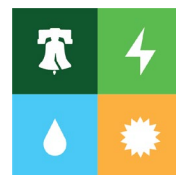


Building Energy Benchmarking Program

2024 REPORT



July 2026



**Office of
Sustainability**
CITY OF PHILADELPHIA

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Executive Summary

Buildings are the largest source of greenhouse gas emissions in Philadelphia, accounting for approximately 65% of emissions citywide with the city's commercial and industrial accounting for approximately 60% of this share (Office of Sustainability, 2025). For over a decade, the City of Philadelphia's Office of Sustainability has been working with building owners to track and reduce energy use and emissions from the city's largest buildings. Improved energy efficiency in our largest buildings helps reduce greenhouse gas emissions, supports clean air, and provides healthier, more comfortable spaces for residents, workers, and visitors.

To improve the energy performance of the city's largest buildings, Philadelphia requires owners with properties 50,000 square feet (sq. ft.) and larger to report their energy and water consumption to the City annually, in accordance with the Building Energy Benchmarking Policy (Philadelphia Code Section 9-3402). More than 2,200 properties across the city are subject to this requirement. The process of recording and monitoring a building's energy usage is known as energy benchmarking.

Benchmarking encourages building owners and managers to monitor energy and water usage, identify opportunities to improve operations and save money, and compare building performance against neighboring properties.

This report summarizes calendar year 2024 benchmarking results for buildings 50,000 sq. ft. and larger in Philadelphia. The analysis uses reported benchmarking data to evaluate compliance, energy performance, and trends across property types. Key highlights include:

- **In 2024, the benchmarking program achieved the highest compliance rate in the program's history**, with almost 75% of buildings complying with the policy.
- The city's benchmarked properties continue to **perform modestly above the national median ENERGY STAR score** and performance improved slightly from 2023 results.
- In 2024, **1.8 GWh of electricity consumed came from onsite renewable energy sources**, a slight increase from the previous year. That amount of electricity is equivalent to the electricity use of 144 homes in one year (US EPA, 2024).
- **Some property types continue to perform better than national benchmarks while others consume considerably more energy per square foot.** Multi-family buildings and K-12 schools were among the building types exceeding national averages for energy consumption.

Decreasing energy use and greenhouse gas emissions from the city's largest buildings is vital to achieving the city's target of carbon neutrality by 2050. Clean, safe, efficient buildings across the city help support Mayor Cherelle L. Parker's vision of making Philadelphia the safest, cleanest, and greenest big city in America with access to economic opportunity for all.

2024 Benchmarking Highlights

Reporting and Compliance

Building energy benchmarking has been a requirement in Philadelphia since 2012. Of the buildings required to comply with benchmarking policies, almost 75% of the buildings submitted compliant reports or an exemption – the highest compliance rate in the program’s history to date. Approximately 26% of buildings failed to meet benchmarking requirements due to incomplete or invalid data.

The median ENERGY STAR score of 60 suggests that benchmarked properties performed modestly above the national median of 50 and improved from last year’s score of 58.

This report analyzes trends in the top 20 most frequently reported property types in Philadelphia. Information on other property types can be found in the publicly reported data on [OpenDataPhilly](#) or in the [Building Energy Programs Visualization tool](#).



308 K–12 Schools
Reported

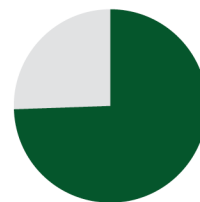


1,061 Multifamily
Buildings Reported



1,556 Buildings Reported

60
Median
ENERGY STAR®
Score



74.6% Compliance Rate

Energy Consumption by Fuel Type

In 2024, electricity accounted for the majority of reported energy consumption with over 4,570 GWh reported. That amount of electricity is equivalent to the electricity use of 375,050 homes for one year (US EPA, 2024).

The next largest energy sources were natural gas and district steam, respectively. Fuel oil represented only a small portion of total building energy use. Diesel and propane fuel usage (combined, represented as “Other”) were also reported, but at a small proportion of less than one percent of all energy usage reported (Figure 1).

