

9 Greenprint Performance Report™

VOLUME 9

 **Urban Land Institute**



**ULI Greenprint Center
for Building Performance**

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Introduction

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 Greenprint-member and strategic-partner properties as a proxy to demonstrate the progress that can be achieved industrywide.

About the Urban Land Institute

The Urban Land Institute is a global, member-driven organization comprising more than 42,000 real estate and urban development professionals dedicated to advancing the Institute's mission of providing leadership in the responsible use of land and in creating and sustaining thriving communities worldwide.

About the ULI Greenprint Center

The ULI Greenprint Center for Building Performance is a worldwide alliance of leading real estate owners, investors, and strategic partners committed to improving the environmental performance of the global real estate industry. Through measurement, benchmarking, knowledge sharing, and implementation of best practices, Greenprint and its members strive to reduce greenhouse gas emissions by 50 percent by 2030.

Global Reach of Greenprint Members and Strategic Partners



\$760.7 B (€653.8 B)
IN REAL ESTATE ASSETS
UNDER MANAGEMENT



7,950 PROPERTIES
IN THE GREENPRINT PORTFOLIO



\$19,859,513 (€17,069,450)
ENERGY AND WATER COST SAVINGS

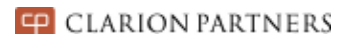


164 MILLION M²
(1.77 BILLION FT²)



28 COUNTRIES
REPRESENTED IN THE PORTFOLIO

Members



Rudin Management Company, Inc.



Innovation Partners



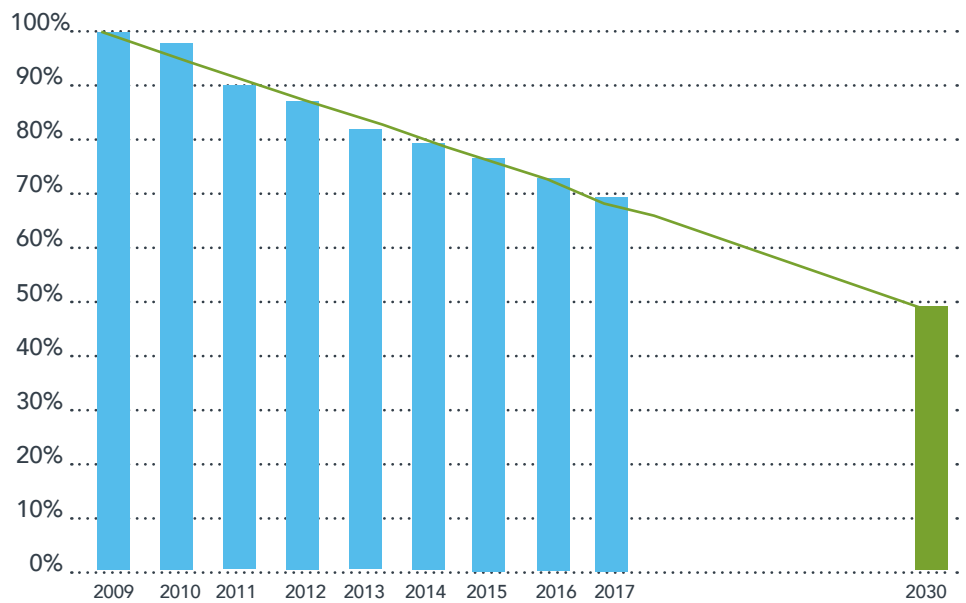
Strategic Partners



Long-Term Results

In 2009, a handful of leading real estate owners came together with shared goals and a shared commitment to cost-effectively reduce energy and water use, waste generation, and greenhouse gas emissions. That group became Greenprint—a blueprint for green buildings. Since then, Greenprint has tracked annual carbon reductions over time and, thus, progress toward member goals. Properties participating in Greenprint are well ahead of schedule in their goal to reduce greenhouse gas emissions by 50 percent by 2030, regularly achieving reductions topping 3 percent annually and demonstrating what is possible for the broader real estate industry.

GREENPRINT CARBON REDUCTIONS OVER TIME



CO₂ YEAR-OVER-YEAR REDUCTION

Greenprint’s mission is to lead the global real estate community toward value-enhancing carbon-reduction strategies. These efforts support global greenhouse gas stabilization by 2030 in line with the goals of the Intergovernmental Panel on Climate Change (IPCC). These goals were ratified by the Paris Climate Accord and have been reinforced by more than 300 cities worldwide that have affirmed their commitment to meet this ambitious climate target.

“Environmental, social, and governance [ESG] best practices are integrated into the core business of LaSalle Investment Management. Nine years in, Greenprint continues to expand its value proposition by working with its members to develop market solutions that will further reduce environmental impact and increase asset-level NOI [net operating income]. With our fiduciary duty to investors to deliver superior investment performance and belief that ESG best practices enhance our returns, LaSalle benefits greatly from Greenprint’s focus on the business case for sustainability.”

LYNN THURBER,
chairman, JLL Income Property Trust;
former chairman, LaSalle Investment
Management;
immediate past global chair, ULI

Annual Results

Greenprint members' buildings collectively continue to reduce energy and water use, waste generation, and carbon emissions year-over-year, as shown below.

ULI Greenprint Performance Snapshot, 2016–2017



ENERGY CONSUMPTION AND SAVINGS

\$18,989,520 SAVINGS*

2016: 5,223,862 MWh
2017: 5,051,231 MWh
1,920 properties



WATER CONSUMPTION AND SAVINGS

\$869,993

2016: 21,573,959 kL
2017: 20,943,529 kL
1,456 properties



CO₂ EMISSIONS

2016: 1,731,769 MT CO₂e
2017: 1,673,036 MT CO₂e
1,920 properties



ELECTRICITY USE

2016: 3,619,343 MWh
2017: 3,485,858 MWh
1,836 properties



WASTE INTENSITY

2016: 0.184 tonnes/m²
2017: 0.167 tonnes/m²
389 properties



WASTE DIVERSION

2016: 0.087 tonnes/m²
2017: 0.090 tonnes/m²
262 properties

* Cost per unit energy savings are estimated using U.S. Energy Information Administration's "Electric Power Monthly," https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a.

