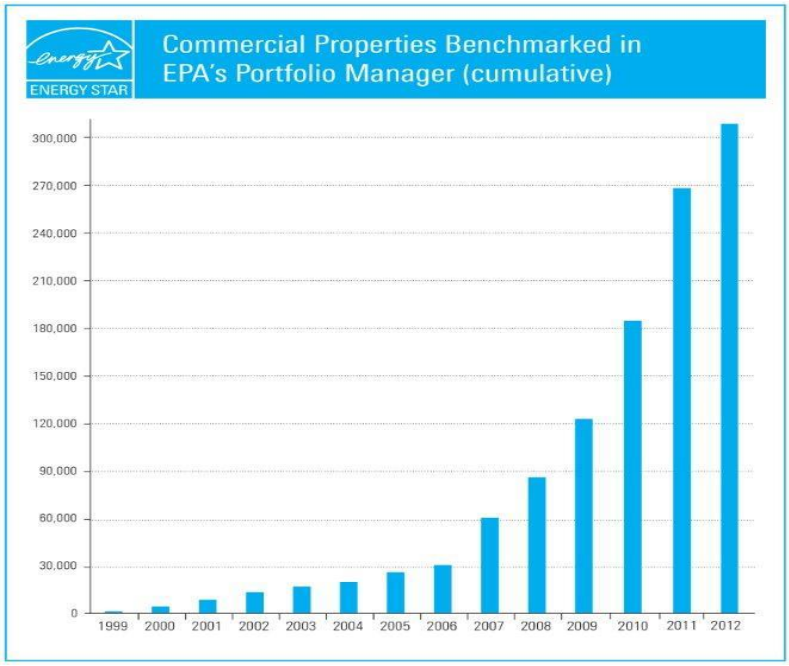
Benchmarking will also show how your building performs compared to other buildings with similar operating characteristics. Benchmarking will give you a baseline for setting goals and tracking progress over time.

Using the EPA's Portfolio Manager

Buildings come in many shapes and sizes, and we use them in many different ways. As a result, you might wonder how it is possible to assess the energy performance of an individual building and compare, or benchmark, it to other buildings. But with a little help, businesses of all types and sizes can do this. You'll need a recent energy bill, some basic information about your building and access to the EPA's free Web-based Portfolio Manager tool.

Developed by the U.S. Environmental Protection Agency (EPA), Portfolio Manager is a free Web-based tool that allows you to track and assess energy use for a single building or a portfolio of buildings. Portfolio Manager is already used by more than 300,000 buildings in the U.S. and has arguably become the de facto national standard for energy benchmarking.

ENERGY STAR: Commercial properties benchmarked in EPA's Portfolio Manager (cumulative)



Buildings with a 1-100 score

Calculating Energy Use Intensity

To assess your building's energy use, you'll start by calculating its Energy Use Intensity (EUI), a unit of measurement that describes the building's energy use. EUI seeks to normalize a building's energy use according to the primary function of the facility. There are many ways to calculate EUI, and Portfolio Manager will perform these calculations for you based on a number of factors, including building usage. Since office buildings primarily exist to provide a physical space to do office work, the traditional way to calculate EUI is to add together the energy

represented by a building's electrical and natural gas use, and then divide by the gross floor area.[1] This measures how much energy is used per square foot to operate an office building.

Although not supported by Portfolio Manager, other EUI measures may be more appropriate for other types of facilities and space uses. For example, a manufacturing facility may prefer to divide total energy use by the number of units produced.

A large percentage of a building's energy use usually goes toward heating and cooling. Since the need for these services varies, Portfolio Manager automatically adjusts your building's EUI to account for regional, seasonal and weather-related variations using data from across the country.

Of course, the energy used in a building is also determined by the type of building and its use. For example, a 5,000-square-foot office in Covington might have 12 full-time employees, use 15 computers and operate 50 hours a week. In contrast, a 12,000-square-foot retail store in Blue Ash might have 25 part-time employees, five computers and be open 70 hours per week. Fortunately, Portfolio Manager also helps you control for these factors.

