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# State of Green

ULI Greenprint Performance Report



**Urban Land  
Institute**

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# About ULI

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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 to shape 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](https://uli.org). Follow ULI on [Twitter](#), [Facebook](#), [LinkedIn](#), and [Instagram](#).

## About ULI Greenprint

The ULI Greenprint Center for Building Performance is a research organization focused on climate mitigation that makes the business case for green buildings by tying carbon reductions to increased asset value. ULI Greenprint also includes a worldwide membership alliance of leading real estate owners and developers committed to improving the environmental performance of the global real estate industry, striving to reduce greenhouse gas emissions meaningfully by 2030, and achieving net zero carbon operations by 2050. ULI Greenprint is organized within the ULI Randall Lewis Center for Sustainability in Real Estate, which also oversees ULI's Urban Resilience Program and the Building Healthy Places initiative.

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# Introductory Letter

The global real estate industry continues to progress toward net zero despite an uncertain economic environment. Factors including government regulations, investor and tenant demands, new sources of capital and financial incentives, and physical and transitional climate risks are strengthening the business case and building global momentum on climate action. In addition to reducing operational carbon emissions, real estate recognizes that it must also tackle embodied carbon—the emissions arising from the manufacturing, transportation, installation, maintenance, and disposal of building materials.

Five years ago, hardly anyone was talking about embodied carbon. Today, everyone is trying to wrap their heads around it. Measuring and reducing embodied carbon requires a whole-of-industry approach. The construction supply chain is creating lower-carbon materials and adopting environmental product declarations (EPDs) to communicate materials' relative amount of embodied carbon. Developers are working with architects and engineers to conduct life cycle analyses and understand the environmental impact of various building design and material choices. Governments are rolling out policies that result in embodied-carbon reductions, and more are sure to follow.

Each year since 2009, ULI Greenprint members have reported their asset-level operational energy, water, waste, and carbon data to be included in the *State of Green* report. For the first time this year, members piloted a voluntary submission of embodied carbon data from recent development projects to *State of Green*, Volume 14. This inaugural embodied-carbon reporting from ULI Greenprint members is an important step in the path to reducing embodied carbon in future projects.



**50 percent**

GROWTH IN MEMBERSHIP IN THE PAST YEAR



**16,500+**

PROPERTIES IN THE ULI GREENPRINT PORTFOLIO



**\$2T+ (€1.9T)**

IN REAL ESTATE ASSETS UNDER MANAGEMENT



**3.66 billion ft<sup>2</sup>**

(340 MILLION M<sup>2</sup>)

Though a dizzying mix of market and other forces were at play, including an ongoing pandemic recovery and global conflicts destabilizing energy prices and transitions, whole-building energy consumption in 2021–2022 revived the downward trend of previous years and decreased by 1.6 percent, a reassuring signal of the role of energy efficiency in decarbonization after energy use had stayed flat in 2020–2021. Notably, whole-building carbon emissions dropped by 6.6 percent, reflecting the continued growth in renewable energy investments. Data from companies committed to ULI Greenprint’s Net Zero by 2050 Goal indicates that off-site renewable energy purchasing likely has a large part to play in this shift.

Although data availability continues to be a significant challenge for embodied carbon, ULI Greenprint will continue to voluntarily request the data from members in the hopes of releasing embodied-carbon benchmarks in future *State of Green* reports to support the industry in tracking and reducing building life cycle carbon emissions. We look forward to seeing innovations and commitments in this burgeoning area of climate action as a way for real estate firms to gain a competitive advantage and deliver better-performing buildings, a must in today’s economy.

The continued improved performance shown in this report underscores the notion that sustainable buildings are good for business despite evolving market conditions. By thoughtfully planning for the inevitable shift to net zero, real estate can enjoy lower operating costs, attract longer term tenants, and avoid fines for regulatory noncompliance. ULI Greenprint’s mission to “Reduce Carbon, Build Value” has never been more important. We look forward to another year of progress – join the movement!

Signed,



**BLAKELY JARRETT**

Senior Director, 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:









## 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 2022 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 14 includes the ULI Greenprint member portfolio’s typical analysis of year-over-year changes in operational carbon, energy, water, and waste, as well as annual benchmarks by property type and major metropolitan area, for calendar year 2022. The report also includes building data collected on progress toward ULI Greenprint’s Net Zero Operations by 2050 Goal for all companies aligned.

This year, ULI Greenprint aligned its *State of Green* operational data collection methodology with GRESB’s data submission template to support the industry’s movement toward standardized and streamlined reporting. The year-over-year, like-for-like, and annual benchmarks were split into whole-building and common area data to enhance transparency. Unless otherwise noted, all data is whole building.

Recognizing the increasing focus on embodied carbon, ULI Greenprint piloted optional embodied-carbon data reporting for Volume 14. Participating members submitted A1–A5 carbon emissions data (i.e., materials production and construction or cradle to practical completion) of new developments completed in the past five years. The embodied reporting template was created with ULI Greenprint member input and will likely be aligned with industry-recognized reporting standards when they become available. The report also includes a few project profiles that highlight embodied-carbon reduction strategies.



**“As this past year’s seemingly endless onslaught of dangerous, damaging, and unprecedented climate change-driven extreme weather events becomes appreciated as our new normal, the imperative of delivering a net carbon neutral built environment as quickly as possible is abundantly clear. Even in these unusual economic markets impacting numerous real estate sectors, the time for delivering dramatic carbon emissions reductions is now, as we have no time to delay.**

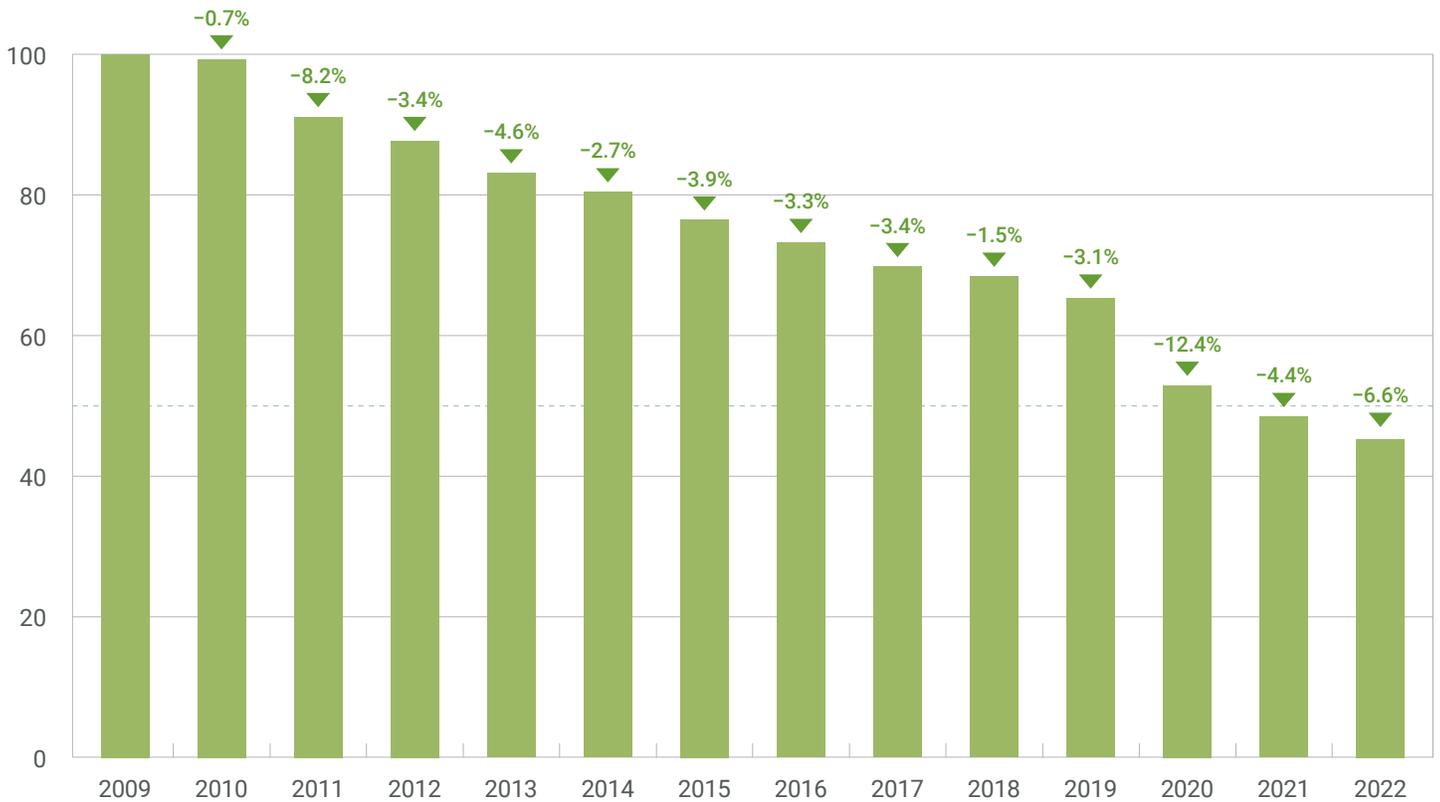
**I’m tremendously heartened by ULI Greenprint as a leading program anywhere in the world supporting some of the most sustainability ambitious developers and owners anywhere on the planet in charting this path forward, showing that even in uncertain times climate action can be delivered in ways that are financially viable and set up buildings for long term success in transforming climates and regulatory environments.”**

—Brian Swett, board chair of the ULI Randall Lewis Center for Sustainability in Real Estate, and Principal, Americas East Leader, Arup

# Annual Results: 2021-2022

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

### ULI GREENPRINT GHG EMISSIONS REDUCTIONS OVER TIME

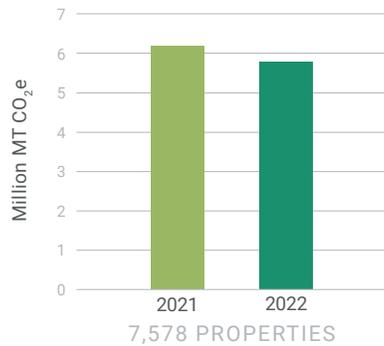


Every year, ULI Greenprint compares member portfolios' performance of assets across energy, water, waste, and carbon. Data provided below refers to whole-building data only.