2016–2017 Emission Reduction Equivalents



135,979
BARRELS OF OIL
NOT CONSUMED



6,342
HOMES NOT CONSUMING
ENERGY FOR ONE YEAR



12,577
CARS TAKEN OFF THE ROAD
FOR ONE YEAR



1.5 MILLION
TREE SEEDLINGS GROWN
FOR 10 YEARS

Best Practices

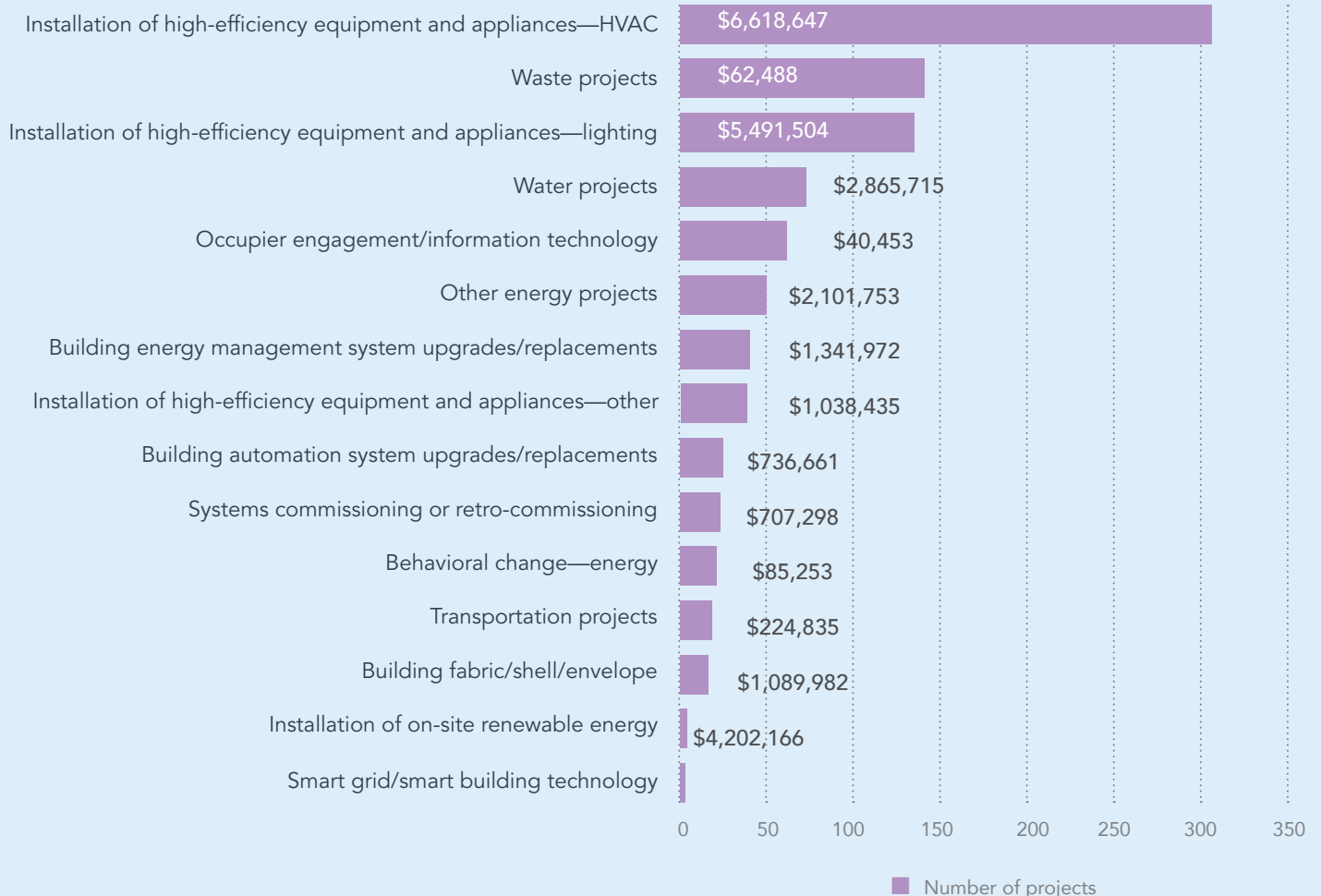
Greenprint Member Projects Continued Carbon Reductions

How does the Greenprint community's portfolio of properties continue to lower carbon emissions? Best practices across energy, water, waste, and holistic building projects lead to improved performance and enhanced property value.

In 2017, Greenprint members collected information in the Measurabl software platform on 998 sustainability projects, up from 963 a year earlier, for a total investment of \$26.6 million. Similar to 2016, most member projects focused on the use of high-efficiency equipment, like LED lighting, lighting controls, and heating, ventilation, and air conditioning (HVAC) equipment. Installation of high-efficiency equipment also received the highest dollar investment among those projects tracking costs, with installation of on-site renewables (solar) and other energy projects receiving the second and third greatest investment.

HIGHLIGHTS BY PROJECT TYPE

\$ INVESTMENT FOR PROJECTS REPORTING COST DATA



Best Practices



High-efficiency equipment: HVAC

In 2017, the most common project recorded in the Greenprint portfolio was the installation of high-efficiency HVAC equipment and controls, with a total of 320 projects. Often, after the low-hanging fruit of lighting improvements have been completed, HVAC is a natural next step. For those projects that tracked cost, this category also received the highest initial investment, \$6,618,647.

Tishman Speyer carried out a chiller replacement and thermal ice storage project for 2 million square feet of class A commercial office space at 45 and 50 Rockefeller Center. The company retired the plant at the end of its useful life,

replacing it with more-efficient equipment that allowed operational flexibility and more control.

Sixty-one ice tanks were installed for a total 11,000 ton-hours of capacity. Refrigerants with high potential for global warming were replaced with ultra-low alternatives, and the new equipment requires 60 percent less power to achieve the same level of cooling. Energy use dropped by 2.3 million kilowatt-hours (kWh), and demand declined by 45 percent from the storage tie-in. Millions of dollars were saved through reduced electrical demand charges, energy savings, and use of available utility incentives. The simple payback on the new system was only seven years.

“Tishman Speyer is a leader in advanced building technologies and controls and strives to provide state-of-the-art building operations throughout its portfolio. This project checks all of the boxes we are looking for—far better efficiency, lower global warming effects, and electrical load shifting that benefits the building and the state and city.”

JONATHAN FLAHERTY, senior director, sustainability and utilities, Tishman Speyer



Waste projects

A total of 147 waste-reduction projects were completed at properties in the Greenprint portfolio. Common projects reported in 2017 included audits to better understand the waste stream, new recycling containers to better organize the waste room, and training to educate tenants on ways to reduce harmful waste.

In 2014, PGIM Real Estate, the real estate investment management business of Prudential Financial Inc., introduced solar-powered, smart waste and recycling stations with built-in compactors at six shopping centers

across the United States. From 2014 to 2018, as older trash containers required replacement, 105 solar-powered compacting bins were installed to facilitate recycling and reduce the volume of waste. This program resulted in litter reduction and an average 23.7 percent recycling rate. A five-year payback period was realized for all upfront bin costs through savings in common-area maintenance. In addition, a 13.3 percent annual return on investment was recorded, with fewer labor hours spent on garbage collection and savings from the reduced need for trash bags.

