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State of Green

ULI Greenprint Performance Report



**Urban Land
Institute**

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Urban Land Institute
2001 L Street, NW, Suite 200
Washington, DC 20036-4948

About ULI

The Urban Land Institute is a global, member-driven organization comprising more than 48,000 real estate and urban development professionals dedicated to advancing the Institute's mission of shaping the future of the built environment for transformative impact in communities worldwide.

ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and academics. Established in 1936, the Institute has a presence in the Americas, Europe, and Asia Pacific regions, with members in 84 countries.

More information is available at uli.org. Follow ULI on [X \(formerly known as Twitter\)](#), [Facebook](#), [LinkedIn](#), and [Instagram](#).

Randall Lewis Center

The ULI Randall Lewis Center for Sustainability in Real Estate leads the real estate industry in creating places and buildings where people and the environment thrive. In collaboration with ULI members and partners, the Lewis Center drives industry transformation, cultivates leaders and champions, and helps foster solutions for sustainable, resilient, healthy, and equitable cities and communities. The center pursues these goals via cutting-edge research, global convenings, community technical assistance, and other strategies. The center's main programs are Decarbonization, Urban Resilience, and Healthy Places. Discover transformative practices for real estate and land use at uli.org/sustainability. Connect with the Lewis Center at sustainability@uli.org.

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Introductory Letter

A quick history lesson: the first *Greenprint Carbon Index* (now the annual *State of Green* report) was published in 2010. The report described Greenprint as “a catalyst for change by taking meaningful, immediate, and measurable actions to generate solutions that improve energy efficiency while increasing property values,” and it launched a benchmark that started with the collective emissions from 14 real estate member portfolios across 600 properties. From the start, this global alliance was committed to reducing emissions in its collective portfolio and in the broader real estate industry.

Fast forward to today: a lot has changed in the past 14 years. The global real estate industry has seen a proliferation of regulations, certifications, and reporting frameworks driving the industry to decarbonize. Political and economic headwinds have brought scrutiny to environmental, social, and governance (ESG) programs. Owners and developers are increasingly expected to take action on reducing their Scope 3 emissions, including tenant emissions and embodied carbon. Through all these changes, ULI Greenprint members have continued to lead the way globally on decarbonization and demonstrate that the business case for climate action is strong.

Here are some ways that ULI Greenprint members have combined their knowledge and resources to accelerate the industry’s [journey to net zero](#):

- Published the [Blueprint for Green Real Estate](#) to guide owners, developers, and investors in designing or accelerating progress on their sustainability strategies
- Expanded the [Global Green Building Policy Dashboard](#) to summarize building sector regulations for more than 70 markets around the world, updated annually
- Created a [Sustainability Pre-bid Checklist](#) to align buyers, sellers, and brokers on common sustainability questions during the pre-bid phase of acquisitions

This year, ULI Greenprint expanded its Net Zero by 2050 Goal into three tracks to give members additional options as they progress along the journey to net zero. Track 1 covers landlord spaces and operational carbon emissions; Track 2 covers whole-building operational carbon emissions; and Track 3 covers whole-building life cycle carbon emissions. Members with multiple funds may align different funds to different tracks as long as their entire portfolio is committed to at least one track. ULI Greenprint continues to provide guidance, tools, and training to help members progress toward these goals.

ULI Greenprint members report their asset-level operational energy, water, waste, and carbon data to be included in the annual *State of Green* report. To prepare the industry for what’s next, members piloted a voluntary submission of embodied carbon data from recent developments last year. This year, members launched a pilot to voluntarily submit refrigerant emissions data.

ULI Greenprint Community



130+ member companies

REPRESENTED IN THE
PORTFOLIO



800 million m²

(8.6 BILLION FT²)



\$4.4 T (€3.9 T)

REAL ESTATE ASSETS
UNDER MANAGEMENT



25,000+ properties

IN THE ULI GREENPRINT
PORTFOLIO



“I commend the global ULI Greenprint community for 15 years of leading the way on sustainability in the built environment. In just the past year, these more than 130 real estate companies have expanded their Net Zero by 2050 Goal, hosted embodied carbon convenings across the supply chain, and contributed to resources like the Global Green Building Policy Dashboard that support the broader real estate industry in its decarbonization activities.”

—Brian Swett, Chair of the ULI Randall Lewis Center for Sustainability in Real Estate advisory board, Chief Climate Officer for the City of Boston

One thing has not changed over the past 14 years: ULI Greenprint members embody the program’s goal of “reducing carbon, building value,” showing the global real estate industry that sustainability is good for business. The collective portfolio reduced its carbon emission intensity more than 6% from 2022 to 2023, continuing its path to a net zero future.

Signed,

Blakely Jarrett, Vice President, Randall Lewis Center for Sustainability in Real Estate

The ULI Greenprint Community

Real Estate Members

A global community of real estate owners, investors, and developers committed to leading the market and advancing sustainability across their portfolios:









nuveen

OFFICEFIRST



PEMBROKE



PIMCO



Revantage



SKANSKA



SPONDA



STOCKBRIDGE



VALUE RETAIL CHINA



VORNADO REALTY TRUST



Innovation Partners

Technology and service providers who contribute innovative best practices that advance sustainability with ULI Greenprint members and in the built environment broadly:



Strategic Partners

Industry actors who engage with ULI Greenprint and its members in the market on topics of relevance to ULI Greenprint's mission of reducing carbon emissions and increasing building value:



THANK YOU TO ULI GREENPRINT'S DATA PARTNERS



ULI is an ENERGY STAR partner and proud recipient of a 2023 Partner of the Year award. For ULI Greenprint members with properties in the United States and Canada, ENERGY STAR Portfolio Manager is a free online benchmarking tool that building owners and managers can use to measure and track energy, water, and waste consumption and carbon emissions.



Since 2016, ULI Greenprint has partnered with Measurabl to leverage its software tool in support of data collection, analysis, and reporting from ULI Greenprint members. This longstanding relationship drives sustainability and building performance tracking to streamline ESG reporting and provide opportunities for portfolio-wide energy management to plan, do, check, and act.



In 2020, ULI Greenprint added Conserve as a data partner to improve the data reporting experience of ULI Greenprint members who use that ESG platform. Conserve helps organizations execute ESG initiatives that attract and retain investors, and accelerate sustainable and responsible growth, while mitigating enterprise risk. Conserve partners with real estate owners and managers to optimize their cash flow and conserve resources through Conserve's software-enabled utility management platform.

About This Report

For the real estate industry, improved environmental performance can reduce operating expenses, increase tenant demand, lead to more efficient management of natural resources, and increase property value. This report tracks industry progress on improved performance using ULI Greenprint-member and strategic-partner properties as a proxy to demonstrate the progress that can be achieved industrywide. These benchmarks can be used by a range of stakeholders (e.g., academic researchers, sustainability practitioners, policymakers) as a reference point for analysis on multiple facets of real estate sustainability.

Volume 15 includes the ULI Greenprint member portfolio's analysis of year-over-year changes from 2022–2023 in operational carbon, energy, water, and waste, as well as annual benchmarks by property type and major metropolitan area, for calendar year 2023. The report also includes portfolio-level data collected on progress toward ULI Greenprint's [Net Zero by 2050 Goal](#) for all companies aligned, including the new tracks.

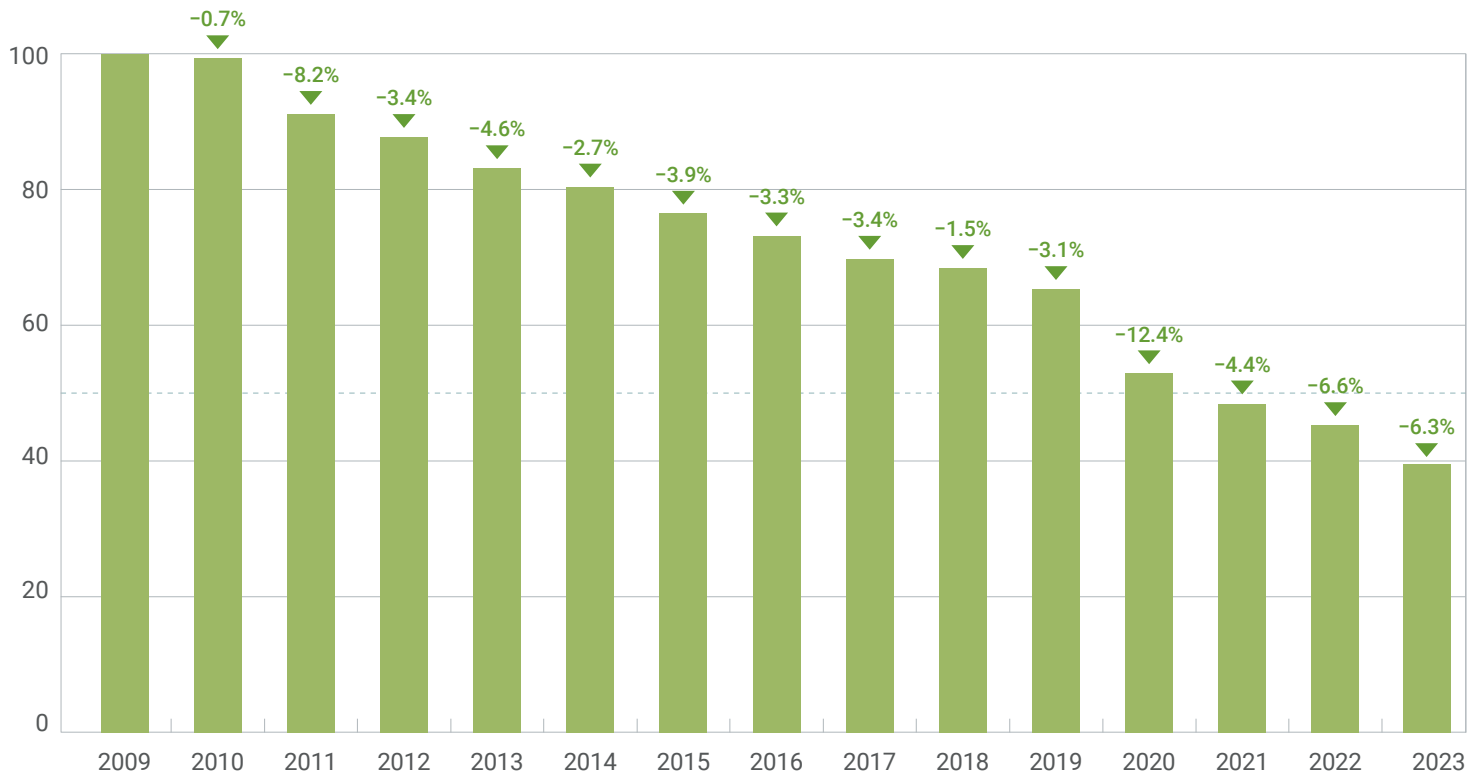
Last year, ULI Greenprint aligned its State of Green operational data collection methodology with GRESB's data submission template to support the industry's movement towards standardized and streamlined reporting. The year-over-year, like-for-like, and annual benchmarks were split into whole-building, base-building, and tenant spaces data to enhance transparency. Unless otherwise noted, all data is whole building.

Recognizing the increasing focus on refrigerant emissions, ULI Greenprint piloted optional refrigerant emissions data reporting for Volume 15. Participating members submitted carbon dioxide equivalent refrigerant emissions data for individual assets. The refrigerant reporting template was created using the [Greenhouse Gas Protocol](#) and edited with expert advice. This will likely be aligned with industry-recognized reporting standards as they become available.

Annual Results: Global 2022–2023

ULI Greenprint has been tracking year-over-year, like-for-like percent reductions in absolute carbon emissions since 2009.

ULI GREENPRINT CARBON EMISSIONS REDUCTIONS OVER TIME



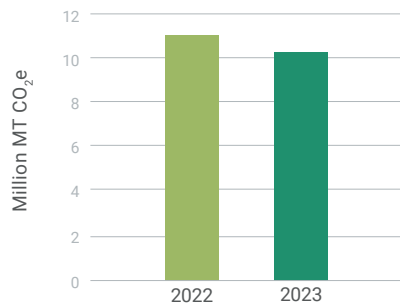
Every year, ULI Greenprint compares member portfolios' performance of assets across energy, water, waste, and carbon. Data provided below refers to whole-building data only.



