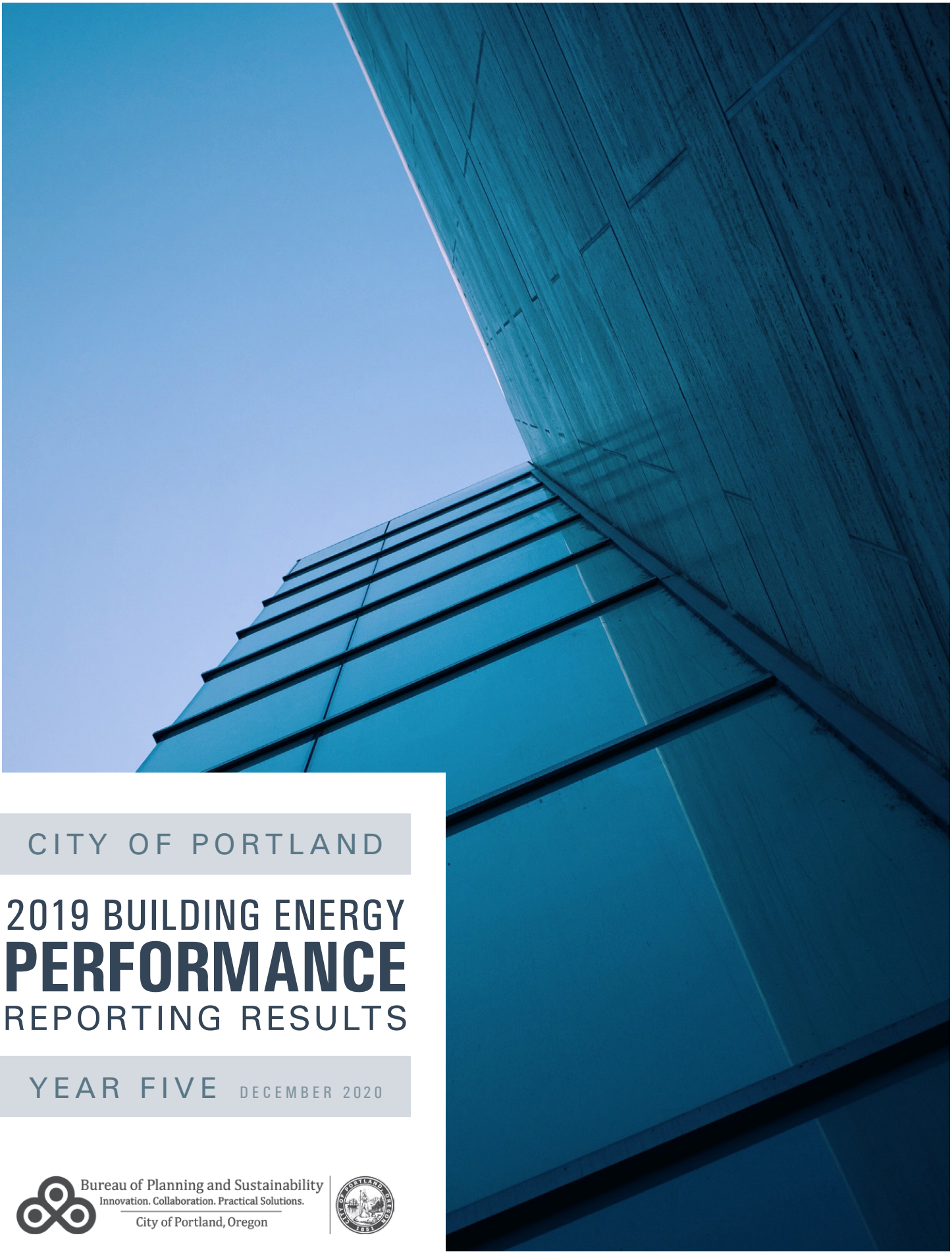

CITY OF PORTLAND

2019 BUILDING ENERGY PERFORMANCE REPORTING RESULTS

YEAR FIVE DECEMBER 2020

Bureau of Planning and Sustainability
Innovation. Collaboration. Practical Solutions.
City of Portland, Oregon

2019 BUILDING ENERGY PERFORMANCE REPORTING RESULTS

CONTENTS

SUMMARY

Each year, the City of Portland compiles and reviews the energy performance information collected through its mandatory energy performance reporting policy. This report summarizes the energy performance data collection process, analysis and results for the fifth year of commercial reporting under the City's ordinance. The Institute for Sustainable Solutions at Portland State University conducted analyses of the data for the 2015 and 2016 reporting years. The analyses completed for 2017, 2018 and this 2019 annual report, were completed by City staff, consistent with the methodology established in the previous years. This year's report also includes a multi-year analysis of reported energy performance information.

HIGHLIGHTS FROM ANNUAL ENERGY REPORTING ANALYSIS

1. **The compliance rate for reporting on the 2019 calendar year dipped to 74 percent** — from an all-time high of more than 93 percent in the previous reporting cycle. This is due, in large part, to the impact of the global pandemic on business operations.

2. **Portland's commercial building stock continues to perform better than national averages across most building categories.** This is despite a recalibration of comparative ENERGY STAR scores in the 2018 reporting year to reflect improving efficiency across the nation.

3. **Initial analyses of trends in performance for these buildings over a four-year period indicates that, overall, worth-normalized EUIs have decreased by about 2.7 percent.**

4. **Although most building types are showing slight declines in weather-normalized site EUI over the course of a four-year period,** the rate of decline is not substantial enough to achieve the City's emission reduction targets of at least 50 percent reduction in carbon emissions by 2030 and net-zero carbon emissions before 2050.

BACKGROUND

In April 2015, Portland City Council adopted the Commercial Building Energy Performance Reporting Ordinance which uses building energy benchmarking to measure and advance progress toward the City's climate goals for existing buildings. The ordinance requires property owners of commercial buildings 20,000 square feet and larger to use the U.S. Environmental Protection Agency's ENERGY STAR® Portfolio Manager® benchmarking tool to track energy performance metrics and report this information annually to the City.