“The installation of these solar-powered compacting bins is illustrative of PGIM Real Estate’s strategy to embed ESG [environmental, social, and governance] best practices throughout our real estate investment, asset management, risk management, and talent management processes. Through our commitment to responsible and sustainable real estate investing and management, we seek to deliver enhanced risk-adjusted returns for our investors, become a landlord of choice, and maintain our position as a practitioner of good global citizenship to all our stakeholders.”

CATHY MARCUS, global chief operating officer and head of the United States, PGIM Real Estate



High-efficiency equipment: lighting

Installation of high-efficiency lighting equipment was again common across the Greenprint portfolio, with a total of 141 projects implemented in 2017. Lighting projects achieved the greatest reduction of energy use of all project types, with a total of 351,553 megawatt-hours (MWh) in expected annual savings. For the projects that collected data on cost and energy savings, lighting projects saved 0.5 MWh per dollar invested and achieved payback in less than one year.

DWS has undertaken a portfolio-wide lighting retrofit program, which is aimed at both reducing its energy and carbon footprint as well as saving money for investors and tenants. To

do this, DWS reviewed its portfolio to create a comprehensive list of properties that would be ideal candidates for lighting retrofits. In addition, DWS developed a standardized process and preferred vendor list and coordinated across property management teams, allowing the company to scale the solution across regions and property types. In 2017, 22 lighting projects were implemented across the portfolio with an estimated 41 percent project-level return on investment. DWS expects in 2018 to more than double the number of lighting projects completed and plans to continue expanding its efforts over the coming years.



Water projects

As water costs continue to rise across the United States, real estate owners in cities with high water costs continue to look for ways to reduce consumption. The most common water projects across the Greenprint portfolio recorded in 2017 focused on cutting water use, including the installation of high-efficiency water fixtures and use of drought-tolerant landscape design with drip irrigation. Seven properties went further, installing on-site wastewater treatment or stormwater reuse systems, allowing the properties to recycle water collected on site.

At Jamestown's Larkspur Landing office campus in Larkspur, California, the management team invested to upgrade the

site to more drought-tolerant and native landscaping to reduce maintenance costs and water use while improving the aesthetics of outdoor common areas. In addition, the irrigation system was retrofitted with drip irrigation, which wastes less water through direct application to the ground near the plantings. This initiative supports Jamestown's goal of achieving a 20 percent reduction in portfolio-wide water use by 2024 (from a 2014 baseline). Between 2016 and 2017, Larkspur Landing achieved a 17 percent reduction in water use as a result of interior plumbing fixture upgrades, and anticipates additional savings from the landscaping project, which was finalized in August 2017.

“As our indoor plumbing fixtures and HVAC systems become more efficient, landscaping represents the next largest driver of water use at most office properties. Thoughtful designs that maximize native species can serve as a beautiful tenant amenity that encourages occupants to spend more time outdoors and provides habitat and food for bees, birds, and butterflies.”

BECCA RUSHIN, vice president, sustainability and corporate social responsibility, Jamestown Properties



JAMESTOWN LP



Tenant Engagement

Tenant engagement is a low-cost option for building owners hoping to reduce their resource consumption, with many of the 64 reported projects claiming an investment of zero dollars in their tenant engagement efforts. Because tenants often consume up to 50 percent of the energy in a property, educating them on energy-efficient choices offers significant benefits. Tenants that feel engaged and can see evidence that their space is sustainable could also be more likely to renew their lease.

The property manager is a key stakeholder in occupant engagement and can take the lead in implementing sustainability initiatives for tenants. Among Greenprint members with third-party property managers, BlackRock, LaSalle Investment Management, PGIM Real Estate, and Heitman had multifamily

properties that participated in an Earth Day campaign. Both site teams and tenants were educated on ways to reduce wasteful energy and water consumption. These campaigns included individual initiatives that focused on plug-load efficiency and promoted recycling of electronics and other waste.

To engage tenants in energy efficiency during property fit-outs, ULI Greenprint's Tenant Energy Optimization Program (TEOP) provides a ten-step process for tenant space design and construction. Tenants using the step-by-step process typically demonstrate energy savings of 30 to 50 percent, have payback periods of three to five years, and average a 25 percent internal rate of return (IRR). Though some TEOP steps do require investment, because the process starts at leasing TEOP can be a great way to start tenant engagement early and reinforce future no-cost engagement efforts.



Holistic Energy Retrofits

In order to achieve 50 percent emissions reductions by 2030, buildings will need to plan to deepen energy efficiency over time. The existing stock of buildings will need to undergo holistic retrofits for energy efficiency, requiring the implementation and tracking of multiple project types. The Greenprint portfolio is already on track: 226 properties reported completing more than one energy efficiency project in 2017.

LaSalle Investments' 2020 K Street in Washington, D.C., is an 11-story multitenant structure built in 1974 with a fitness center, parking garage, and rooftop terrace. Since acquisition in 2010, LaSalle has been continually upgrading the building to achieve a holistic retrofit as part of its investment strategy. Initiatives include the following:

- » variable frequency drives (VFDs) installed on relief fans, cooling tower fans, and condenser water pumps;
- » efficient toilets installed;
- » second-floor windows retrofitted;
- » water treatment system upgraded;
- » domestic water booster pump replaced to be more efficient;
- » occupancy sensors installed on all stairwell fixtures;
- » chiller-plant building management system controls replaced;
- » lighting control system software upgraded and lighting retrofitted with LEDs;
- » switchgear and feeder cables replaced;
- » retail tenants segregated from the base building to reduce off-hours energy consumption;
- » tenant engagement to reduce overtime HVAC use;
- » wireless lighting system and energy-efficient light bulbs installed; and
- » ongoing recycling program with a 73 percent diversion rate.

These upgrades resulted in 2017 cost savings of \$150,000 and energy savings of 500,000 kWh, and helped the building achieve Gold certification under the Leadership in Energy and Environmental Design (LEED) program.



Trends Driving Sustainability

Through its strong relationships with global real estate owners, investors, and strategic partners, Greenprint has gained insight into the trends leading the industry toward improved efficiency and environmental performance. Three trends in particular highlight new and evolving opportunities that the real estate community can capitalize on to gain a competitive edge by making buildings more efficient and increasing asset value: investing in new technology, changing utility relationships, and expanding the definition of sustainability to include wellness, resilience, and transparency.

Investing in Innovations How Real Estate Developers Are Shaping New Technology

Building owners and developers continue to look for new technologies to optimize property performance, build better connections with tenants, and provide actionable insights to the property management team. Real estate technology can enhance the built environment and reduce its environmental impact in many ways, including by reducing excessive lighting and HVAC use, enhancing tenant productivity, and leveraging distributed energy resources. However, with so many technologies available, it can be difficult to identify the ones that best fit within an owner's strategy and goals, and that actually work as the vendor promises. How can a firm know whether it has a winning technology that will meet expectations and function over the life of the asset?