2022-2023 YEAR-OVER-YEAR PERFORMANCE, GLOBAL Whole-Building Data

CO₂ EMISSIONS

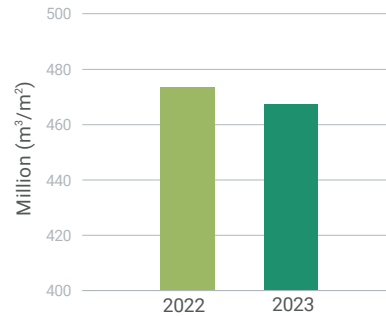
▼ -6.3%



2022: 10,981,650 MT CO₂e
2023: 10,286,146 MT CO₂e
11,777 PROPERTIES

WATER USE

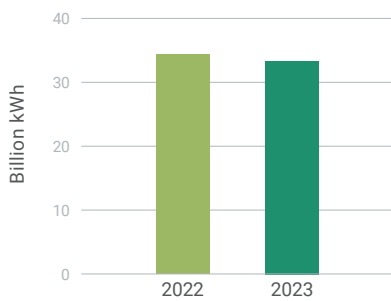
▼ -1.9%



2022: 475,205,399 M3
2023: 466,133,663 M3
7,253 PROPERTIES

ENERGY USE

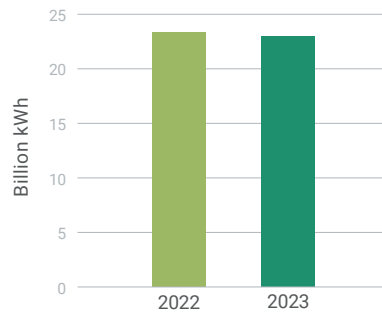
▼ -2.7%



2022: 33,844,427,298 KWH
2023: 32,933,555,496 KWH
11,390 PROPERTIES

ELECTRICITY USE

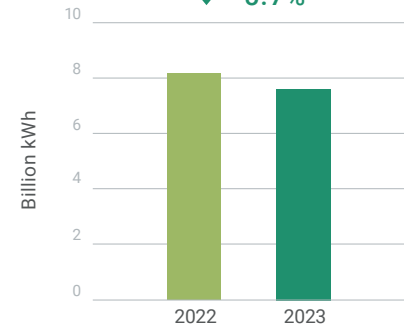
▼ -1.4%



2022: 23,360,864,970 KWH
2023: 23,029,220,288 KWH
11,481 PROPERTIES

FUELS USE

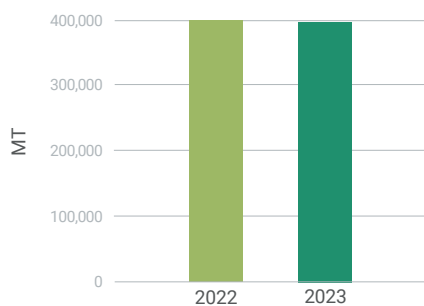
▼ -5.7%



2022: 8,239,100,593 KWH
2023: 7,769,246,633 KWH
5,807 PROPERTIES

LANDFILL WASTE

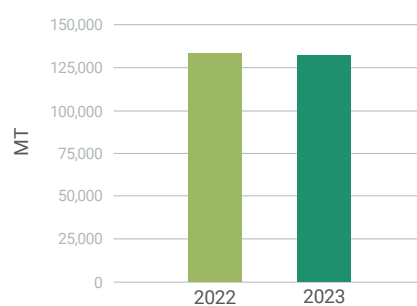
▼ -0.8%



2022: 401,786 MT
2023: 398,766 MT
2,572 PROPERTIES

WASTE DIVERSION

▼ -0.3%



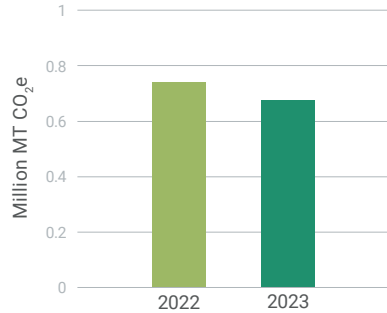
2022: 130,552 MT
2023: 130,203 MT
1,644 PROPERTIES



2022-2023 YEAR-OVER-YEAR PERFORMANCE, GLOBAL Base-Building Data

CO₂ EMISSIONS

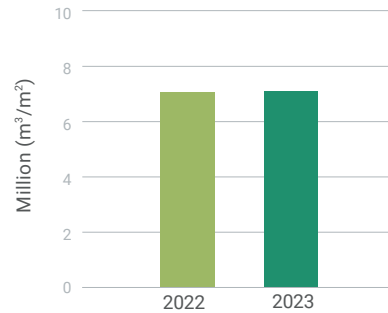
▼ -14%



2022: 768,431 MT CO₂e
2023: 679,493 MT CO₂e
1,932 PROPERTIES

WATER USE

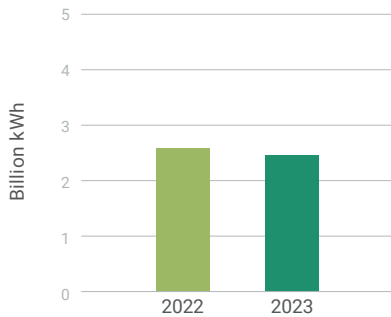
▲ +0.2%



2022: 7,058,267 M3
2023: 7,073,708 M3
390 PROPERTIES

ENERGY USE

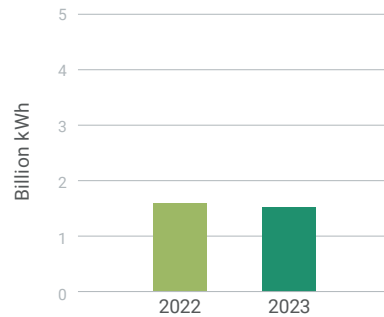
▼ -2.7%



2022: 2,580,153,350 KWH
2023: 2,453,293,832 KWH
1,819 PROPERTIES

ELECTRICITY USE

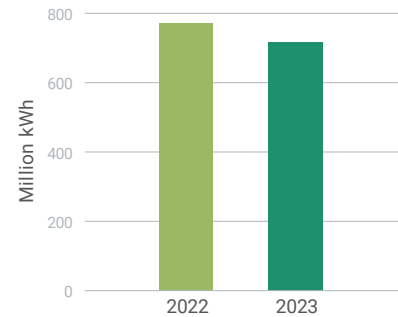
▼ -3.3%



2022: 1,557,082,624 KWH
2023: 1,506,288,936 KWH
1,805 PROPERTIES

FUELS USE

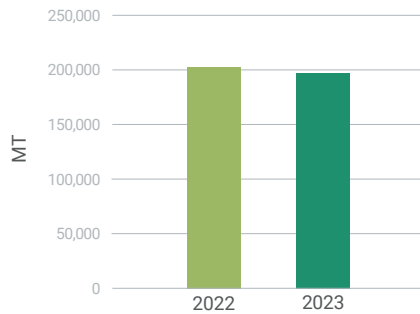
▼ -6.8%



2022: 771,830,447 KWH
2023: 719,487,155 KWH
1,003 PROPERTIES

LANDFILL WASTE

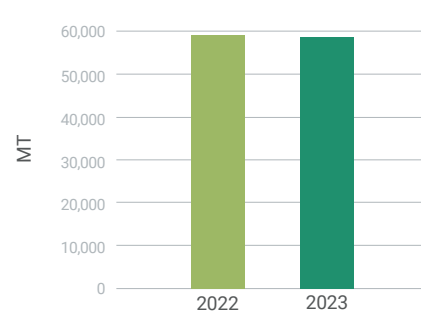
▼ -1.5%



2022: 200,809 MT
2023: 197,748 MT
859 PROPERTIES

WASTE DIVERSION

▲ +0.7%



2022: 59,273 MT
2023: 59,667 MT
623 PROPERTIES

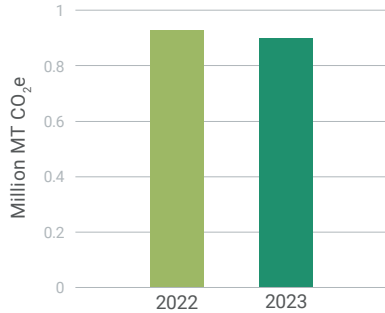


2022-2023 YEAR-OVER-YEAR PERFORMANCE, AMERICAS

Whole-Building Data

CO₂ EMISSIONS

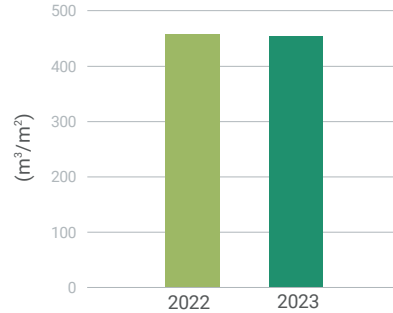
▼ -5.1%



2022: 9,376,703 MT CO₂E
 2023: 8,894,936 MT CO₂E
 7,236 PROPERTIES

WATER USE

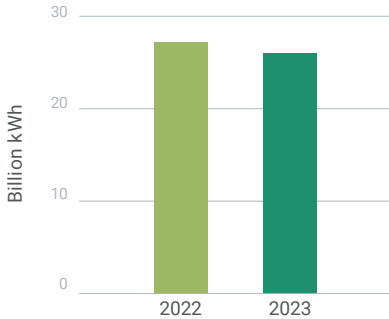
▼ -2.0%



2022: 463,896,198 M3
 2023: 454,808,688 M3
 4,666 PROPERTIES

ENERGY USE

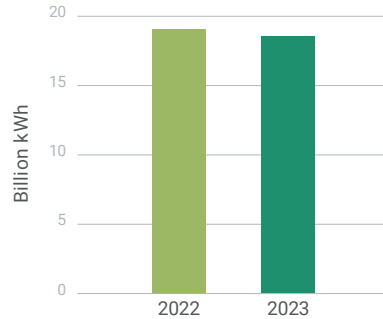
▼ -2.3%



2022: 26,691,970,428 KWH
 2023: 26,071,514,467 KWH
 7,153 PROPERTIES

ELECTRICITY USE

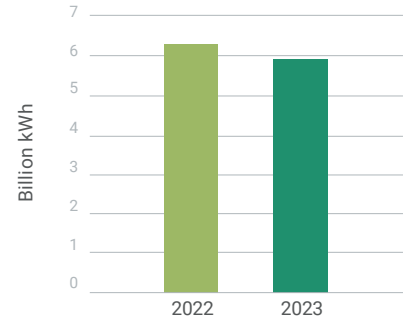
▼ -1.0%



2022: 18,732,904,564 KWH
 2023: 18,545,101,586 KWH
 7,205 PROPERTIES

FUELS USE

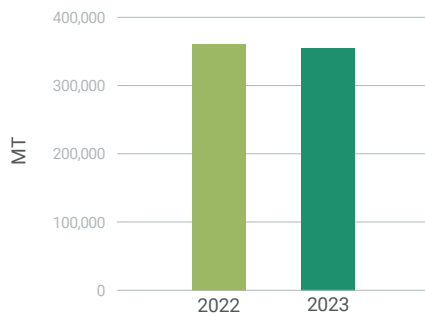
▼ -5.8%



2022: 6,264,792,380 KWH
 2023: 5,904,174,854 KWH
 3,782 PROPERTIES

LANDFILL WASTE

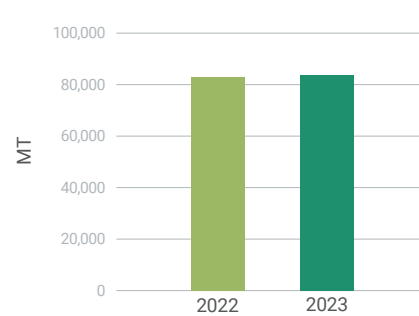
▼ -0.6%



2022: 366,290 MT
 2023: 364,047 MT
 2,129 PROPERTIES

WASTE DIVERSION

▲ +1.7%



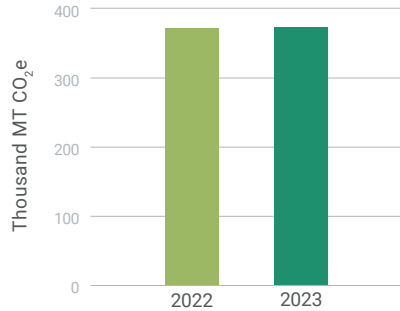
2022: 82,789 MT
 2023: 84,189 MT
 1,285 PROPERTIES