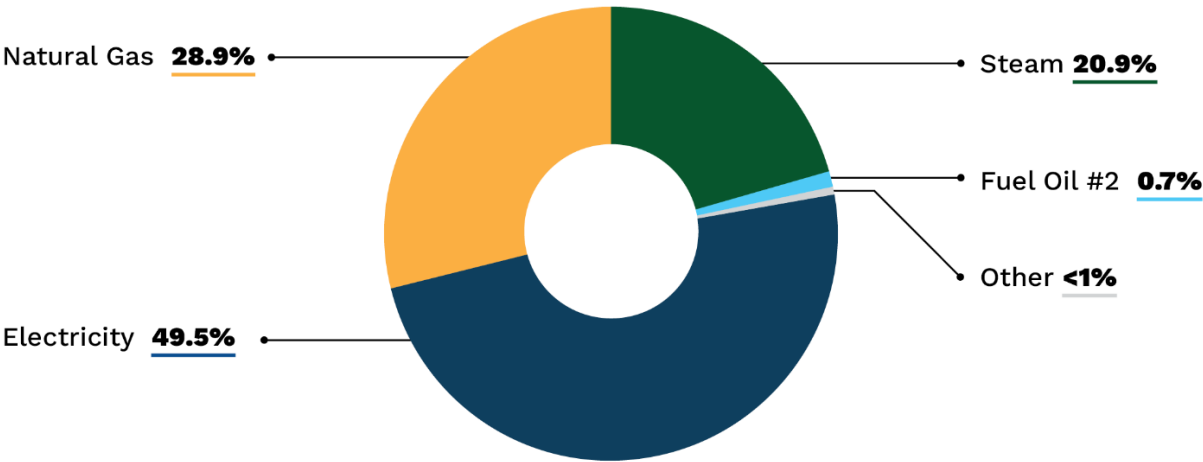


Figure 1. Percent of energy sources used in 2024.

To reduce greenhouse gas (GHG) emissions, building owners and utilities must continue to consider and incorporate low- or no-carbon alternatives. In 2024, 1.8 GWh (or 1,755,904 kWh) of the reported electricity consumed came from renewable energy sources. Although it represents a small proportion of electricity use, it has increased from the 0.81 GWh used in 2023. Continued electrification of buildings and a switch to cleaner energy sources will improve building performance and reduce emissions, while also supporting cleaner air for all Philadelphians.



More than
4,570 GWh of
Electricity Used



1.8 GWh of
Electricity
Generated from
Onsite Renewable
Systems

26
ENERGY STAR®
Certified Buildings

304
All Electric
Buildings

Citywide Energy Performance

Types of Buildings in Philadelphia

Annual benchmarking is the first step to understanding building performance across the city. The five most popular property types of benchmarked buildings include multifamily housing, college/university facilities, K-12 schools, office buildings, and hospitals. We can compare the performance of buildings by analyzing their energy use intensity and ENERGY STAR scores.

Energy use intensity (EUI) measures a building’s energy consumption on a per-square-foot basis, allowing buildings of different sizes to be compared more accurately. By dividing energy use by floor area, EUI provides facility managers with a useful indicator of overall building energy performance. Additionally, the EUI values are adjusted for weather, or weather-normalized, so that extremely hot summers and very cold winters do not skew the values. Lower EUI values generally reflect more efficient building operations, while higher values may indicate opportunities for energy efficiency improvements and operational optimization.

The ENERGY STAR score was developed by the United States Environmental Protection Agency (US EPA) and provides a metric for comparison with other similar buildings. The score accounts for differences in climate, occupancy and operating hours. A score of 50 represents median energy performance, while a score of 75 or better indicates a building is a top performer.

Table 1. Metrics on the top five most frequently benchmarked property types.

