

10 Greenprint Performance Report™

VOLUME 10



**Urban Land
Institute**

10
YEARS

ULI GREENPRINT

ANNIVERSARY

Reducing carbon. Building value

Introductory Letter

The ULI Greenprint Center for Building Performance has now been a market driver for 10 years, a catalyst for real estate advancement on carbon reduction and asset value worldwide.

At its founding in 2009 in Greenland, 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.

“The vision was to create a membership-based organization represented by major investors and financial institutions to develop an industry standard for benchmarking carbon performance, hit carbon reduction targets, help visualize how we can meet those targets, and lead by example to encourage and inspire others to follow.”

—Ron Weidner, Greenprint founder

Commercial buildings account for 39 percent of global carbon emissions, and Greenprint members are doing their part to reduce their impact on the environment. Since its beginnings, the community of practice has expanded to include



\$750 B (€674 B)
IN REAL ESTATE ASSETS
UNDER MANAGEMENT



8,916 PROPERTIES
IN THE GREENPRINT PORTFOLIO



2.0 BILLION FT²
(190 MILLION M²)



32 COUNTRIES
REPRESENTED IN THE PORTFOLIO

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.

We are pleased to share that Greenprint members have showed continued performance improvement on energy, water, waste, and carbon emissions. Since 2009, Greenprint properties have improved their energy use intensity, with the median energy use intensity of U.S. office properties dropping from over 220 kilowatt-hours per square meter (kWh/m²) to 183 kWh/m², a 17 percent decrease. In calendar year 2018 alone, Greenprint members collectively implemented 1,010 sustainability projects, invested \$40.7 million, and reduced emissions another 1.5 percent, moving further toward the goal of a 50 percent reduction by 2030 from a 2009 baseline.

The market, sustainability, and need to reduce carbon emissions in real estate are only moving faster from here, and Greenprint is ready for it. The real estate market is feeling the pressure from rising global temperatures, from city policies driving climate action locally, from investors demanding more on sustainability reporting, and from new approaches on the environment like the circular economy pushing the market forward.

As Greenprint looks beyond our goal of cutting carbon emissions by 50 percent by 2030, we aim to up the ante and expand the scope to cover all facets of sustainability in real estate. We thank the longstanding Greenprint members who have been a part of the community since the beginning, and welcome the more recent (and future) real estate members who join us in continuing to prove out the value in high-performance green buildings.

Signed,

Marta Schantz, Senior Vice President, ULI Greenprint

“For the past ten years Greenprint has worked with the real estate investment community to help expand and improve upon sustainability best practices within the commercial real estate sector. As the race against climate change’s various impacts on our cities picks up, the focus of global fiduciaries has become sharpened. Greenprint continues to provide an important tool and platform for understanding resource usage within our investment properties. Environmental, social, and governance (ESG) best practices must be pursued with an eye to investors’ bottom-line returns, and those return estimates increasingly include factors such as heat, flooding, carbon emissions, and other climate-related issues. Greenprint, along with the Center for Sustainability and Economic Performance, exists to serve as a resource hub for investors across the globe.”

—Daniel Cashdan, president, HFF Securities (a JLL company),
and chairman of ULI’s Center for Sustainability and Economic Performance

Members

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



“Greenprint is facilitating leading companies in ESG [environmental, social, and governance] and sustainability. If you want to raise your standards, you need to be around the leaders in the industry.”

—Laura Craft, global strategy and investment ESG, Heitman

Innovation Partners

Technology and service providers who contribute innovative best practices that advance sustainability with Greenprint members and in the built environment broadly by reducing operating costs, enhancing property value, and conserving natural resources.



Strategic Partners

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



“For us to be part of a group where we can both share a little bit and learn a lot and form these strategic partnerships is really exciting. And we’re just getting into it, but honestly in the first six months we’ve been a partner and part of the process, we’ve learned more and gotten more out of it than we had ever hoped to get when we first joined, so we’re excited for more!”