2022-2023 YEAR-OVER-YEAR PERFORMANCE, ASIA PACIFIC Whole-Building Data

CO₂ EMISSIONS

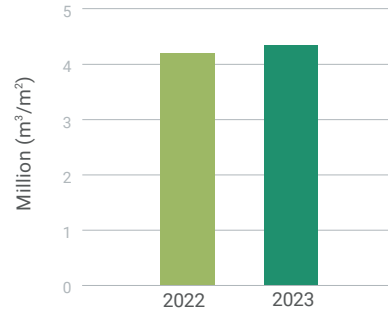
▲ +0.4%



2022: 366,459 MT CO₂e
2023: 367,756 MT CO₂e
583 PROPERTIES

WATER USE

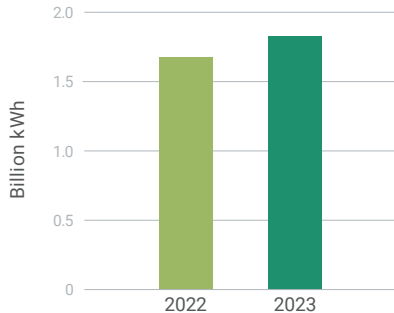
▲ +4.2%



2022: 4,169,549 M3
2023: 4,345,380 M3
439 PROPERTIES

ENERGY USE

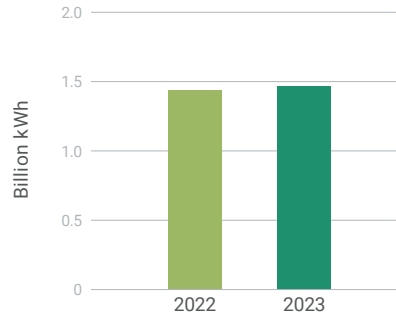
▲ +1.0%



2022: 1,566,560,726 KWH
2023: 1,582,827,938 KWH
584 PROPERTIES

ELECTRICITY USE

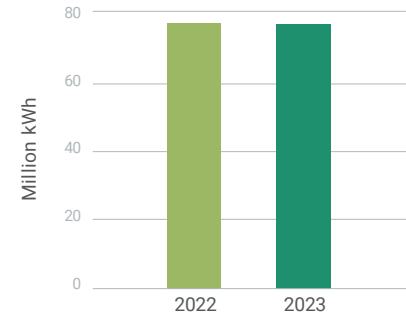
▲ +1.2%



2022: 1,458,826,313 KWH
2023: 1,476,079,810 KWH
583 PROPERTIES

FUELS USE

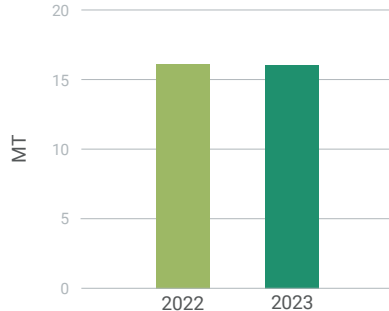
▼ -0.5%



2022: 76,665,906 KWH
2023: 76,267,025 KWH
82 PROPERTIES

LANDFILL WASTE

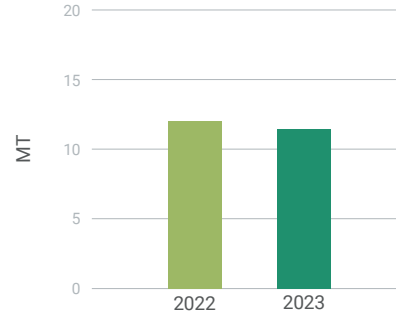
▼ -0.5%



2022: 16,113 MT
2023: 16,032 MT
117 PROPERTIES

WASTE DIVERSION

▼ -5.6%



2022: 12,178 MT
2023: 11,499 MT
54 PROPERTIES

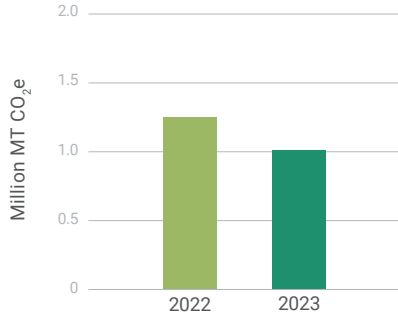


2022-2023 YEAR-OVER-YEAR PERFORMANCE, EUROPE

Whole-Building Data

CO₂ EMISSIONS

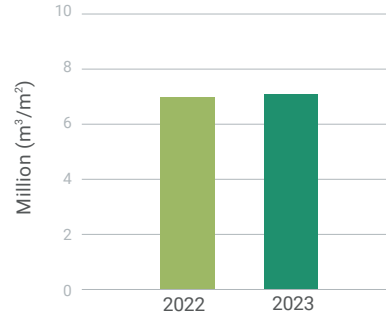
▼ -17.4%



2022: 1,238,489 MT CO₂E
 2023: 1,023,454 MT CO₂E
 3,958 PROPERTIES

WATER USE

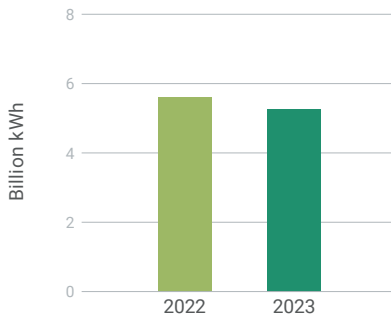
▼ -2.2%



2022: 7,139,652 M3
 2023: 6,979,595 M3
 2,148 PROPERTIES

ENERGY USE

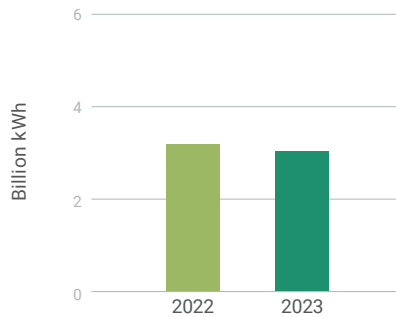
▼ -5.5%



2022: 5,585,896,143 KWH
 2023: 5,279,213,092 KWH
 3,653 PROPERTIES

ELECTRICITY USE

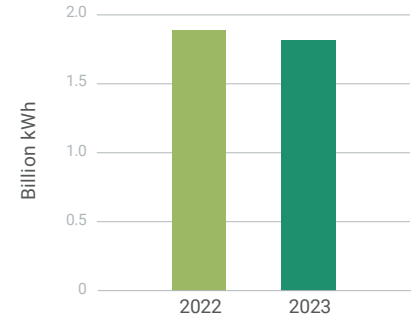
▼ -5.1%



2022: 3,169,134,094 KWH
 2023: 3,008,038,892 KWH
 3,693 PROPERTIES

FUELS USE

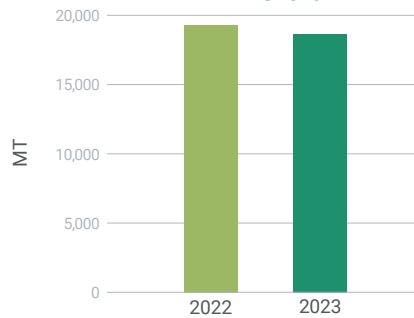
▼ -5.7%



2022: 1,897,642,307 KWH
 2023: 1,788,804,754 KWH
 1,943 PROPERTIES

LANDFILL WASTE

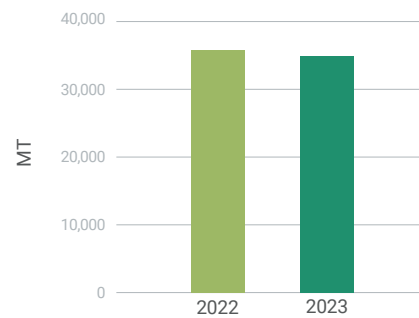
▼ -3.6%



2022: 19,384 MT
 2023: 18,688 MT
 326 PROPERTIES

WASTE DIVERSION

▼ -3.0%



2022: 35,584 MT
 2023: 34,515 MT
 305 PROPERTIES

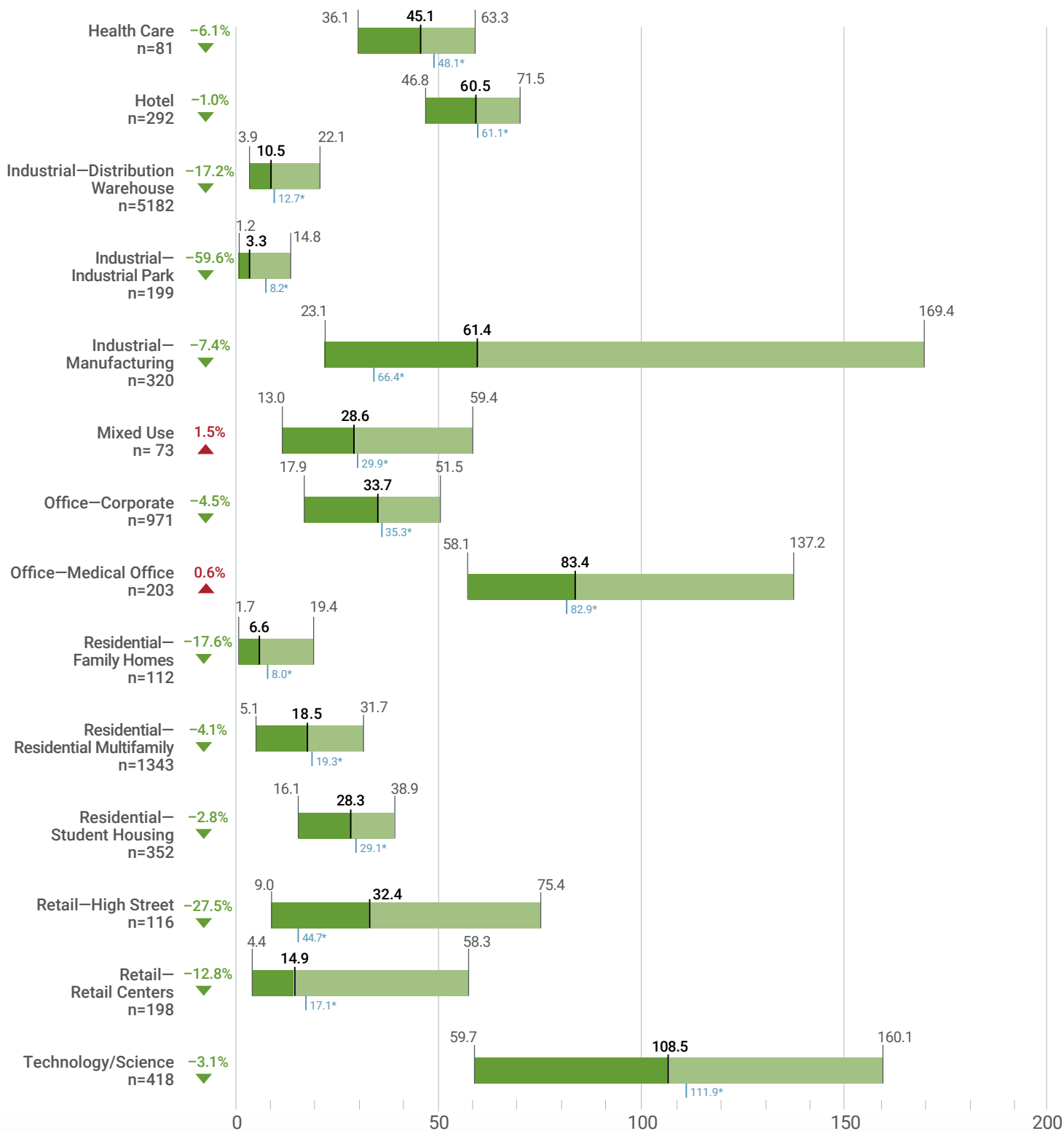
Deep Dive on Performance

ULI Greenprint members can report data for the whole building, or the base building and tenant spaces. Whole-building data represents the entire asset’s environmental data. Base-building data can be used when the landlord controls the common areas and shared services, for example. Tenant spaces data can be reported to the landlord if the landlord does not control the utilities.

When reporting, ULI Greenprint members provide absolute carbon emissions, energy use, water use, and waste data. After analysis, ULI Greenprint reports carbon, energy, and water intensities, which are the total consumption divided by the asset size. These intensities help to compare performance across buildings.