In order to identify successful early-stage technology companies, real estate owners and developers are starting to partner with technology incubators such as Fifth Wall and MetaProp. It is a mutually beneficial relationship: technology companies benefit from a deeper understanding of their customer base's needs, while the real estate companies can guide development to better fit their needs as well as pilot innovative technologies in their portfolios before their competitors do. Beyond identifying new technologies, real estate companies invested in technology also gain value from equity in successful startups.



RUDIN MANAGEMENT COMPANY, a private and diversified real estate owner, began investing in technology in 2015. It first recognized the potential to pilot new technology across its portfolio when it founded and then spun off Prescriptive Data, a real estate technology startup with the goal of making real estate run more efficiently while enhancing the tenant experience. Rudin's strategy is to

invest in technologies that enhance its business by making buildings run more efficiently, lease up faster, or improve tenant engagement.

With that strategy in place, Rudin aims to pilot any new technology that it plans to invest in, either before making the investment or soon afterward. In addition, to identify new technologies it might not normally be exposed to and to undertake additional due diligence,

Rudin has partnered with Fifth Wall, joining a recent fund exclusively focused on real estate technology.

Looking toward the future, Rudin not only continues to look for technology that complements its business goals and current technology, but also plans to use its extensive experience in the real estate industry and its valuable building portfolio to inform a bespoke set of technology products.

Other Greenprint members are also participating in technology investments, with new deals and partnerships being reported regularly, including the following:

- » BlackRock invested \$70 million to complete a \$200 million financing round for View, a dynamic glass manufacturer and Greenprint Innovation Partner.¹
- » PGIM participated in a \$40 million venture capital fund through MetaProp aimed at real estate technology startups.²
- » Fifth Wall has partnered with and received investment from Prologis, Hines, and Rudin Management.³
- » JLL Spark, a division of JLL, launched a \$100 million global venture fund to focus on technology startups that will support JLL clients and investors, as well as help JLL improve its business.⁴

1. Katie Fehrenbacher, "View Dynamic Glass Closes Another Big Round, Bringing Total Raise to \$700 Million," GTM (Greentech Media), June 27, 2017, <https://www.greentechmedia.com/articles/read/smart-glass-maker-view-raises-another-big-round#gs.O7EsazE>.

2. David M. Levitt, "Prudential, CBRE Join Startup MetaProp's \$40 Million Fund," Bloomberg, June 19, 2018, <https://www.bloomberg.com/news/articles/2018-06-19/prudential-cbre-join-tech-startup-metaprop-s-40-million-fund>.

3. Liam La Guerre, "Fifth Wall, Rudin Raise \$4.3M in Seed Funding for PropTech Company," *Commercial Observer*, January 25, 2018, <https://commercialobserver.com/2018/01/fifth-wall-rudin-raise-4-3m-in-seed-funding-for-proptech-company>.

4. JLL, "JLL Spark Announces \$100 million global venture fund," June 5, 2018, www.jll.com/news/317/jll-spark-proptech-global-venture-fund.



Such investment is funding a wide range of new real estate technologies. The figure below provides examples of technology already deployed or being piloted by Greenprint members and others.

TECHNOLOGY BEING DEPLOYED

- Inexpensive sensors that, coupled with building analytic software, provide continuous commissioning and opportunities to optimize energy and water efficiency.
- Energy storage with smart software that helps buildings engage in power price arbitrage and significantly reduce peak load pricing.
- Wellness technologies, including advanced acoustic materials that reduce ambient noise, lighting that mimics circadian rhythms, and electrochromic glass that optimizes daylighting and saves energy.

TECHNOLOGY ON THE HORIZON

- Artificial intelligence–driven building automation that advances analytics from sensor-driven continuous commissioning systems.
- New building materials that generate energy, such as solar glass, solar pavers, and kinetic floors.
- New virtual- and augmented-reality tools that make construction and maintenance safer, faster, and more efficient.
- Smart-city tools that better connect buildings to autonomous vehicles, smart grids, and other infrastructure technology of the future.

With such a wide range of technologies, implementation is never standard because buildings and their operations vary widely. In particular, systems combining hardware and software are reported to be more complex, requiring additional integration and staff training to ensure optimal

efficiency. However, if properly selected and implemented, each of these new technologies has the potential to add value to the built environment. Together, real estate and technology can work to embrace innovation and gain a competitive advantage.



VIEW INC.

Changing Utility Relationships

For decades, the only relationship between utilities and the real estate industry was the sending and paying of bills for metered energy use. But times have changed, with utilities often required by regulators to support energy efficiency and renewable energy goals.

In order to meet these goals, utilities are offering custom incentives, providing free audits to identify opportunities to improve energy efficiency, and even offering on-bill financing for major efficiency capital projects. In addition to incentives, building owners are looking for more from utility companies, including whole-building energy use data for compliance with city benchmarking ordinances, interval-level data to enhance opportunities for peak-load shaving or demand response, and smart metering to better adapt to the increase in distributed energy resources on stressed electric grids. These changes have led to a new relationship between the real estate industry and its utility providers that continues to evolve and strengthen.

Buildings can now achieve even deeper savings thanks to creative utility programs to boost customers' energy efficiency in the built environment. Because utility incentives and what they cover change regularly, it is important for real estate companies to stay up to date on local incentive programs and maintain strong connections with utility representatives.

Vendors of energy-efficient equipment and systems can also support owners by submitting project proposals that incorporate the incentives and, in some cases, take on

the risks involved in the shifting, complicated incentive programs. To ensure that the project financials pencil out, some vendors provide the equivalent of the utility rebate for an energy-efficient system to the owner then are reimbursed by the owner when the rebate comes through from the utility later. One of the strongest resources for identifying utility incentives is the building engineer, who not only knows the building, but likely already has a list of vendors to work with. Because building engineers will manage any new technology placed in a building, getting their buy-in early in the incentive process is invaluable.

Utilities, cities, and states are providing particularly attractive incentives right now. Many Greenprint members are using standardized utility efficiency incentives through programs like California's local capacity requirements (LCRs) to implement LED lighting across their portfolios, or through streamlined portfolio-wide opportunity analyses from utility program implementers like Waypoint.

Utility incentives also can be leveraged to make technologies like battery storage and peak-shedding programs like demand response make sense financially for interested companies, improving building energy efficiency and reducing operating expenses.

KILROY REALTY has used utility incentives at a diverse set of properties to implement energy efficiency projects outside the capital expenditure budget, says Sara Neff, Kilroy senior vice president of sustainability. For example, the company has taken an innovative approach to partner with utilities on emerging technology programs, installing vetted and fully funded real-time energy monitoring and management software, as well as advanced HVAC controls. Though

not all technologies yielded impressive savings, they came at no cost and provided an opportunity to test their potential benefits.

