

Welcome to BENCHMARKING 101



Thanks to our Hosts!

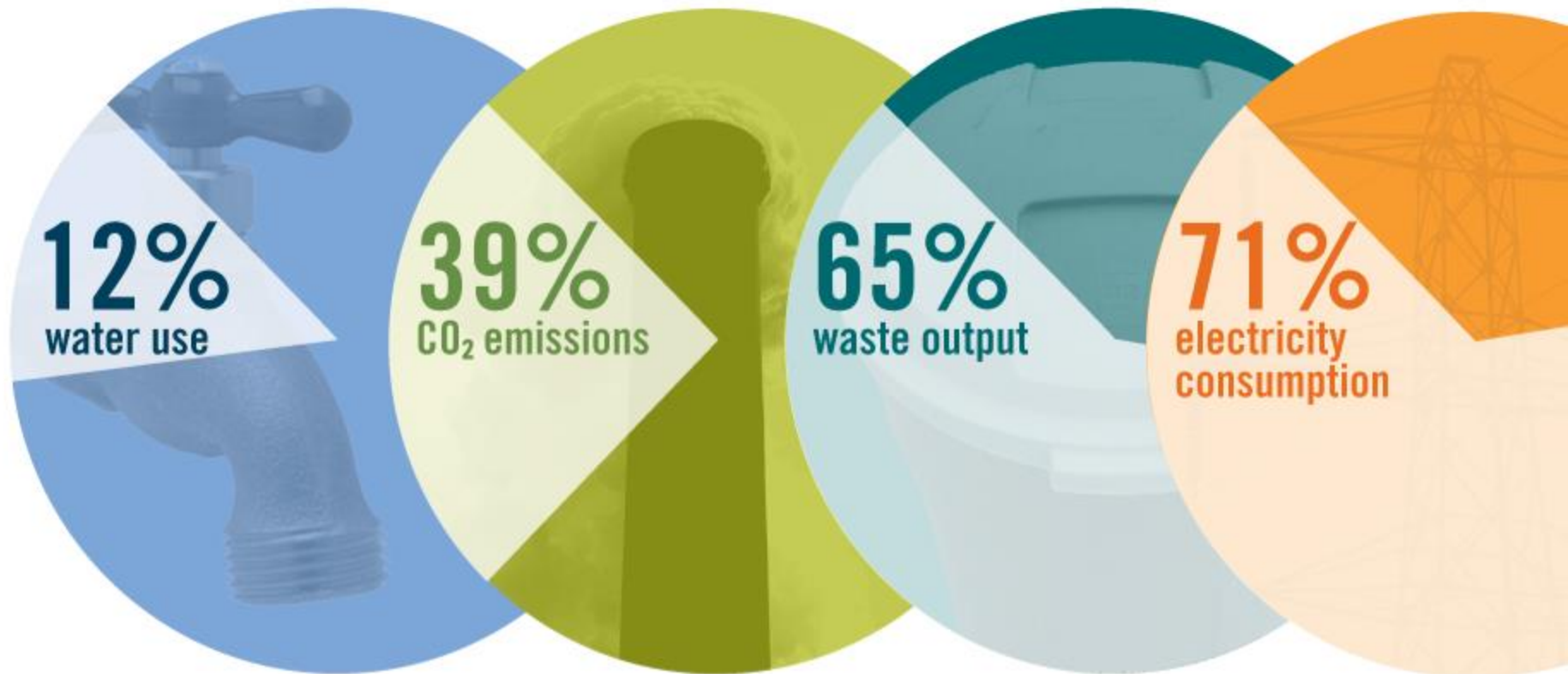


midwest building
**ENERGY CODES
CONFERENCE**
st. louis november 28-29, 2018



Building Energy Use Impacts

U.S. Buildings Have a BIG Impact



Locally, climate impacts are even bigger

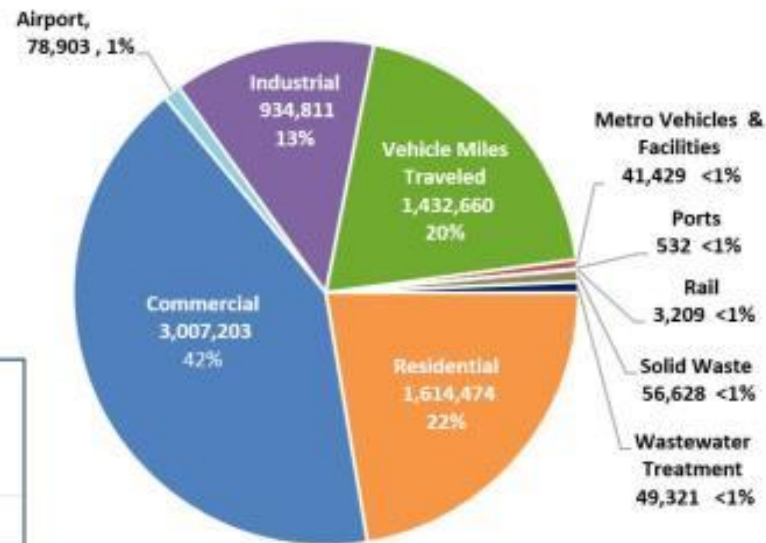


2015 Greenhouse Gas Emissions Inventory: *Community*

2015 GHG Emissions: All Community Sectors
7,219,170 mtCO₂e

- Buildings
 - Commercial (42%)
 - Residential (22%)
 - Industrial (13%)
- Vehicles
 - Vehicle Miles Traveled (20%)
- Other