## 2021-2022 YEAR-OVER-YEAR PERFORMANCE

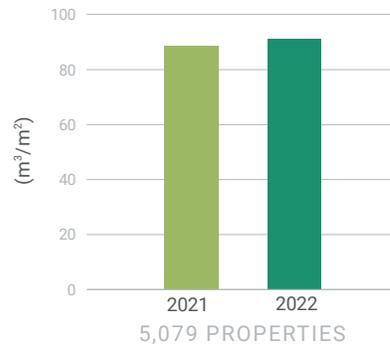
### CO<sub>2</sub> EMISSIONS

▼ -6.6%



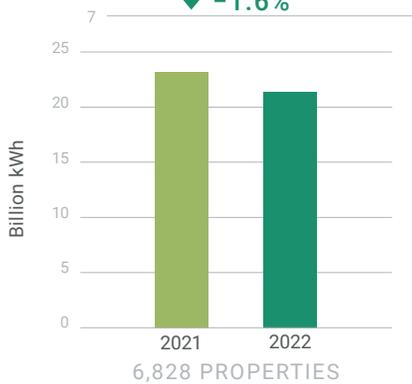
### WATER CONSUMPTION

▼ -1%



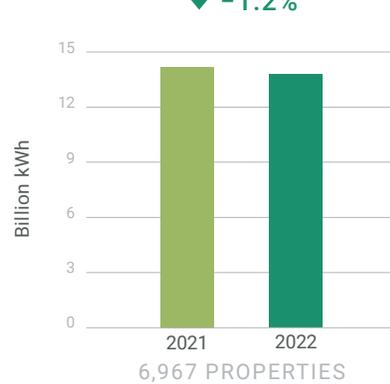
### ENERGY CONSUMPTION

▼ -1.6%



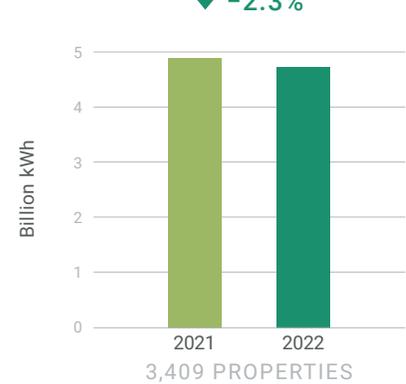
### ELECTRICITY USE

▼ -1.2%



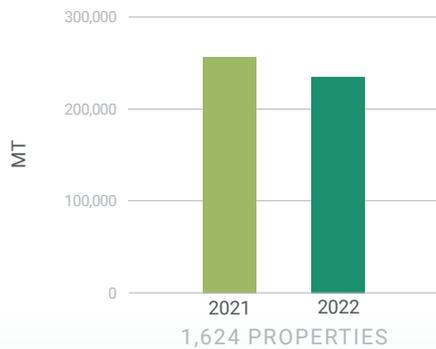
### FUELS CONSUMPTION

▼ -2.3%



### LANDFILL WASTE

▼ -7.7%



### DIVERTED WASTE

▼ -0.2%

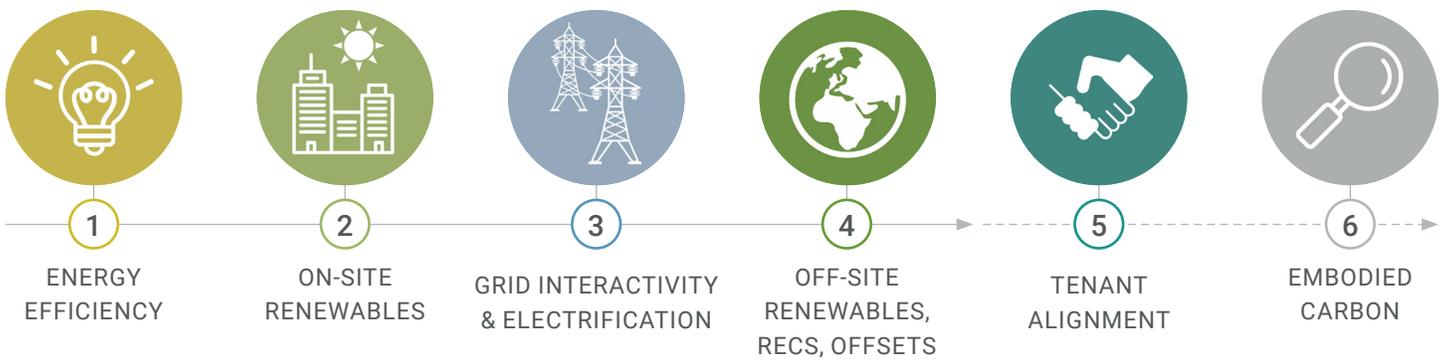


# Net Zero Carbon by 2050

ULI Greenprint’s net zero goal aims to reduce the operational carbon emissions of its members’ buildings under operational control to net zero by the year 2050. Thirty-six ULI Greenprint members have aligned to the ULI Greenprint Net Zero Carbon Operations by 2050 Goal, representing more than \$1.1 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.

## JOURNEY TO PORTFOLIO-WIDE NET ZERO



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

### NEW ALIGNERS (WITHIN THE PAST 12 MONTHS)



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

ALL OTHER ALIGNERS



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

The following data tables present all committed member companies' emissions (broken out by scope), as well as all forms of on-site and off-site renewable energy produced or purchased/acquired (both in the 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, 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.

However, for the entire ULI Greenprint portfolio's Scope 2 emissions calculation, emissions data using the market-based method was sufficiently robust and was thus used because of 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.

Discussions on the definition of net zero continue to evolve, and though Greenprint will not provide verification of net zero emissions claims by any member company, Greenprint plans to continue tracking member emissions by scope and all indicated forms of renewable energy year over year and anticipates emissions will fall while use of renewable energy will increase as we move toward 2050 (and any interim goal years set by member companies).

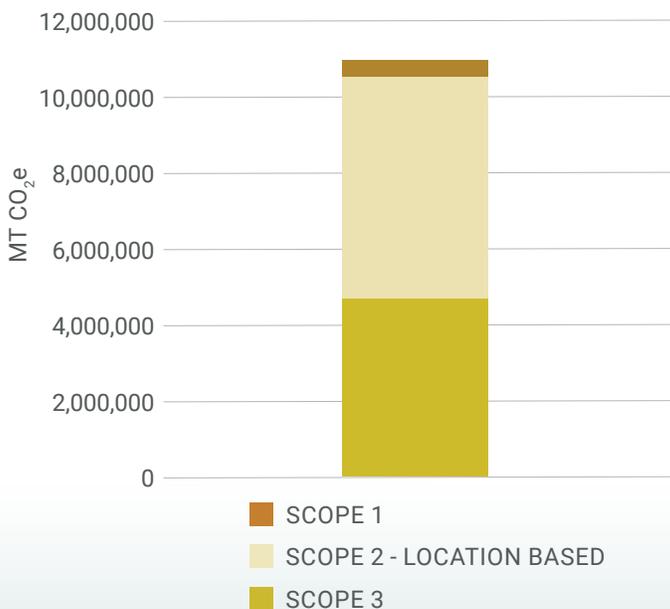
## 2022 GREENPRINT NET ZERO CARBON BREAKDOWN

Total Emissions	
<b>Total emissions (scope 1, 2, and 3)</b> 12,381 assets 604,016,103 m <sup>2</sup>	<b>10,733,895 MT CO<sub>2</sub>e</b> <b>17.77 kg per m<sup>2</sup></b>
Scope 1 emissions	393,242 MT CO <sub>2</sub> e 0.65 kg per m <sup>2</sup>
Scope 2 emissions (location based)	5,526,811 MT CO <sub>2</sub> e 9.15 kg per m <sup>2</sup>
Scope 3 emissions	4,813,843 MT CO <sub>2</sub> e 7.97 kg per m <sup>2</sup>

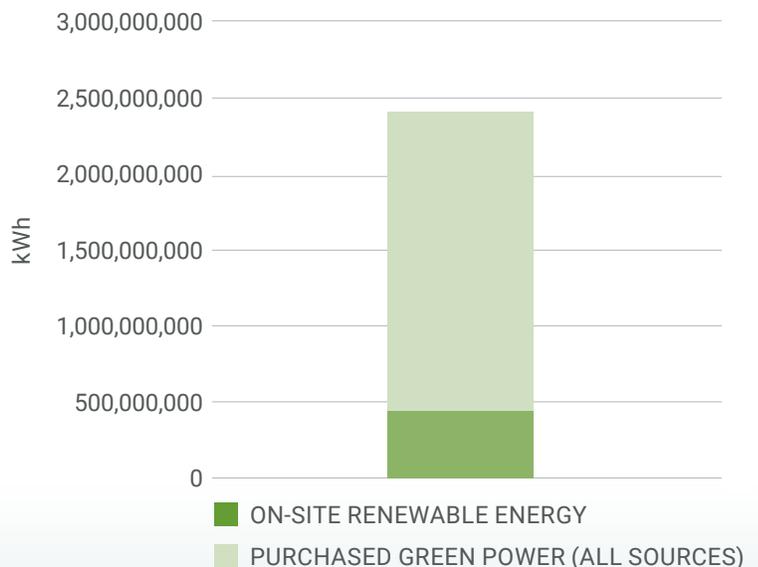
Total Renewable Energy and Offsets	
<b>On-site renewable energy</b>	<b>458,557,090 kWh</b> <b>2.25% of total energy</b>
<b>Green power (purchased/acquired, all sources)</b>	<b>1,925,557,520 kWh</b> <b>9.45% of total energy</b>
Unbundled RECs	360,631,111 kWh 1.77% of total energy
<b>Purchased carbon offsets</b>	<b>34,221 MT CO<sub>2</sub>e</b>

Note: Not all companies provided information on individual sources of purchased/acquired green power; therefore, avoided emissions from unbundled RECs are provided, but others, such as physical and virtual power purchase agreements, have been removed. See EPA's definitions of [Green Power Supply Options](#) for more on sources of green power.