Commercial buildings are responsible for one-quarter of Portland's carbon emissions, and improving energy performance in the building sector is critical to reducing these emissions which are responsible for the harmful effects of climate change. The City of Portland and Multnomah County's 2015 Climate Action Plan previously targeted a 40 percent reduction in carbon emissions below 1990 levels by 2030. In July 2020, the City of Portland declared a climate emergency which amended the City's emission reduction targets to at least 50 percent reduction in carbon emissions by 2030 and net-zero carbon emissions before 2050.

The City began publishing energy performance metrics in 2017 for individual buildings in a spreadsheet and an online interactive map, which can be accessed at www.portlandoregon.gov/bps/energyreporting. This information allows building owners, managers, tenants, customers, energy service providers and other stakeholders to compare building energy performance across the city. The map includes a ranked list that includes high performing buildings which have received an ENERGY STAR certification in 2019 or 2020. A building may also be included on the list if the building owner indicates that the information in their Portfolio Manager account has been verified by a registered architect or professional engineer

BENCHMARKING METRICS

The City collects annual energy performance information via ENERGY STAR® Portfolio Manager®. The tool generates two key metrics to measure building energy performance: **Energy Use Intensity (EUI)** and the **ENERGY STAR score**. These metrics provide diagnostics for identifying and tracking building energy performance over time. The tool also calculates carbon emissions using a regional factor applied to the entire Pacific Northwest.

Portfolio Manager provides more than 80 building types as options to characterize a building. Of these, only 21 building types are eligible to receive an ENERGY STAR score. For the purposes of this analysis, the City has further aggregated these buildings into nine broad categories which include Grocery Store, Hospital, Hotel, Office, Other, Medical Office, Retail, Strip Mall and University. These categories are used to create the figures that appear in this report, unless specified otherwise.

KEY PERFORMANCE METRICS DEFINED

Site EUI *is a building's total annual energy use (generally, electricity plus natural gas) divided by its gross floor area. EUI indicates overall building energy performance and is measured in kBTU/sf (one thousand British thermal units per square foot). Higher EUIs show greater energy use, while lower EUIs indicate better performance. Weather-normalized site EUI also takes into account weather conditions within a particular year, allowing for comparison across multiple years.*

ENERGY STAR score *compares a building's energy use to other buildings across the country on a scale of 1 (least efficient) to 100 (most efficient). A score of 50 represents the national median and buildings scoring 75 or higher may be eligible to earn ENERGY STAR certification.*

As of November 2020, 144 buildings in the Portland metro area have achieved ENERGY STAR certification at some point, distinguishing their exemplary energy efficiency.

COMPLIANCE AND DATA QUALITY

Portland's Energy Performance Reporting Policy applies to commercial buildings with a gross floor area (GFA) of at least 20,000 square feet, where no more than 50 percent of that square footage is used for housing, nursing home, parking, primary and secondary education, industrial, warehouse or worship purposes. In total, 1,039 buildings were expected to report energy performance metrics for the 2019 calendar year. Some buildings share energy metering services across multiple building footprints and report their energy performance as a "campus."

The City offers case-by-case exemptions from the reporting requirements for new construction, wholly unoccupied buildings, permitted demolitions and other extenuating circumstances. Seventeen buildings received exemptions from 2019 reporting.

The City received reports accounting for energy performance in 719 buildings, resulting in a compliance rate of 75 percent. The compliance rate dipped lower than any previous year from last year's all-time high of 93 percent. This is due, in large part, to business disruptions caused by the global pandemic. The 2019 reporting year did not overlap with the onset of the global pandemic, however most building owners and managers typically compile and prepare the report in March and April of the following year. The City extended the deadline from April 22 to July 22 to allow more time for building representatives to complete the report.

Building energy information is self-reported through Portfolio Manager by building managers or energy service providers acting on their behalf. Data quality can be influenced by factors including manual data entry errors, omission of energy meters and a lack of familiarity with Portfolio Manager or software tools in general. For the purposes of this analysis, some buildings are removed from the dataset due to obvious and apparent data quality issues, as listed:

- No Site EUI available.
- Exceptionally high or low Site EUI, often with a likely co-presenting error identified.
- Missing electric energy consumption.
- Reported GFA smaller than 20,000 square feet.
- Primary property type incorrectly reported.
- Extra reports received that were not expected.
- Default or temporary building details values applied to buildings that were also eligible for an ENERGY STAR score.

As a result of that screening, 44 reports were excluded from the analysis. A subset of reports for 553 individual buildings and 42 campuses covering more than 71 million square feet remained for statistical analysis. Less discernible errors may remain within the dataset, such as unreported electric and natural gas meter data or discrepancies in actual property use type or gross floor area. To help improve data quality issues, the City continues to provide an Energy Reporting Help Desk, reference guides for new and returning users, and customized instructions for correcting reports submitted with errors.

BUILDING CHARACTERISTICS

As displayed in Figure 1, **office buildings cover the most floor area, followed by the "other" category which is a collection of many different buildings that are either ineligible for a comparative ENERGY STAR score or are a unique building type such as a courthouse**. The call-out box shown below lists the building types that are included in the "other" category. Hospitals, universities, hotels, retail stores, medical offices, grocery stores and strip malls make up the remaining categories. The buildings included in this analysis represent more than 71 million square feet of commercial building floor area.