Benchmarking with ENERGY STAR®

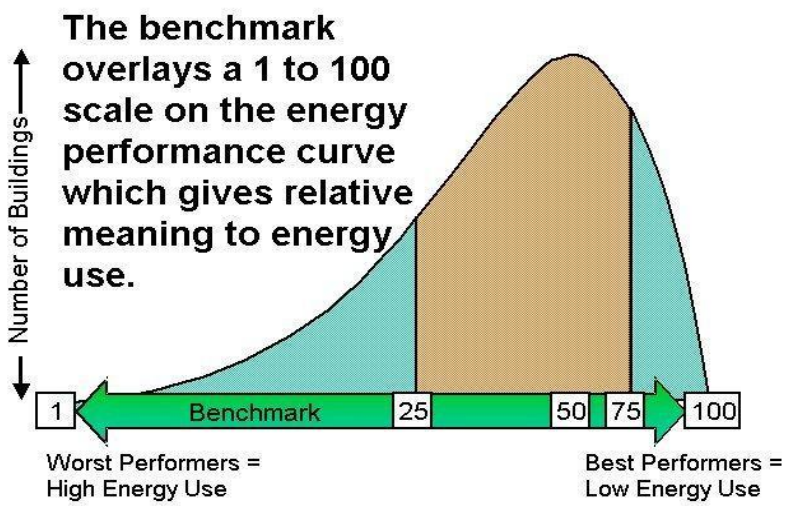
In addition to calculating EUI for all facilities, Portfolio Manager calculates an ENERGY STAR score between 1 and 100 for most – but not all – buildings. If your building meets certain criteria and is an eligible type of facility, it will be given an ENERGY STAR score. This number reflects how your building's performance compares to the performance of other facilities in the same category.[2]

A score of 50 indicates that half of the buildings are better and half are worse. A score of 75 indicates that your building performs better than 75 percent of all similar buildings nationwide.

[1] Electricity is often measured in kilowatt-hours (kWh) and natural gas in hundred cubic feet (CCF). To calculate EUI, these units are typically converted to British thermal units (Btu or thousand Btu (kBtu) and then divided by square footage (SF). As a result, EUI is often measured in kBtu/SF, but other methods are possible.

[2] Wondering how ENERGY STAR Portfolio Manager can do all of this? It uses a statistical model based on a U.S. Department of Energy database of more than 5,000 buildings.

1 to 100 Benchmark Scale



Buildings Eligible for ENERGY STAR Scores

Commercial Buildings eligible to receive a score include:

- Bank and financial institutions
- Courthouses
- Data centers
- Hospitals
- Hotels
- Houses of worship
- K-12 schools
- Medical offices
- Municipal wastewater treatment plants
- Offices
- Residence halls and dormitories
- Retail stores
- Senior care facilities
- Supermarkets
- Warehouses

LEED® Certification

Leadership in Energy and Environmental Design (LEED) certification, established by the nonprofit U.S. Green Building Council, is another way to compare your building's performance with other similar buildings.

The LEED certification process looks at various aspects of green building and awards recognition to structures that meet certain standards. Buildings seeking LEED certification earn credits in several categories. These differ by the type of LEED certification but generally include sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation.

LEED and ENERGY STAR are complementary to each other.
Buildings may be both LEED certified and ENERGY STAR

Other building types can still use Portfolio Manager to calculate EUI and compare performance to a broader list of national averages available on the ENERGY STAR website at:

http://www.energystar.gov/ia/business/tools_resources/new_bldg_design/2003_CBECSPerformanceTargetsTable.pdf?9093-f0cc.

Improving Energy Performance

Once location, season, weather, building type and usage have been accounted for, EUI and ENERGY STAR scores provide a simple assessment of your building's energy performance, as well as an apples-to-apples comparison to other similar buildings. This allows you to benchmark your building to itself over time, and to similar buildings in the U.S. These comparisons also provide a rough indication of how much you may be able to improve your building, and consequently, how much energy you might be able to save.