### 2022 TOTAL CARBON EMITTED

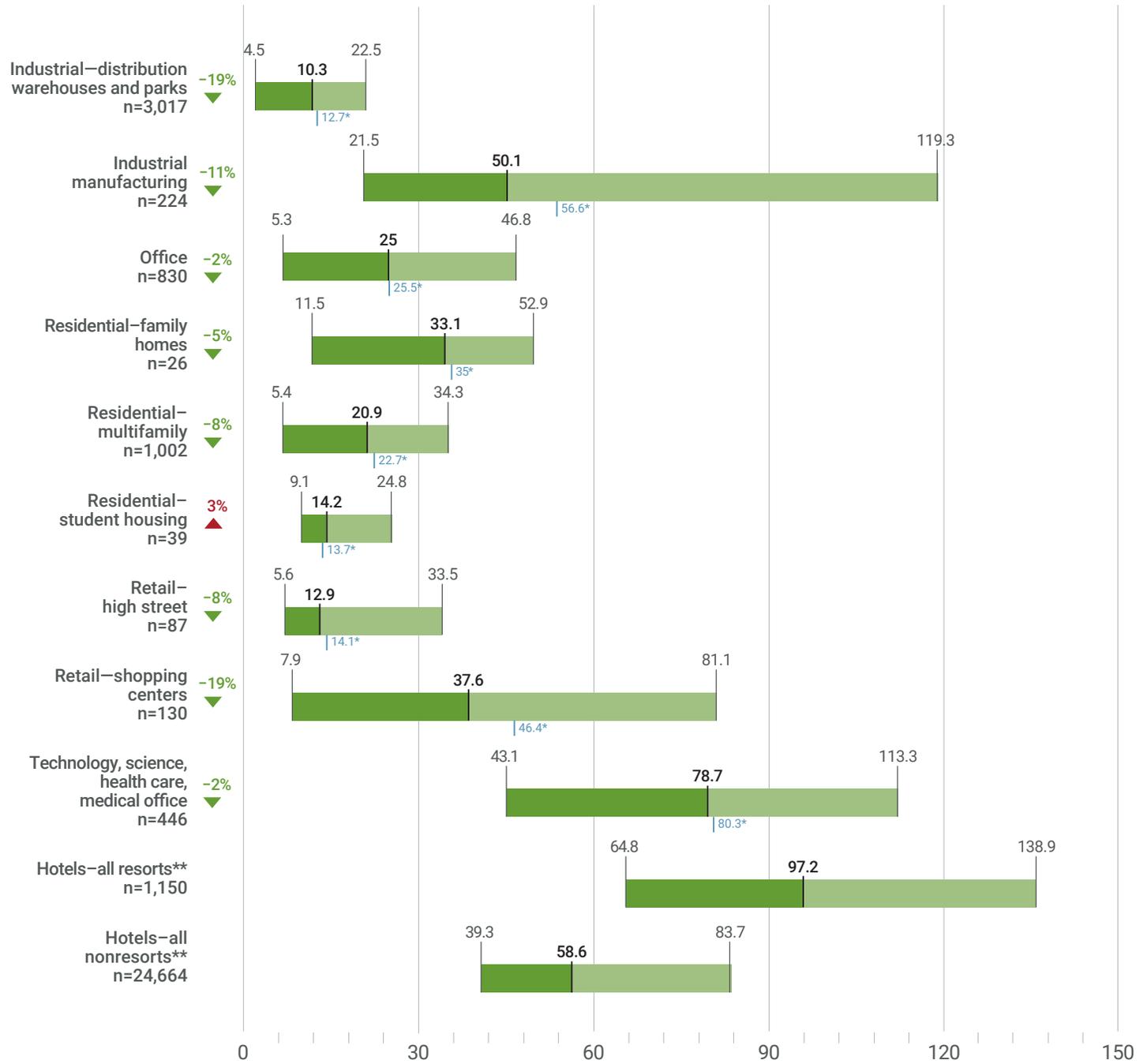


### 2022 TOTAL RENEWABLE ENERGY



# Carbon

## 2022 WHOLE BUILDING CARBON EMISSIONS INTENSITY BY BUILDING TYPE (KG CO<sub>2</sub>E/M<sup>2</sup>)



n=2022 building count

▲ Percent change from 2021 median to 2022 median

■ 25th percentile

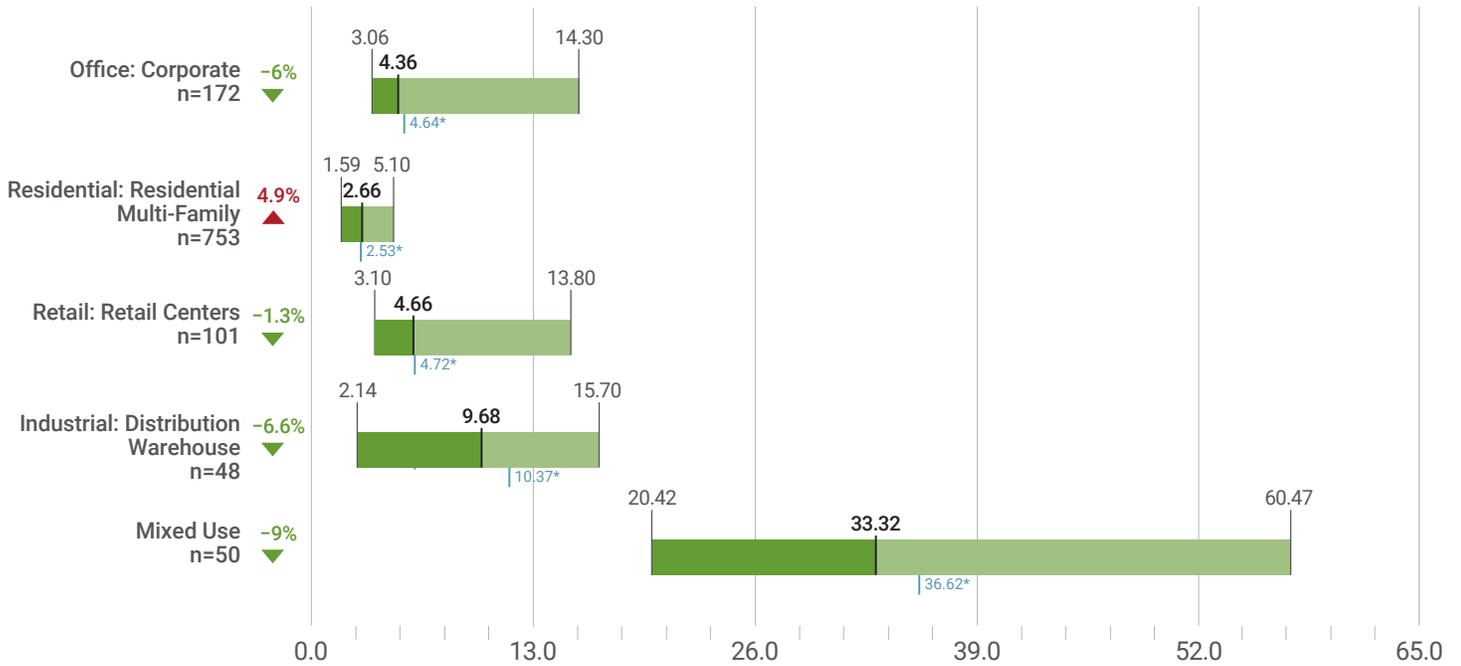
■ 75th percentile

\*2021 median (for comparison)

\*\*Hotel data sourced from 2021 Cornell Hotel Sustainability Benchmarking Data.

# Carbon

## 2022 NON-WHOLE-BUILDING\* CARBON EMISSIONS INTENSITY BY BUILDING TYPE (KG CO<sub>2</sub>E/M<sup>2</sup>)

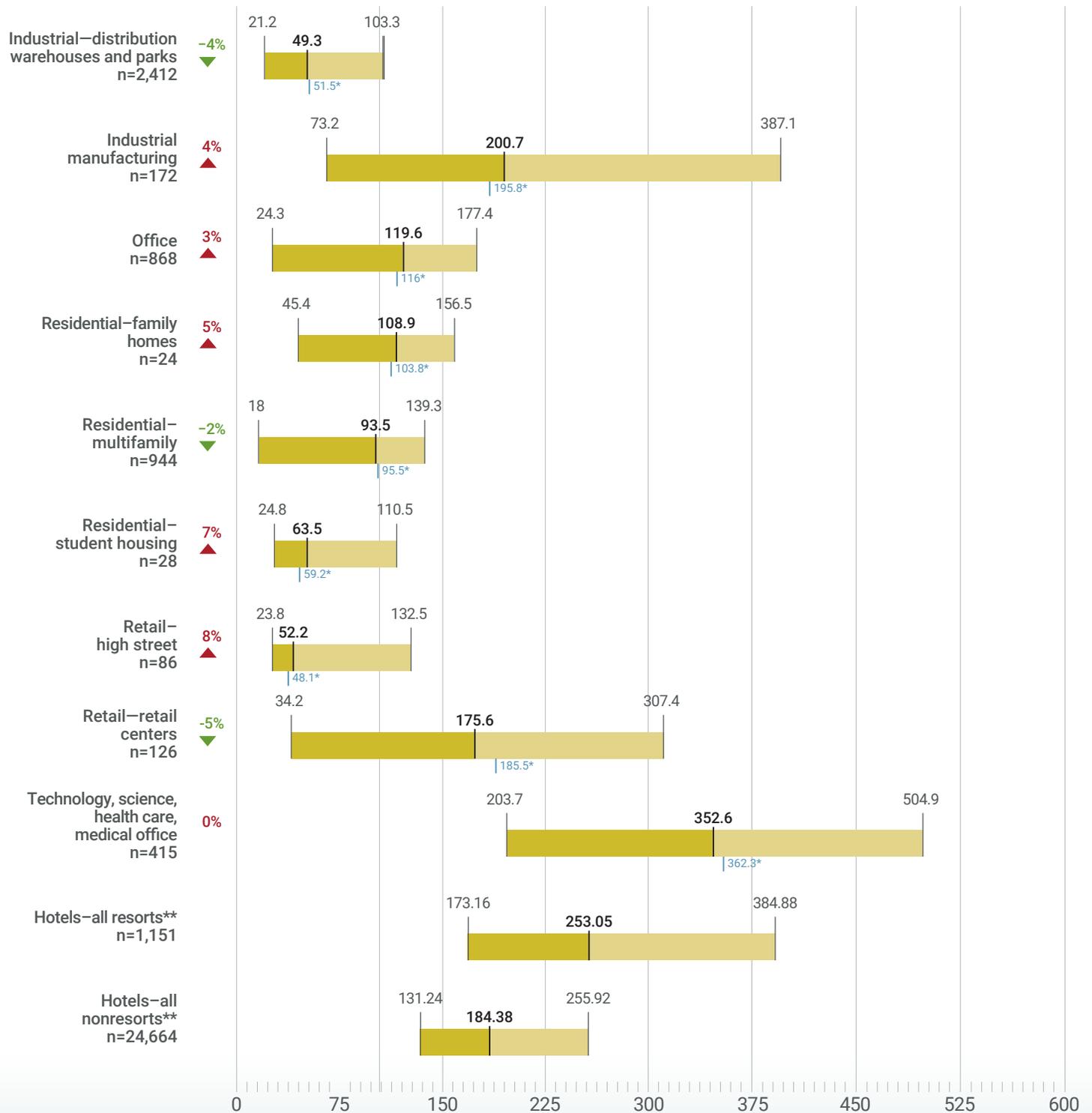


n=2022 building count    ▲ Percent change from 2021 median to 2022 median    ■ 25th percentile    ■ 75th percentile    \*2021 median (for comparison)

\*Non-whole building data includes base building data and common area data.