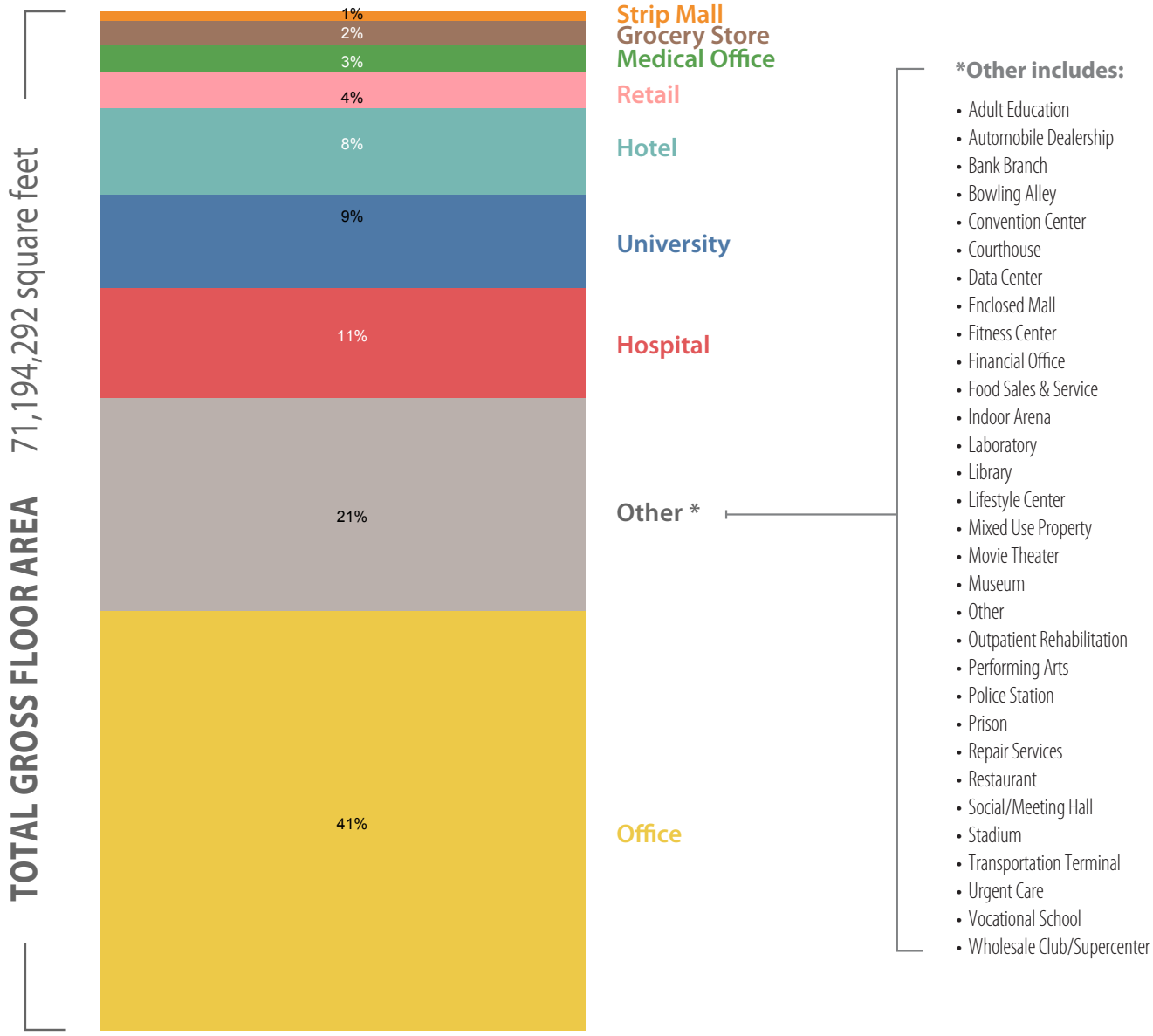

Figure 1: Percentage of Floor Area by Building Category

In this year's analysis, **office buildings and hospitals account for the most carbon emissions**, as shown in Figure 2. These two categories represent more than half of the total carbon emissions based on calculations generated by Portfolio Manager, which use a regional emissions factor for the entire Pacific Northwest. The buildings and campuses included in this analysis emitted almost 490,000 metric tons of carbon pollution in Year Five. The City plans to create a supplement to this report that recalculates carbon emissions using local utility specific emissions factors to better align with progress towards City carbon reduction goals.