 - Airport (1%)
 - Solid Waste (<1%)
 - Wastewater Treatment & Facilities (<1%)
 - Metro Vehicles & Facilities (<1%)
 - Rail (<1%)
 - Ports (<1%)

CITY OF ST. LOUIS
2015 COMMUNITY GHG EMISSIONS INVENTORY
Scopes 1, 2, and 3



*all quantities in metric tons CO₂equivalent

Energy Savings

30% of energy used in buildings is wasted through inefficiency (EPA)

Half of all energy savings are possible through low-cost or no-cost operational improvements (EPA)

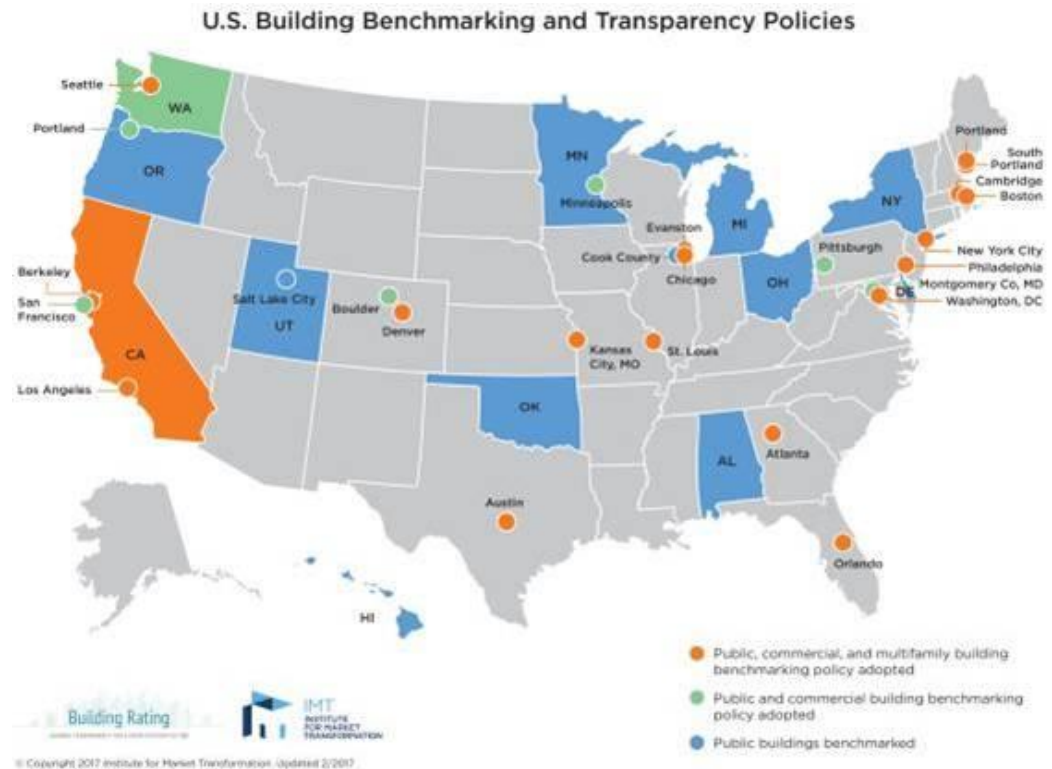
Benchmarking is the first step to saving energy, water & money!