# Energy

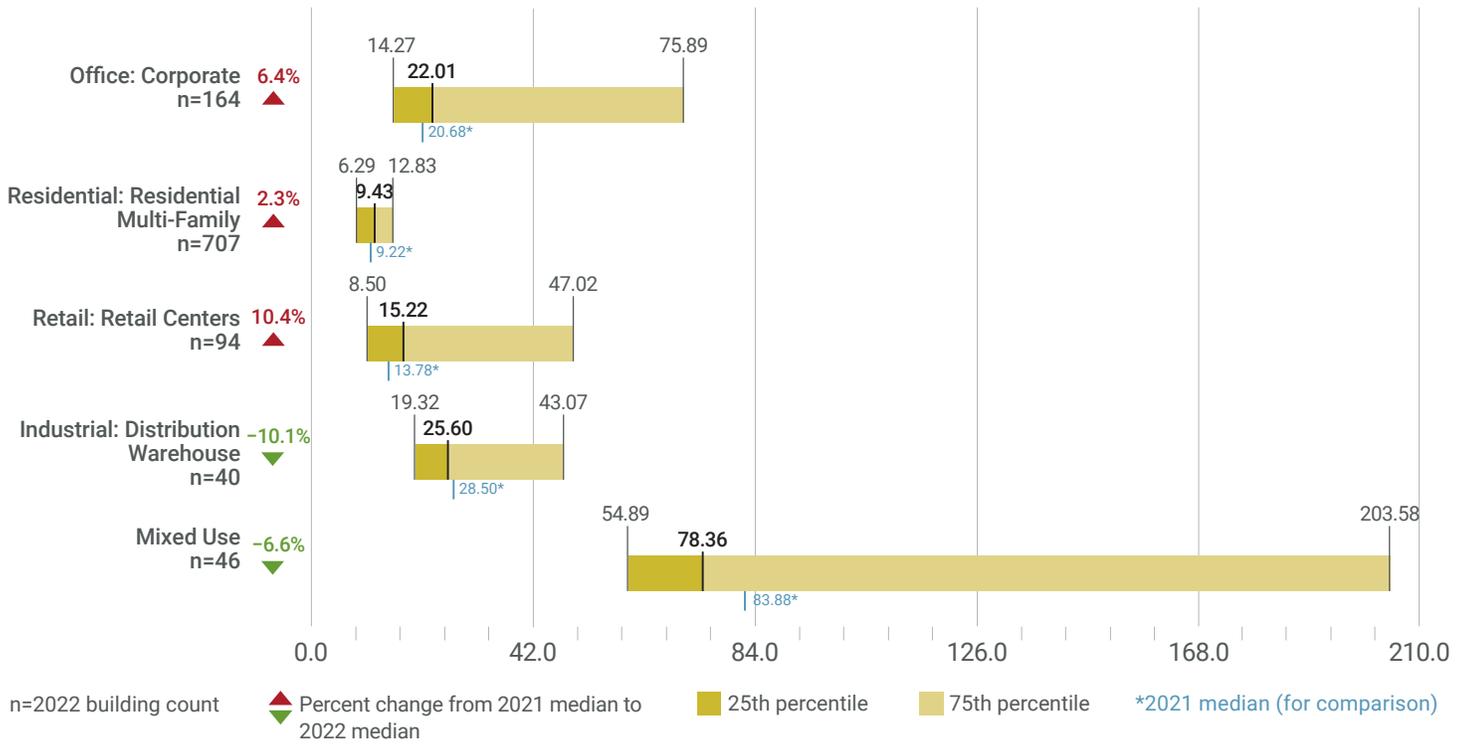
## 2022 WHOLE BUILDING ANNUAL ENERGY USE INTENSITY BY BUILDING TYPE (KWH/M<sup>2</sup>)



n=2022 property count    ▲ Percent change from 2021 median to 2022 median    ■ 25th percentile    ■ 75th percentile    \*2021 median (for comparison)  
 \*\*Hotel data sourced from 2021 Cornell Hotel Sustainability Benchmarking Data.

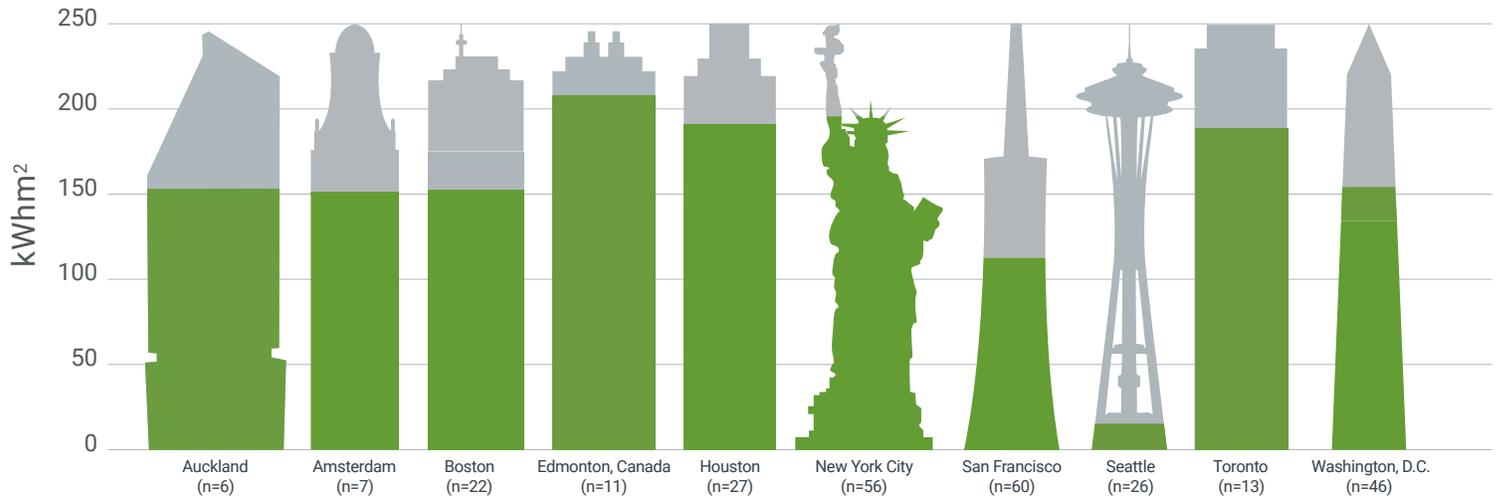
# Energy

## 2022 NON-WHOLE-BUILDING\* ENERGY USE INTENSITY BY BUILDING TYPE (KWH/M<sup>2</sup>)



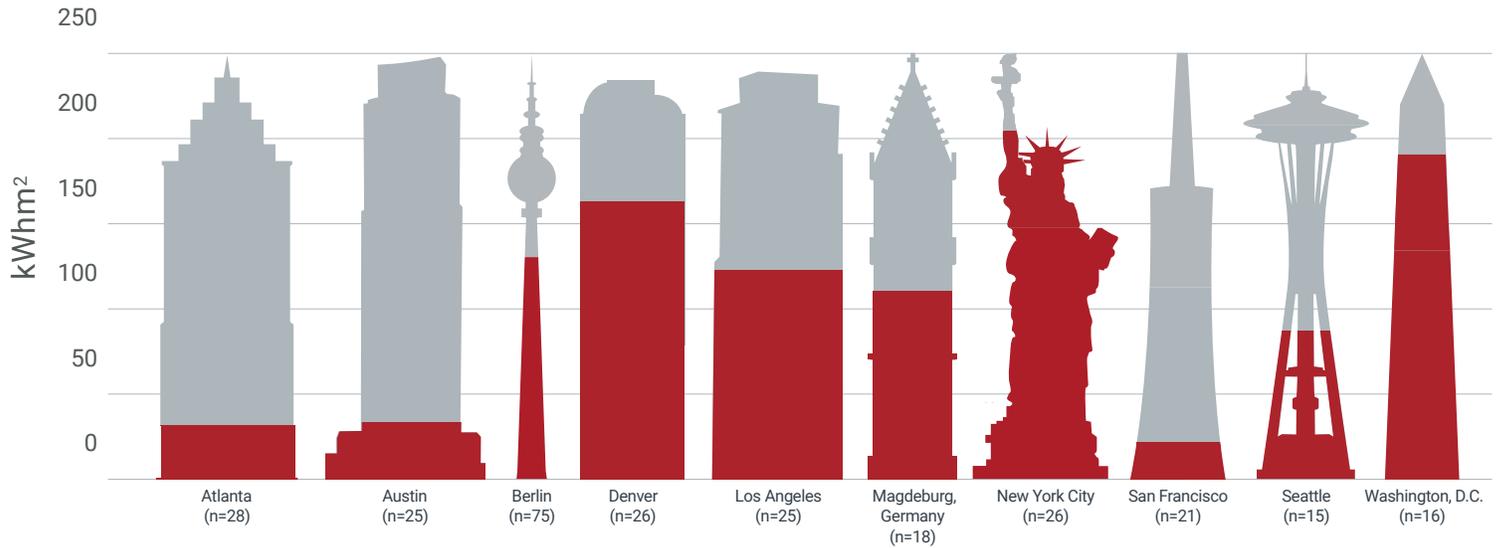
\*Non-whole building data includes base building data and common area data.