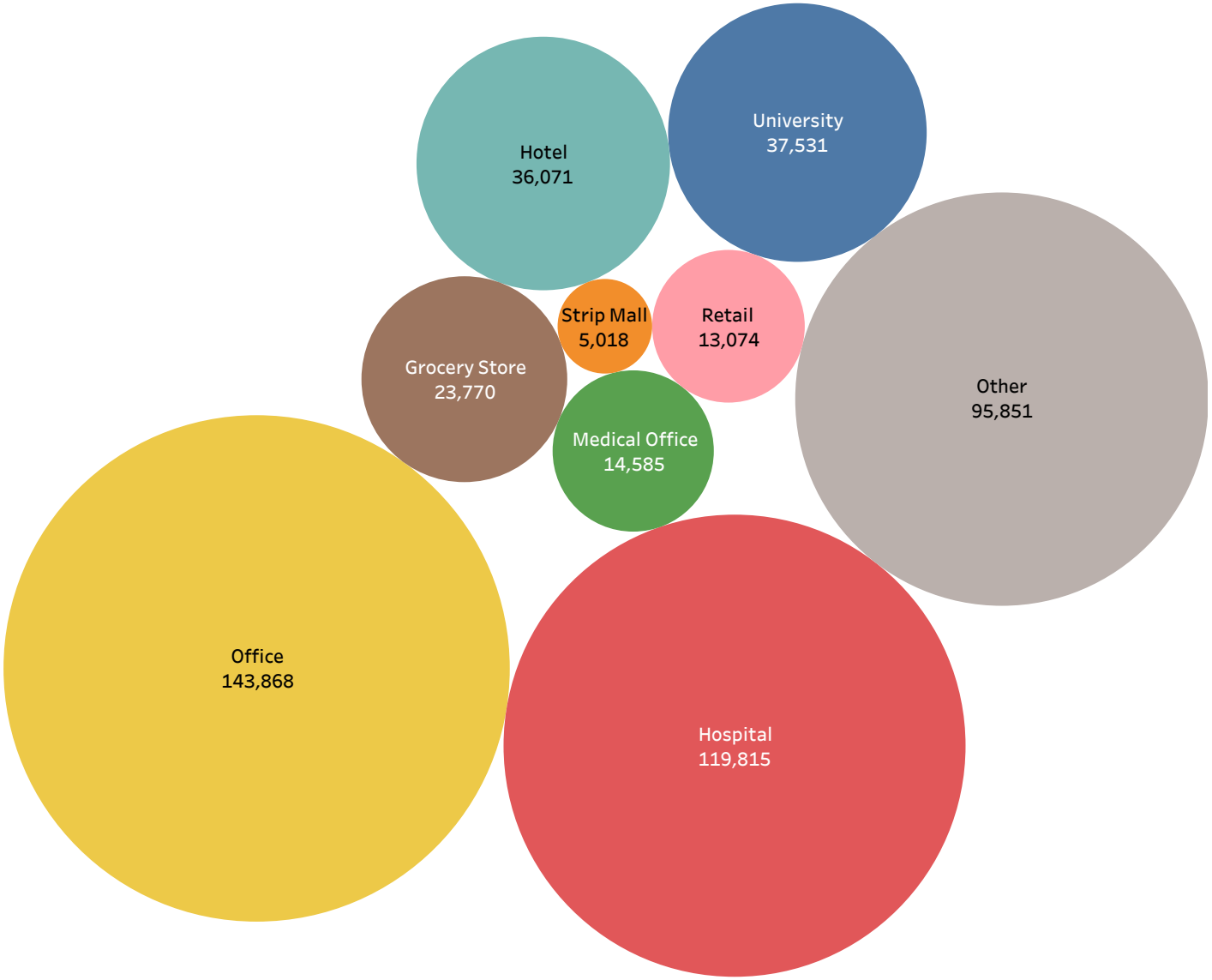

Figure 2: Carbon Emissions (metric tons CO2e) by Building Category

ANNUAL ENERGY PERFORMANCE RESULTS

Site EUI and ENERGY STAR scores varied greatly for commercial buildings of the same type, as displayed in Figures 3 and 4, respectively. All 553 individual buildings and 43 campuses included in this analysis reported a Site EUI. The poorest performing buildings in each category used two to five times as much energy per square foot compared to the median value within their category, shown below in Figure 3.

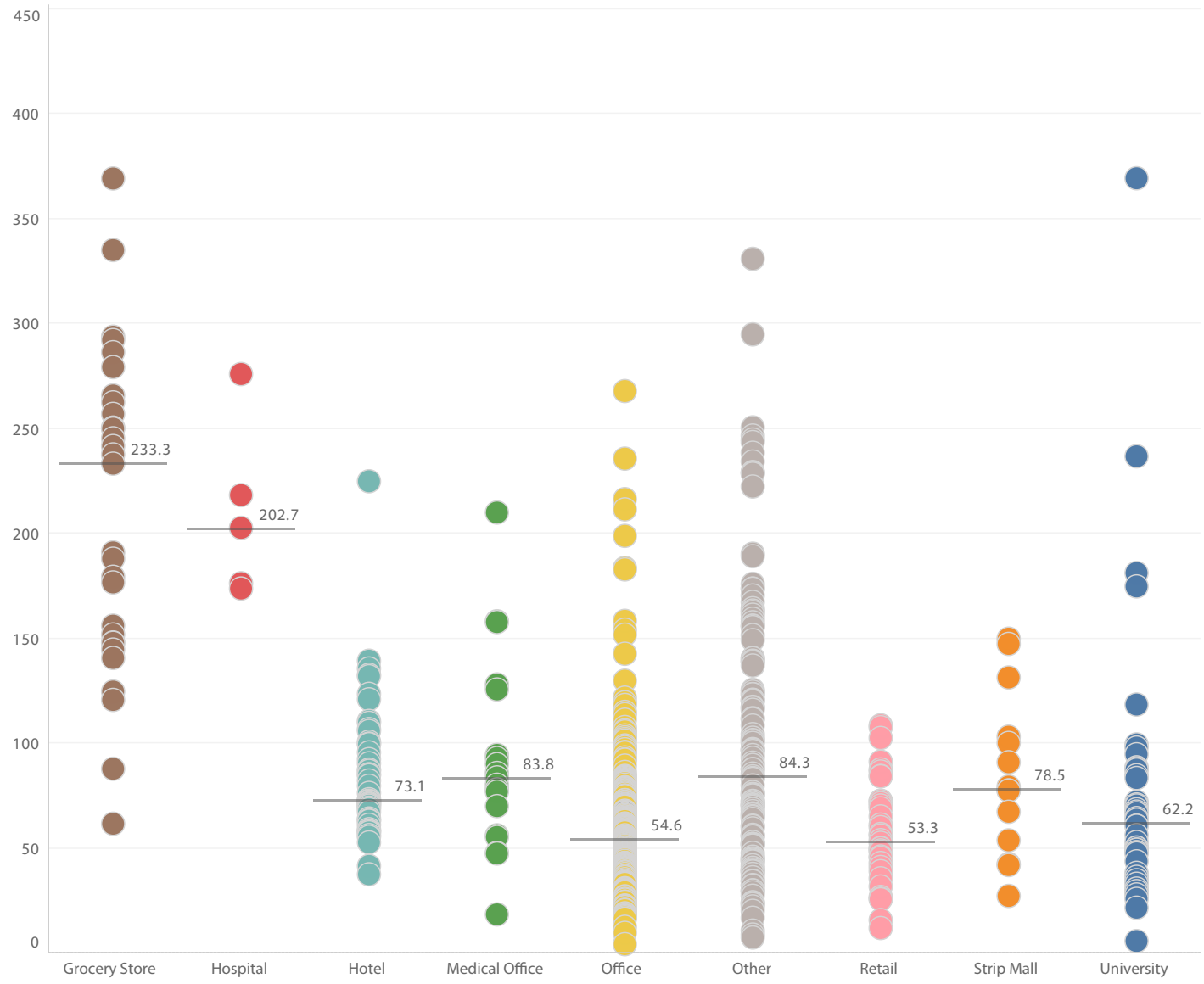

Figure 3: Weather-normalized Site EUI Distribution and Portland Median by Building Category