What is Benchmarking?

Tracking your building's energy use and comparing your performance to the past and to similar buildings is called ***BENCHMARKING***

Context for Benchmarking Ordinance

- 40% of energy consumption & GHG emissions in the U.S. is from buildings; in St. Louis the figure is roughly 80%
- Stay competitive with other cities!



Context for Benchmarking Ordinance

- Supports Building Division goals of maintaining and improving building stock
- Aligns with City's Sustainability Plan and Climate Action & Adaptation Plan



Passed Jan. 27th, 2017 & Signed February
16th, 2017!



Building Energy Awareness Ordinance

Requirements:

- Municipal and private buildings over 50,000 square feet must track and report energy and water use annually – including multi-family
 - Municipal buildings to comply by December 31 of each year
 - Private buildings to comply by April 1 of each year
- Some exemptions (low or no occupancy, manufacturing, financial duress, state & federal buildings)
- Buildings not in compliance with the ordinance would *not* be eligible for issuance of new residential or commercial occupancy permits
- Training and assistance available!

REPORTING DEADLINE

April 1, 2018

City of St. Louis Building Energy Awareness Ordinance

Effective in 2017, privately owned buildings and municipal buildings in St. Louis that are 50,000 square feet or more are

www.stlbenchmarking.com

Join the Green Building Movement!



www.usgbc-mogateway.org/membership

Benchmarking Basics

ENERGY STAR®
PortfolioManager®

ENERGY STAR®
PortfolioManager®

Energy | Water | Waste

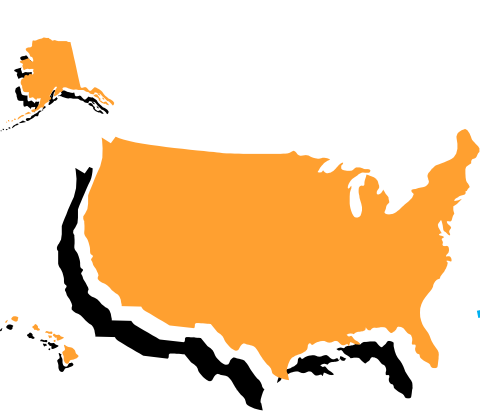
ENERGY STAR®
PortfolioManager®

**You can't manage
what you don't measure**

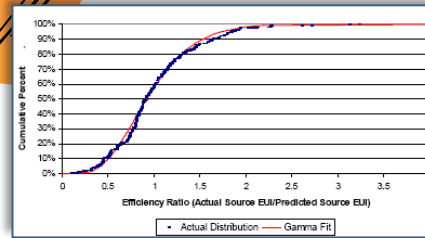
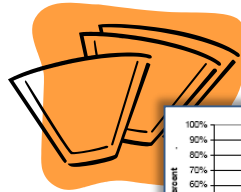
Ways to Benchmark Performance - Energy

- **1-100 ENERGY STAR Score**
- National Medians
- Similar Buildings in your Portfolio
- Past Performance
- Target Performance

1-100 ENERGY STAR Score



Nationally representative survey - CBECS gathers data on building characteristics and energy use from thousands of buildings across the US