2023 WHOLE-BUILDING CARBON EMISSIONS INTENSITY BY BUILDING TYPE (KG/M2)



n=2023 Building Count

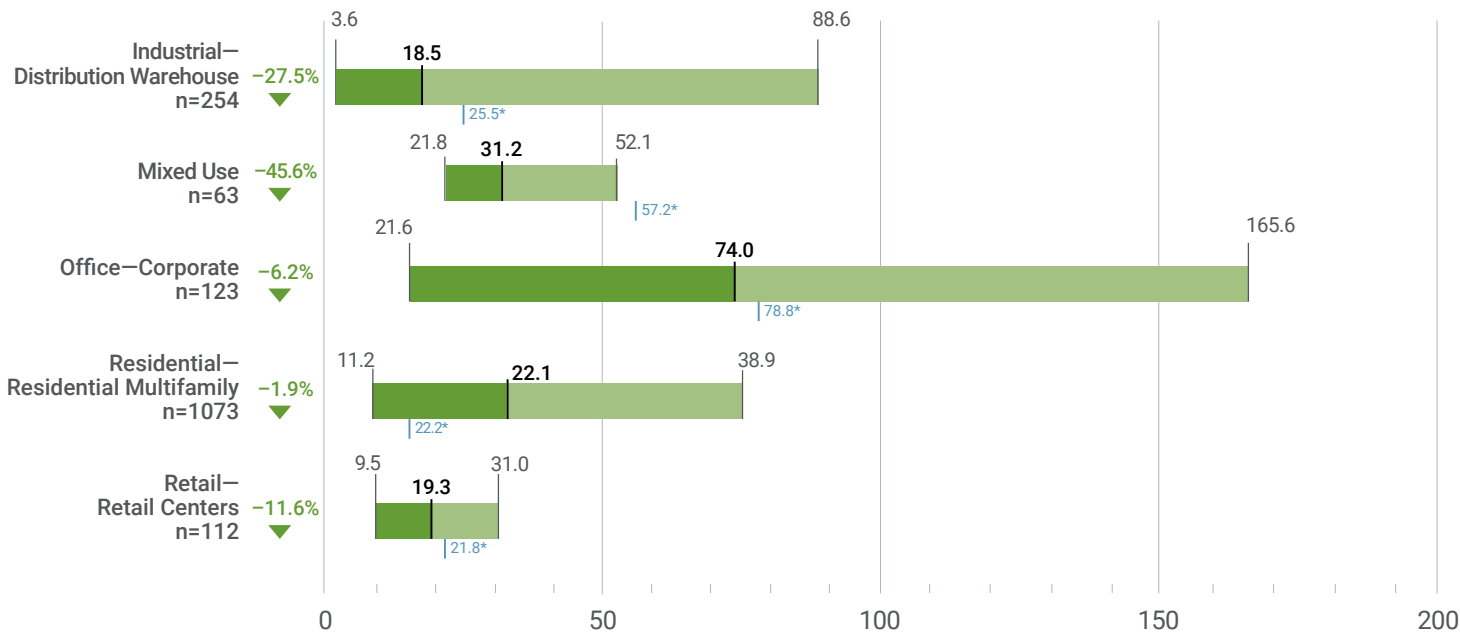
▲ Median Percent Change from 2022 to 2023

■ 25th percentile

■ 75th percentile

*2022 median (for comparison)

2023 BASE-BUILDING CARBON EMISSION INTENSITY BY BUILDING TYPE (KG/M2)



n=2023 Building Count

Median Percent Change from 2022 to 2023

25th percentile

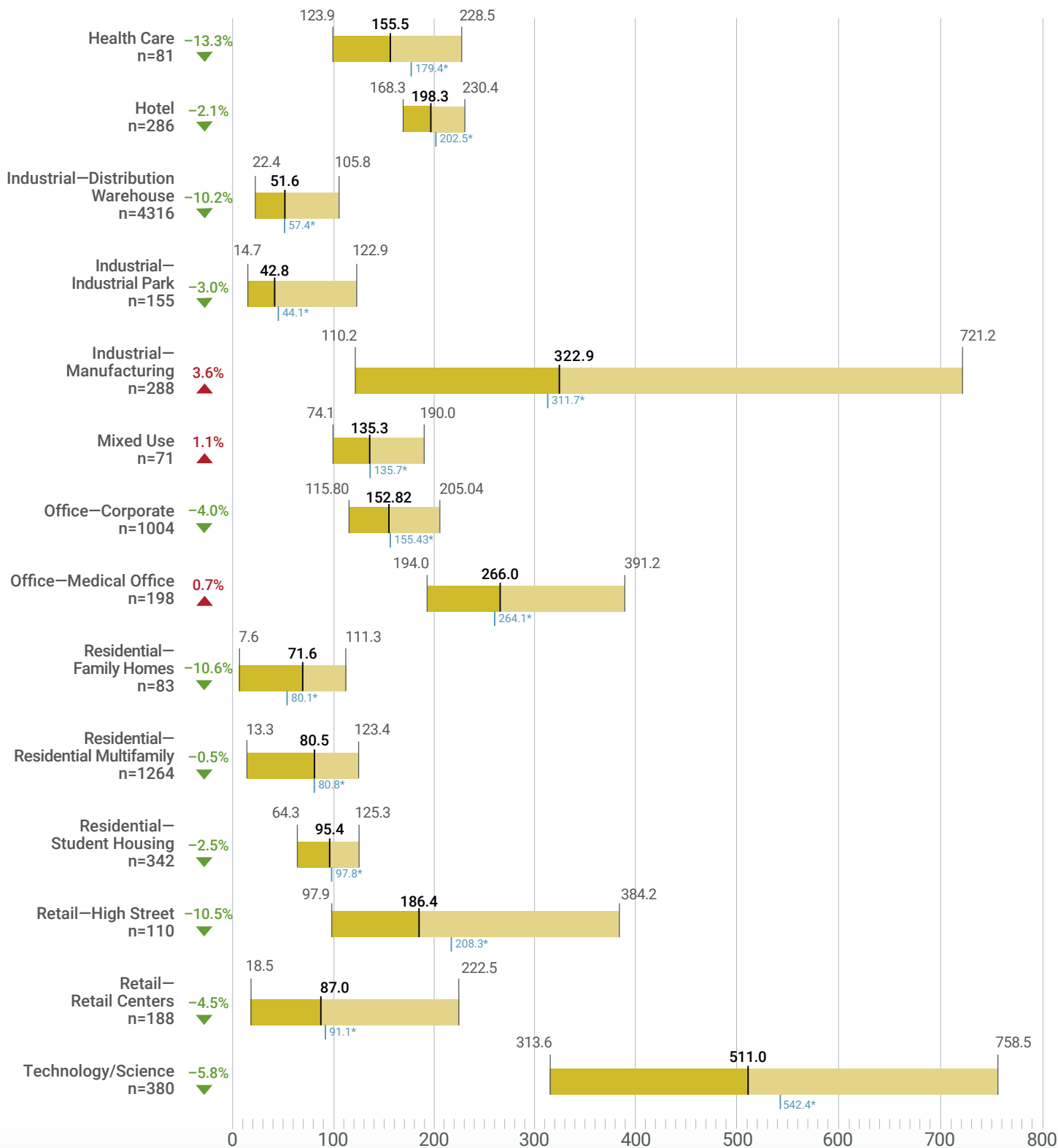
75th percentile

*2022 median (for comparison)



Energy

**2023 WHOLE-BUILDING ANNUAL ENERGY USE INTENSITY
BY BUILDING TYPE (KWH/M2)**



n=2023 Building Count

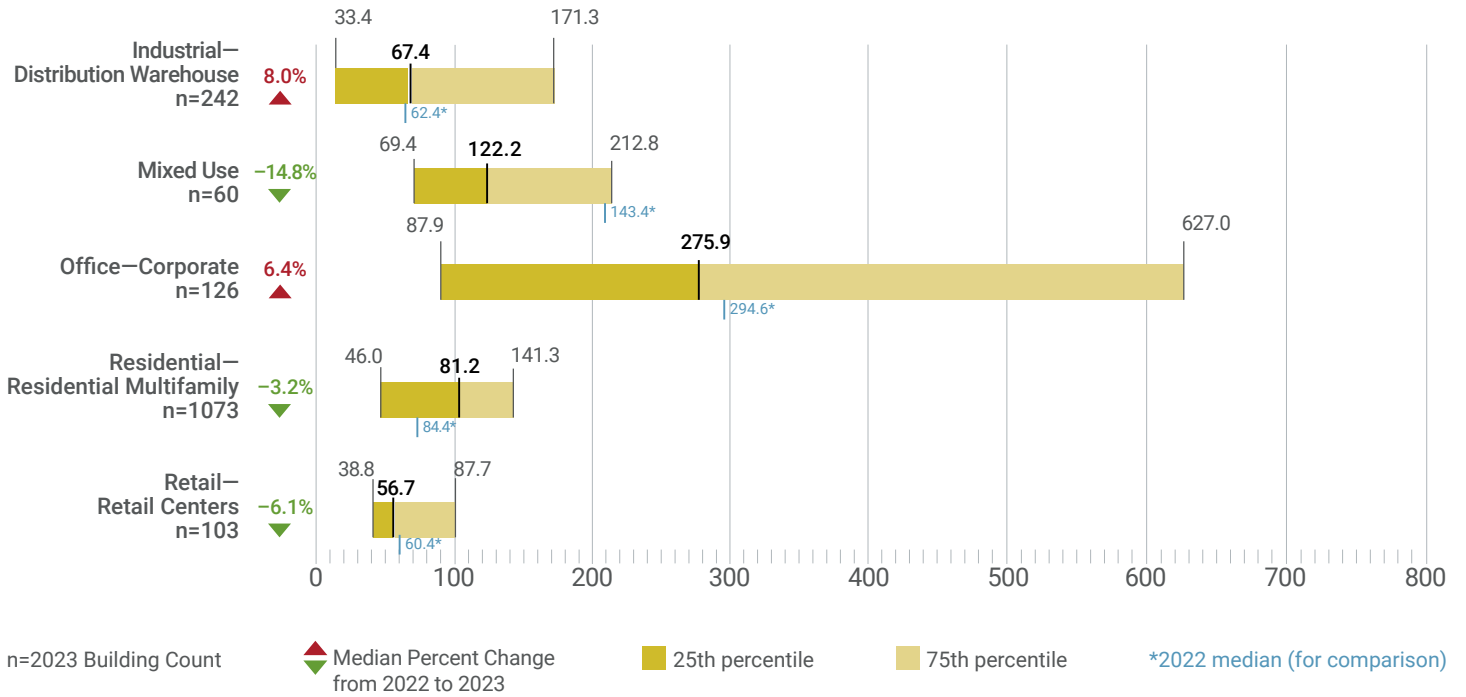
Median Percent Change from 2022 to 2023

25th percentile

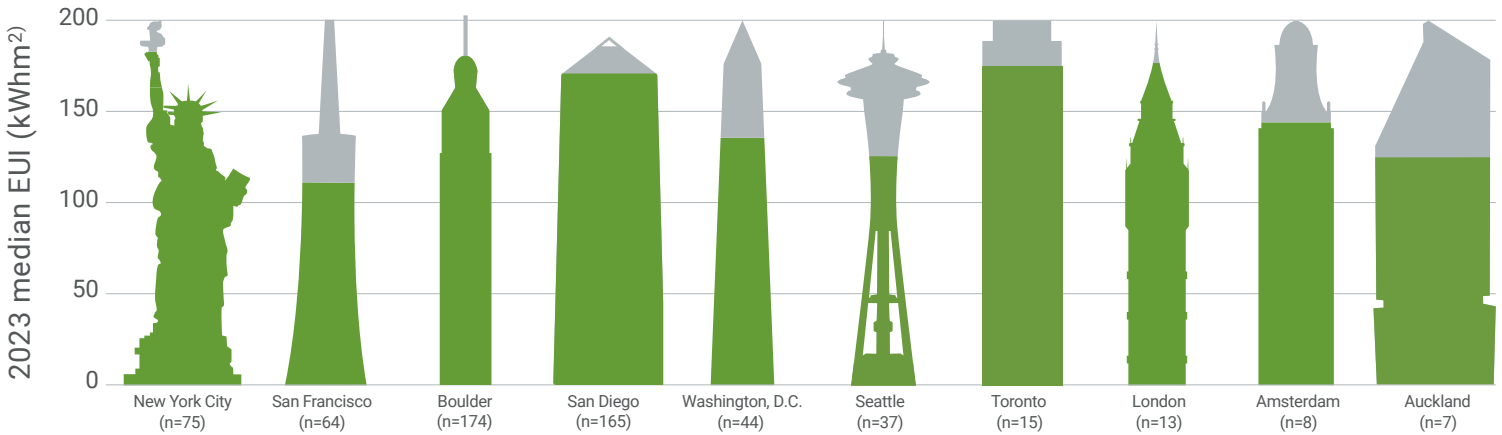
75th percentile

*2022 median (for comparison)