Building Type	Number of Buildings	Share of Total Gross Floor Area	Average Weather Normalized Site EUI	Average ENERGY STAR Score
Multifamily Housing	1,061	31.9%	31.9%	60.6
College/University	336	4.3%	4.3%	78.0
K-12 School	308	9.1%	9.1%	39.1
Office	142	14.6%	14.6%	64.5
Hospital	95	5.9%	5.9%	55.8

Multifamily Housing represented the leading reported property type, accounting for more than one thousand buildings and approximately one-third of total reported gross floor area. Office buildings and colleges/universities demonstrated relatively strong ENERGY STAR performance compared to several other categories. Hospitals exhibited the highest average weather-normalized site EUI, which is appropriate for the energy intensive operations of hospitals. K-12 schools recorded below-average ENERGY STAR scores, indicating significant opportunities for operational and equipment improvements (Table 1).

Comparison with Buildings Nationwide

The chart below shows the performance of Philadelphia’s buildings compared with the national average building performance, measured using weather-normalized site EUI. National averages were acquired from the US EPA’s ENERGY STAR Portfolio Manager Data Explorer for buildings 50,000 sq. ft. and larger, reported in 2024.

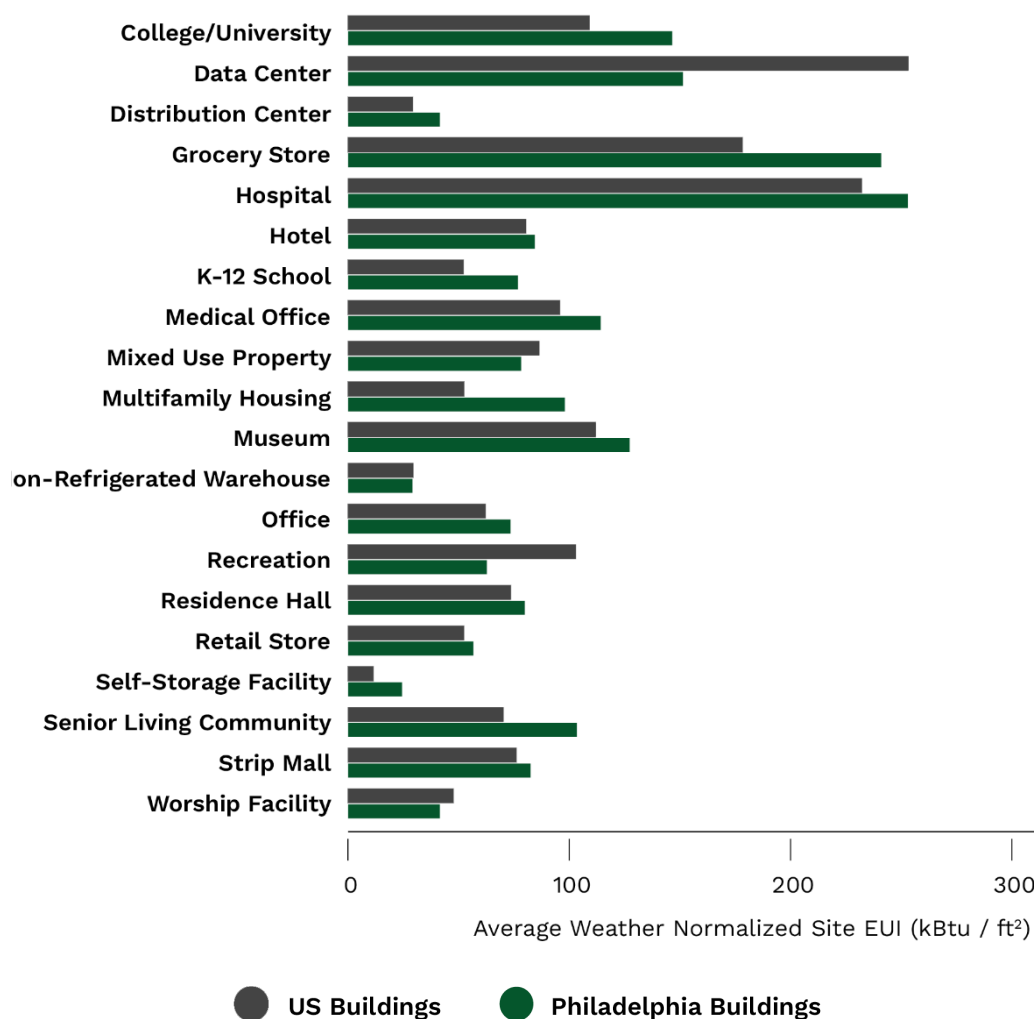


Figure 2. The average weather normalized site EUI of the 20 most frequently reported property types in Philadelphia compared to national averages.