—Andrew Bush, principal, Morgan Creek Ventures

Contents

- TRENDS DRIVING SUSTAINABILITY IN REAL ESTATE 6
 - Moving Beyond Operational Carbon to the Circular Economy 6
 - Cities Get Serious on Climate: Regulations Set Performance Standards 10
 - Investors Demand More on ESG 12

- BEST PRACTICES: GREENPRINT MEMBER PROJECTS ACHIEVE CONTINUED CARBON, WASTE, AND WATER REDUCTIONS 14
 - 2018 Highlights by Project Type 14
 - 2018 Certification Breakdown 15
 - Greenprint Member Project Examples 17

- MANAGING WHAT IS MEASURED 24
 - Long-Term Results: From 2009 to Now 24
 - Annual Results 25
 - Detailed 2018 Analysis 27

- GUIDE TO REPORT TERMS AND CHARTS 33

- ACKNOWLEDGMENTS 34

Trends Driving Sustainability in Real Estate

This year, Greenprint members identified trends that highlight market drivers pushing real estate companies to stay innovative and continue integrating sustainability into their core business. Those trends are

- increased awareness of the circular economy and alternative materials;
- intensification of climate legislation that sets building performance standards; and
- heightened investor pressure on ESG initiatives.

Moving Beyond Operational Carbon to the Circular Economy

Many in the industry are familiar with best practices for measuring and reducing their building’s greenhouse gas emissions, energy use, water consumption, and waste production. However, only half of a building’s total carbon emissions come from energy use during the life of the building; the rest comes from carbon emitted during construction, including materials sourcing and production.

To fully address the environmental impact of buildings, real estate must move toward a circular economy, where waste of materials is minimized. The business case for considering embodied carbon and the circular economy is growing, with new regulations being passed across the globe and innovations in materials causing more architects and developers to take note.

The buildings and construction industry is the largest global consumer of raw materials, and demand for these materials is only increasing as developing countries urbanize. These materials are becoming increasingly scarce and expensive, transforming the business-as-usual, “cradle to grave” mentality for materials to a “cradle to cradle” one instead—a sustainable

approach to design and construction that reduces carbon emissions and increases longevity of assets for the benefit of future generations—and making the transition to a circular economy a smart choice environmentally and economically.

Circular design principles in the buildings sector aim to reduce, reuse, and recycle materials.

The main principles of circularity are:

- Reduce use of materials to what is really needed.
- Reuse available materials whenever possible.
- Recycle any waste to minimize value lost.¹

It is also important to design and construct buildings for easier disassembly, making it easier to reuse the materials used to build them.

One way leaders in sustainability are tracking the shift toward the circular economy is to calculate embodied carbon—the emissions created during manufacture of building materials and their transport for construction. Life cycle assessments (LCAs) can help owners quantify the environmental impacts of buildings from creation to disposal, and typically include “global warming potential” as a measure of these emissions. Low-carbon construction materials include sheep’s wool for insulation rather than traditional materials like high-density spray foam, or timber framing for structures as an alternative to concrete or steel.

Mass timber buildings are growing in popularity because LCAs show that wood outperforms steel and concrete in terms of carbon footprint—and because mass timber products such as cross-laminated timber (CLT) have the strength and stability to replace steel or concrete in applications where wood traditionally has not been considered. Wood materials used in buildings also continue to store carbon absorbed by the trees while growing, which is kept out of the atmosphere during the lifetime of the structure—and even longer if the building material is reused.



“The 2021 International Building Code will allow innovative mass timber buildings up to 18 stories, increasing the opportunity for our built environment to act as a carbon sink. Lightweight mass timber also offers a unique opportunity for developers to add vertical density over existing buildings, further reducing the embodied impacts of new structures.”

—Melissa Kroskey, technical director, WoodWorks, a Greenprint innovation partner

As part of its larger sustainability program, Jamestown, a real estate investment and management company that specializes in adaptive use, has a stated objective of selecting materials with minimal environmental impact. The company works with stakeholders across the real estate industry to support businesses that are innovating and finding avenues to reduce waste. Jamestown is driven to track embodied carbon in projects and recognizes that the construction phase offers a meaningful opportunity to reduce a building’s carbon footprint. In addition, certification under the Leadership in Energy and Environmental Design (LEED) program rewards use of sustainable materials.

Jamestown’s redevelopment of Ponce City Market, a 2 million-square-foot (186,000 sq m) project that reused a 1920s former Sears, Roebuck regional distribution center and achieved LEED (v2009) Core & Shell Gold certification. At Ponce City Market, energy efficiency, sustainability, and circularity went hand in hand.

Jamestown decided to reuse the original windows after completing an energy model that showed replacing them would result in a less than 1 percent improvement in energy efficiency.