Kilroy has also had great success combining incentives to implement demand-response technology, using one incentive to finance the demand-response software and another to layer on additional energy-efficiency software.

(Response demand is important because up to 40 percent of a utility bill can come from use at peak

times.) By identifying through a specialized consultant dates when the building could hit its peak load, Kilroy is able to use the installed software to shave the peak load and significantly reduce operational expenditures. The company's investment in on-site battery storage from Stem supports its capability to shift energy load during peak-demand events.

Many incentives are currently available, but the business case for them varies significantly. Some owners are installing technologies like battery storage exclusively in areas with attractive incentives and where a strong financial case can be made based on the cost of energy and the stress on the electric grid.

Further, not all technologies come with strong incentives or are worth the paperwork. Some building owners report complications with utilities even when they offer substantial incentives. For example, for the installation of electric vehicle charging stations, some owners are hesitant to accept the utilities' contract terms, which can include requirements for easements and a large minimum number of charging stations. In such instances, some owners are willing to forgo the incentives and just pay for the infrastructure themselves.

As technologies evolve and properties incorporate more on-site power generation and storage, utilities and the real estate community are being forced to adapt their relationship in order to address—together—the needs of the electric grid. Although building owners and utilities have competing priorities, working together they can get closer to achieving ambitious environmental and financial goals.

BEST PRACTICES FOR LEVERAGING UTILITY INCENTIVES

The following list of best practices came to light through a review of case studies and discussions with Greenprint members about their relationships with utilities.

- Stay on top of new incentive programs by connecting with utility officials and staying up to date through them.
- Use utility-funded audits to identify opportunities for energy savings, but be sure to get your own cost and payback estimates.
- Love your facility engineers: they provide some of the strongest referrals for vendors and incentives.
- Consider combining incentives to optimize project performance and maximize financial returns.
- Ask vendors to include incentives in their project proposals; if allowed, owners can sign over rebates to the vendor in order to take early advantage of the incentives.



STEM

Expanding the Definition of Sustainability

Health, Wellness, Resilience, Reporting

The definition of a *sustainable building* continues to evolve, with leading tenants and investors now expecting building owners to incorporate health and wellness principles into new projects and to implement design and operations strategies to improve building resilience.

By incorporating these features into the design and management of their properties, Greenprint members are creating spaces better able to adapt to environmental stressors like extreme weather events and to protect tenants from business disruptions related to unhealthy or damaged workplaces. Investors also are expecting owners to provide more transparency regarding their sustainability programs and performance, including their progress in integrating health and resilience into their sustainability programs and metrics.

Likewise, tenants are paying close attention to health and wellness in their spaces. For each square foot in an office space, a typical U.S.-based organization will spend 100 times more on employees than on utilities. Because employee productivity has high value and is in strong demand, health and wellness certifications like WELL Building and Fitwel are gaining popularity.

These certifications, which help owners and tenants enhance building performance to support better health outcomes, are already in use in more than 1,000 buildings, and more are in the pipeline. Recently certified projects have already been able to quantify reduced turnover, reduced absenteeism, and increased employee satisfaction, all of which have a significant impact on a tenant's bottom line.

This trend is not only found in office buildings: Greenprint members like Prologis are leading the way for health and wellness in industrial buildings. Prologis has achieved the world's first warehouse-specific WELL Building certification, for a property in the Netherlands.

Resilient building design addresses the risks posed by climate change and better prepares structures for large storms, rising water levels, and potential scarcity of resources, as well as other shocks and stresses. Lower risk from extreme weather events can lead to better insurance terms and coverage and attract high-quality tenants that value business continuity. More and more cities are focusing on the importance of resilience in real estate as they plan for the future. Incorporating resilience into design often involves building-level techniques like stormwater management and siting of and protection for major mechanical and electrical equipment, as well as alternative energy sources and battery storage, microgrids, and on-site and community solar power.

Many buildings that will be facing the climate-related stressors and extreme weather of the future have already been built. To prepare for future events, each asset needs to be reviewed for resilience risks and an individual emergency response plan developed for it.



For PROLOGIS, the leader in logistics real estate, resilience is about designing its business and buildings to reduce disruption and improve adaptability. Every building in the global Prologis portfolio has a detailed emergency response and communications plan in place, and construction crews and supplies are on standby in areas where natural disasters are likely.

Thanks to its resilient building practices, Prologis reported no major hurricane damage in 2017 other than to one

roof in Florida despite owning more than 500 properties in states affected by extreme weather that year. With properties reporting such minimal damage, the Prologis Foundation was also able to donate about \$200,000 and 364,000 square feet of warehouse space to support recovery efforts through its Space for Good program, which provides rent-free distribution space to nonprofit organizations providing seasonal community support and short-term disaster relief.

“Our emergency response protocols put our customers back in service quickly, minimizing disruptions to their businesses. Although we had \$2 billion in assets in regions impacted by 2017’s extreme weather events, our structures stood strong, incurring negligible damage, and our customers experienced no significant business interruptions.”

JEANNIE RENNE-MALONE,
vice president of sustainability, Prologis

While tenants, investors, and cities are helping drive investments in wellness and resilience, investors are increasing and expanding their expectations for transparency for real estate environmental, social, and governance (ESG) performance. ESG best practices and sustainability reporting standards, often requested by investors interested in the environmental performance of a portfolio, are provided by CDP (formerly the Carbon Disclosure Project), the Sustainability Accounting Standards Board (SASB), and the Task Force on Climate-related Financial Disclosures (TCFD), and include CDP’s Science-Based Targets, the Dow Jones Sustainability Index (DJSI), the Global Reporting Index (GRI), the Global Real Estate Sustainability Benchmark (GRESB), among others.

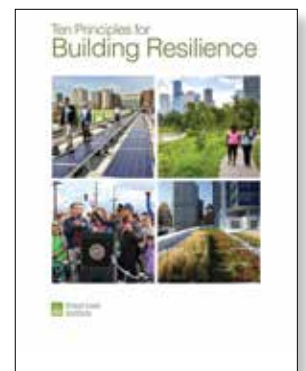
These reporting standards have broad, varying, and sometimes even contradictory expectations for sustainability. Many of these standards are beginning to include questions on resilience, health, or social governance in their reporting structures.

As more investors expand their definition of sustainability and request information on activities in these areas, building owners should be prepared to respond. Greenprint members are working to stay ahead of the curve on sustainability reporting by identifying emerging sustainability issues and developing metrics to track their performance by shaping and piloting new GRESB modules and helping organizations shape the emerging wellness standards of WELL and Fitwel.