Across both Philadelphia and the United States, hospitals, grocery stores, and data centers remain the most energy-intensive property types, reflecting their operational demands and specialized equipment. In contrast, self-storage facilities, warehouses, and distribution centers have the lowest EUIs due to lower occupancy levels and fewer energy-intensive systems.

The 2024 data indicates that while Philadelphia performs competitively in several building sectors, many major property types consume more energy than national averages (Figure 2). Improving efficiency in multifamily housing, hospital facilities, educational institutions, and medical offices could provide significant opportunities to reduce energy use, operating costs, and GHG emissions citywide.

Table 2. Property types that performed worse on average in Philadelphia than nationwide.

Building Type	Number of Buildings	Philadelphia Avg. Site EUI (kBtu / ft ²)*	Nationwide Avg. Site EUI (kBtu / ft ²)*	Percent Difference between EUIs
Multifamily Housing	1,061	98.0	52.3	+87%
College/University	336	146.5	109.0	+34%
K-12 School	308	76.8	52.0	+48%
Office	142	73.4	62.0	+18%
Hospital	95	253.0	232.1	+9%
Self-Storage Facility	69	24.4	11.4	+114%
Hotel	54	84.4	80.3	+5%
Distribution Center	37	41.5	29.2	+42%
Residence Hall	28	79.8	73.4	+9%
Grocery Store	27	241.0	178.2	+35%
Retail Store	26	56.7	52.3	+8%
Strip Mall	25	82.5	76.1	+8%
Senior Living Community	23	103.4	70.1	+47%
Medical Office	21	114.1	95.7	+19%
Museum	13	127.2	111.8	+14%

*Average Weather Normalized Site EUI (kBtu / ft²)

Several property categories reported higher-than-average energy use compared with national benchmarks. Multifamily housing, which represented the largest share of benchmarked buildings, used approximately 87% more energy per square foot than the national average. Self-storage facilities also showed significantly higher energy use intensity, with EUI values roughly 114% above national averages. Senior living communities, K-12 schools, distribution centers, and grocery stores also exceeded national averages, indicating opportunities for operational improvements, equipment upgrades, or enhanced building efficiency strategies (Table 2).

Table 3. Property types that performed better on average in Philadelphia than nationwide.

Building Type	Number of Buildings	Philadelphia Avg. Site EUI (kBtu / ft²)*	Nationwide Avg. Site EUI (kBtu / ft²)*	Percent Difference between EUIs
Non-Refrigerated Warehouse	77	29.1	29.4	-1%
Mixed Use Property	35	78.3	86.3	-9%
Worship Facility	18	41.4	47.5	-13%
Data Center	15	151.3	253.1	-40%
Recreation	15	62.7	102.9	-39%

*Average Weather Normalized Site EUI (kBtu / ft²)

Conversely, several building categories demonstrated lower EUI than comparable buildings nationwide. Data centers exhibited the largest reduction, with average EUI values approximately 40% below the national average. Philadelphia currently has 15 small data centers, unlike the large data centers being built across the country today. Other property types performing better than national benchmarks included recreation facilities, non-refrigerated warehouses, mixed-use properties, and worship facilities. These lower EUI values may reflect newer equipment, operational efficiencies, reduced occupancy schedules, or more efficient building systems (Table 3).

The data highlights the importance of benchmarking as a tool for identifying sectors with the greatest opportunities for improvements in energy efficiency. Property types with EUI values substantially above national averages may benefit from targeted retrofits, operational optimization, and energy management strategies to reduce energy consumption and GHG emissions over time.