If your energy performance is below average – or not as high as you want it to be – it's time to look for opportunities to save energy and make your building more efficient.

You already may know of opportunities to improve your building's energy performance. But if you're looking for a place to start, consider some of the improvements listed here:

Time for Payback	Improvement Options
Near Term	**Inspections of existing equipment** • Check for space heaters, open windows, covered diffusers and personal fans. These could indicate operational or thermal comfort problems. • If you have already installed programmable thermostats, lights and occupancy sensors, make sure these are functioning properly. • **Install** programmable thermostats and occupancy sensor for lights.
Medium Term	• **Lighting retrofits** are almost always the most cost-effective energy conservation measure, with the quickest payback time. • **Building automation controls** also offer a quick payback and cost-effective savings.

	• **HVAC upgrades** improve efficiency on a large scale.
Longer Term	• **Boiler upgrades** provide savings that depend on the facility size and heating needed. • **Roof repairs and upgrades** are critical to facility modernization. • **Insulation and window upgrades** offer smaller financial benefits but are highly desired for increased comfort and aesthetics.

Do you manage multiple facilities? Compare the EUI for all of your facilities to learn which ones operate most efficiently and which may have the most room for improvement

A more comprehensive set of suggestions for energy efficiency improvements is available in guides from the U.S. Small Business Administration and the EPA:

• **http://www.sba.gov/content/easy-energy-efficiency-improvements**

• **http://www.energystar.gov/index.cfm?c=business.bus_upgrade_manual**

Energy efficiency resources

As you identify potential improvements and develop a plan, you should determine if there are any energy efficiency incentives or rebates available to you, and whether any of your partner organizations can help you obtain these benefits. You can identify local, state and federal incentives and rebates on the Database of State Incentives for Renewables & Efficiency (DSIRE) website:

Federal incentives: **http://www.dsireusa.org/incentives/index.cfm?state=us**

Ohio incentives: **http://www.dsireusa.org/incentives/index.cfm?state=OH**

Kentucky incentives: **http://www.dsireusa.org/incentives/index.cfm?state=KY**

Indiana incentives: **http://www.dsireusa.org/incentives/index.cfm?state=IN**

Locally, there are two very helpful resources available:

Duke Energy's Smart $aver® energy efficiency incentive Programs

Duke Energy, the regulated electricity and natural gas distribution utility for parts of southwest Ohio, northern Kentucky and Indiana, has two incentive programs to help customers save energy. Since 2009, Duke Energy's Smart $aver programs have provided $20 million in incentives to Ohio businesses and have helped those companies save $19 million annually on their electric bills.

- Smart $aver prescriptive incentives are cash incentives for standard energy-saving projects, such as retrofitting lights or installing variable frequency drives. The incentive amounts are based on industry experience with these technologies and their energy savings potential.

- Smart $aver custom incentives are cash incentives for nonstandard energy-saving projects. These require engineering calculations or energy modeling to calculate the energy savings potential. For custom incentives, customers generally engage an engineer or a design-build contractor to help prepare the application. To receive a custom incentive, you must apply and receive an incentive offer letter from Duke Energy before starting the project.

Information on Duke Energy's Smart $aver incentive programs, which vary by state, can be found online at
duke-energy.com.

Ohio: **http://www.duke-energy.com/ohio-business/smart-saver/smart-saver-incentive-program-customer.asp**

Kentucky: **http://www.duke-energy.com/kentucky-business/smart-saver-incentive-program.asp**

Indiana: **http://www.duke-energy.com/indiana-business/smart-saver-incentive-program.asp**

The Greater Cincinnati Energy Alliance's Better Building Performance Program

The Greater Cincinnati Energy Alliance (Energy Alliance) is a nonprofit organization that facilitates investment in energy efficiency projects for building owners in the Greater Cincinnati region through project management and financial solutions. The Energy Alliance offers support to commercial building owners in Hamilton County in Ohio and Boone, Kenton and Campbell counties in Kentucky with the Better Buildings Performance Program.