The ULI Center for Sustainability and Economic Performance considers resilience and healthy buildings to be an integral element of sustainability and has worked with leading

members to identify and develop metrics in advance of new reporting requirements. The center regularly showcases best practices in these areas through the Building Healthy Places Initiative and Urban Resilience program, and in such recent publications as *The Business Case for Healthy Buildings* and *Ten Principles for Building Resilience*.

Leading ULI members recognize the importance of transparency and leveraging shared data to improve performance—this is the Greenprint mission—which prepares them for higher investor expectations regarding new metrics and transparency. At the same time, the real estate industry will need to work with investors and other stakeholders to refine the wide range of sustainability metrics, making sure that what is being reported is material to both bottom-line financial metrics and ESG goals, and that it does not lead to overreporting, thereby distracting sustainability directors from their most important job—improving the environmental performance of their real estate operations.



Managing What's Measured

Benchmarks and Analysis by Property Type

A common saying in the sustainability industry is “You can’t manage what you don’t measure.” The following benchmarks show the year-over-year change in median energy, water, and waste intensity by property type for Greenprint member properties. Benchmarks presented in this report represent the full suite of data provided by members, irrespective of lease type.

To collect and analyze the data for this report, Greenprint relies on its software partner, Measurabl.



Measurabl’s tools support Greenprint members in collecting data, reporting, analyzing performance, and identifying opportunities for improvement.

“Prologis’s portfolio is comprised of buildings constructed to the highest sustainability design standards, which reduce operating costs for our customers. By using Greenprint’s software platform and analytical tools, we have access to energy data that allows us to benchmark the performance of our portfolio. This is immensely valuable as we continue to implement new energy technology in our buildings and assess emerging opportunities that support our long-term business strategy.”

JACK RIZZO, ULI Board member



PROLOGIS

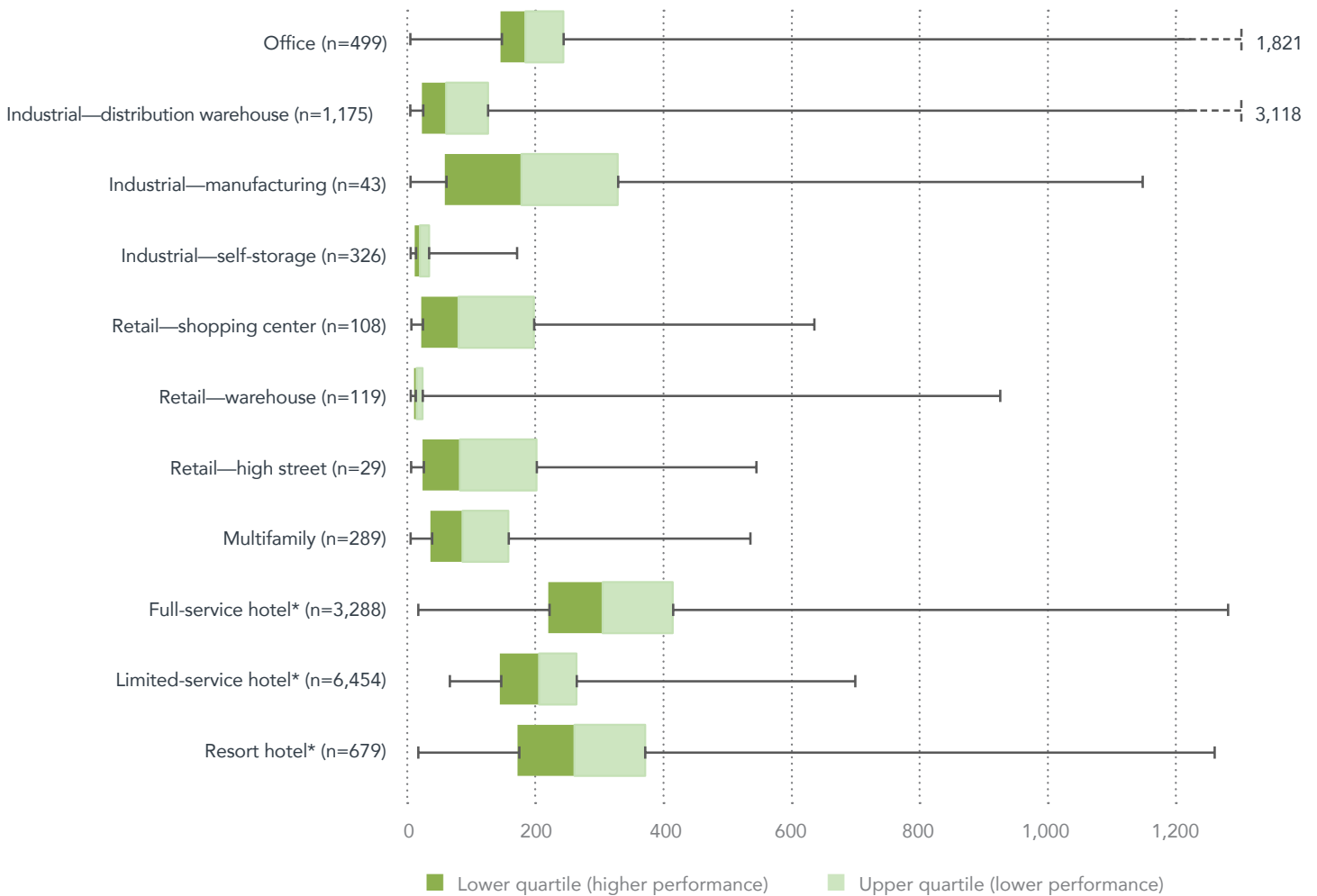
Energy

Similar to the findings in the *Greenprint Performance Report, Volume 8*, hotels recorded the highest median energy use intensity (EUI), followed by office properties. Across all property types, one of the largest largely uncontrollable users of energy is the tenant. For instance, two office properties may perform very differently depending on the tenant density of use and type. This disparity between more- and less-efficient properties is even more extreme in distribution warehouse and industrial space.

In addition, depending on lease type, owners may face a split incentive: investments in sustainability may not benefit their bottom line. With the numerous incentives available through utilities and financiers like Fannie Mae providing funds for efficiency upgrades, low-cost capital is available to most owners to make improvements.

ENERGY USE INTENSITY BY BUILDING TYPE, 2017

(kWh/m²)



*Hotel data are for calendar year 2016.

Energy benchmarks can help owners better understand the potential energy and cost savings associated with improving a building's performance. For example, the potential savings from a building climbing from the 75th percentile of performance to the median, or from the median to the 25th percentile, can present owners with an achievable goal because at least 25 percent of that building's competitors are already achieving that next level of performance. It also can help the owner quantify the financial value of making that performance improvement.

The following chart shows how significant these potential cost savings can be for office buildings when they improve performance from one quartile to the next. Implementation of energy efficiency projects, like those discussed in the Best Practices section, drive reductions in EUI for the property. Buildings in areas with high energy costs stand to save the most and see the greatest increase in asset value.