Greenhouse Gas Intensity

A building’s size, energy efficiency, and the source of power contribute to the amount of GHG emissions produced by the building. Greenhouse gas intensity (GHG intensity) is a measure of the GHG emissions per square foot of the building and is useful in comparing emissions from buildings of different sizes. Higher GHG intensities generally indicate that a building uses more fossil fuels, while lower GHG intensities may indicate that a building uses cleaner sources of energy such as rooftop solar.

The chart below shows the GHG intensity of the 20 property types most frequently reported, represented as kilograms (kg) of carbon dioxide equivalents (CO₂e) per square foot.

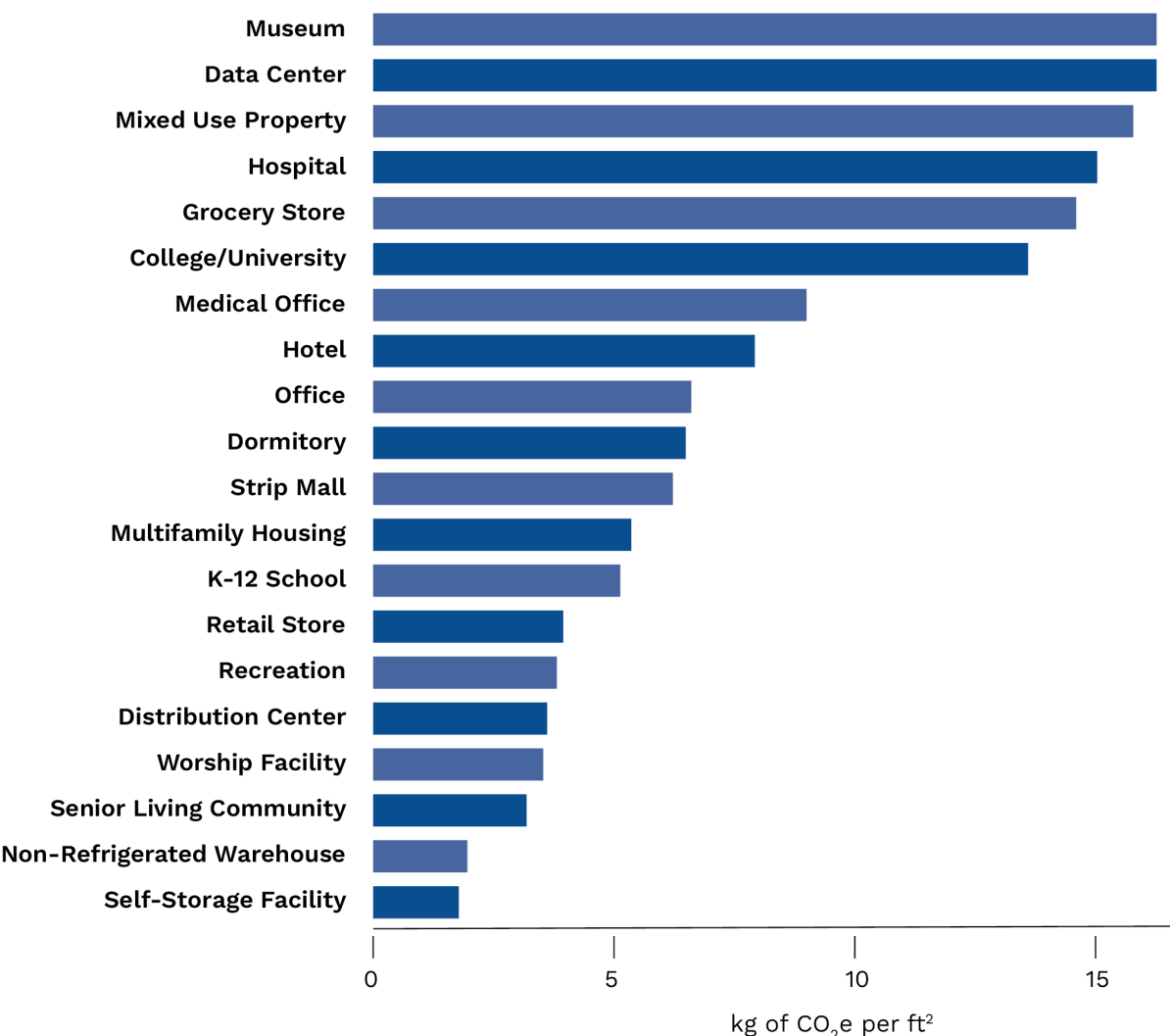


Figure 3. The GHG intensities for the 20 most frequently benchmarked property types.