By keeping and restoring the windows, Jamestown minimized waste of energy and materials and also saved funds that were able to be invested into energy efficient base building HVAC systems. Jamestown also prioritized recycling of construction waste during demolition, with over 98 percent of refuse diverted from the landfill. Instead of installing new flooring, Jamestown kept 99.5 percent of the original maple hardwood flooring—over 400,000 square feet (37,000 sq m)—saving 455 metric tons of carbon dioxide equivalent (MTCO_{2e}) in embodied carbon just by leaving the old floor in place, not even considering the carbon embodied in new flooring materials.

Since redevelopment, operational practices include on-site oil reclamation that removes cooking oil from the food hall restaurants and turns it into biofuel. Additionally, the use of regenerating elevators capture heat energy from elevator brakes and return it to the grid, saving the market \$14,000 annually. The innovations in sustainability and the focus on developing the local community and economy led to Ponce City Market receiving a 2016 ULI Global Award for Excellence.



JAMESTOWN

“As we continue to address the impact of our supply chain it’s important to take embodied carbon into consideration. Re-purposing an existing building is a great first step for many of our projects, but there is progress to be made on tracking the embodied carbon of new materials and integrating that into our decision making process. We see the rising popularity of alternative materials like mass timber as a win-win that should make it easier for developers to choose lower carbon solutions.”

—Becca Rushin, vice president, sustainability and CSR, Jamestown

In the United States and abroad, governments are beginning to take note of embodied carbon and materials and creating legislation focused on it, putting in place a strong business case for why developers should consider circular strategies.

In the Netherlands, the government has set a sustainability goal for the entire country to be 50 percent circular by 2030 and 100 percent circular by 2050. Requirements to track embodied carbon are also in place in the United Kingdom, Canada, and California, and many expect performance standards to follow in the future. In addition, a number of California counties are looking to adopt the first embodied-energy building codes in the United States, focused primarily on low-carbon concrete.

As global regulations evolve (and the pricing of carbon impacts improves), the value of thinking in terms of life cycle impacts will become increasingly important. Many corporate tenants are already setting targets in alignment with the United Nations Sustainable Development Goals (Goal 12 is ensuring sustainable consumption and production patterns), making buildings that embrace these principles more desirable. Reducing the amount of material used in a building also results in a healthier space with lower levels of volatile organic compounds (VOCs), adding points toward LEED certification and improving tenant happiness and productivity.

Low-carbon material choices have even more direct financial benefits. Reusing building materials from a building about to be demolished creates a new opportunity for value at the end of a building's life span.

For example, for architects and developers using mass timber in their projects, additional material costs can be offset by aesthetic value of the building (which can improve leasing velocity and leasing premiums); lighter weight (which can yield additional savings on foundation costs, particularly on sites with poor soils); fewer laborers on site (ideal when facing a labor shortage); and faster construction schedules (quick construction

and an earlier start for follow-up trades because, unlike with concrete, no cure times are required). Mass timber also allows for just-in-time delivery and small staging/lay-down areas, which is ideal for building on dense urban sites. Finally, as the market for low-carbon materials grows, suppliers will invest more in innovation and material costs likely will achieve pricing parity with traditional building materials.

A showcase building already implementing circularity is Circl, a 35,000-square-foot (3,300 sq m) pavilion space developed by Dutch bank ABN AMRO in the central business district of Amsterdam. At Circl, the entire building was created with circular principles in mind: each material considered for the project was looked at from production to disposal.

Instead of being a traditional concrete structure, the building was framed with large local birch beams, and leftover wood from beam construction makes up parts of the interior. The ground floor uses hardwood reclaimed from 15 different buildings, ranging from a former monastery to the bar of a Dutch football club. The windows were previously used in old office buildings. The elevator is rented from Mitsubishi, and the pavilion pays for each vertical movement; a competitively priced service contract will double the life span of the elevator and allow future reuse.

Sixteen thousand pairs of jeans collected from ABN AMRO employees were turned into fiber to make soundproofing material for the ceilings. The rooftop and exterior-wall solar panels were designed and manufactured in the Netherlands with a guaranteed long life span, reducing the costs and carbon required to ship panels from farther away, as well as the need to replace them soon. Even the pavilion's restaurant tenant got involved, opting to have no company uniforms and instead use aprons over employees' regular clothing, and asking its suppliers to follow similar practices.

“Circl serves not only as a bank office, but also as a public building and a community meeting space, as well as a learning tool, facilitating conversations with society and potential bank clients interested in sustainable and circular development.”