THE BENEFITS OF IMPROVING BY A QUARTILE

Building location	Average commercial cost of electricity per kWh*	EUI reduction from 75th percentile to median (kWh/m ²)	Potential annual cost savings	Increase in asset value**	EUI reduction from median to 25th percentile (kWh/m ²)	Potential annual cost savings	Increase in asset value**
New York City	\$0.16	87.6	\$279,970	\$6,999,250 (4.0% cap rate)	104.0	\$332,416	\$8,310,400
Los Angeles	\$0.13	68.3	\$174,028	\$3,702,723 (4.7% cap rate)	36.0	\$91,728	\$1,951,659
Washington, D.C.	\$0.12	60.6	\$141,319	\$2,717,673 (5.2% cap rate)	51.7	\$120,564	\$2,318,538

* Figures are for June 2017. Figures for New York City and Washington, D.C., are estimated using U.S. Energy Information Administration's "Electric Power Monthly," https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a; estimates for Los Angeles are from Electricity Local, "Los Angeles Electricity Rates," <https://www.electricitylocal.com/states/california/los-angeles>.

** Cap rates are from Cushman & Wakefield, "Mid-2017 U.S. Capital Markets Report: Capitalization Rates by Property Type."

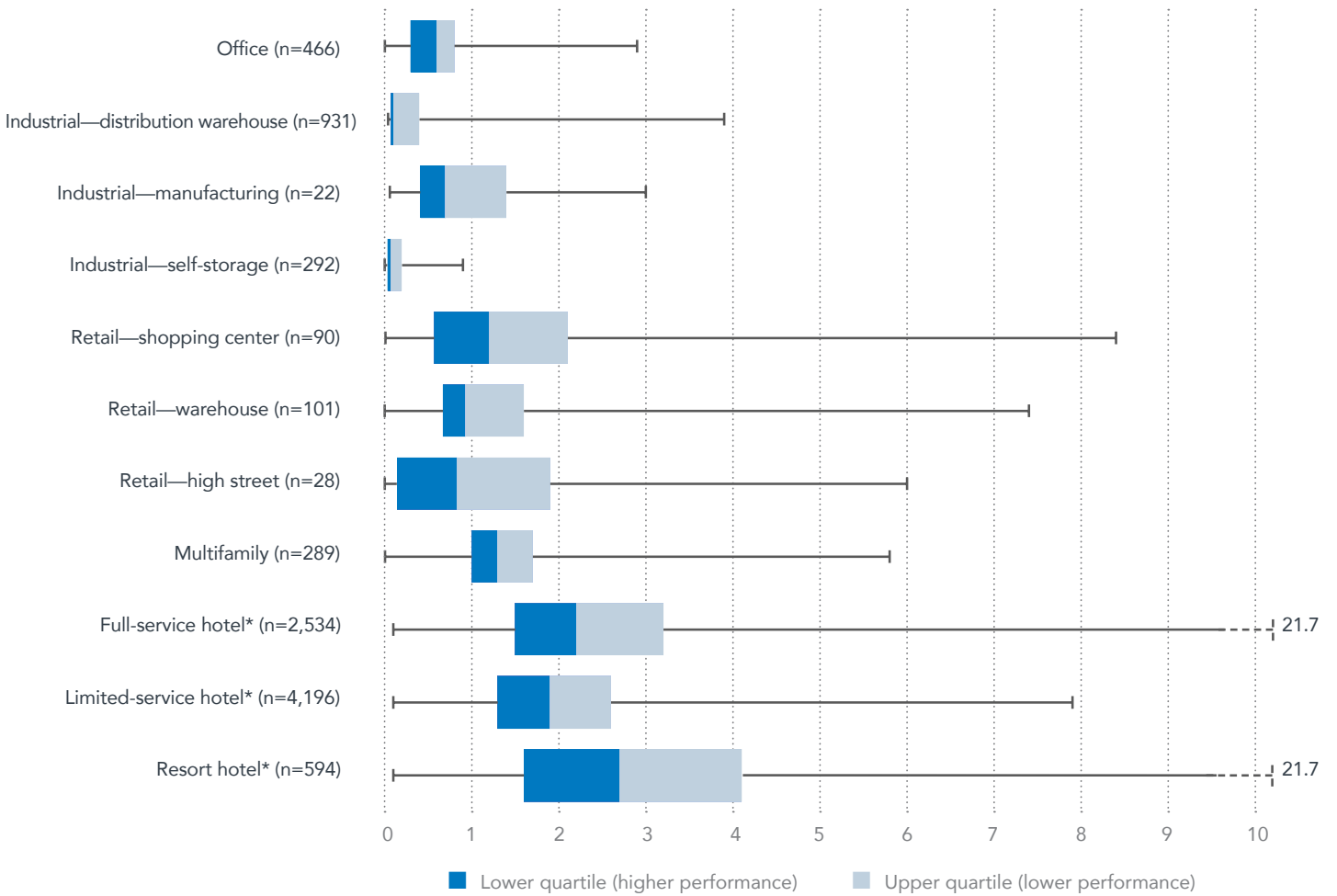
Note: Figures are for a sample 20,000-square-meter building.



Water

As in years past, hotels reported the highest water use among all property types, followed by multifamily properties. Hotels and multifamily properties are more likely to have many water fixtures, including for showers, large-scale laundry machines, and dishwashers. Pools and extensive landscaping are also more common in these property types. For urban office properties, primary water users are restroom fixtures. Industrial properties like distribution centers and self-storage continue to be the lowest consumers of water because they generally contain few restrooms and have limited landscaping.

WATER USE INTENSITY BY BUILDING TYPE
(kL/m²)



*Hotel data are for calendar year 2016.