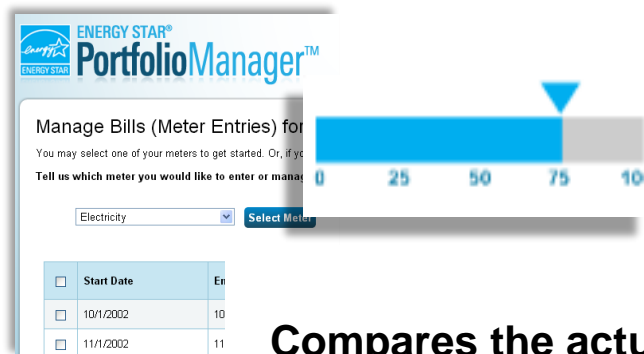


EPA analyzes & filters the data - ensuring data robustness and quality

Descriptive Statistics for Variables in Final Regression Model				
Variable	Full Name	Mean	Minimum	Maximum
SrcEUI	Source Energy per Square Foot	198.4	19.62	1133
LNsqFt	Natural Log of Square foot	9.535	8.517	13.82
PCDen	Number of Computers per 1000 ft ²	2.231	0.0273	11.11
LNWkHrs	Natural Log of Weekly Operating Hours	3.972	3.611	5.124
LNWkrDen	Natural Log of Number of Workers per 1000 ft ²	0.5616	-3.882	2.651
HDDxPH	Heating Degree Days x Percent Heated	4411	0.0000	9277
CDDxPC	Cooling Degree Days x Percent Cooled	1157	0.0000	5204

Note:
 - Statistics are computed over the filtered data set (n=498 observations).
 - Values are weighted by the CBECS variable ADJWTS.
 - The mean values are used to center variables for the regression.

EPA creates a **statistical model** that correlates the energy data of the property use details to identify the key drivers of energy use, accounting for weather variations



Compares the actual energy data for a building to the modeled estimate to determine where the building ranks relative to its peers