The 2024 benchmarking results show significant variation in GHG Intensity across property types, ranging from approximately 2 to 16 kg of CO₂e per square foot. Museums and data centers have the highest GHG intensities, followed closely by mixed-use properties, hospitals, grocery stores, and colleges/universities. These building types typically have high energy demands due to specialized equipment, continuous operations, stringent environmental controls, or large and complex building systems. In contrast, self-storage facilities and non-refrigerated warehouses exhibit the lowest GHG intensities, reflecting their relatively low energy requirements and limited occupancy (Figure 3).

A clear trend emerges in which buildings with energy-intensive operations and high occupant activity generate substantially higher emissions than storage and low-occupancy facilities. Offices, hotels, dormitories, schools, and multifamily housing fall within the middle range of GHG intensity, indicating moderate energy use. The wide gap between the highest- and lowest-emitting property types highlights the importance of tailoring energy efficiency and decarbonization strategies to building function, with the greatest opportunities for emissions reductions likely concentrated in the most energy-intensive sectors.



Compliance and Program Participation

Owners of buildings that are 50,000 sq. ft. or greater are required to comply with the City’s Building Energy Benchmarking Policy by submitting their utility data annually to the City. Buildings may receive an annual exemption from reporting if they are vacant during the reporting year.

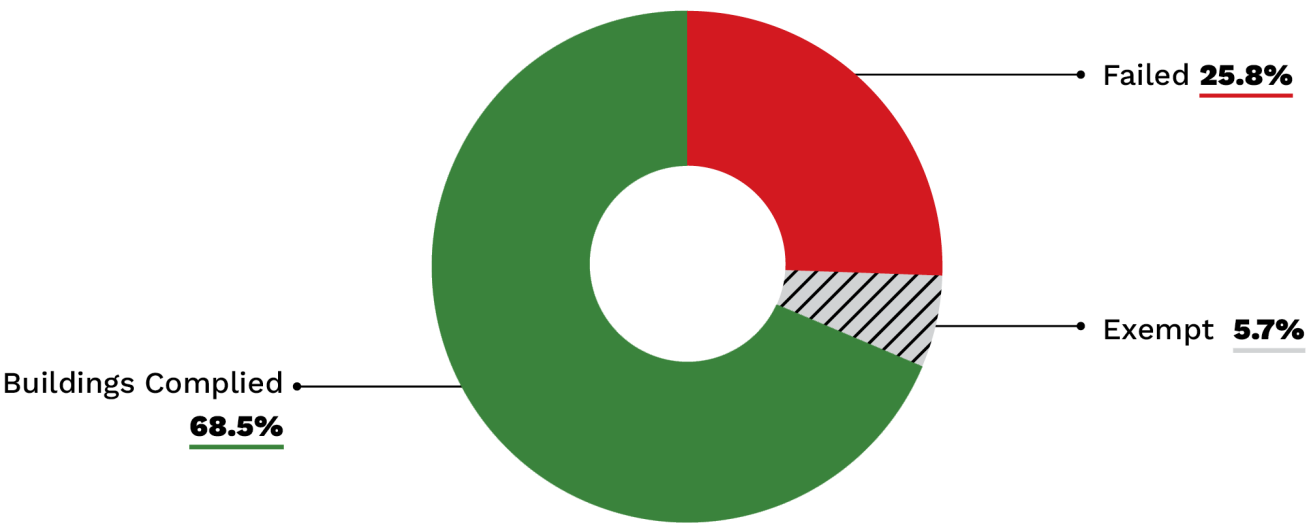


Figure 4. Compliance rates with 2024 benchmarking requirements.