Waste

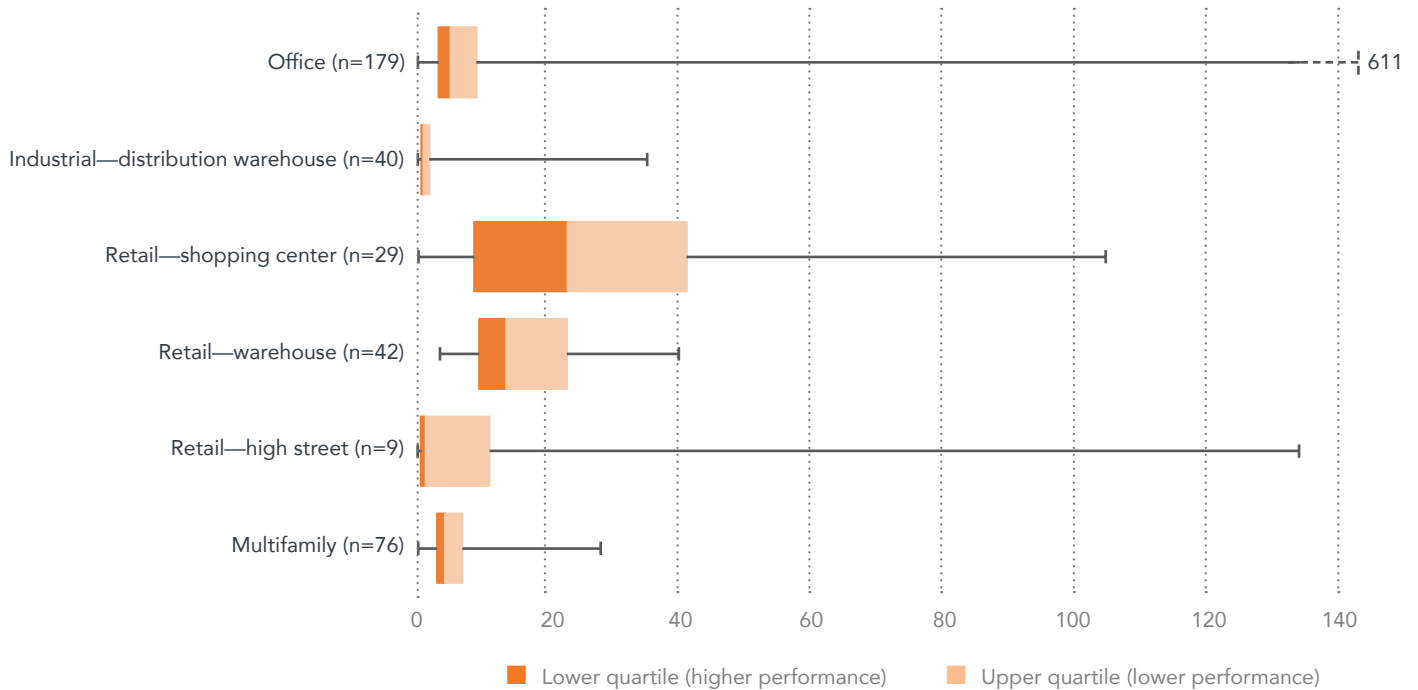
Across the Greenprint portfolio, waste intensity—the amount of waste generated per square meter of space—is highest in retail and hotel properties.

In order to reduce the amount of waste headed to landfills, Greenprint members aim to improve their annual diversion percentage through increased recycling, composting, or incineration. By measuring both recycling and diversion rates, building owners can better understand their waste stream, identifying the reduction of waste creation, amount kept from the landfill, and amount able to be reused through recycling.

Retail and hotel properties report the highest waste diversion rates and industrial properties the lowest. This is likely due to many industrial properties having triple-net leases and the building owner having little to no oversight of energy consumption and waste generation because all utility bills are paid by the tenant.

WASTE INTENSITY BY BUILDING TYPE

(kg/m²)



Guide to Report Terms and Charts

Glossary

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.

GREENHOUSE GAS (GHG) EMISSIONS

Carbon dioxide (CO₂) and other gases released into the atmosphere as a result of energy consumption at the property. Emissions are expressed in carbon dioxide equivalent (CO₂e), which normalizes global warming potential of each gas to an equivalent quantity of carbon dioxide.

MEDIAN

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

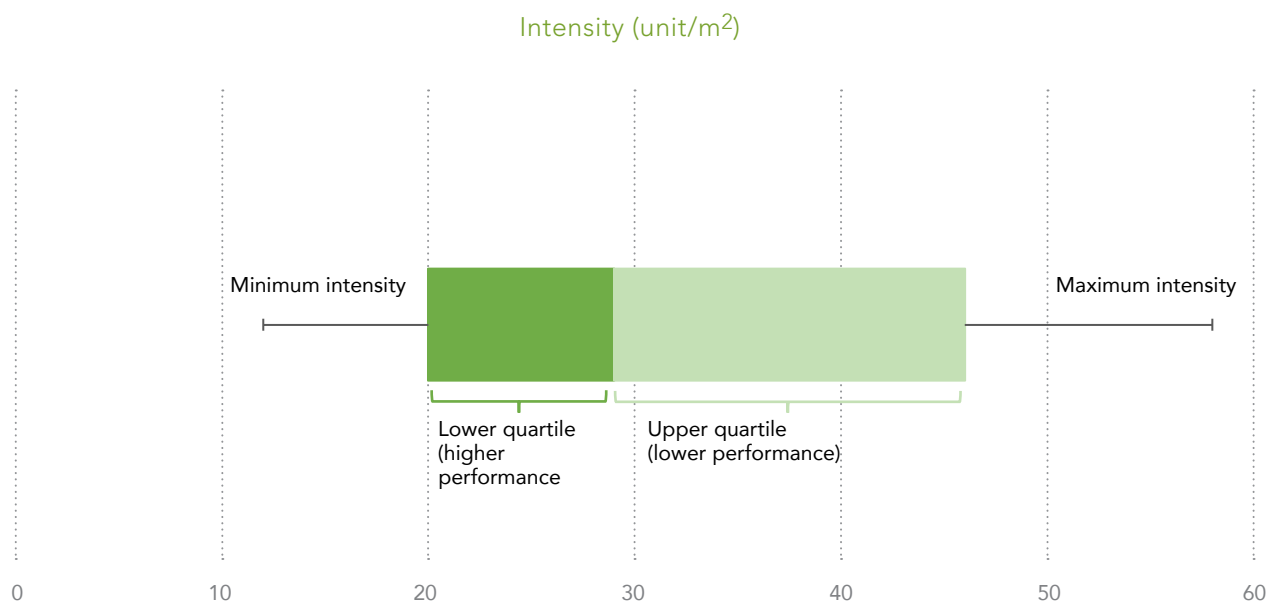
WASTE DIVERSION

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

Reading the charts

The data presented in charts throughout this report, unless otherwise noted, are from 2017.

The charts in this report show energy, water, and waste use intensities by property type. The box-and-whisker visuals show the four quartiles of data from the lowest intensity (far left line) to highest intensity (far right line). This helps show the spread in performance across the dataset. The darker colored bar represents the lower quartile (25th percentile to the median) or higher performance. The lighter colored bars represent the upper quartile (median to 75th percentile) or lower performance.



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Acknowledgments



For the third year running, Greenprint has partnered with the Cornell Hotel Sustainability Benchmarking (CHSB) initiative to present a comprehensive hotel performance benchmark. The CHSB is a collaborative initiative aimed at developing hotel industry-specific benchmarks for energy use, water use, and carbon emissions.



Since 2016, Greenprint has partnered with Measurabl to leverage its software tool in support of Greenprint member data collection, analysis, and reporting.