Property types with 1-100 ENERGY STAR scores



Bank Branch



Barracks*



Courthouses



Data Centers



Distribution Centers



Financial Offices



Hospitals



Hotels



K-12 Schools



Office Buildings



Medical Offices*



Multifamily Housing



Residence Hall/Dormitory*



Retail Stores



Senior Care Communities



Supermarkets



Warehouses



Wastewater Treatment Plants*



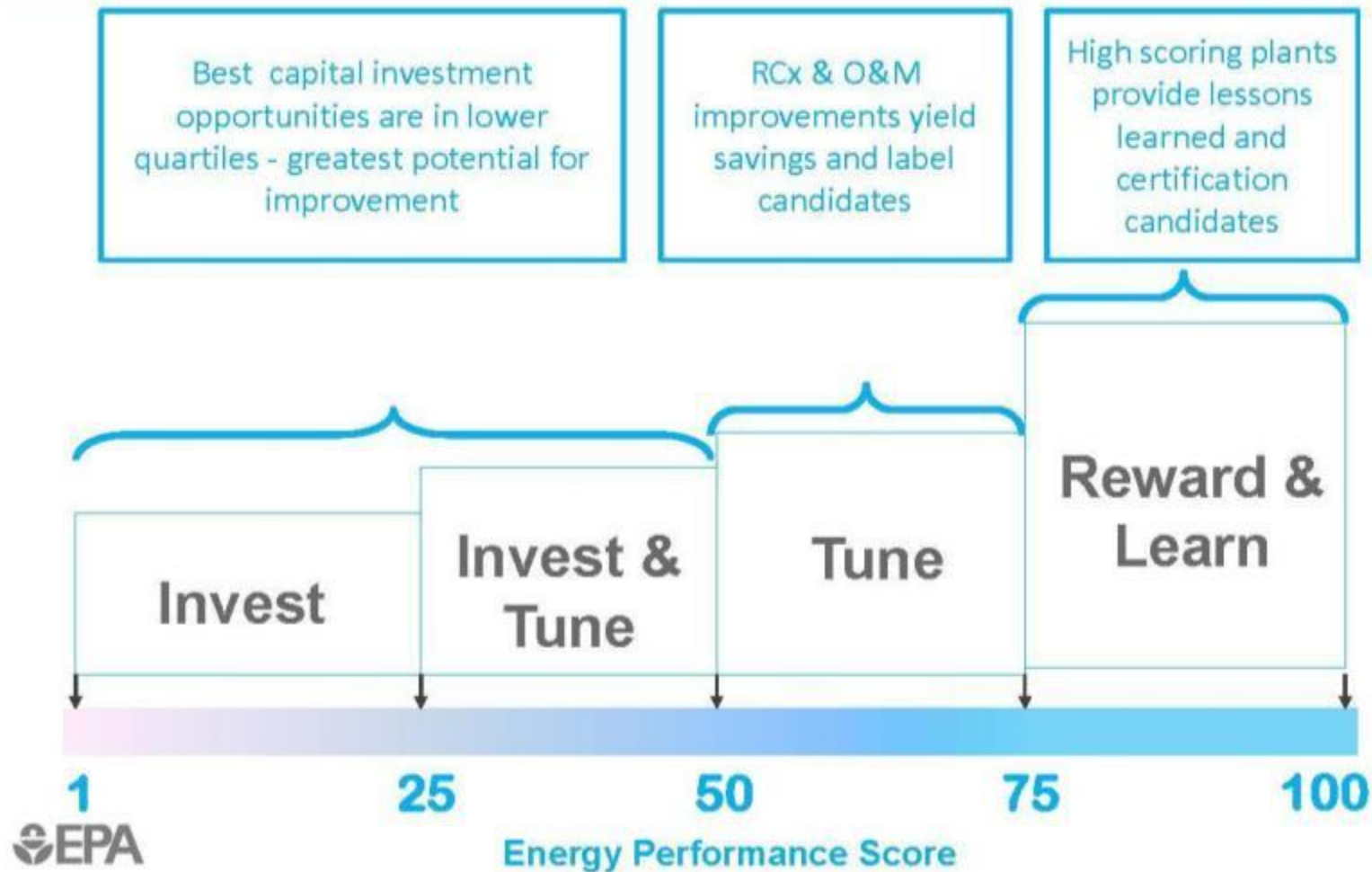
Wholesale club/ Supercenters



Worship Facilities

*Not eligible for ENERGY STAR Certification

1-100 ENERGY STAR Score



ENERGY STAR Score Updates

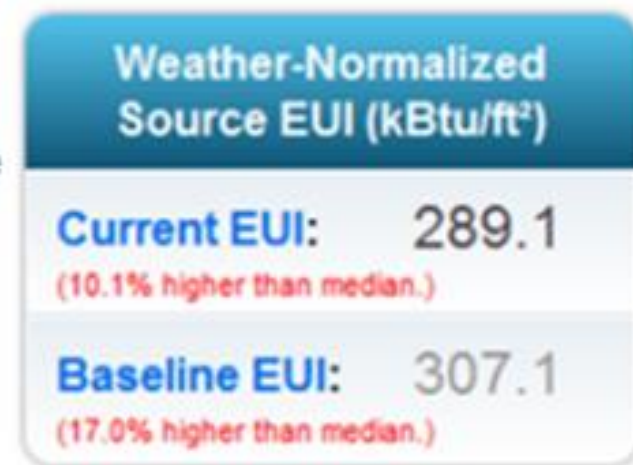
- ENERGY STAR Updated performance metrics for U.S. buildings in August 2018 based on the most recent market data
- Currently implementing industry engagement and review period, temporarily suspended new ENERGY STAR certification applications

Ways to Benchmark Performance - Energy

- 1-100 ENERGY STAR Score
- **National Medians**
- Similar Buildings in your Portfolio
- Past Performance
- Target Performance

Energy Use Intensity

- Energy used per square foot
- Compare to national median EUI for your property type



Ways to Benchmark Performance - Energy

- 1-100 ENERGY STAR Score
- National Medians
- **Similar Buildings in your Portfolio**
- **Past Performance**
- **Target Performance**