—Petran van Heel, sector banker, construction, ABN AMRO



ABN AMRO

After its experience with Circl, ABN AMRO continued experimenting and helps lower barriers and open the market to more circular economy–focused projects. Moving beyond thought leadership, ABN AMRO is now working with clients to finance \$1 billion in circular assets, finance 100 circular loans, and cut CO₂e emissions by 1 million tons, all by 2020.

Many challenges remain to scaling up this type of development, the primary one being lack of knowledge. Architects must learn to work with new or secondhand materials. Developers must be prepared to ask for and specify in their bids low-carbon products according to a material's Environmental Product Declaration (EPD). Potential space occupiers accustomed to glass, steel,

and marble must understand the value in the change to minimal interiors such as bare concrete and exposed fixtures.

Because reused materials tend to have a smaller carbon footprint than newly manufactured ones, it is still important to seek out reused building materials as often as possible. In the Netherlands, the New Horizon Urban Mining Collective connects builders with used materials, thereby adding value to a building at the end of its life. The collective sees the urban environment as the new materials mine, unlocking the value of existing materials in old buildings and creating a new circular way of looking at the economy.



ABN AMRO

RESOURCES ON THE CIRCULAR ECONOMY

At such an early stage of the new focus on embodied carbon and circularity, knowledge sharing and collaboration are keys to driving the transition toward a circular economy. The following are resources for those interested in learning more on the subject.

A Circular Economy product council has been created by ULI Netherlands to consider how building design and construction can integrate circular principles. The council is working on an information platform to be introduced in early 2020 that will highlight best practices and provide case studies.

Architecture 2030's Carbon Smart Materials Palette is designed to support and complement life cycle assessments and Environmental Product Declarations while providing high-impact guidelines for low-/no-carbon material selections and specifications. <https://materialspalette.org>.

The Carbon Leadership Forum is an industry/academic collaboration hosted at the University of Washington. This community of manufacturers, designers, builders, and academics is focused on reducing the carbon embodied in building materials. www.carbonleadershipforum.org

Cities Get Serious on Climate: Regulations Set Performance Standards

An increase in the number of regulations that raise sustainability standards, identified as a trend in past editions of the *Greenprint Performance Report*, is coming to fruition as cities take action to set and meet ambitious climate goals. New legislation mandating building performance will affect the bottom line of real estate transactions, from costs during development through operations.

In the United States, at least 31 cities, from San Francisco to Atlanta, have set energy benchmarking policies for buildings, with 15 requiring that structures meet performance targets or

undertake additional actions like energy audits. And with 287 U.S. cities and counties signed on to the We Are Still In pledge to remain in the Paris Climate Accord, more policies addressing energy use in buildings are coming.

Regulatory programs already in place are moving beyond benchmarking, with cities, states, and countries now looking to set minimum performance standards that get more stringent over time. Recent legislation at the forefront of addressing carbon emissions in real estate includes the following:



CALIFORNIA

As part of the California Energy Efficiency Strategies Plan, the state set goals for all new residential construction to achieve net-zero energy (NZE) by 2020, all new commercial construction to be NZE by 2030, and 50 percent of commercial buildings to retrofit to NZE by 2030. Some California cities are pushing even further, with Santa Monica enacting a net-zero building code in October 2016 and Berkeley mandating in July 2019 that all new buildings be all electric.



WASHINGTON, D.C.

The new Clean Energy DC law addresses the city's buildings sector in several ways, expanding the mandatory benchmarking program to all buildings larger than 10,000 square feet (930 sq m). Building energy performance standards are currently being developed, and buildings that fail to meet those standards by 2020 will be required over five years to improve their energy performance, follow a prescriptive improvement plan, or pay a significant fine.



NEW YORK CITY

Local Law 97, the building emissions section of the city's larger 2019 Climate Mobilization Act, sets carbon emissions limits for the commercial buildings sector. By 2024 and 2030 deadlines, buildings must reduce their emissions below limits set by property type. Failure to comply with this legislation will result in fines estimated to be as high as \$2 per square foot (\$22 per sq m).