## OFFICE ENERGY PERFORMANCE IN SELECT CITIES



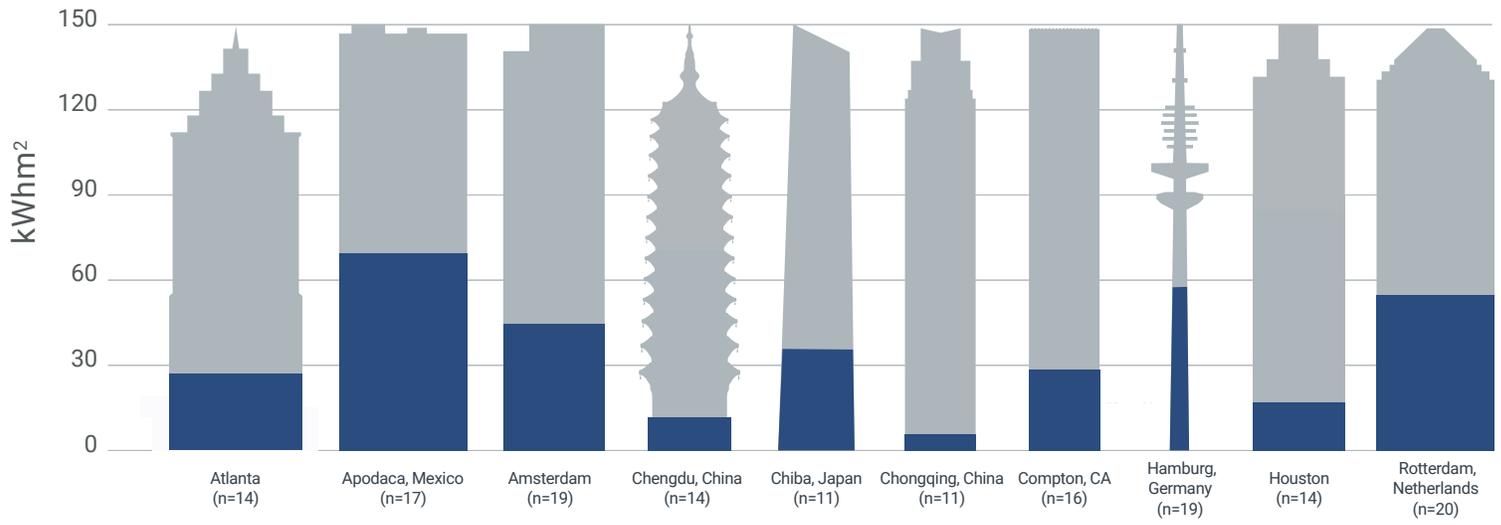
Data provided is whole building only.

## MULTIFAMILY ENERGY PERFORMANCE IN SELECT CITIES



Data provided is whole building only.

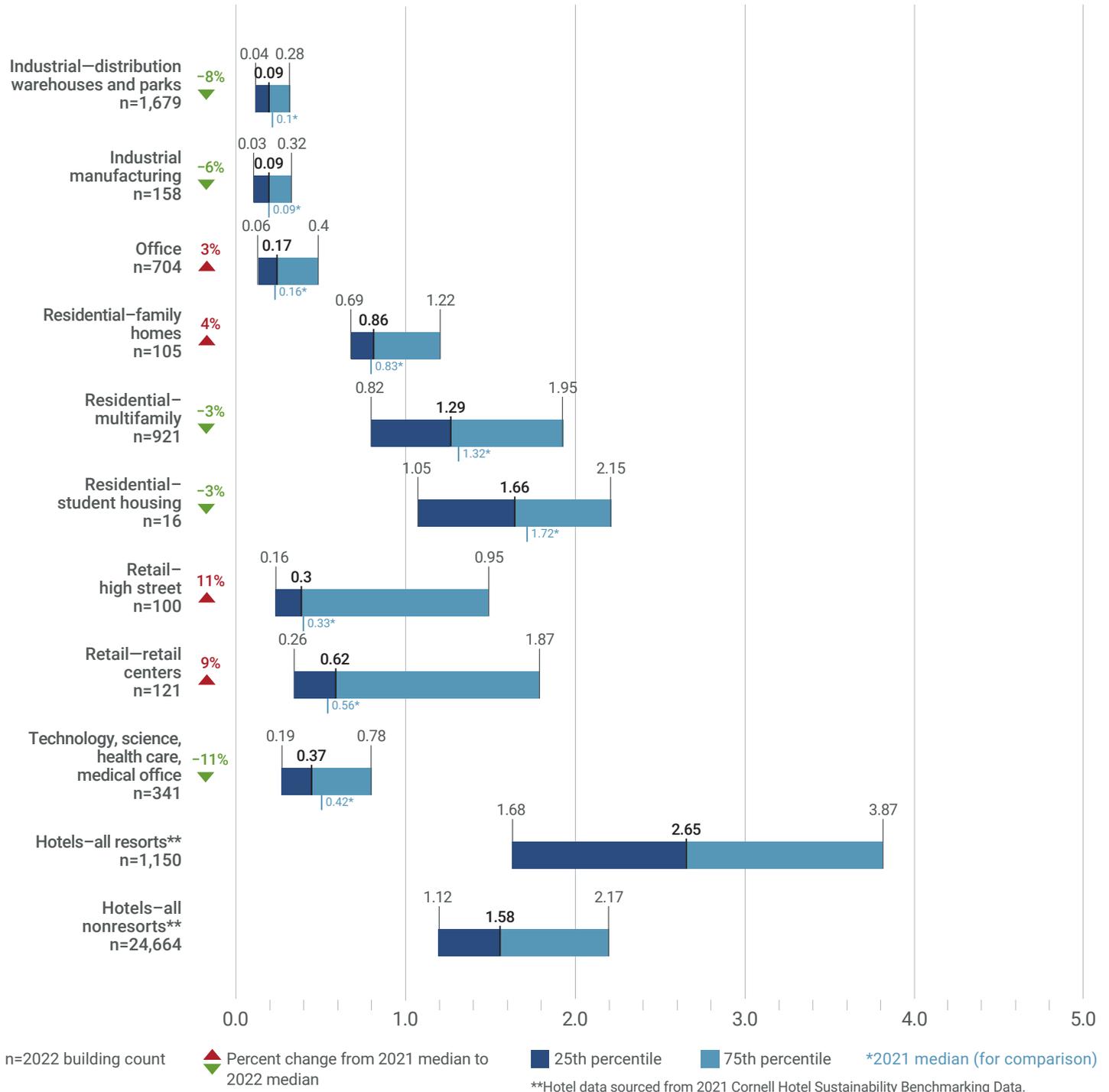
# INDUSTRIAL WAREHOUSE ENERGY PERFORMANCE IN SELECT CITIES



Data provided is whole building only.