2023 BASE-BUILDING ANNUAL ENERGY USE INTENSITY BY BUILDING TYPE (KWH/M2)

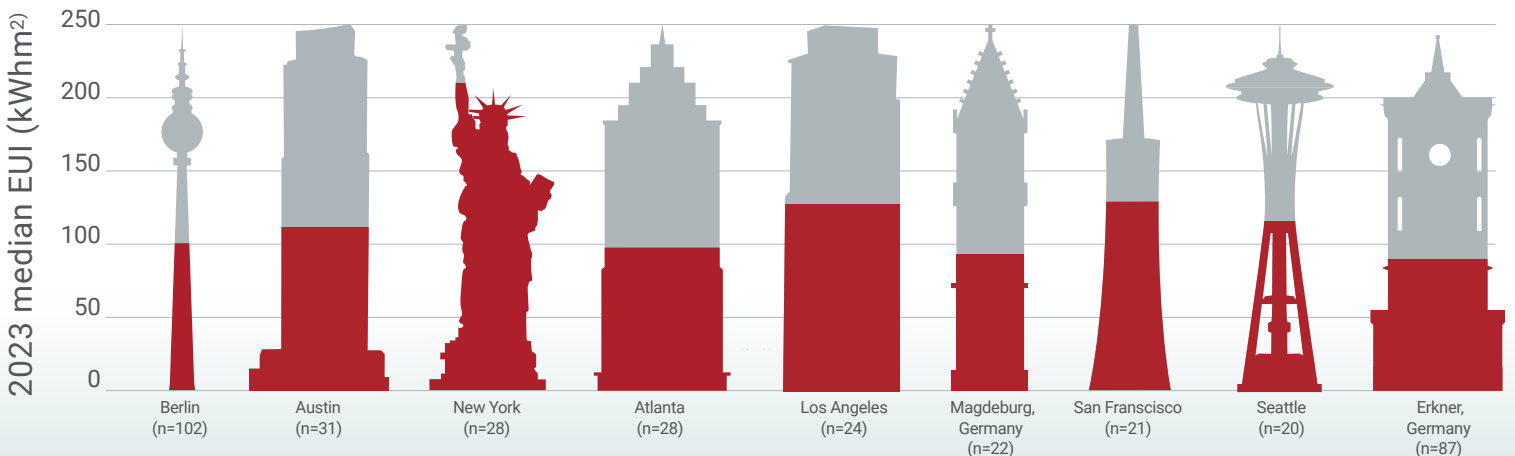


2023 OFFICE ENERGY PERFORMANCE IN SELECT CITIES

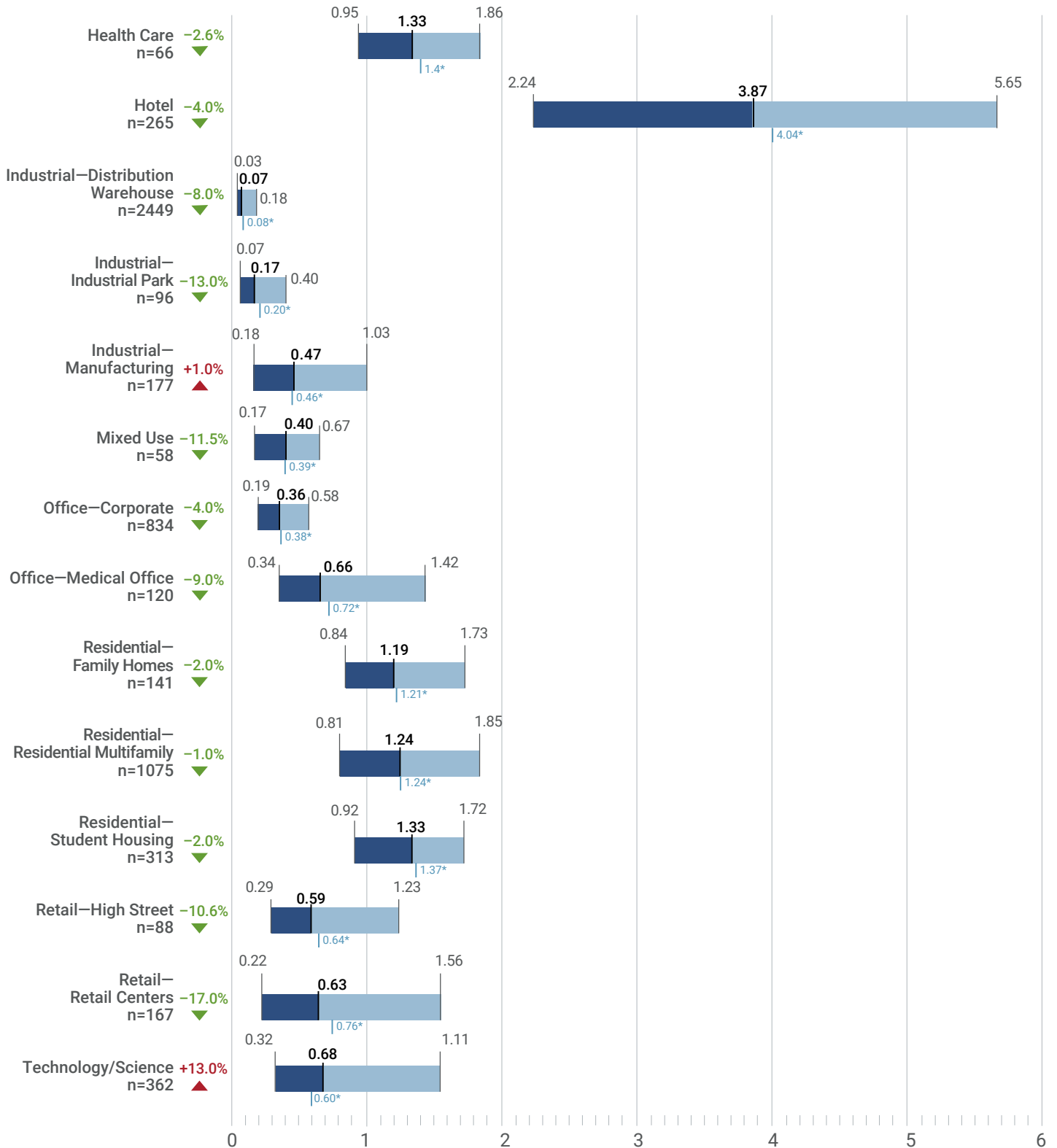


Data provided is whole-building only. Cities selected reflect the larger sample sizes in the Greenprint portfolio, inclusive of all global regions.


2023 MULTIFAMILY ENERGY PERFORMANCE IN SELECT CITIES





2023 WHOLE-BUILDING WATER USE INTENSITY BY BUILDING TYPE (M3/M2)



n=2023 Building Count

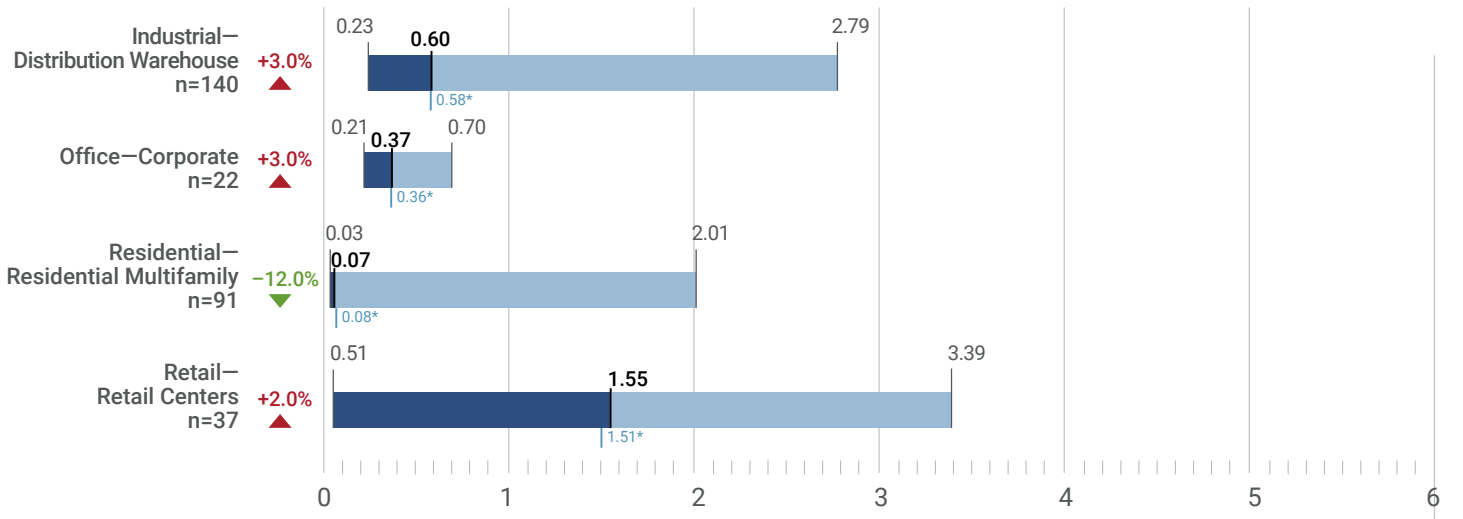
 Median Percent Change from 2022 to 2023

 25th percentile

 75th percentile

*2022 median (for comparison)

2023 BASE-BUILDING WATER USE INTENSITY BY BUILDING TYPE (M3/M2)



n=2023 Building Count

▲ Median Percent Change from 2022 to 2023

■ 25th percentile

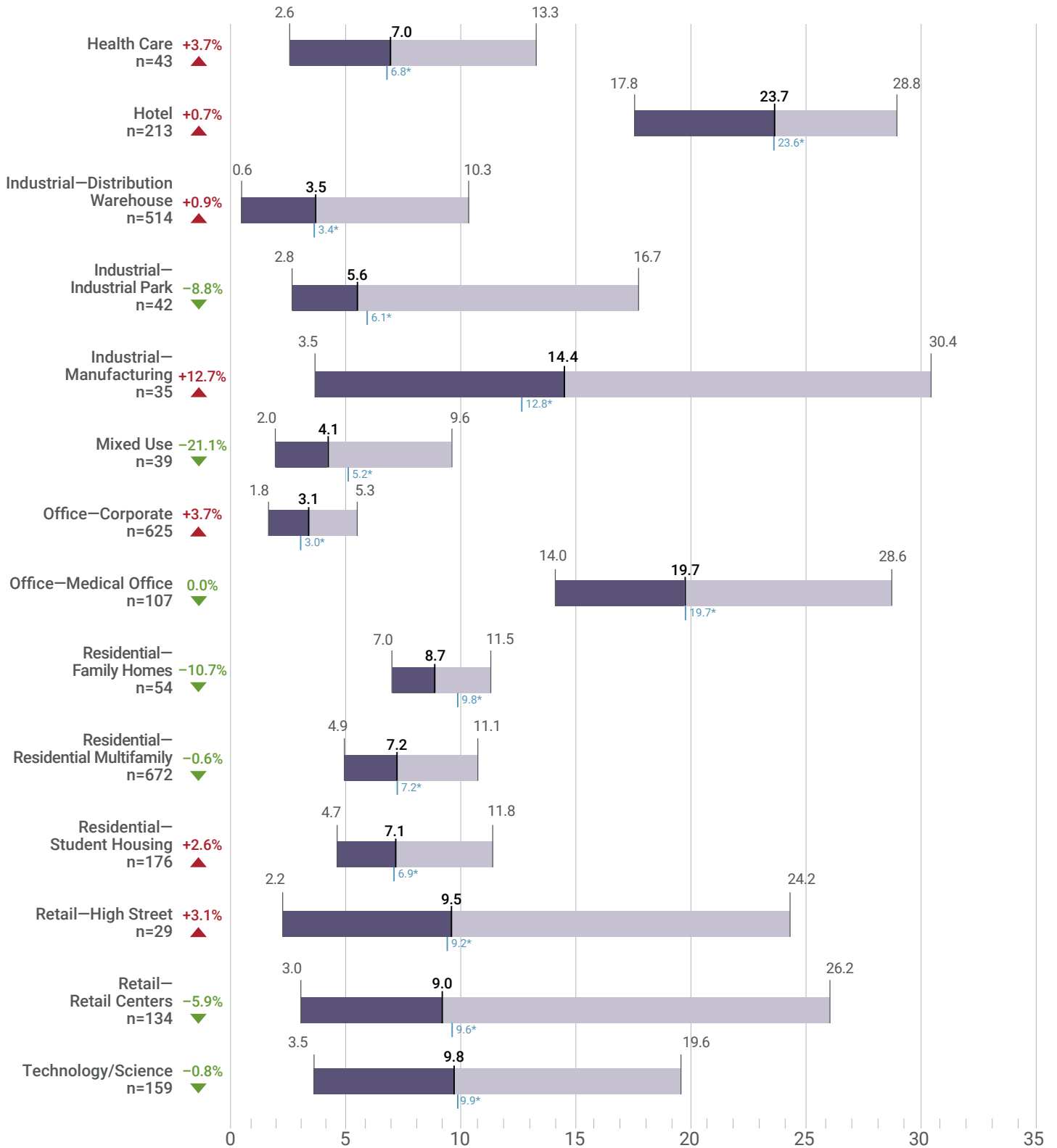
■ 75th percentile

*2022 median (for comparison)