Understanding Performance

Dashboard (Metrics current as of 09/27/2017 10:48 AM EDT) Search by ID or Name

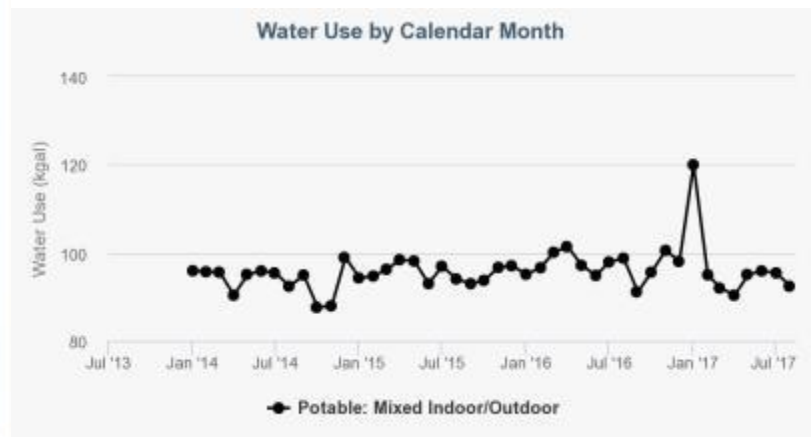
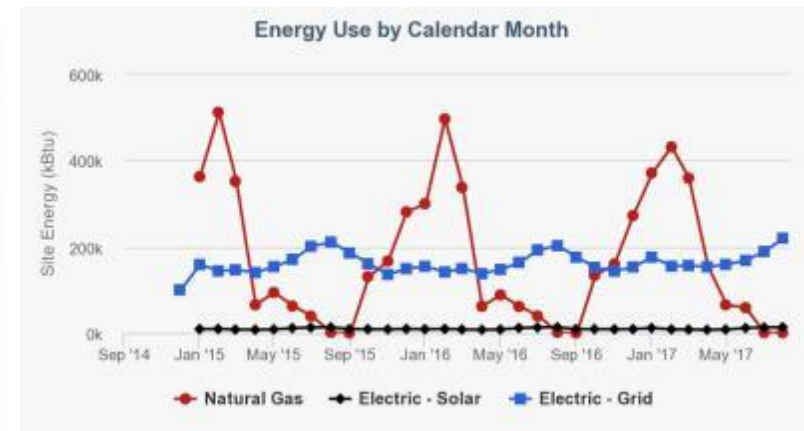
View All Properties (6) Energy Highlights Refresh Metrics

[Add/Edit/Delete Groups](#) [Add/Edit/Delete Views](#)

Name	Energy Current Date	ENERGY STAR Score	Site EUI (kBtu/ft ²)	Source EUI (kBtu/ft ²)
Sample Engineering Laboratory (US) 6047684	03/31/2017	NA	69.1	182.1
Sample K-12 School (US) 6047702	08/31/2017	76	55.0	113.5
Sample Library (US) 6047705	08/31/2017	NA	97.3	228.3
Sample Office (US) 6047681	08/31/2017	44	100.3	275.2
Sample University (including one child building) (US) 6047703	03/31/2017	NA	70.5	170.6
Sample Engineering Laboratory (US) 6047704	03/31/2017	NA	69.1	182.1

First Previous Page 1 of 1 Next Last 100 View 1 - 6 of 6

Properties (6) (Count includes 1 child properties. Expand carets to view.) [Download Data Table](#)



Ways to Benchmark Performance - Water

- NEW 1-100 Water Score *(multifamily only)*
- Water Use Intensity
- Similar Buildings in your Portfolio
- Past Performance
- Target Performance

Follow Steps Outlined in Quick Start Guide

ENERGY STAR
Portfolio Manager®

"How To" Series

Portfolio Manager® Quick Start Guide

EPA's ENERGY STAR Portfolio Manager tool helps you measure and track the energy and water use, waste and materials, and greenhouse gas emissions of your buildings, all in a secure online environment. You can use the results to identify under-performing buildings, set investment priorities, verify efficiency improvements, and receive EPA recognition for superior energy performance. Follow the steps in this guide to get started using the new Portfolio Manager to benchmark your properties, assess performance, and view results.