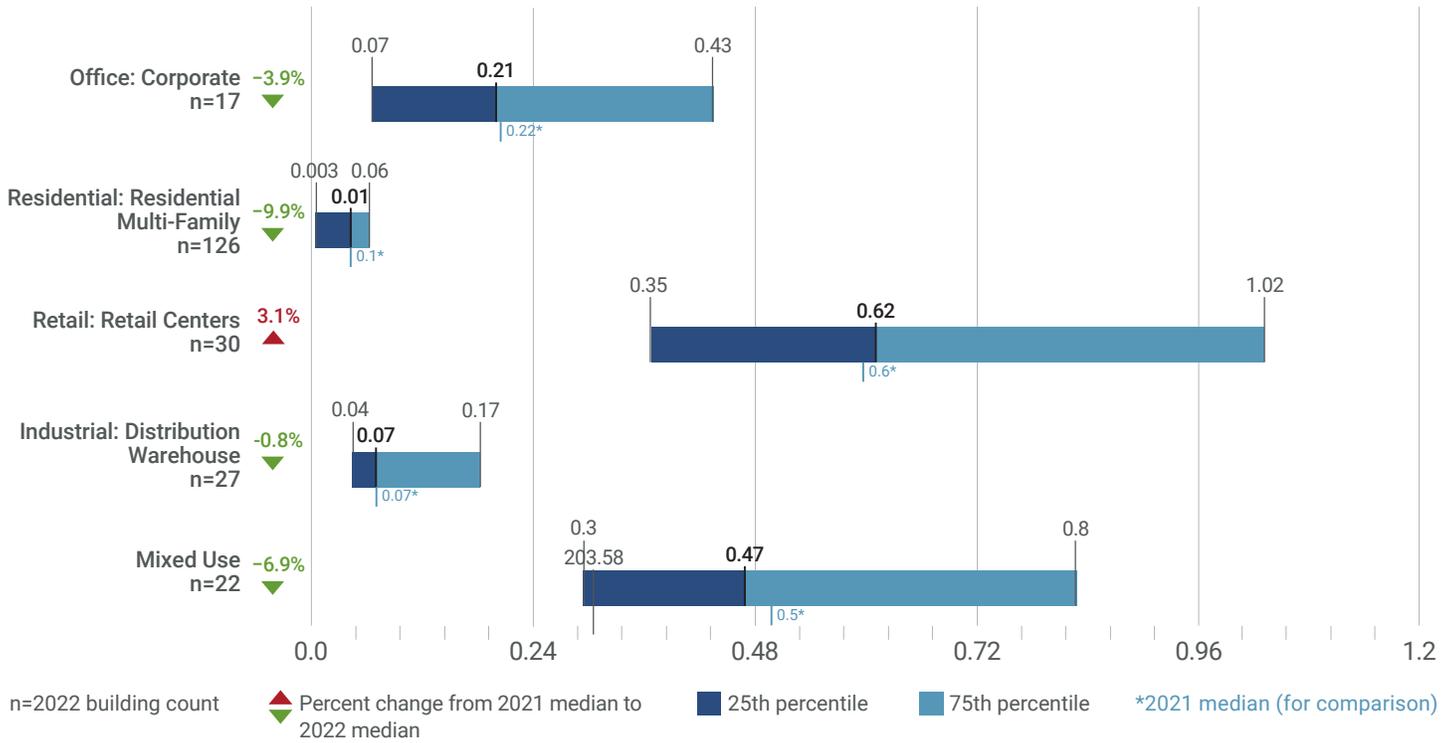
# Water

## 2022 WHOLE BUILDING WATER USE INTENSITY BY BUILDING TYPE (M<sup>3</sup>/M<sup>2</sup>)



# Water

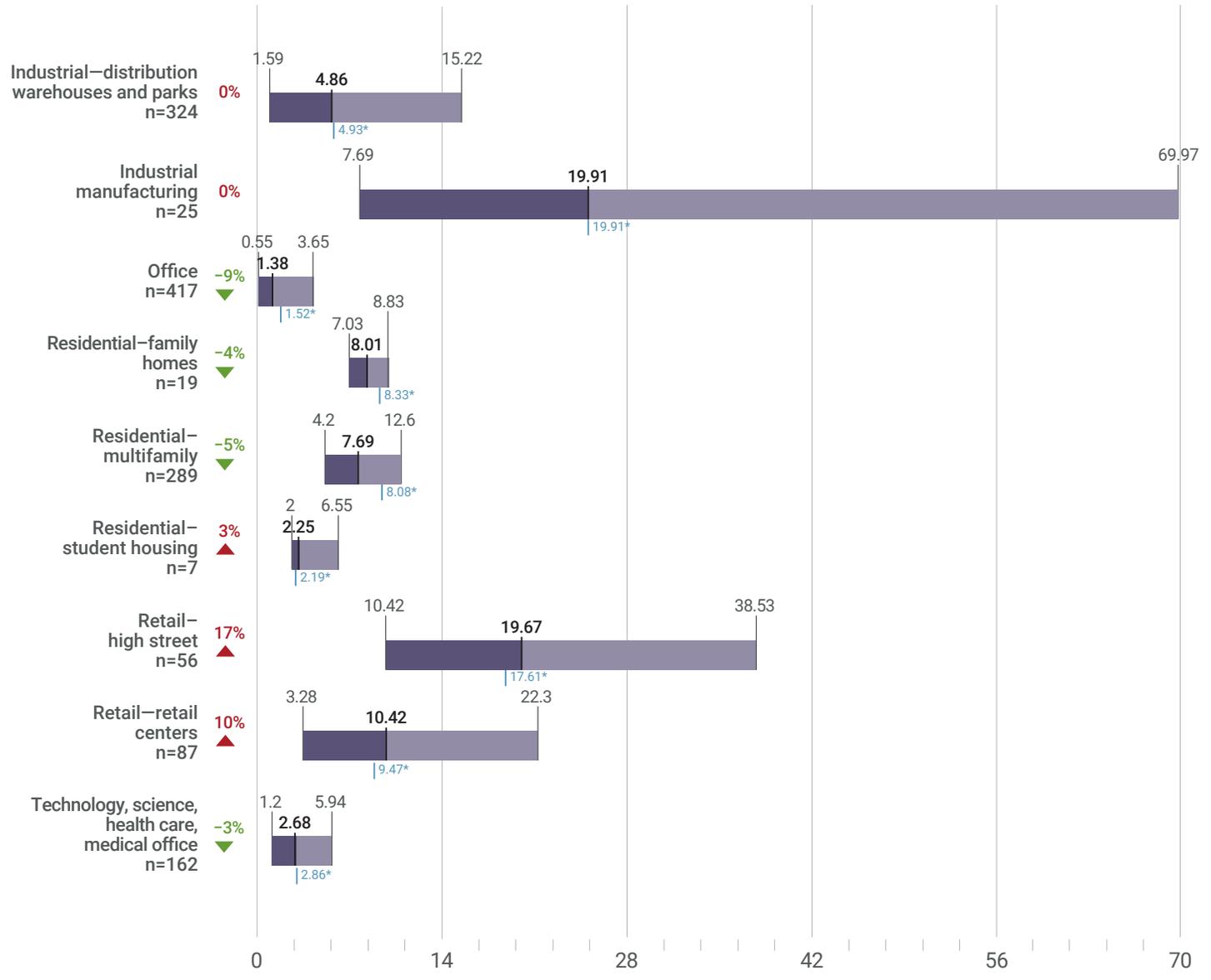
## 2022 NON-WHOLE-BUILDING\* WATER USE INTENSITY BY BUILDING TYPE (M<sup>3</sup>/M<sup>2</sup>)



\*Non-whole building data includes base building data and common area data.

# Waste

## 2022 WHOLE BUILDING WASTE USE INTENSITY BY BUILDING TYPE (KG/M<sup>2</sup>)



n=2022 building count

▲ Percent change from 2021 median to 2022 median

■ 25th percentile

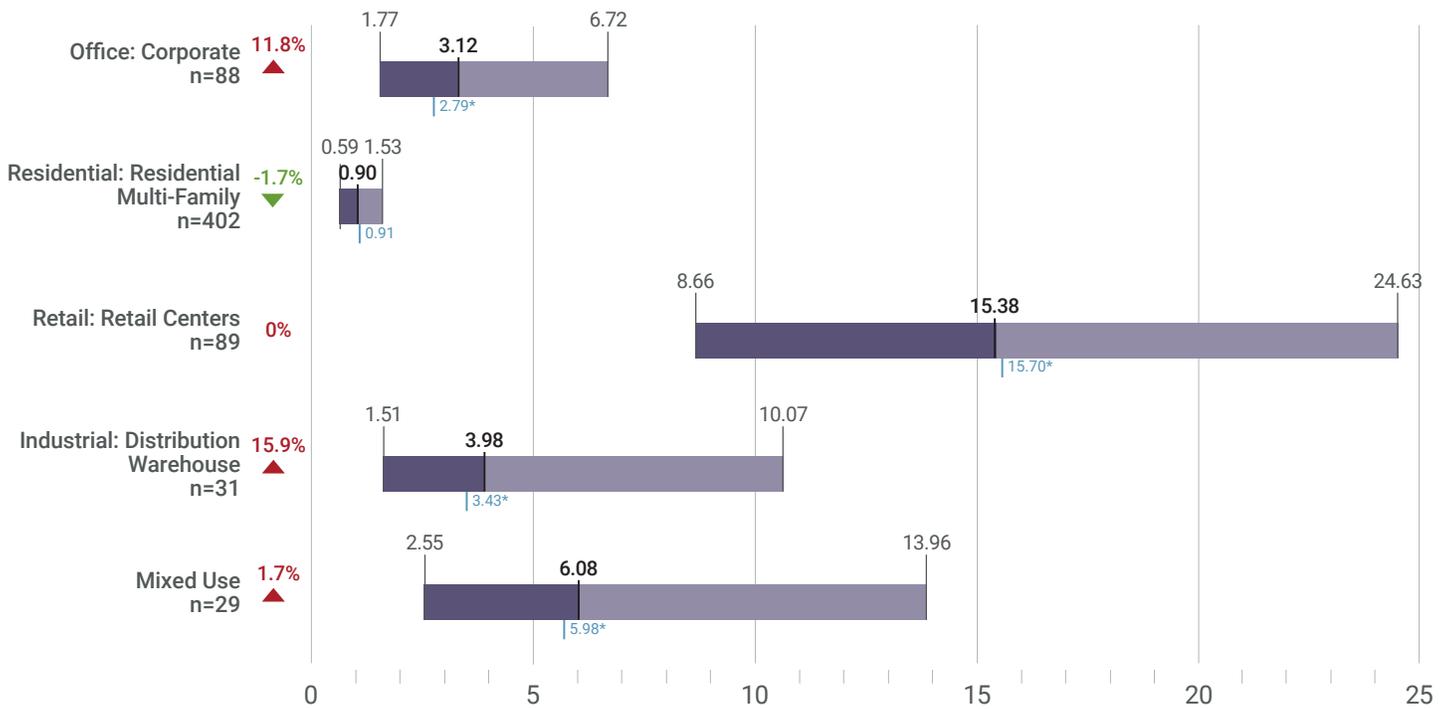
■ 75th percentile

\*2021 median (for comparison)

Note: Cornell Hotel Sustainability Benchmarking waste data was unavailable.

# Waste

## 2022 NON-WHOLE-BUILDING\* WASTE USE INTENSITY BY BUILDING TYPE (M<sup>3</sup>/M<sup>2</sup>)



n=2022 building count    ▲ Percent change from 2021 median to 2022 median    ■ 25th percentile    ■ 75th percentile    \*2021 median (for comparison)

\*Non-whole building data includes base building data and common area data.

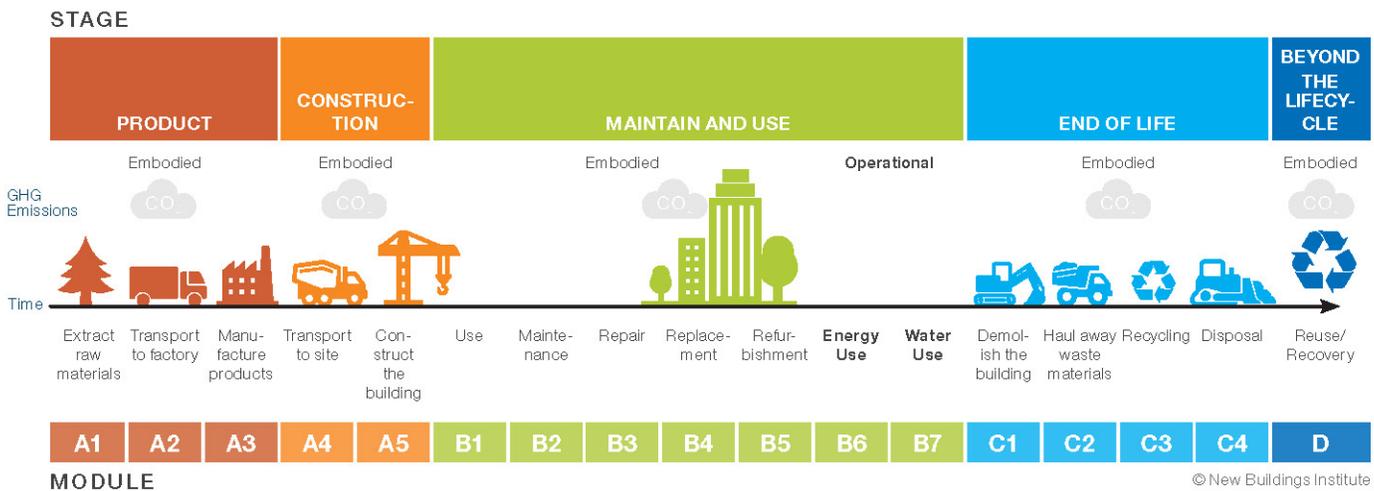
# Embodied Carbon

## Embodied-Carbon Data

ULI Greenprint has a strong history of supporting real estate in achieving net zero goals through annual benchmarking, knowledge sharing, and resource creation. Members have continued to reduce year-over-year like-for-like operational carbon emissions using strategies such as energy efficiency and renewable energy procurement. Thirty-six ULI Greenprint members have aligned to the ULI Greenprint Net Zero Carbon Operations by 2050 goal. However, this reporting is limited to operational carbon, the greenhouse gas emissions that result from building operations. The remaining building-sector emissions come from embodied carbon, the greenhouse gas emissions resulting from the manufacturing, transportation, installation, maintenance, and disposal of building materials.