Through the Better Buildings Performance Program, the Energy Alliance connects participants with qualified building performance auditors, provides the expertise and guidance of the Energy Alliance staff to identify and prioritize energy efficiency improvement measures and promotes implementation of energy efficiency projects through financing. The Energy Alliance

provides continued support during and after construction by both educating building occupants on best practices to reduce energy consumption in the workplace and through ongoing energy usage tracking. Information on the Energy Alliance's commercial program can be found at http://greatercea.org/commercial/.

Learning about Portfolio Manager

The ENERGY STAR website provides terrific resources to introduce the Portfolio Manager tool and help you benchmark your building. We recommend starting with the Quick Start Guide because it provides references to guide you through Portfolio Manager account setup and the data collection process. U.S. EPA also offers two training sessions on using Portfolio Manager, Portfolio Manager 101 – Getting Started, and Portfolio Manager 201 – Advanced Users. These live webinars will help you learn how to: navigate the new Portfolio Manager; add a property and enter details about it; enter energy and water consumption data; share properties; generate performance reports to assess progress; and respond to data requests.

Quick start guide:
http://www.energystar.gov/buildings/tools-and-resources/portfolio-manager-quick-start-guide

Collecting data
After creating an account and learning the basics of Portfolio Manager, you'll need to collect some information on your building. Most of the information is easy to understand and the terms are explained in the online Portfolio Manager Help section.

You will need 12 months of energy use data (which is typically included in each of your energy bills) and some basic information about your building. For example, office buildings will need to provide gross floor area, weekly operating hours, the number of computers and workers on the main shift and information on how much floor area is heated and cooled. If you don't have all of the information, Portfolio Manager can help you estimate some of it.

Using Portfolio Manager to pursue continuous improvement
Regardless of your EUI or ENERGY STAR score, Portfolio Manager is a great way to introduce continuous improvement into your company. If your EUI or ENERGY STAR score is below where you want it to be, Portfolio Manager and the resources identified in this toolkit can help set you on a path of measuring, managing and improving your performance. As your performance improves, you may become eligible for the ENERGY STAR label. Or take your energy savings to the next level by incorporating a broader continuous improvement process into your business's operations (see page 15).

Additional capabilities of Portfolio Manager
Once you've benchmarked your building's energy performance, you can explore Portfolio Manager's other capabilities. The tool can help you set energy investment priorities, identify under-performing buildings, verify efficiency improvements, calculate greenhouse gas emissions, track renewable energy certificate and green power purchases, and monitor water consumption. More information can be found on the ENERGY STAR website.

Portfolio Manager FAQs

Q: Should supporting spaces, such as storage areas, mechanical areas and vertical penetrations, be included in the floor space for my facility?

A: Yes. The total of all spaces must include the floor area for all supporting functions, such as lobbies, stairways, restrooms, storage areas, elevator shafts and other supporting spaces in the facility.

Q: How is parking handled in Portfolio Manager?

A: The "parking" space type is intended for any parking area that is on the same electric meter as the building. This includes parking lots, fully enclosed parking structures and unenclosed parking structures that are open on all sides and may or may not include roof parking. All like parking should be combined into one parking area. By apportioning the square footage of the parking area into these three categories, Portfolio Manager can properly assign lighting and ventilation allowances.

Q: Should my server closets, computer training areas, telecom closets or print and copy rooms be listed as "data center" space?

A: No, these are not defined as data centers. The data center space type is intended for sophisticated computing and server functions, which typically include high-density computing equipment, dedicated cooling systems, uninterruptible power supplies (UPS) and raised floors. Server rooms that do not meet the definition of a "data center" but have separate cooling systems and operating hours that differ from the rest of the building should be entered as a separate space in Portfolio Manager using the "office" space type.