UNITED KINGDOM

Starting in 2018, commercial properties with an energy performance rating of F or G (on a scale from A to G, with G being worst) could no longer be re-leased. By 2020, the requirements will apply to both new and existing leases in residential properties, and by 2023, the same requirements will apply to all commercial leases. With an estimated 18 percent of commercial properties and 10 percent of residential properties in England and Wales in the F or G categories, about £727 billion (US\$838 billion) in asset value will be unrentable.²

The avalanche of new local policies is leading to adjustments in real estate transactions and overall fund strategies, including which assets will be purchased and the length of the hold. A new concern is what the cost will be to bring a building into compliance as minimum sustainability standards increase.

In the United Kingdom, energy performance certificate (EPC) ratings are integrated into the acquisition process: each potential purchase is assessed against a benchmark. Though for now this

has not stopped owners from buying lower-rated properties, during due diligence investors are calculating the required investments for bringing an asset into compliance. Changing standards can also be a concern with new construction because developers risk building a product that within five years could be outdated—such as by installing gas stoves or furnaces in localities moving toward all-electric buildings.

“The real estate industry is eager to help combat climate change and make sure that the industry contributes their share of the reductions needed to achieve global goals in carbon reduction. However, governments frequently apply local solutions to global problems, with unintended consequences. We look forward to working with policymakers to help create a consistent regulatory framework that can achieve public- and private-sector goals.”

—Jonathan Flaherty, senior director of sustainability and utilities, Tishman Speyer

One real estate concern is that cities in the United States and countries in Europe are often looking at local solutions for global problems, creating a mosaic of requirements that can be hard to track. Real estate owners with portfolios spanning a wide geographic range can find it hard to stay on top of the changing regulatory landscape, especially at times when legislation is passed before an organization even hears mention of it. For instance:

- In the United States, which currently lacks an aggressive overall federal policy, major cities are passing widely varying policies using a variety of different metrics—for instance, energy use reductions versus carbon emissions reductions.
- Even though EPCs are required by the European Union, implementation is multilayered, and each country implements them differently and calculates their grades differently, with the United Kingdom using them to set performance standards and other countries requiring that the information be available at point of lease or sale. In addition, policies that apply to commercial real estate can be specific to either the building level or the portfolio level. Language barriers in continental Europe also make transparency and understanding more difficult.

Getting ahead of these policies can help ensure that business will not be disrupted or become more costly. It also can build industrywide demand for sustainable practices, leading to creation of a knowledgeable workforce and reducing prices for materials. To build relationships with cities as they develop climate action plans and policies, real estate firms depend on third-party organizations like the Building Owners and Managers Association (BOMA), the U.K. Better Buildings Partnership (BBP), and the Urban Land Institute.

In summer 2019, ULI brought together public-sector policymakers and ULI members for the Public/Private Partnerships for Climate Mitigation workshop in order to highlight best practices that facilitate collaboration between the public and private sectors to achieve value-enhancing climate policy. To bring this conversation to a broader U.S. audience, ULI is developing a “10 Principles” document highlighting public/private partnerships on climate mitigation in order to identify key aspects of successful and collaborative climate policy. The report, to be released in early 2020, will be grounded in the context of specific communities and best practices from their building-level climate mitigation policies. It is intended to serve as an ongoing tool for cities, real estate leaders, and other stakeholders.



THE HOWARD HUGHES CORPORATION

“The myriad recent environmental regulations can make it more complex to acquire, lease, and manage properties. However, legislation certainly has its place in galvanizing the real estate industry into action to mitigate climate change.”

—Sophie Carruth, head of sustainability–Europe, LaSalle Investment Management

Investors Demand More on ESG

Across the board, investors are asking real estate owners and asset managers for more information on their real estate funds' environmental, social, and governance (ESG) programs when allocating capital. This desire for more information has led to an increase in real estate organizations fielding ESG questions in requests for proposals, reporting their compliance with voluntary external standards, and responding to internal investor requests to disclose progress toward portfolio-level goals.

On average, Greenprint members are reporting on their portfolios' environmental performance to at least four ESG initiatives. The most common initiative that members report to is the Global Real Estate Sustainability Benchmark (GRESB); others are the Carbon Disclosure Project (CDP), Global Reporting Initiative (GRI), and Task Force on Climate-Related Financial Disclosure (TCFD).

Investor interest in ESG varies by geography, with Australian investors asking the most ESG-related questions, followed by European investors, and then U.S. coastal investors—though interest from U.S. and Asia investors is growing. Many investors report strong interest in reduced energy use because it is tied so closely to cost savings.