**FIGURE 1: LIFECYCLE STAGES**

Data source: BS EN 15978:2011

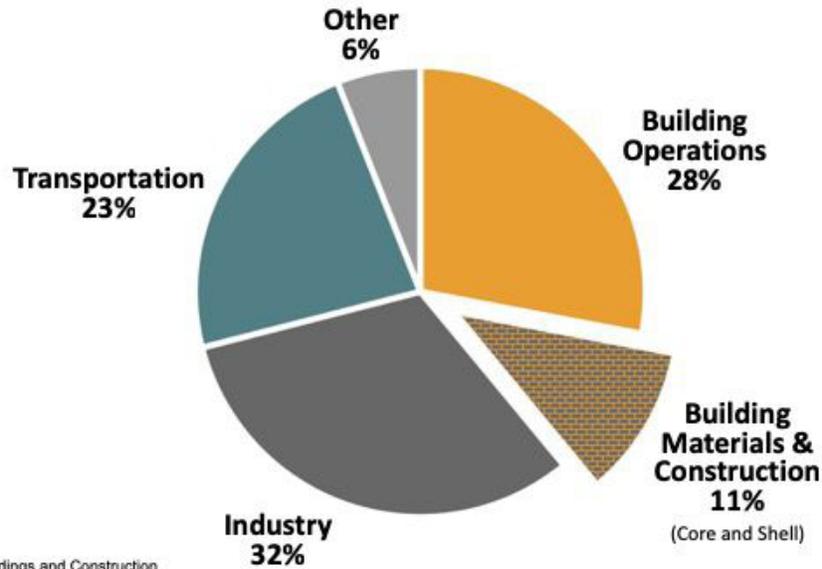


© New Buildings Institute

SOURCE: NEW BUILDINGS INSTITUTE

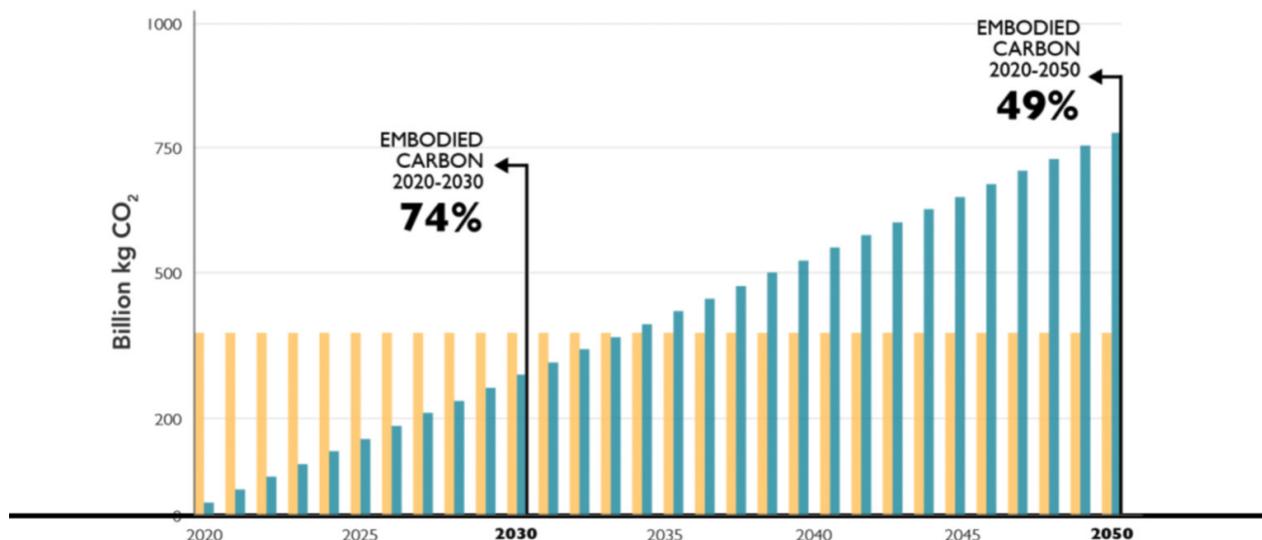
Buildings account for a total of 39 percent of global carbon emissions annually, which breaks down as 28 percent from building operations and 11 percent from embodied carbon. In fact, embodied carbon from materials and construction can account for half a building's lifetime emissions. With global floor 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. Finally, state and local building sector regulations are no longer limited to operational carbon as more jurisdictions require embodied carbon reductions.

### Global CO<sub>2</sub> Emissions by Sector



Source: Global Alliance for Buildings and Construction. 2018 GLOBAL STATUS REPORT.

### Total Carbon Emissions of Global New Construction from 2020-2050 Business as Usual Projection



In the past year, ULI Greenprint launched an embodied-carbon subgroup so that members could support one another in tackling embodied-carbon reductions. As an outgrowth of this subgroup, ULI Greenprint invited members to voluntarily submit their embodied-carbon data to this year’s State of Green report, including data for any buildings completed between 2019 and 2023.

Members reported their total 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 following table includes the assets that were reported this year using tools such as Tally, EC3, and OneClick LCA. This year, all nine assets are based in the United States, with projects split between retrofits and new construction. ULI Greenprint sees this inaugural embodied-carbon reporting from members as an important step in the path to reducing embodied carbon in future projects.

### ULI Greenprint Member-Reported Embodied Carbon of New Construction and Retrofit Projects

REGION	YR.	NEW CONSTRUCTION OR RETROFIT	GFA (M <sup>2</sup> )	PROPERTY TYPE	SPACE TYPE	TOTAL A1:15 (KGC02E)	EC INTENSITY (KGC02E)
New England	2023	Retrofit	9,662	Office: corporate–low-rise office	Single	177,755	18.40
New England	2023	Retrofit	5,853	Retail: high street	Tenant space	114,288	19.53
Mid-Atlantic	2022	New construction	98,778	Office: corporate–high-rise office	Single	2,461,818	24.92
Mid-Atlantic	2022	New construction	44,208	Office: corporate–high-rise office	Single	2,066,473	46.74
New England	2022	New construction	38,514	Office: corporate–high-rise office	Single	3,270,241	84.91
New England	2022	Retrofit	22,633	Technology/Science: laboratory/life sciences	Single	2,098,059	92.70
Pacific Northwest	2023	New construction	50,725	Office	Single	8,700,000	171.51
West Coast	2023	New construction	40,386	Other*	Multi-building	11,057,143	273.79
West Coast	2022	Major construction	65,831	Office**	Single	46,493,180	706.25

\*This is a studio campus that includes office and new ground-up studio sound stages with concrete walls.

\*\* This is an adaptive use project that converted a mall to office. Major embodied-carbon contributors include all new glazing system and associated metals.

# Embodied-Carbon Project Profiles

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## Embodied-Carbon Project Profiles

As embodied carbon has become a focal point of decarbonization, companies have explored numerous ways across the globe to achieve embodied carbon reductions. Below are select examples of embodied carbon reductions including using mass timber in a new development to façade retention and careful design when redeveloping an existing asset. This report provides select examples of ULI Greenprint members' embodied carbon reductions including two using mass timber in a new development, and one prioritizing façade retention and careful design when redeveloping an existing asset.

## 619 Ponce – Atlanta, Georgia



619 Ponce is a four-story mass timber loft office building at Ponce City Market in Atlanta, developed by real estate investment and management firm Jamestown. The building, which includes 87,000 square feet (8,080 m<sup>2</sup>) of office space and 27,000 square feet (2,508 m<sup>2</sup>) of retail space, is being constructed with local, Georgia-grown timber and targeting net zero carbon operations, LEEDv4 Core & Shell certification, and Fitwel certification.

Whereas most timber for mass timber construction is currently sourced from Canada, Austria, or Germany, Jamestown is using timber that was sourced and produced locally. Jamestown's use of Georgia-grown timber and a regional supply chain—a first for mass timber construction in Georgia—reduces the project's transportation emissions and the overall environmental impact of construction and maximizes the sustainability and local economic benefits of mass timber. The building's columns, beams, and floor slabs are made of local southern yellow pine sawtimber harvested from Georgia forests, including from timberland Jamestown owns and manages near Columbus, Georgia. The timberland is managed under the 2022 SFI® Forest Management Standard, which provides third-party verification of sustainable forestry management

based on several factors, including measures to protect water quality, biodiversity, wildlife habitat, and threatened and endangered species.

The sawtimber was transported to Georgia-Pacific's sawmill in Albany, Georgia, where it was converted into lumber. The lumber was then transported to SmartLam's mass timber plant in Dothan, Alabama, where it was manufactured into cross-laminated timber (CLT) panels. The CLT panels were erected on site at Ponce City Market by StructureCraft and JE Dunn, with full building completion expected in 2024. The project aims to leverage best practices for material specification, prioritizing human health by minimizing chemicals of concern in building materials with special focus on interior high-touch elements. Material selections, like mass timber, accented by a natural zinc facade, prioritize embodied carbon reduction and support of the local economy by sourcing materials from within 100 miles where possible.

StructureCraft worked with Jamestown and Handel Architects to evaluate and compare the carbon impact of the Final Project Design to a concrete baseline. A life cycle assessment (LCA) was performed to compare the carbon footprint of the final structural design to an equivalent mild reinforced concrete building, which is more common for office buildings in the area. The boundaries of the LCA were set to highlight the difference in the carbon emissions for the gravity systems (made up of beams, columns, and floors) and ignore building elements shared between the two schemes (concrete shear walls, foundations, and building envelope and finishes).