Waste

2023 WHOLE-BUILDING WASTE USE INTENSITY BY BUILDING TYPE (KG/M2)



n=2023 Building Count

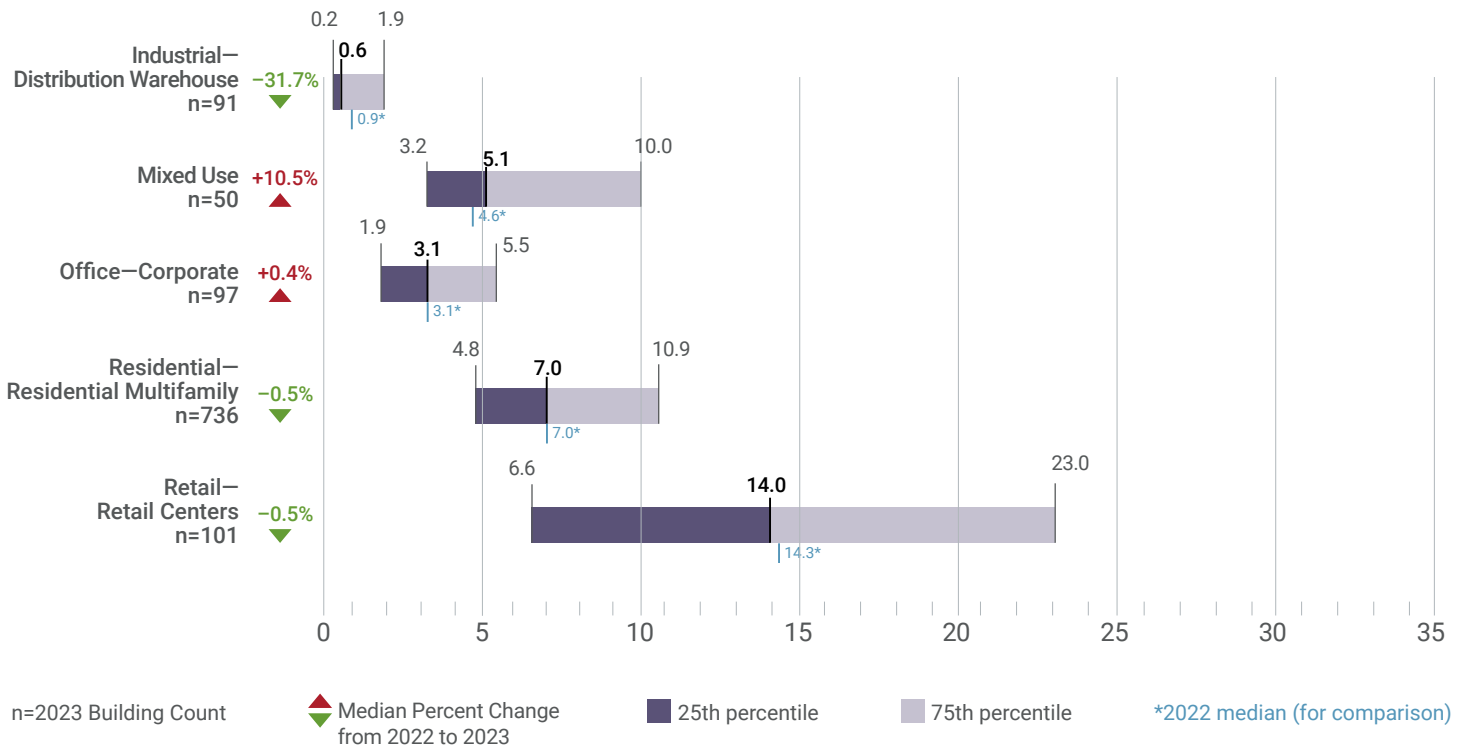
▲ Median Percent Change from 2022 to 2023

■ 25th percentile

■ 75th percentile

*2022 median (for comparison)

2023 BASE-BUILDING WASTE USE INTENSITY BY BUILDING TYPE (KG/M2)

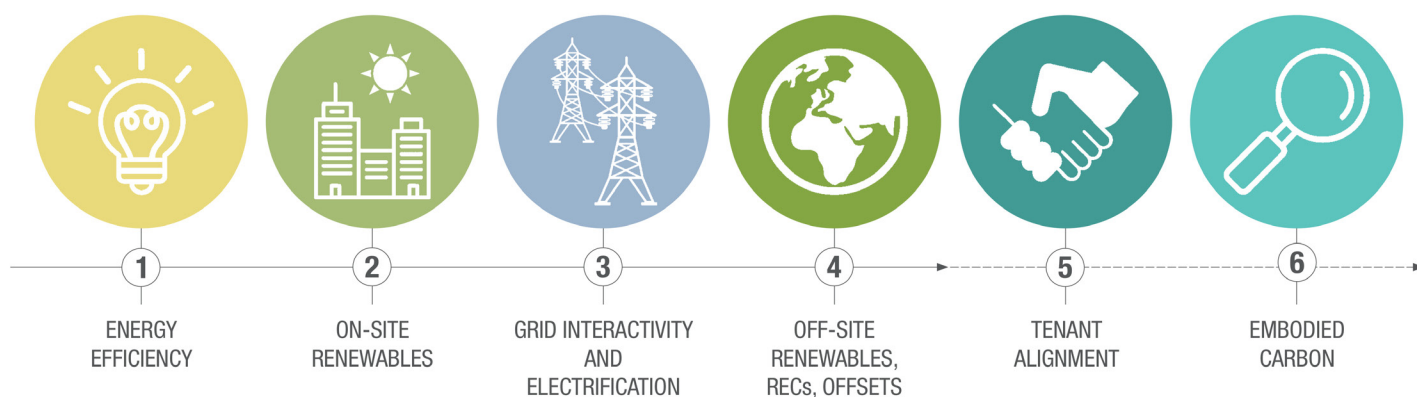


Net Zero Carbon by 2050

ULI Greenprint's Net Zero by 2050 Goal aims to reduce the operational carbon emissions of its members' buildings under operational control to net zero by the year 2050. Thirty-five ULI Greenprint members are aligned to the ULI Greenprint Net Zero by 2050 Goal, representing more than \$2.9 trillion in assets under management.

ULI Greenprint defines a net zero portfolio as highly energy efficient and fully powered from on-site and/or off-site renewable energy sources and offsets. ULI Greenprint measures members' progress toward these goals by tracking their collective improvements in energy efficiency, purchase of power from green utilities, and increased investment in on- and off-site renewable energy and offsets.

REAL ESTATE'S JOURNEY TO NET ZERO



This goal was expanded this year to allow aligned ULI Greenprint member companies greater flexibility in setting the boundaries of their goal, and to keep pace with an evolving market around net zero commitments that requires increasing transparency, whole-building performance standards, and inclusion of Scope 3 emissions. Companies may now align to one of three tracks that determine which types of spaces and carbon in buildings are included, shown in the graphics below.

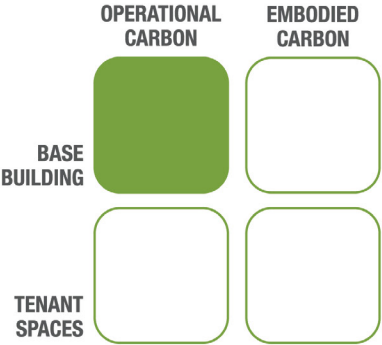
ULI'S NET ZERO BY 2050 GOAL

TRACK 1
Landlord Spaces, Operational Carbon

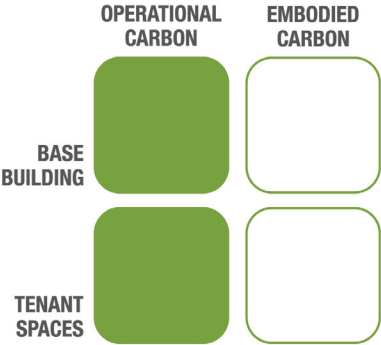
TRACK 2
Whole Building, Operational Carbon

TRACK 3
Whole Building, Life Cycle Carbon

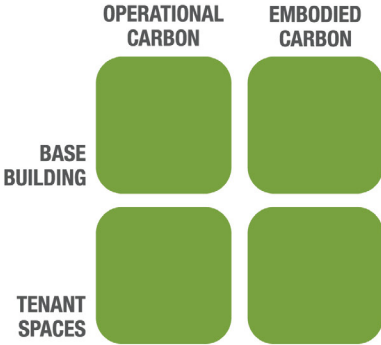
TRACK 1



TRACK 2



TRACK 3



+ No on-site fossil fuel emissions

ULI Greenprint member companies publicly aligned with the goal of net zero carbon operations by 2050 include the following:

TRACK 1

Landlord Spaces, Operational Carbon. Equivalent to ULI's original Net Zero by 2050 Goal.

Aligners to this track will pursue net zero operational carbon by 2050 in spaces under landlord operational control.



*Indicates an organization has already achieved the goal. Year in parentheses indicates an organization has an earlier timeline than 2050.

TRACK 2

Whole Building, Operational Carbon. Aligners to this track will pursue net zero operational carbon by 2050 at the whole-building level, in both landlord and tenant spaces.



TRACK 3

Whole Building, Life Cycle Carbon. Aligners to this track will pursue net zero operational carbon and embodied carbon at the whole-building level, in both landlord- and tenant-controlled spaces.



*Indicates an organization has already achieved the goal. Year in parentheses indicates an organization has an earlier timeline than 2050.

The data tables below present all committed member companies' reported emissions broken out by scope, as well as all forms of onsite and offsite renewable energy produced or purchased/acquired both in aggregate and by specific category where available.

To calculate committed member companies' Scope 2 emissions for this Net Zero Carbon Breakdown, ULI Greenprint used the location-based accounting method described by the GHG Protocol Corporate Accounting and Reporting Standard due to lack of available emissions data using the market-based method, unless Scope 2 market-based data was provided by the member, while recognizing the lower precision of the location-based method. This may change in future years if market-based emissions data becomes more widely available from committed member companies.

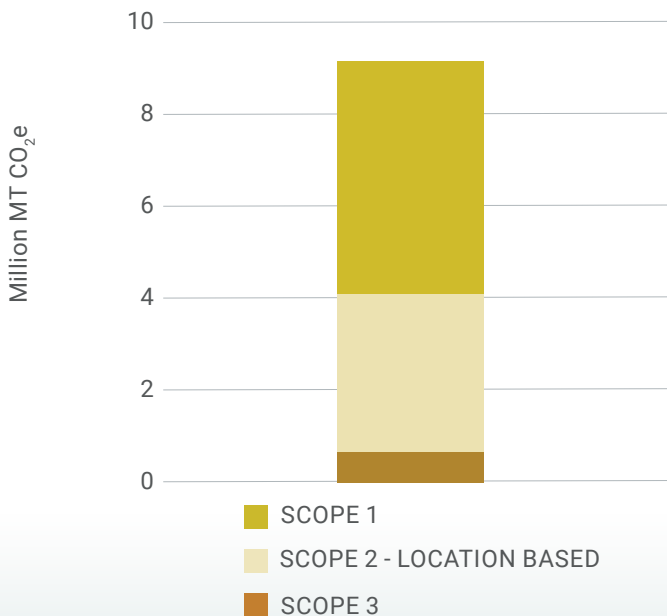
For the entire ULI Greenprint portfolio's Scope 2 emissions calculation, emissions data using the market-based method was sufficiently robust and was used due to its greater precision and incorporation of multiple renewable energy purchasing instruments. Location-based data was used as a substitute where market-based emissions were not provided.