Some buildings reporting energy performance through Portfolio Manager are eligible for an ENERGY STAR score, which uses a national dataset to compare buildings with similar characteristics on an ascending scale of 1-100. The score normalizes for business operations and considers year-to-year changes in weather conditions.

Just under two-thirds of the buildings included in this analysis were eligible to generate an ENERGY STAR score. The median overall ENERGY STAR score for this dataset is 70. **Buildings that receive an ENERGY STAR score lower than the national median of 50 are likely to have the greatest opportunities to improve energy performance**. Buildings that score 75 or higher are eligible for ENERGY STAR certification, but still have some remaining opportunities to optimize building energy performance.

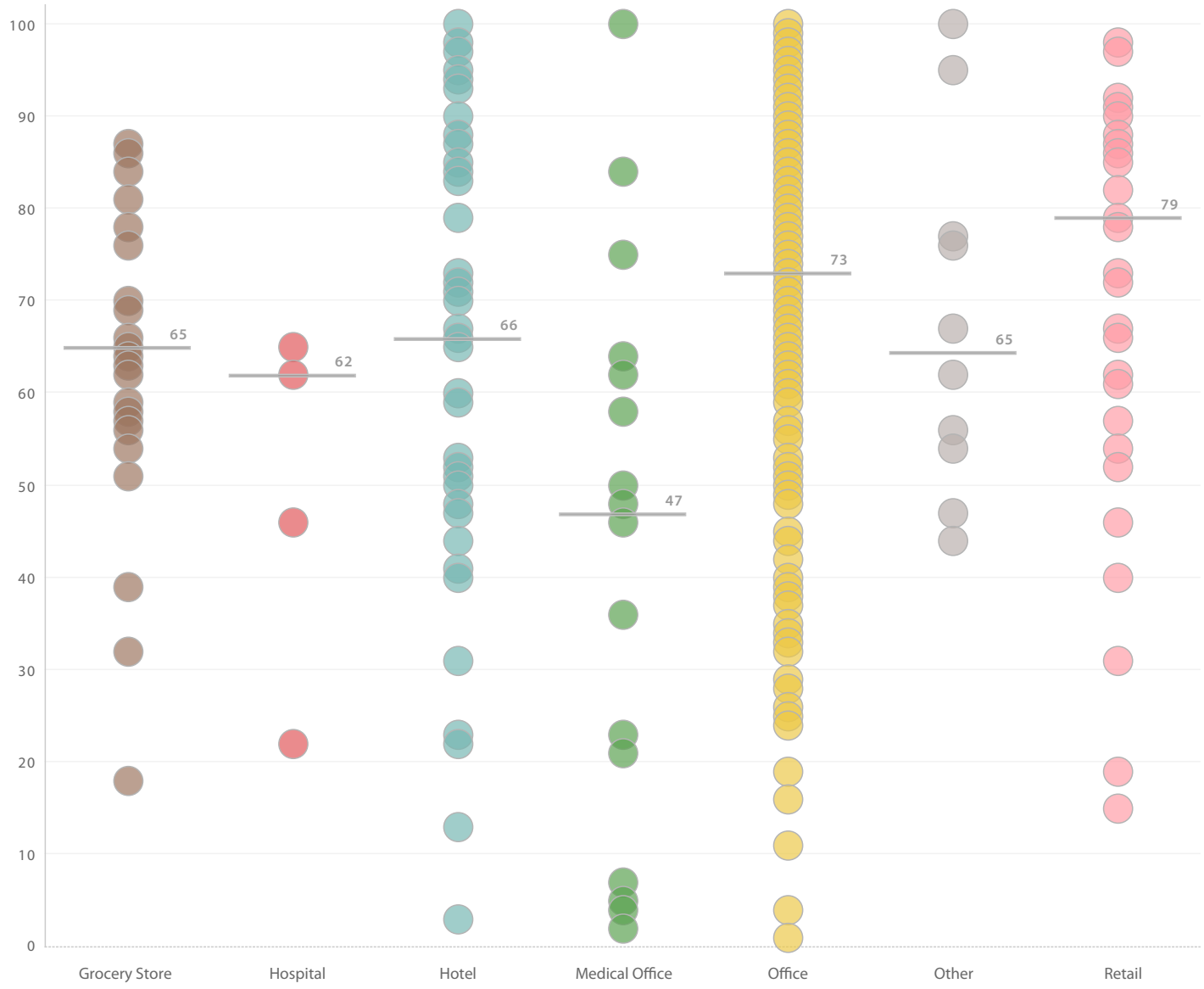

Figure 4: ENERGY STAR Score Distribution by Building Category

Common building types within this dataset that are eligible to receive an ENERGY STAR score include offices, retail stores, grocery stores, supercenters, hotels, hospitals, medical offices and properties that have a mix of any of these. Figure 5 displays the median ENERGY STAR scores for these building types. Courthouses, large bank branches and wholesale/supercenters are also eligible to receive scores, though are uncommon within the dataset.