Across CalPERS's \$378 billion investment portfolio, ESG is considered material to long-term investment returns. This is certainly the case for the CalPERS real estate portfolio because sustainable features, like LED lighting upgrades that reduce utility costs, can have a strong influence over a building's cash flow.



HEITMAN

“We are a fiduciary. Meeting our obligations to our beneficiaries by generating strong returns is our North Star. We focus on the sustainability of our real estate portfolio because we don't want to leave money on the table or have an unnecessary environmental footprint.”

—Beth Richtman, managing investment director, sustainable investments, CalPERS

To ensure a systematic approach to how the company assesses sustainability, CalPERS is going beyond basic ESG reporting requirements to request that fund managers detail all opportunities to make their existing buildings more sustainable and improve the return on investment. The company's Energy Optimization Initiative asks managers to propose energy optimization projects every year, conduct energy audits on each building at least every five years, track and report data annually, and implement tenant-facing best practices such as sustainable tenant improvement initiatives and green lease clauses.³ The initiative seeks to facilitate the transition of the CalPERS portfolio to carbon neutrality where accretive to performance.

Investors are also asking new questions regarding both health and wellness and climate risk, especially as reporting initiatives

like GRESB begin to add questions on those topics to their surveys. Investors also receive a great deal of information from reporting initiatives that they belong to like GRESB and the United Nations–supported Principles for Responsible Investment (PRI) network. As new factors are incorporated into ESG reporting standards, investors become more aware and begin to ask questions.

For some investors, the perception remains that if asset managers are focused on sustainability, they are not focused on financial returns. However, many investors now see ESG as material to long-term investment returns and work with asset managers to balance ESG and financial returns. Buildings cannot be moved in response to weather or community risks, so changes in the physical risks posed by climate change affect the asset and its value over time.

“Material ESG factors can enhance value as well as present risks for investments. Heitman is an investment manager, and it is our duty to educate clients on ESG materiality, as materiality differs for different investments vehicles—private equity, debt, and public securities—and varies by property type.”

—Laura Craft, head of global strategy and investment ESG, Heitman

Other tactics like staying competitive on utility costs, ensuring tenant wellness and productivity, and promoting walkability affect an asset's occupancy and rental rates. Because these metrics influence cash flow over time, investors should consider potential ESG projects during underwriting. ULI's recent report *Embedding Sustainability in Real Estate Transactions*

(available at uli.org/sustainabletransactions) highlights the 11 strategic opportunities that exist in every transaction to include and consider energy and sustainability. Including ESG in due diligence, using sustainability-specific financing tools, and leveraging the underwriting period are all opportunities discussed in the report.

QUESTIONS INVESTORS SHOULD ASK ABOUT ESG

What should investors be asking regarding ESG? Investors should ask current or prospective fund managers the following questions during the request-for-proposals process:

- Do you follow any international standards, industry guidelines, reporting frameworks, or initiatives that promote responsible investment practices?
- How is ESG considered during the investment process?
- What is the portfolio's exposure to climate risk, and how are you mitigating it?
- Are you tracking environmental metrics (energy, carbon, water, and waste), and how are they trending over time?
- What projects are you implementing across your portfolio?
- Are you employing innovative technologies or renewables?
- How are you engaging with service providers and property-occupant stakeholders on sustainability?
- What is the average Energy Star score of your properties, and how much have you improved this over time?
- What kinds of certifications and external ratings have been achieved?

Asset managers and investors agree that scores like the GRESB star rating or CDP letter grade received should be used to start a conversation and that more context should be considered when assessing an organization's ESG program. Reporting initiatives provide good information to help identify risks in the portfolio and show companies how they compare to peers. However, scoring does not always result in apples-to-apples comparisons of portfolios because of the following factors:

- **Portfolio diversification.** A diversified fund composed mostly of gross-leased office assets is difficult to compare to a diversified fund composed mostly of triple-net industrial assets.
- **Geography.** A fund in the Netherlands cannot necessarily be compared to a fund in Germany. For example, in Germany, multifamily tenants bring their own appliances, making tenant energy use more difficult to control. German multifamily tenants also prefer to be left alone by the landlord.
- **Asset types.** Not all asset classes, like self-storage, are able to receive green certifications.

Over time, it is hoped that reporting initiatives will become more fine-tuned to take these nuances into account.