2023 ULI GREENPRINT NET ZERO BY 2050 GOAL BREAKDOWN

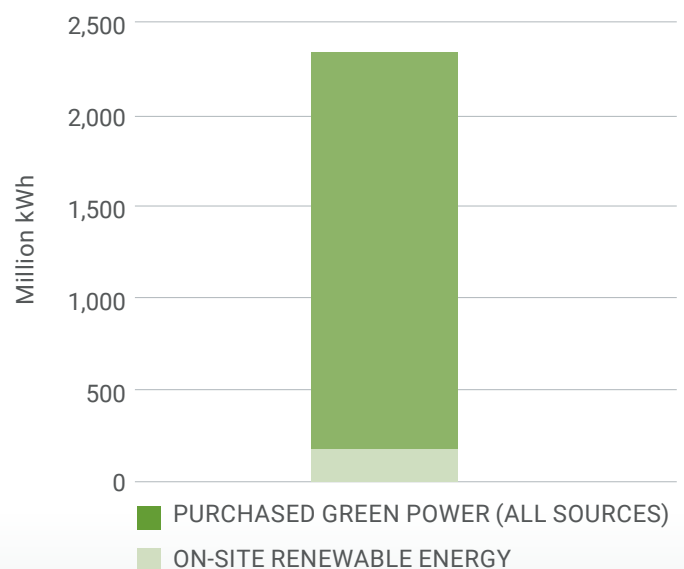
Total Emissions	
Total emissions (scope 1, 2, and 3) 12,444 assets 391,150,492 m ²	8,384,143 MT CO₂e 22.26 kg per m²
Scope 1 emissions	623,628 MT CO ₂ e 1.66 kg per m ²
Scope 2 emissions (location based)	3,162,412 MT CO ₂ e 8.40 kg per m ²
Scope 3 emissions	4,598,103 MT CO ₂ e 12.21 kg per m ²

Total Renewable Energy and Offsets	
On-site renewable energy (kWh)	184,046,934 kWh 0.8% of total energy
Green power (purchased/acquired, all sources)	2,154,422,286 kWh 5.66% of total energy
Unbundled RECs	744,209,146 kWh 3.23% of total energy
Purchased carbon offsets	49,378 MT CO₂e
Total energy (kWh)	38,080,544,118 kWh

2023 TOTAL OPERATIONAL CARBON EMITTED



2023 TOTAL RENEWABLE ENERGY



Embodied Carbon

Buildings account for 39 percent of global carbon emissions annually; of this amount, 28 percent results from building operations and 11 percent is associated with embodied carbon. In fact, embodied carbon from materials and construction can account for half a building’s lifetime emissions.

Embodied carbon is measured by tallying up the carbon emissions and environmental impacts from each stage of a product’s life cycle from extraction through disposal.

With global floor area expected to double by 2060—coupled with the fact that embodied carbon cannot be reduced once a building is constructed—now is the time for real estate to act on embodied carbon. Further, government building sector regulations are no longer limited to operational carbon, as more jurisdictions require embodied carbon reductions.

ULI has produced several reports documenting ways that real estate can reduce its embodied carbon emissions through materials selection or balancing operational and embodied carbon.

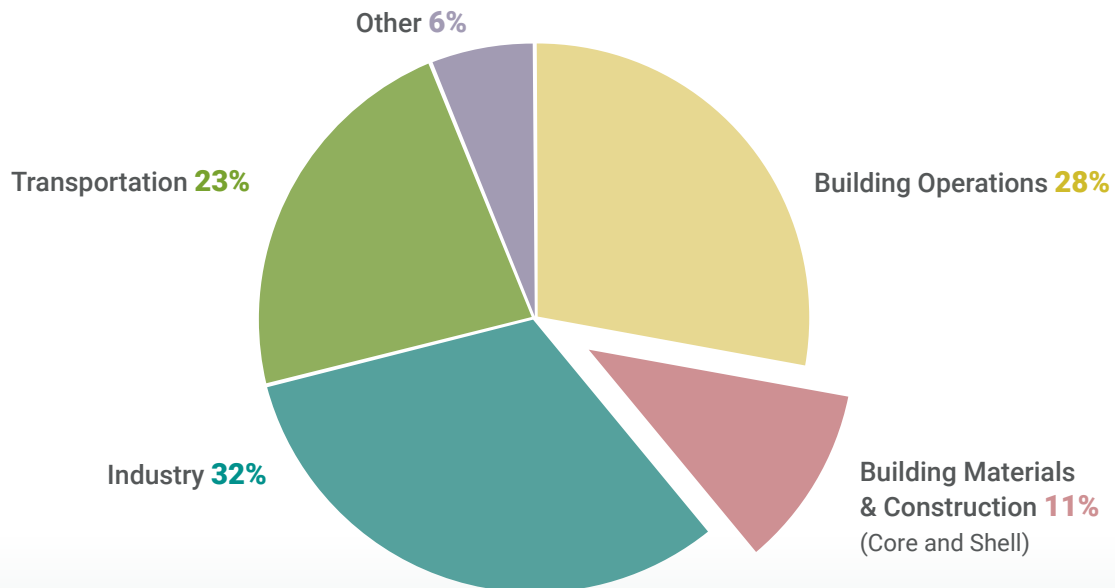


[The Materials Movement: Creating Value with Better Building Materials | ULI Knowledge Finder](#)



[The Carbon Sweet Spot | ULI Knowledge Finder](#)

GLOBAL CO₂ EMISSIONS BY SECTOR

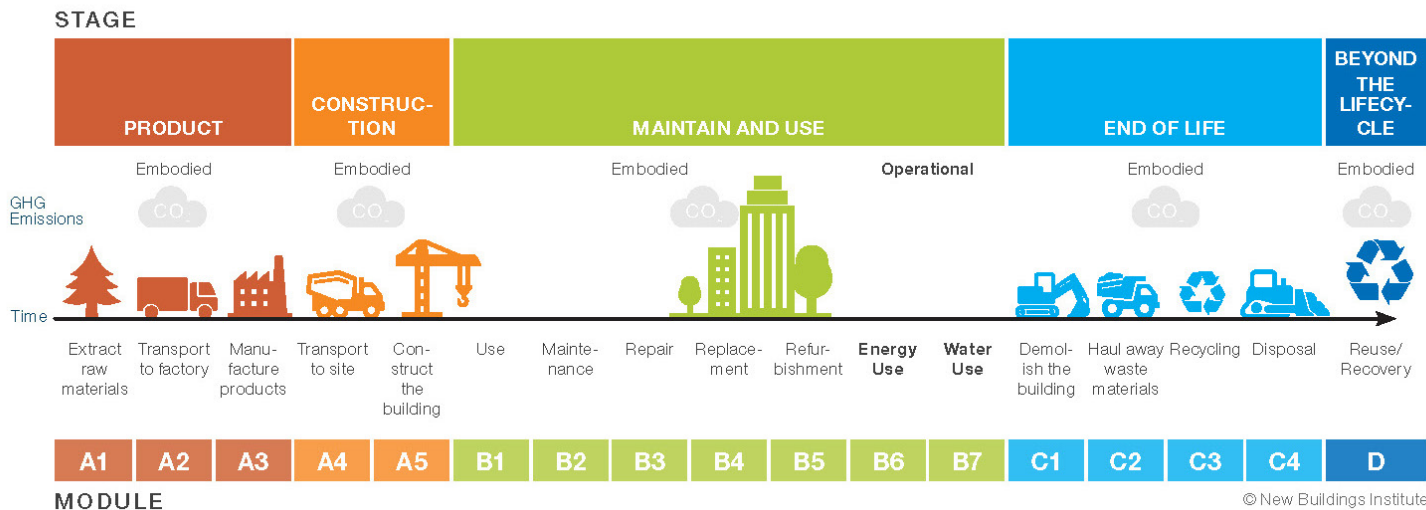


Adapted from Global Alliance for Buildings and Construction 2018 Global Status Report.

Embodied Carbon Data

FIGURE 1: LIFECYCLE STAGES

Data source: BS EN 15978:2011



Source: [NBI](#)

ULI Greenprint members voluntarily reported building-level embodied carbon data for the second year, covering buildings completed between 2019 and 2023. Members reported their total metric tons of CO₂ A1 through A5 embodied carbon emissions.

A1 through A3 include emissions associated with the extraction of raw materials, transportation to the materials processing facility, and manufacturing the product to be used in the building. A4 includes emissions from transporting the material to the construction site and A5 includes emissions resulting from the construction process.

The 27 buildings reported for State of Green Volume 15, compared to the nine reported for Volume 14, demonstrate improved data coverage and market action on embodied carbon measurement and reductions. All assets reported are based in the United States.

In addition to reporting data, ULI Greenprint’s embodied carbon subgroup continues to meet to remain up to date on industry initiatives related to embodied carbon. ULI hosted two embodied carbon convenings over the past year, to bring together developers and supply chain, and developers and architects/structural engineers to discuss opportunities to partner in reducing embodied carbon throughout the development process. These convenings are critical, as reducing embodied carbon cannot be done in a silo: it requires coordination among stakeholders along the real estate value chain.

ULI GREENPRINT MEMBER-REPORTED EMBODIED CARBON OF NEW CONSTRUCTION AND MAJOR RENOVATION PROJECTS

Region	Year	New Construction or Retrofit	GFA (m2)	Property Type	Space Type	Total A1:15 (kgCO2e)	EC Intensity (kg CO2e/m2)
New England	2022	Major Renovation	39,019	Office: Corporate: High-Rise Office	Single Building	15,724,505	402.99
New England	2022	Major Renovation	20,810	Technology/ Science: Laboratory/Life Sciences	Single Building	2,552,383	122.65
New England	2021	Major Renovation	12,821	Technology/ Science: Laboratory/Life Sciences	Single Building	524,150	40.88
New England	2023	Major Renovation	9,662	Office: Corporate: Low-Rise Office	Single Building	395,012	40.88
Midwest	2023	New Construction	48,774	Residential: Multifamily: High-Rise Multifamily	Single Building	34,880,243	715.14
Pacific Northwest	2019	New Construction	71,164	Office, Corporate	Single Building	35,266,234	495.56
Mid-Atlantic	2022	New Construction	98,663	Office: Corporate: High-Rise Office	Multi Building	48,270,933	489.25

New England	2021	New Construction	58,250	Office: Corporate: High-Rise Office	Single Building	28,498,941	489.25
New England	2020	New Construction	29,729	Residential: Multifamily: High-Rise Multifamily	Single Building	14,544,914	489.25
Mid-Atlantic	2023	New Construction	39,019	Office: Corporate: High-Rise Office	Single Building	18,079,383	463.35
West Coast	2023	New Construction	21,423	Technology/ Science: Laboratory/Life Sciences	Single Building	8,758,321	408.83
Mid-Atlantic	2021	New Construction	68,748	Office: Corporate: High-Rise Office	Single Building	28,106,603	408.83
Mid-Atlantic	2020	New Construction	25,641	Office: Corporate: High-Rise Office	Single Building	10,483,003	408.83
New England	2020	New Construction	19,603	Office: Corporate: Mid-Rise Office	Single Building	8,014,180	408.83
New England	2020	New Construction	62,245	Office: Corporate: High-Rise Office	Single Building	25,447,871	408.83
New England	2019	New Construction	45,058	Office: Corporate: High-Rise Office	Single Building	18,421,220	408.83
New England	2019	New Construction	35,768	Office: Corporate: High-Rise Office	Single Building	14,623,030	408.83
West Coast	2020	New Construction	30,101	Residential: Multifamily: High-Rise Multifamily	Single Building	12,256,970	407.2

Mid-Atlantic	2023	New Construction	38,833	Office, Corporate	Single Building	14,198,988	365.64
Southeast	2023	New Construction	60,294	Office, Corporate	Single Building	21,684,269	359.64
West Coast	2023	New Construction	9,941	Office, Corporate	Single Building	2,353,125	236.72
Mid-Atlantic	2021	New Construction	10,323	Industrial: Distribution Warehouse: Non-Refrigerated Warehouse	Single Building	3,359,992	325.5
Southeast	2024	New Construction	52,322	Industrial: Distribution Warehouse: Non-Refrigerated Warehouse	Single Building	16,608,538	317.43
Southeast	2023	New Construction	25,854	Industrial: Distribution Warehouse: Non-Refrigerated Warehouse	Single Building	7,895,076	305.37
Midwest	2024	New Construction	62,951	Industrial: Distribution Warehouse: Non-Refrigerated Warehouse	Single Building	15,395,050	244.56
West Coast	2023	New Construction	74,769	Industrial: Distribution Warehouse: Non-Refrigerated Warehouse	Single Building	18,075,850	241.76
Southeast	2023	New Construction	32,105	Industrial: Distribution Warehouse: Non-Refrigerated Warehouse	Single Building	7,716,791	240.36

Refrigerant Emissions

Many in the building sector haven't yet realized the importance of reducing refrigerant emissions across their portfolio. Refrigerant emissions technically qualify as Scope 1 greenhouse gas emissions.