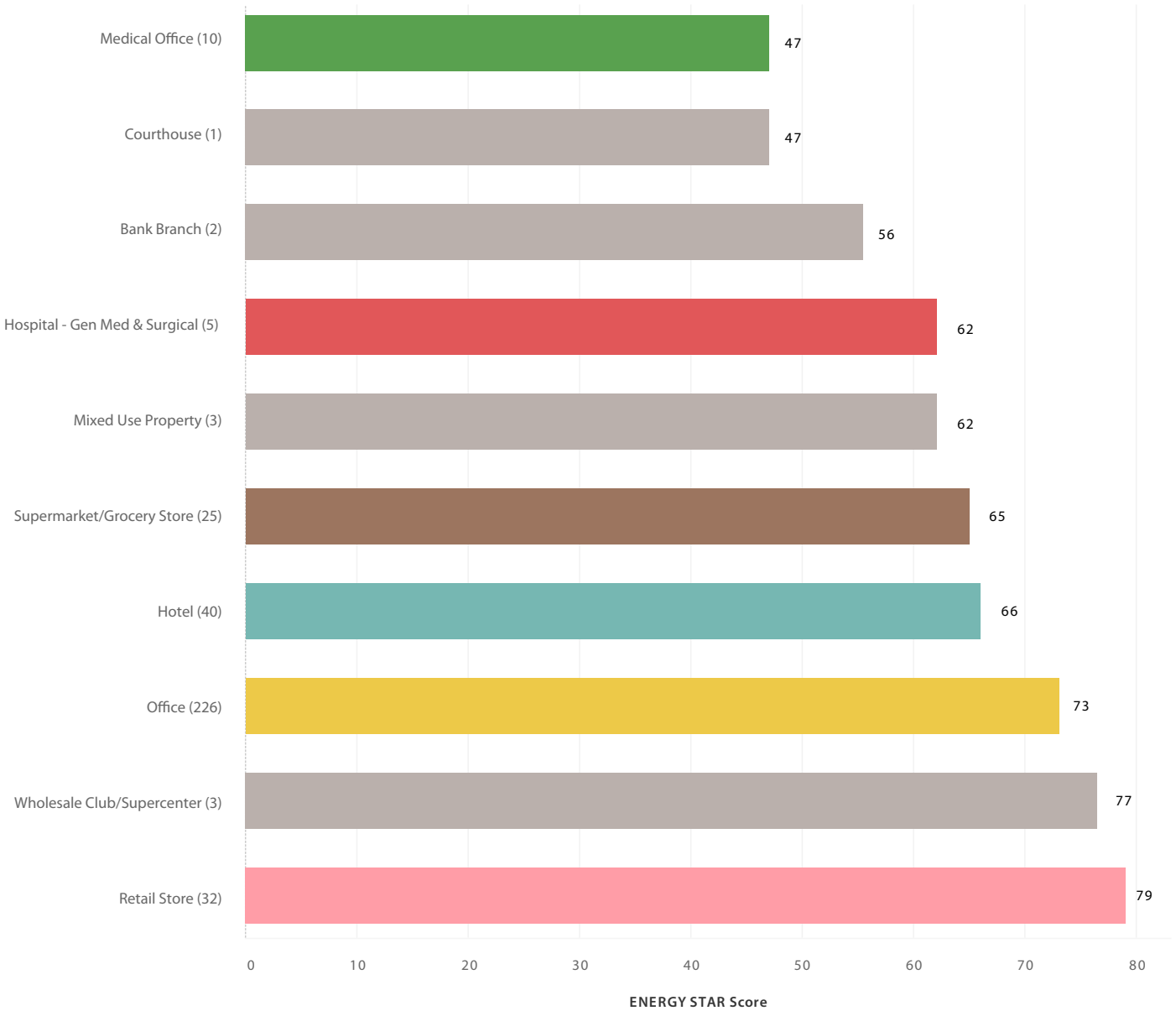

Figure 5: Median ENERGY STAR Score by Building Category

Figure 6 shows the distribution of the number of buildings with an ENERGY STAR score. Buildings scoring 50 or higher are performing better than the national median. **More than three-quarters of buildings reporting energy performance to the City received an ENERGY STAR score above the national median**.

Buildings that score 75 or higher could be eligible for ENERGY STAR certification. **Just over 40 percent of buildings that reported ENERGY STAR scores in Year Four are eligible for ENERGY STAR certification**. Buildings between 20,000 to 50,000 square feet are represented by the lighter shaded areas, while buildings larger than 50,000 square feet appear in darker shades.