Getting Started

- Step 1: Add a Property
- Step 2: Enter Energy & Water Data
- Step 3: View Results & Progress

1 Add a Property

To get started, log in to Portfolio Manager at www.energystar.gov/portfolio/manager. Then, follow these instructions to create a property and to enter property information.

- Click Add a Property on the MyPortfolio tab.
- Answer questions about your property and click Get Started!
- Enter basic property information and select the boxes next to the statements that apply to your property. Then click Continue.
- Enter Use Details such as Gross Floor Area (GFA), operating hours, and number of workers for each type of use. You can use default or temporary values at this time and enter more accurate data later. **NOTE:** Mouse over the Use Detail to see a definition.
- Click Add Property. When you have successfully added your property, you will see the property's Summary tab.

If you have additional types of uses on the property, you can add them at any time.

- Click the property's Details tab, and then select a Property Use Type from the Add Another Type of Use drop-down menu. Click Add.
- Enter Use Details for the property and then click Save Use.

Property Types

All property types can be benchmarked. For properties with multiple buildings only hospitals, hotels, K-12 schools, multifamily, and senior care communities are eligible to receive the 1 - 100 ENERGY STAR score.

Properties with Multiple Use Types

Some properties include multiple use types, such as restaurants in hotels, salons in senior care communities, and cafeterias in hospitals. As a general rule, if a certain use commonly occurs in the type of property being benchmarked, do not break it out as a separate Property Use Type. Simply include it's square footage with the building's primary use.

May 2018 1

1. Log In
2. Add Property
3. Add Meters
4. Add Energy, Water or Waste Data
5. Review Results

Find online at

www.energystar.gov/buildings/training/training

Follow Reporting Checklist

www.stlbenchmarking.com

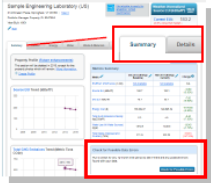
1. Benchmark - follow steps in Quick Start Guide
2. Check for Errors
3. Add your St. Louis Building ID
4. Generate & submit your energy and water report

Find online at


<https://www.stlbenchmarking.com/HowToComply/#reporting-checklist>

Reporting Checklist

1. Collect all data needed for benchmarking.
2. Create an ENERGY STAR Portfolio Manager account or log in to your existing account at www.energystar.gov/benchmark
3. Benchmark your property.
Following the steps outlined in the ENERGY STAR Quick Start Guide or in the quick demonstration videos available at www.energystar.gov/buildings/training/training.
 - Set up your property in Portfolio Manager
 - Set up energy and water meters
 - Add energy and water data
4. Check for Errors
Use Portfolio Manager's Data Quality Checker to find potential issues. Click on the link that reads "Check for Possible Errors" on your property's Summary tab.
5. Add your St. Louis Building ID to your property.
This ID is required to track compliance.
 - Locate your St. Louis Building ID by clicking "Building ID and Address Lookup" on the homepage of www.stlbenchmarking.com. Alert us if you have issues locating your Building ID by emailing benchmarking@stlouis-mo.gov or calling 314-622-5689
 - To add your St. Louis Building ID to your property, click on your property's Details tab. Look for the Unique Identifiers section in the bottom left. Click Edit. Locate the Standard IDs section, choose St. Louis Benchmarking ID from the drop down menu, and enter your ID number. Click Save.



Click Check for Possible Errors on your property's Summary Tab to use Portfolio Manager's Data Quality Checker.



Click on your property's Details Tab, then click Edit in the Unique Identifiers section in the bottom left.

Look for the Standard IDs Section. Choose St. Louis Benchmarking ID from the drop down menu, enter your ID number and click Save.

Continued on next page

www.stlbenchmarking.com

City of St. Louis | benchmarking@stlouis-mo.gov | 314-622-5689
USGBC-Missouri Gateway Chapter | usgbc-mogateway@mobot.org | 314-577-0854

Do any of the following apply to you?