In 2024, 74.6% or 1,688 buildings covered by the policy complied with the program – including buildings successfully reported and exempt for the year – marking it as the highest compliance rate since the start of the program. Twenty-six percent failed to meet the reporting requirement, either because of incomplete or erroneous data (Figure 4).

Conclusions and Next Steps

The 2024 benchmarking results provide important insights into building energy performance across the city's large-building sector.

Major findings include:

- Multifamily housing remains the most frequent sector of buildings benchmarking their energy use.
- Electricity continues to dominate overall building energy consumption.
- Energy-intensive property types such as hospitals and grocery stores continue to exhibit the highest EUI values.
- Several property categories under-perform compared with national average energy use benchmarks, demonstrating opportunities for operational best practices.
- Compliance levels remain relatively strong but can be improved through enhanced outreach and reporting assistance.

Building energy benchmarking provides a critical foundation for understanding how buildings perform, identifying inefficiencies, and prioritizing opportunities for energy-saving improvements and capital investments. Through its benchmarking program, the City's Office of Sustainability works closely with building owners and managers to improve data quality, increase reporting compliance, and provide resources that help stakeholders better understand and act on their building performance data. Strengthening participation and fostering collaboration with building owners supports the continued growth of the City's building performance initiatives and advances efforts to reduce GHGs from the largest buildings in the city.

As the program evolves, the Office of Sustainability continues to engage residents, building owners, policymakers, and other stakeholders to ensure that future policies and programs are informed by broad community input and practical experience. Building performance initiatives play a key role in achieving the City's climate and sustainability objectives while also delivering benefits beyond emissions reductions, including lower operating costs, healthier air quality, improved building resilience, and economic opportunities. Together, these efforts support Mayor Parker's vision of making Philadelphia safer, cleaner, and greener, with economic opportunity for all.

Appendix

Data Source

This report was developed using the calendar year 2024 benchmarking data available on the [OpenDataPhilly](#) open data portal.

References

Office of Sustainability. (2025, March 26). *2022 Citywide Greenhouse Gas Inventory Report*.

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U.S. Environmental Protection Agency. (2024). *ENERGY STAR Portfolio Manager data explorer* [Dataset]. <https://portfoliomanager.energystar.gov/dataExplorer/>.

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Glossary

British Thermal Unit (Btu) - A unit of energy, that can represent both thermal energy and electricity. One Btu is the amount of energy required to raise one pound of water one degree Fahrenheit. In this report, energy is typically reported in kilo-Btu (kBtu).

Carbon Dioxide Equivalents (CO₂e) - Carbon dioxide equivalents (CO₂e) are a standard unit of measurement for greenhouse gases and their ability to trap heat in the atmosphere. These greenhouse gases include carbon dioxide, methane, nitrous oxide and chloroflouro-carbons.

Energy Use Intensity (EUI) - Energy use (kBtu) per square foot at a property (energy divided by square foot). EUI enables you to compare different sized buildings.

ENERGY STAR Rating - The 1-100 ENERGY STAR score was developed by the U.S. Environmental Protection Agency and provides a metric or comparison with other similar buildings across the country. The score accounts for differences in climate, occupancy and operating hours. A score of 50 represents median energy performance, while a score of 75 or better indicates a building is a top performer.

Site EUI - The annual amount of all the energy a property consumes on-site per square foot of the property, regardless of the source. It includes energy purchased from the grid or in bulk (which are the amounts on utility bills), as well as renewable energy generated and consumed on-site such as from solar and wind (excess renewable energy generated on-site and sold to the utility is excluded from site energy use). Site Energy can be used to understand how the energy use for an individual property has changed over time.

Weather Normalized Site Energy - The energy use your property would have consumed during 15-year average weather conditions. For example, if 2012 was a very hot year, then your *Weather Normalized Site Energy* may be lower than your *Site Energy Use*, because you would have used less energy if it had not been so hot. It can be helpful to use this weather normalized value to understand changes in energy when accounting for changes in weather.

The definition of other key terms can be found in the [United States' ENERGY STAR glossary online](#).

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