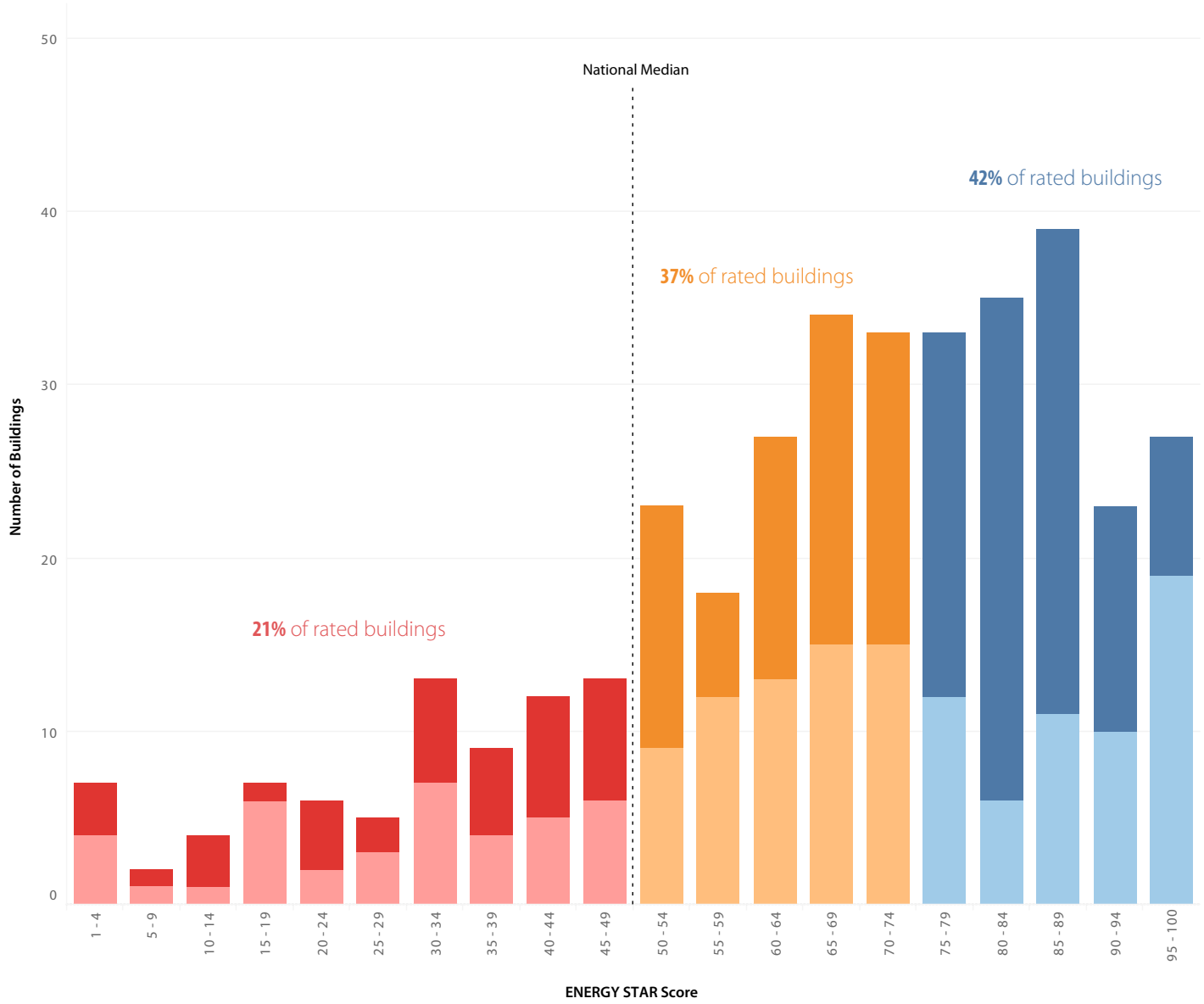

Figure 6: Number of Buildings Receiving ENERGY STAR Scores from 1 to 100

MULTI-YEAR REPORTING RESULTS

Most buildings have now been required to report energy performance information to the City for at least four consecutive years.

The analysis in this section uses the weather-normalized site EUI metric. This metric calculates the energy used per square foot and adjusts for weather conditions within a given reporting year. Some building types, such as grocery stores and hospitals, use more energy due to the nature of their operations. This is normally accounted for through the ENERGY STAR score, which offers a comparative score on a scale from 1 to 100 that accounts for more intense building operations. However, the scoring model underwent an update in 2018, and scores calculated before and after that time cannot readily be compared.

Buildings with four consecutive years of reporting data from 2016 through 2019 are shown in Figure 7. This analysis represents data from 455 buildings. The number of buildings included within each category varies considerably, and is noted in the chart below. **The median value for all buildings decreased slightly from 66.5 to 64.7 kBtu per square foot during the four-year period. Most building types showed slight declines in overall EUI except for universities and the collection of buildings included in the "other" category**.