It is important to note that real estate organizations are not solely reporting their voluntary compliance with external sustainability standards for the benefit of their investors. Internal reporting is valuable in order for a company to understand its performance and to help identify opportunities across its portfolio. Measuring achievements and improving the bottom line are what all companies want to do regardless of whether it relates to ESG. Reporting performance in alignment with different initiatives can help real estate firms speak a common language with each other and with tenants. External memberships and the signatory status levels they bestow can



HEITMAN

demonstrate further commitment and publicly align a company with specific values. After making specific public commitments like setting a Science-Based Target, real estate companies must then report progress toward their goals.

However, companies need to be cautious to not overburden themselves with external reporting. To determine when and where to report performance data, real estate owners and managers should identify which standards align with their goals, and reporting initiatives should work toward consolidation, not re-create the wheel.

Best Practices: Greenprint Member Projects Achieve Continued Carbon, Waste, and Water Reductions

Greenprint members consistently reduce carbon emissions; implement innovative waste reduction, renewable energy, and tenant engagement strategies; and lead the industry in energy and sustainability initiatives.

“Back when we first joined ULI Greenprint, we were doing a lot of learning. Now, we’re really happy to give back to our other peers by sharing some of the best practices that we’ve learned along the way.”

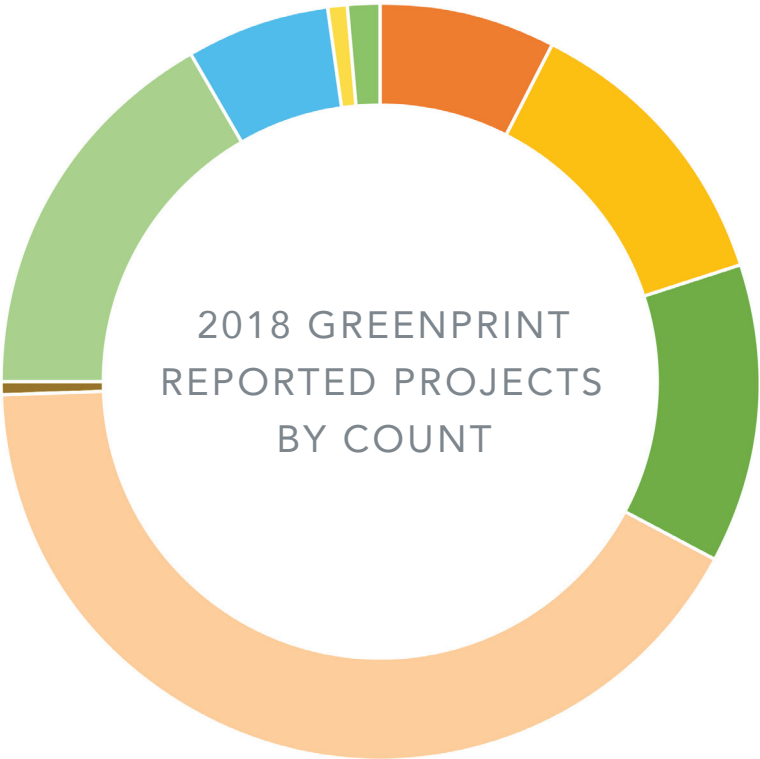
—Becca Rushin, vice president of sustainability, Jamestown

2018 Highlights by Project Type

In 2018, Greenprint members tracked data in the Measurabl software platform to monitor and record 1,010 sustainability projects; the 330 projects on which cost data were reported totaled over \$40.7 million in investment. As expected, high-efficiency equipment and appliance projects dominated the list in terms of project count.