Refrigerant emissions result from refrigeration and air conditioning. These gases are emitted from leakage and service of equipment and disposal at the end of the gas's useful life. [Refrigerant emissions are "fugitive,"](#) meaning they are accidental due to a leak or improper storage. Man-made refrigerants can have more global warming potential¹ (GWP) than carbon dioxide; for example, R-22 is the most used refrigerant and has a GWP that is almost 2,000 times greater than carbon dioxide. In other words, [one kilogram of R-22 has the same effect as 1,810 kilograms of carbon dioxide.](#)

Importantly, refrigerants frequently are emitted through leaks that are not detected until maintenance is completed. This means that these extremely potent gases are leaking undetected into the atmosphere. To adequately understand and address this, real estate is in early stages of working to measure and account for refrigerant emissions. The industry is also focused on improving the quality and consistency of refrigeration and air conditioning equipment installations to ensure proper best practices that minimize leakage over time.

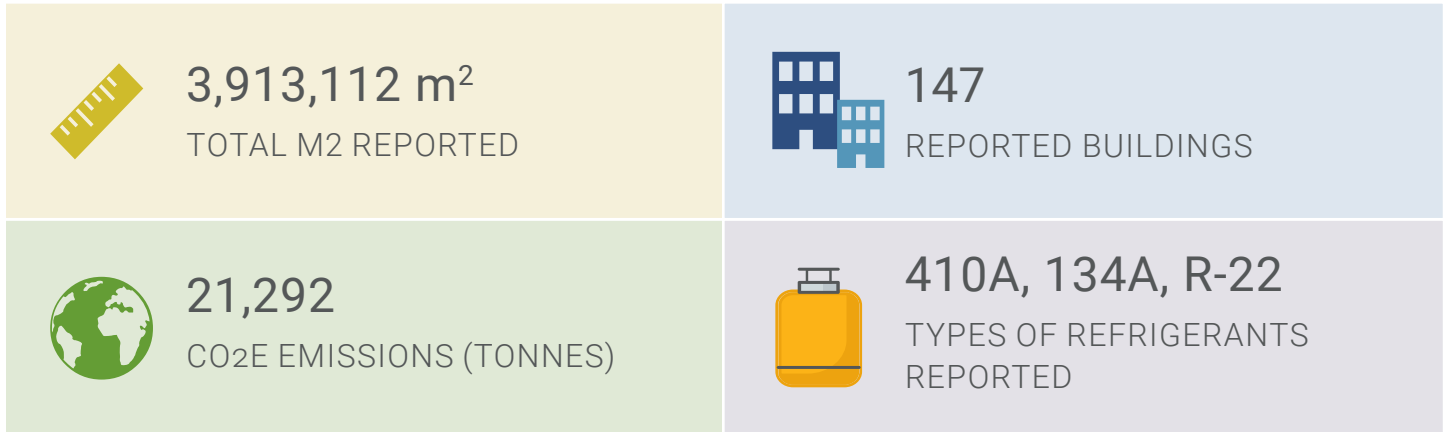
The next era of refrigerant containment is bringing new ideas. Companies are creating refrigerant management plans that standardize the refrigerant emissions reporting process from technicians to property managers. There are also strides being made in alternative refrigerants that have a lower GWP. That way, when there is an inevitable leak, the effects are not as pronounced.

¹ The Intergovernmental Panel on Climate Change (IPCC) created global warming potential as a metric to compare the global warming impacts of different gases to carbon dioxide. Carbon dioxide has a GWP of 1, and as the GWP increases, the more a gas will warm Earth in that time period.



Refrigerant Emissions Data

For the first year of refrigerant data collection, members reported more than 3.9 million square meters of data on 147 total buildings located in the United States and China. Refrigerant data collection requires coordination on all levels to acquire accurate data. ULI Greenprint plans to collect this data from members annually moving forward.



Beyond encouraging members to submit refrigerant emissions data, ULI Greenprint is building its members' capacity to reduce these emissions in other ways. Members in Asia Pacific have launched a refrigerants topical group led by Hang Lung Group and the Yale Carbon Containment Lab. ULI Greenprint has also welcomed effecterra as its newest Innovation Partner to educate real estate members on refrigerant regulations and refrigerant management plans. Members in North America and Europe already attended a webinar with effecterra on this topic, and one is planned for the Asia Pacific region as well.

As a [U.S. Department of Energy Better Buildings Ally](#), ULI is also engaging in the DOE refrigerants working group to understand and share updates and guidance on refrigerant emissions reductions with its members. As more members build capacity on this topic, ULI Greenprint will seek ways to support the broader industry on its journey to tackle refrigerant emissions.

Guide to Report Terms and Charts

BASE BUILDING FLOOR AREA

Square meters for which energy is supplied by central building services to common areas and possibly to lettable/leasable areas.

CARBON INTENSITY

Annual carbon emissions divided by gross floor area, including CDP (formerly the Carbon Disclosure Project) Scope 1 and 2 emissions at minimum and Scope 3 emissions if member companies choose to do so.

EMBODIED CARBON

The greenhouse gas emissions arising from the manufacturing, transportation, installation, maintenance, and disposal of building materials.

ENERGY USE INTENSITY (EUI)

Annual energy consumption divided by gross floor area. This report uses site EUI, which is equal to energy used on site divided by floor area.

GLOBAL WARMING POTENTIAL (GWP)

Allows comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emission of 1 ton of a gas will absorb over a given period of time, relative to the emission of 1 ton of carbon dioxide (CO₂). The larger the GWP, the more that a given gas warms the Earth compared to CO₂ over that time period.

MEDIAN

The value lying at the midpoint of a distribution of observed values.

NET ZERO

ULI Greenprint defines a net zero portfolio as highly efficient and fully powered by on-site and off-site renewable energy sources and offsets.

REFRIGERANTS

Heat transfer mediums used in refrigeration, air conditioning, and heat pumps.

REFRIGERANT EMISSIONS

The most common refrigerants are hydrofluorocarbons (HFCs). HFCs are human-made fluorinated chemicals, and extremely potent greenhouse gases, with GWPs that can be thousands of times more potent than CO₂ in contributing to global warming.

RENEWABLE ENERGY CERTIFICATE (REC)

A market tool that represents the property rights to the environmental, social, and other nonpower attributes of renewable electricity generation. RECs are issued when one megawatt-hour of electricity is generated and delivered to the electricity grid from a renewable energy resource.

TENANT SPACE FLOOR AREA

Square meters of a building that are leased; can be landlord or tenant controlled.

WASTE DIVERSION

Reducing waste sent to a landfill through reduction of waste generation, recycling, reuse, or composting.

WHOLE BUILDING FLOOR AREA

The building's gross floor area in square meters.

Guide to Report Terms and Charts

ULI Asset-Type Definitions

ULI follows asset-type definitions outlined by GRESB.

HEALTH CARE

Properties used for the purpose of primary health care. Examples may include but are not limited to hospitals, clinics, physical therapy centers, and mental health centers.

HOTEL

Includes hotels, motels, youth hostels, lodging, and resorts.

INDUSTRIAL: DISTRIBUTION WAREHOUSE

Industrial buildings used for the purpose of storing, processing, and distribution of goods to wholesalers, retailers, and/or consumers.

INDUSTRIAL: INDUSTRIAL PARK

An industrial business park is an area zoned for the purpose of industrial development, where (lightweight) industrial properties are grouped together with offices. Examples may include but are not limited to industrial estate, trading estate, and enterprise zone.

INDUSTRIAL: MANUFACTURING

Industrial properties used for the purpose of manufacturing, otherwise known as a factory or manufacturing plant.

INDUSTRIAL: OTHER

Other industrial properties that do not fit in the aforementioned property types.

MIXED USE

Mixed use properties containing two or more property types in their spaces.

OFFICE: CORPORATE

Office properties.

OFFICE: MEDICAL OFFICE

Examples may include but are not limited to offices specifically used for the purpose of medical administration, secondary research, or other purposes, exclusive of the property types specified for health care center.

OFFICE: OTHER

Other office properties that do not fit in the aforementioned property types.

RESIDENTIAL: FAMILY HOMES

Includes both single-family homes and multidwelling units not including apartment blocks. A single-family home is a separate, freestanding residential property. A multidwelling family home includes those such as two-flats, duplex, semi-detached, and townhouses. Synonyms include single-family home, single-detached dwelling, detached house, single-family residence, separate house, freestanding house, townhouse, duplex, condominium, semi-detached, villa.

RESIDENTIAL: RESIDENTIAL MULTIFAMILY

Multifamily residential buildings.

RESIDENTIAL: STUDENT HOUSING

Residential properties used for the purpose of housing students, otherwise known as student apartments, student houses, student residences, student quarters, and student accommodations.

RESIDENTIAL: OTHER

Other residential properties that do not fit in the aforementioned property types.

Guide to Report Terms and Charts

RETAIL: HIGH STREET

Retail properties located on the high street in a particular area, usually terraced properties located in the city center or other high-traffic pedestrian zones.

RETAIL: RETAIL CENTERS

Includes the following types of retail centers: enclosed centers for retail purposes consisting of multiple retail stores connected with internal walkways; properties comprising more than one retail store, restaurant, or other business, in an open-air configuration where each establishment has an exterior entrance to the public and there are no internal walkways; retail centers that consist of both enclosed and unenclosed spaces, often including retail stores as well as leisure amenities; Big box, single-tenant retail properties.

RETAIL: OTHER

Other retail properties that do not fit in the aforementioned property types.

TECHNOLOGY/SCIENCE

equipped to meet the needs of high-density computing equipment, such as server racks, used for data storage and processing (typically, these facilities require dedicated uninterruptible power supplies and cooling systems); data center functions may include traditional enterprise services, on-demand enterprise services, high performance computing, internet facilities, and/or hosting facilities; properties that provide controlled conditions in which scientific research, measurement, and experiments are performed or practical science is taught.

Greenprint Benchmark Data Thresholds

Benchmarks presented in this report represent the full suite of data provided by members, irrespective of lease type or occupancy level. The ULI Greenprint like-for-like analysis excludes buildings with less than 24 months of data collected, with over 50 percent change in energy use from year to year, or with energy use intensities outside 3.15 and 3,153 kilowatt-hours per square meter. The analysis does not account for additional variables, such as heating and cooling degree days, vacancy rates, hours of operation, and occupant density.

Report Team

Blakely Jarrett

Vice President, ULI Randall Lewis Center for Sustainability in Real Estate

August Williams-Eynon

Manager, ULI Randall Lewis Center for Sustainability in Real Estate

Celeste Smith

Senior Associate, ULI Randall Lewis Center for Sustainability in Real Estate

Marta Schantz

Co-Executive Director, ULI Randall Lewis Center for Sustainability in Real Estate

Billy Grayson

Executive Vice President, ULI Centers and Initiatives

Libby Riker

Senior Editor

Brandon Weil

Graphic Design

Michael Brown

Building Technologies Senior Managing Consultant, ICF

Jiayuan Yao

Energy and Sustainability Specialist, ICF