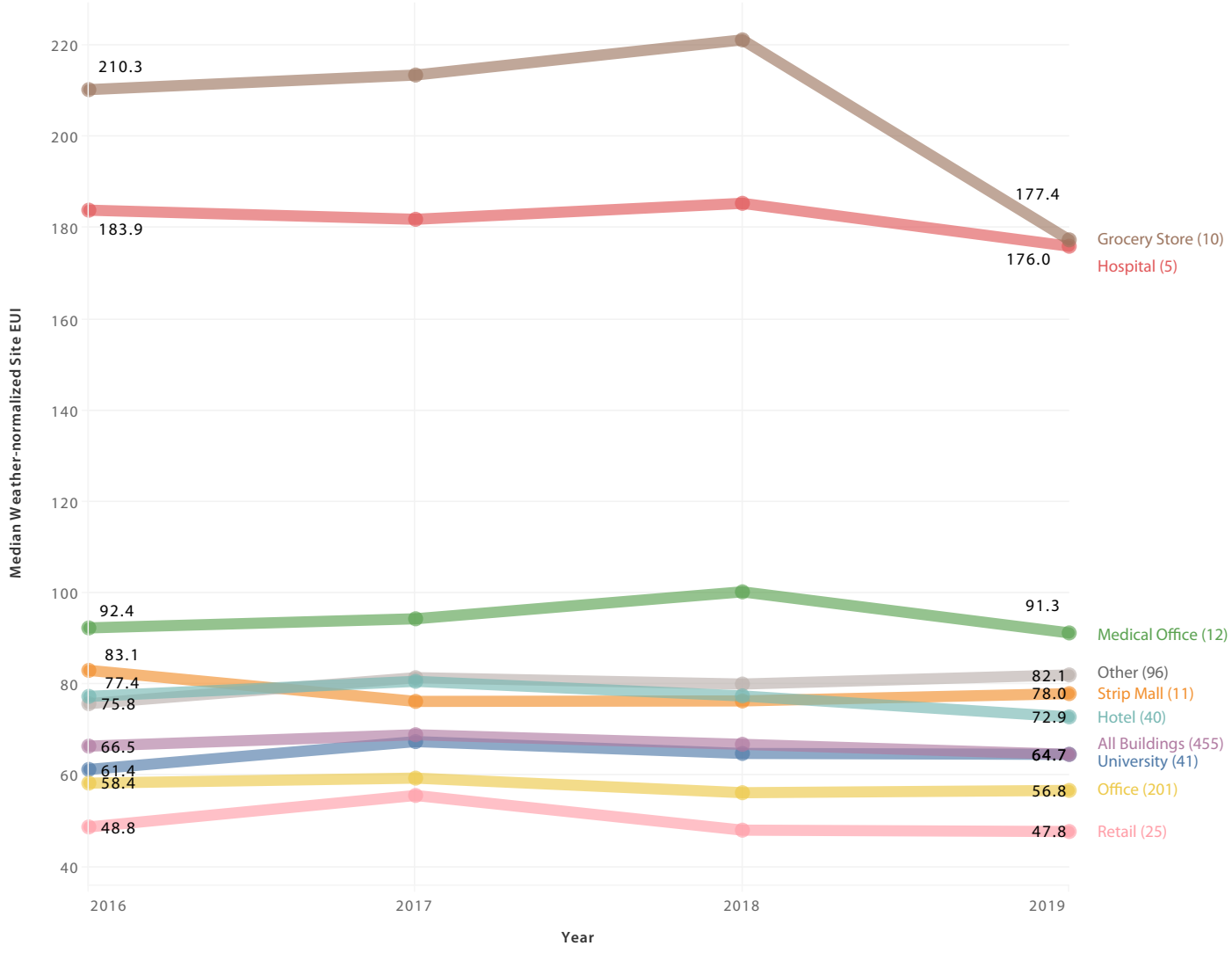

Figure 7: Median Weather-normalized Site EUI by Building Category from 2016–2019

Figure 8 further illustrates changes to the median weather-normalized site EUI that have occurred over the four-year period by property type. **The median value for all buildings decreased by 2.7% during the four-year period**. Most building categories have shown reductions in median site EUI, with grocery stores notably showing a decrease of more than 15 percent. Just two categories – university and other – experienced an increase in median EUI over this period.

	% Change				
Property Type	2016-2017	2017-2018	2018-2019	Overall	2016-2019 Trend
All Buildings	3.76%	-3.04%	-3.29%	-2.7%	
Grocery Store	1.52%	3.61%	-19.80%	-15.6%	
Hospital	-1.09%	1.92%	-5.07%	-4.3%	
Hotel	4.26%	-3.97%	-5.94%	-5.8%	
Medical Office	2.16%	6.25%	-8.97%	-1.2%	
Office	1.88%	-5.38%	0.89%	-2.7%	
Other	7.52%	-1.72%	2.50%	8.3%	
Retail	14.14%	-13.64%	-0.62%	-2.0%	
Strip Mall	-8.18%	0.13%	2.09%	-6.1%	
University	9.93%	-3.85%	-0.31%	5.4%	

Figure 8: Change in Median Weather-normalized Site EUI by Building Category from 2016–2019

NEXT STEPS

Expanded access to energy performance information enables a greater understanding of the energy consumption and associated carbon emissions for Portland's largest commercial buildings. Building energy performance can easily be overlooked in day-to-day building operations and during sale and leasing transactions. Increasing awareness of building energy performance is intended to motivate energy efficiency improvements in commercial buildings, and ultimately, make progress towards meeting Portland's climate goals for existing buildings.

Portland's commercial buildings continue to perform relatively well compared to national averages. **However, significant opportunities for improving energy performance remain within every category of commercial buildings covered by the Energy Performance Reporting Program**. This analysis and ongoing monitoring of the commercial building sector indicate that while energy use is declining for some building types, the rate is not substantial enough to meet goals in the 2015 Climate Action Plan or the City's more recent climate emergency declaration which amended emission reduction targets to at least 50 percent reduction in carbon emissions by 2030 and net-zero carbon emissions before 2050.

Based on the findings of this year's analysis, the City plans to focus on the following next steps:

- Explore additional policy options to stimulate and accelerate adoption of energy efficient operations and technologies.
- Apply local utility-specific carbon emissions factors to multi-year data to analyze how these more locally representative results align with the City's carbon emissions inventory and emission reduction targets. The results of this analysis will be published as a follow-up to the annual report.
- Begin targeted outreach to consistently low performing buildings using energy signature analysis to help identify recommendations for energy efficiency improvements.
- Use City communications tools to more clearly articulate follow-up options and pathways for buildings seeking to pursue activities that could improve building energy performance, including financing options such as PropertyFit, which is Multnomah County's commercial property assessed clean energy financing tool.

As core components of the policy, the City will continue to support the following tasks:

- **Publish individual building performance metrics annually.** Individual building energy performance metrics and compliance status information for buildings 20,000 square feet and larger are published at www.portland.gov/bps/energy-reporting and will continue to be updated on an annual basis. This information allows managers and tenants, as well as the broader public, access to transparent building energy information and comparison based on building characteristics.
- **Update the online interactive map annually.** The online map provides an interactive method to explore individual building data and compare building performance. Information for buildings 20,000 square feet and larger can be viewed at www.portlandmaps.com/bps/buildingenergy. The City will continue to explore opportunities to improve map functionality based on user feedback.
- **Recognize high performing buildings.** The City publishes a ranking of top-performing buildings that are eligible for an ENERGY STAR score and have recently had their score certified or verified by a licensed professional. The City will continue to encourage building managers to pursue certification or verification.
- **Coordinate with program partners.** The City will also continue to analyze multi-year data collected through the City's benchmarking requirements. The data inform strategies to help connect commercial building owners with resources that can help them assess and implement energy efficiency improvements and learn from buildings with similar profiles. This includes coordination with the Energy Trust of Oregon and BOMA Oregon.
- **Maintain support for building managers**. Compliance with the City's reporting requirements relies on maintaining a level of support for building managers via a dedicated Energy Reporting Help Desk. The City will also continue to refine processes to address data quality issues and minimize the occurrence of delinquent buildings.

QUESTIONS?

Please contact the City of Portland Energy Reporting Help Desk

503-823-7070

-or-

energyreporting@portlandoregon.gov

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