Multiple buildings share energy and/or water meters?

Refer to ENERGY STAR's Campus Benchmarking Guide

You generate renewable energy onsite

Refer to our Green Power Guide

Common Benchmarking Issues

- Incorrect gross square footage
- Missing energy use data, missing meters
- Incorrect units for energy usage

Information needed for Benchmarking

Property Use Details

All Properties

- Property Name
- Property Address
- Total Gross Floor Area
- Year Built
- Occupancy (%)
- Number of Buildings
- For Compliance* – St Louis Benchmarking Building ID, find on www.stlbenchmarking.com

Gross Floor Area (GFA)

- GFA= Total property square footage between exterior walls of the building.
- Includes ALL finished areas, including support areas (elevator shafts, stairwells, mechanical spaces, **basements**, etc)
- NOT the same as rentable or leasable space.
- Don't include Parking square footage in your total property GFA.

Determining Gross Floor Area

Don't know your Gross Floor Area? Refer to:

- Life Safety Drawings
- Architectural Plans
- Physical space measurements

Your GFA impacts your energy metrics.

Try to get it right the first time!

You can enter a temporary value during initial set-up, but should confirm before submitting data to the City.

[Reference this ENERGY STAR FAQ for more Gross Floor Area details](#)

Property Use Details

- Additional details vary by Property Type.
- Use [ENERGY STAR's Online Data Collection Worksheet](#)

Gather Utility Data

- Ordinance requires annual data:
at least January 1, 2017 – December 31, 2017
- Billing periods likely won't line up with calendar year
- you'll likely need to gather 13+ months of bills
- Water and all fuel types used in building
 - Water (billed quarterly)
 - Electricity – purchased or generated onsite
 - Natural Gas
 - District Steam
 - Energy purchased in bulk: Fuel Oil, propane, diesel, etc.

Data Needed

- Start Date of billing cycle *
- End Date of billing cycle *
- Usage *
- Cost
- Estimation (Yes/No) *
- *Purchased Electricity Only Demand*
- *Purchased Electricity Only Demand Cost*

*** REQUIRED**

*Frequent Question: Data Needed Bulk Delivery – Fuel Oil, etc

- Delivery Date *
- Quantity *
- Total Cost
- Estimation (Y/N) *

* REQUIRED

Compliance

What Happens to Reported Data?

- Building Division will issue an annual municipal and private buildings report in 2019
 - Preliminary benchmarking data will be released to the public in December 2018 on www.stlbenchmarking.com
- Address + Energy Star score / EUI will be available online

2017 Preliminary Findings

- Over 1000 buildings in our covered buildings list
 - In our first year of enforcement, **we had a compliance rate of nearly 70%!**
 - 211 exemptions
- ENERGY STAR Portfolio Manager reported data
 - 108,242,979 total square footage reported
 - 2,207,174 metric tons of CO₂
 - 1,751,980,789 total kilowatt hours (kWh) used
 - 45,376,995 total therms used
 - 27,609,270 total kilogallons (Kgal) used

Next Steps

- Data analysis and publishing benchmarking summary reports in 2019
- Convene local stakeholders in order to gauge interest in a 2nd improvement policy to the ordinance
 - Examples: retro-commissioning, audits, performance standards
- St. Louis is a Bloomberg American Cities Climate Challenge grant recipient!
- Offer more building operator trainings to municipal staff and outside organizations in the St. Louis metro area
- Ameren MO will be offering automated upload feature in 2019!
- Hoping to reach **80%** compliance in 2019 for 2018 reported data

Questions?

Contact Us

Rajiv Ravulapati

Technical Advisor

314-622-3616

ravulapatir@stlouis-mo.gov

Emily Andrews

Executive Director – USGBC-Missouri Gateway Chapter

314-577-0854

emily.andrews@mobot.org

Johanna Schweiss

Volunteer & Outreach Coordinator – USGBC-Missouri Gateway Chapter

314-577-0884

johanna.schweiss@mobot.org