The timber gravity system in the final design resulted in an almost 75 percent reduction in carbon emissions when compared to the equivalent concrete gravity system, even when carbon captured by the trees during their growth is ignored. When that embedded carbon is included, the gravity system for the final building has a net negative 1,266 tons of carbon embodied. Ignoring the reductions from embedded carbon, almost four timber frames could be built for the same carbon emissions of a concrete gravity frame.



**“Mass timber is the future of sustainable development, and the future of mass timber is locally sourced. 619 Ponce will help redefine sustainable mass timber construction in the Southeast, providing developers and architects with a clear path forward for using local timber.”**

—Michael Phillips, president of Jamestown

## T3 Collingwood - Melbourne, Australia

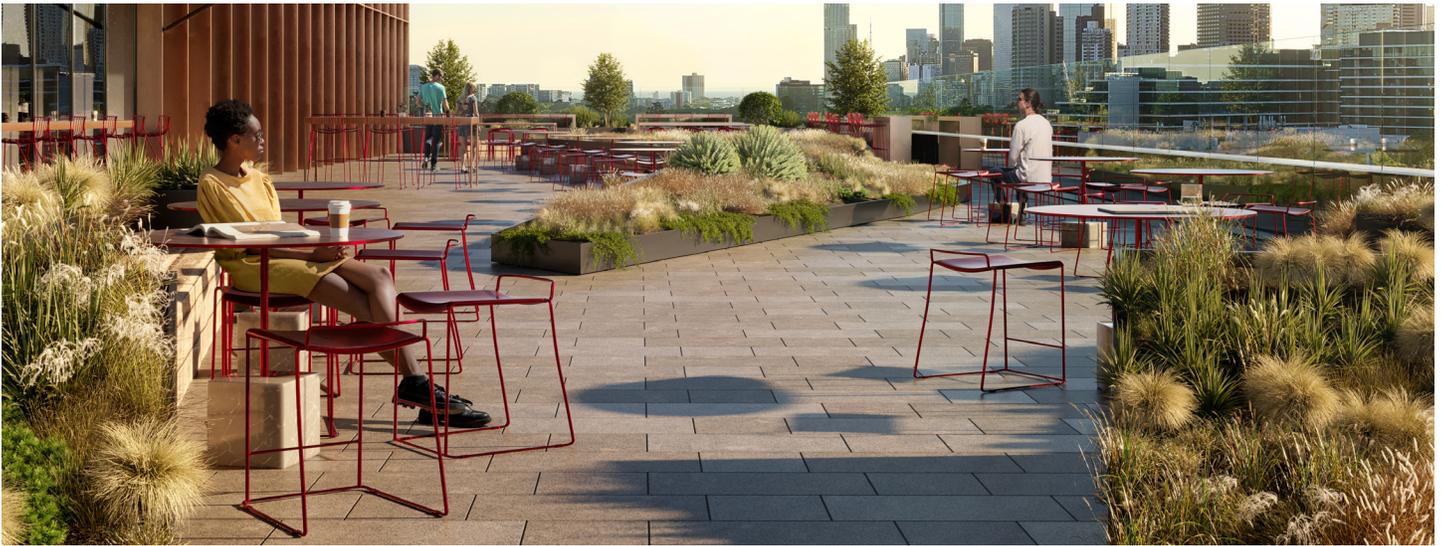
“T3 Collingwood is a groundbreaking, sustainable evolution of old-fashioned office buildings. The timber we use is rapidly renewable, sustainably sourced, cleaner to construct and helps keep carbon out of the atmosphere.”

—Ray Lawler, CEO of Hines, Asia Pacific



In 2019, Hines acquired a 22,819-square-foot (2,120 m<sup>2</sup>) corner site at 26-52 Wellington Street in Melbourne, Australia. This property, Hines’ first ground-up construction project in Australia, is in the Melbourne fringe suburb of Collingwood and is a part of Hines’ “T3” strategy, which stands for timber, transit, and technology. This 15-story prime grade office building is the tallest hybrid mass timber building in Melbourne and Hines’ first timber building in the Asia Pacific region, which can significantly reduce the embodied carbon of a project compared to using conventional materials such as concrete and steel.

Hines’ T3 strategy covers 26 assets around the globe and uses rapidly renewable and sustainably sourced timber, which comes at a slight premium to traditional options like concrete but also shortens the construction duration of projects significantly, making these buildings poised to meet global climate goals. Hines developed the T3 concept in response to evolving tenant requirements and the firm’s ongoing dedication to sustainability. Timber stores carbon rather than emitting it; is less energy intensive to extract



and process; is cleaner, quieter, and quicker to build with; and produces less waste than concrete. It is recyclable, biodegradable, nontoxic, and more fire-resistant than traditional building materials. There is no difference between the life expectancy of a timber building and that of a concrete or steel structure.

The Collingwood building is estimated to reduce the embodied carbon emissions of the structural frame by 26 percent by using timber rather than concrete or steel construction, as determined by the Green Star Design and As-Built Review methodology. Green Star is an internationally recognized rating system founded by the Green Building Council of Australia that measures the impact of a building on reducing climate change effects, among other areas. This reduction pertains only to the product stage embodied carbon, not to whole life carbon. This project used 2,358 cubic meters of cross-laminated timber and 874 cubic meters of glue-laminated timber. Along with other backers, the Clean Energy Finance Corporation (CEFC) committed up to \$70 million in debt financing to fund this development. This CEFC commitment is its first investment under the CEFC Timber Building Program, which aims to encourage the use of mass timber in commercial construction. In addition to reducing its embodied carbon, the building is targeting net zero emissions in its operations. By encouraging use of mass timber construction, CEFC hopes to catalyze local skills and experience and enhance supply chain and delivery capabilities.

The building also includes amenities focused on health and well-being, and the bright natural wood interiors provide spaces that optimize occupant well-being. The project features common social areas, has large tenant terraces, is close to public third spaces, and has end-of-trip facilities that support cyclists, joggers, and walkers in using alternative ways to travel to work. Research shows employees in office environments with exposed timber have more positive associations with their workplace, enjoy higher levels of well-being, and take less leave. Wood is correlated with increased levels of concentration, improved mood, and personal productivity.

**“Mass timber construction is an important step in driving a sustainable future for the built environment we live and work in,” Hines Australia managing director Simon Nasa said. “Not only is timber a completely renewable resource, but timber offices are also biophilic in creating a more natural working environment for tenants and their staff. This results in increased productivity and better mental health outcomes, helping to create the people-friendly live/work/play communities that Hines is known for.”**

## 25 Cannon Street – London, U.K.

“We’re immensely proud of what we have achieved at 25 Cannon Street working with the City of London Corporation and our project partners. This repositioning programme is strengthening the City’s offer of sustainable, high-spec office spaces. The refurbishment of 25 Cannon Street is a prime example of working within an existing building structure and reusing existing materials to enhance an office asset and reduce carbon emissions, a vital contribution to Pembroke’s objective to be net carbon zero by 2035.”

—Caroline Johns, director of sustainability at Pembroke



Through creative thinking and visionary design at 25 Cannon, Pembroke has shown that repurposing existing buildings to meet today’s standards can minimize embodied carbon, highlight existing urban fabric in a new way, and reduce financial exposure through a shorter delivery time. In 2022, Pembroke completed landmark revitalization of neo-classical 25 Cannon Street in London. This 10,684-square-meter (115,000 ft<sup>2</sup>) mixed-use building includes high-specification office and retail over five floors and a roof terrace that affords a clear view of London’s iconic St. Paul’s Cathedral.

With sustainability at its core, the building achieved an excellent embodied-carbon result meeting the 2030 LETI target with an A rating for commercial developments. The facade retention was a key factor in the embodied carbon reductions Pembroke was able to achieve. Due to technical challenges of creating larger windows within a structural facade, a new skin was considered, but the team opted to work with the existing structure and accept the construction risk involved with this choice. The reglazed facade improves the building’s occupant experience with enhanced views and a contemporary, yet contextual finish.

Replacement events led to higher contribution of emissions from utility and maintenance services, internal finishes, and the glazed facade. Fifty-six percent of the carbon emissions of this project occurred as upfront embodied carbon at the point of repositioning, with 30 percent of this upfront quota being from the improvement and remodeling of services and approximately 19 percent contributed by the structural frame.

In future projects, Pembroke plans to have even more of an impact on the embodied carbon through material selection. Substitutions such as electric arc furnace steel rather than basic oxygen furnace steel or ground granulated blast-furnace (GGBS) cement rather than the basic cement would lower embodied carbon even further. Recycled raised flooring could be bought and ceilings left exposed. Internal mullions and transoms could be made from Forest Stewardship Council timber.

25 Cannon Street has also been engineered to high-performance criteria, achieving a BREEAM excellent rating, and the all-electric building now operates fully on renewable power. The high-level urban greening forms part of London's biodiversity green corridor. In addition to the rooftop terrace, two other levels of communal terraces and a revitalized public garden enhance the structure. Pembroke worked with landscape design practice Tom Stuart-Smith to sensitively redesign the publicly accessible garden. In the garden's center is a large, reflective pool designed in collaboration with water feature specialist Andrew Ewing. This reflects the dome of St. Paul's and serves as a light-well for new leasable space below.



# Guide to Report Terms and Charts

## Report Terms

### BASE BUILDING FLOOR AREA

Square meters (or square feet) 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.

### MEDIAN

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

### NET ZERO

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

### NON-WHOLE BUILDING USE

Data includes base building and common area data.

### RENEWABLE ENERGY CREDIT

A renewable energy certificate is 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 (or square feet) of a building that are leased. This floor area 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 (or square feet).

### WHOLE-BUILDING USE

Data includes base building, common area, and tenant data.

## ULI 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, or buildings with over 50 percent change in energy use, carbon emissions, water use, or waste diversion from year to year. The analysis also excludes energy use intensities outside of 3.15 and 3,153 kWh per square meters and assets with 0 carbon use intensity. The analysis does not account for additional variables, such as heating and cooling degree days, vacancy rates, and occupant density. The analysis does not normalize for changes in building performance due to COVID.

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