Earning the ENERGY STAR label

If your ENERGY STAR score is 75 or higher, consider pursuing the ENERGY STAR label. Before you can place the ENERGY STAR label on your building, you must have a professional engineer or registered architect verify that all energy use is accounted for accurately, that the building characteristics – including the square footage of the building – have been properly reported, that the building is fully functional in accordance with industry standards and that a set of indoor environmental criteria has been met. If you do qualify and obtain the ENERGY STAR label, you'll be joining the more than 20,000 facilities across the country that have earned this prestigious recognition.

Get your local pride on!

In 2012, Cincinnati ranked 13th in the country for the number of ENERGY STAR certified buildings, moving up from a previous ranking of 25th in 2011.1 We're now ranked above other Midwest cities such as Indianapolis and Minneapolis. Certify your buildings to help Cincinnati maintain and move up even higher in the rankings. And trumpet your success – perhaps issue a press release or include an article on your website to tell your customers and the community about your energy saving efforts. Build your civic pride while saving energy and money!

To explore green building activity by location and see trends and patterns in green building practice, check out the Green Building Information Gateway at **gbig.org.**

To be eligible to earn the ENERGY STAR, a building must be at least 5,000 square feet, with three exceptions:

- A bank must be at least 1,000 square feet.
- A hospital must be at least 20,000 square feet.
- A house of worship must be at least 1,000 square feet.

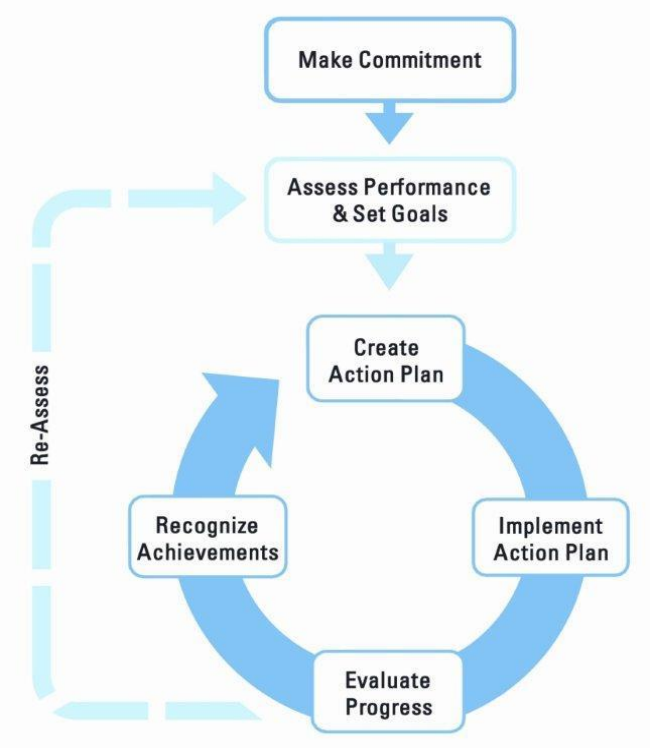
However, the EPA's Portfolio Manager tool can be used for any size facility.

The next level: Energy Management Plans

If you are seeking a more comprehensive plan to ensure long-term energy savings, an energy management plan can help. An energy management plan compiles all of the pieces of your energy program – from short term program goals to longer-term efficiency improvements – into an all-inclusive, actionable plan that is tailored to your business. The plan encompasses seven key steps, as shown in the graphic below.

Detailed guidelines for creating your own energy management plan can be found here:
• **http://www.energystar.gov/index.cfm?c=guidelines.guidelines_index**

The U.S. EPA has also developed an easy-to-use assessment tool to help organizations compare their current Energy management practices to those outlined in the guidelines.
• **http://www.energystar.gov/buildings/tools-and-resources/energyprogram-assessment-matrix-excel**



These tools can provide step-by-step assistance in creating a long-term plan that will enable you to:

- Drive energy savings and increase your competitiveness.
- Match energy performance and efficiency with your overall financial performance.
- Improve your bottom line.