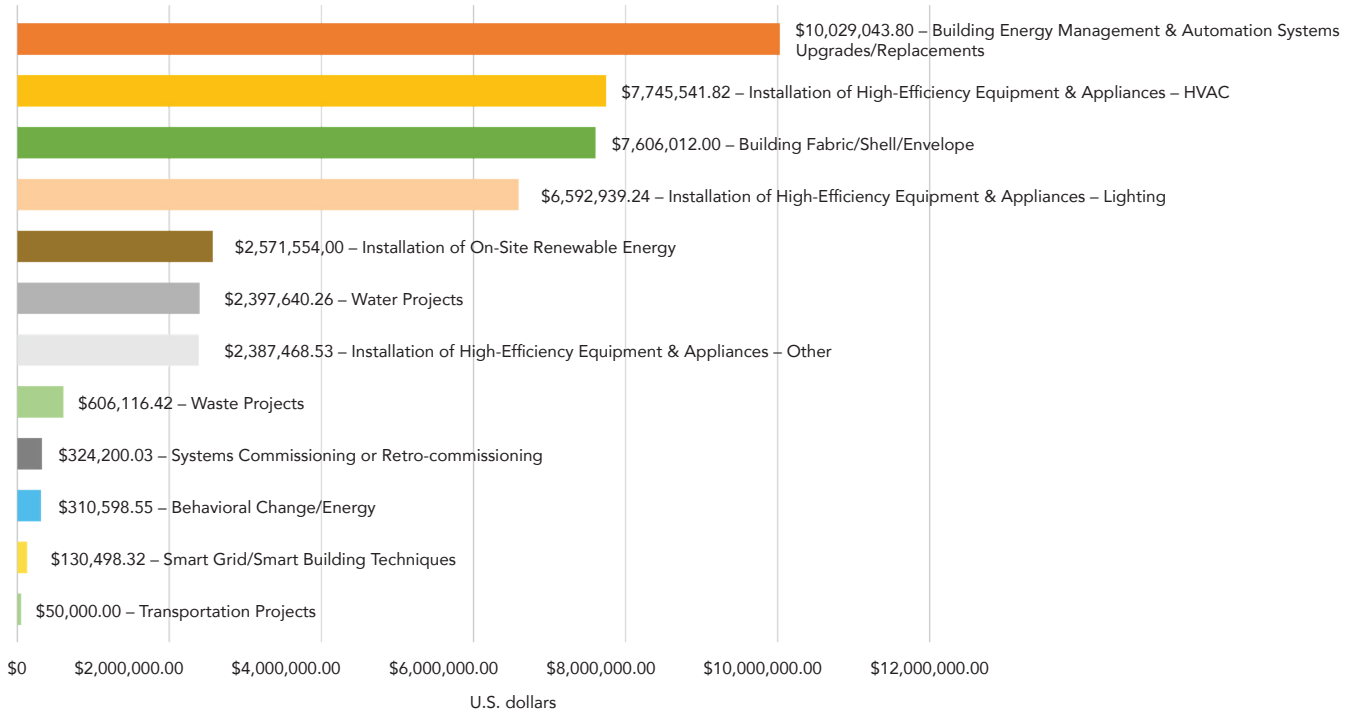
However, in 2018 for the first time, waste and building envelope projects took second and third place with 144 and 110 projects, respectively. This demonstrates a growing trend in the real

estate industry to think beyond energy use reductions when analyzing possibilities for sustainability improvements. Another exciting trend to note is the high spending on building energy and automation systems projects, which reached \$10 million in 2018, up from just \$2 million in 2017. This points to increasing awareness and adoption of innovative technologies that help building managers reduce energy and water consumption in real time, lowering both operational costs and operational emissions.



- 67 Building Energy Management & Automation Systems Upgrades/Replacements
- 107 Installation of High-Efficiency Equipment & Appliances – HVAC
- 110 Building Fabric/Shell/Envelope
- 360 Installation of High-Efficiency Equipment & Appliances – Lighting
- 5 Installation of On-Site Renewable Energy
- 144 Waste Projects
- 54 Behavioral Change – Energy
- 06 Smart Grid/Smart Building Technologies
- 11 Transportation Projects

COLLECTIVE 2018 GREENPRINT REPORTED PROJECTS BY INVESTMENT



2018 Certification Breakdown

Green building certification standards provide guidelines for buildings to reduce operating expenses and improve the efficiency of on-site energy, water, waste, materials, transportation, and health and wellness options. Certifications can also act as a market indicator for tenants to help them identify landlords committed to providing sustainable and efficient spaces. As demand for that type of space grows over time, more corporate tenants recognize the strong case for going

green—not just lower utility costs, but also more engaged and productive employees. With building owners reporting strong interest in green-certified space from desirable corporate tenants like technology companies, it is no surprise that office properties achieved more certifications than all other property types combined. Greenprint members reported the following building certifications for 2018 with the Measurabl software system:

TYPE	COUNT
Office	227
Industrial	139
Multifamily	44
Retail	25
Hotel	3
Other	4

Across 10 major international markets in 2018, 227 million square feet [21 million sq m] of space were certified green, or 18.6 percent of available space, a significant increase from 6.4 percent of available space in 2007.

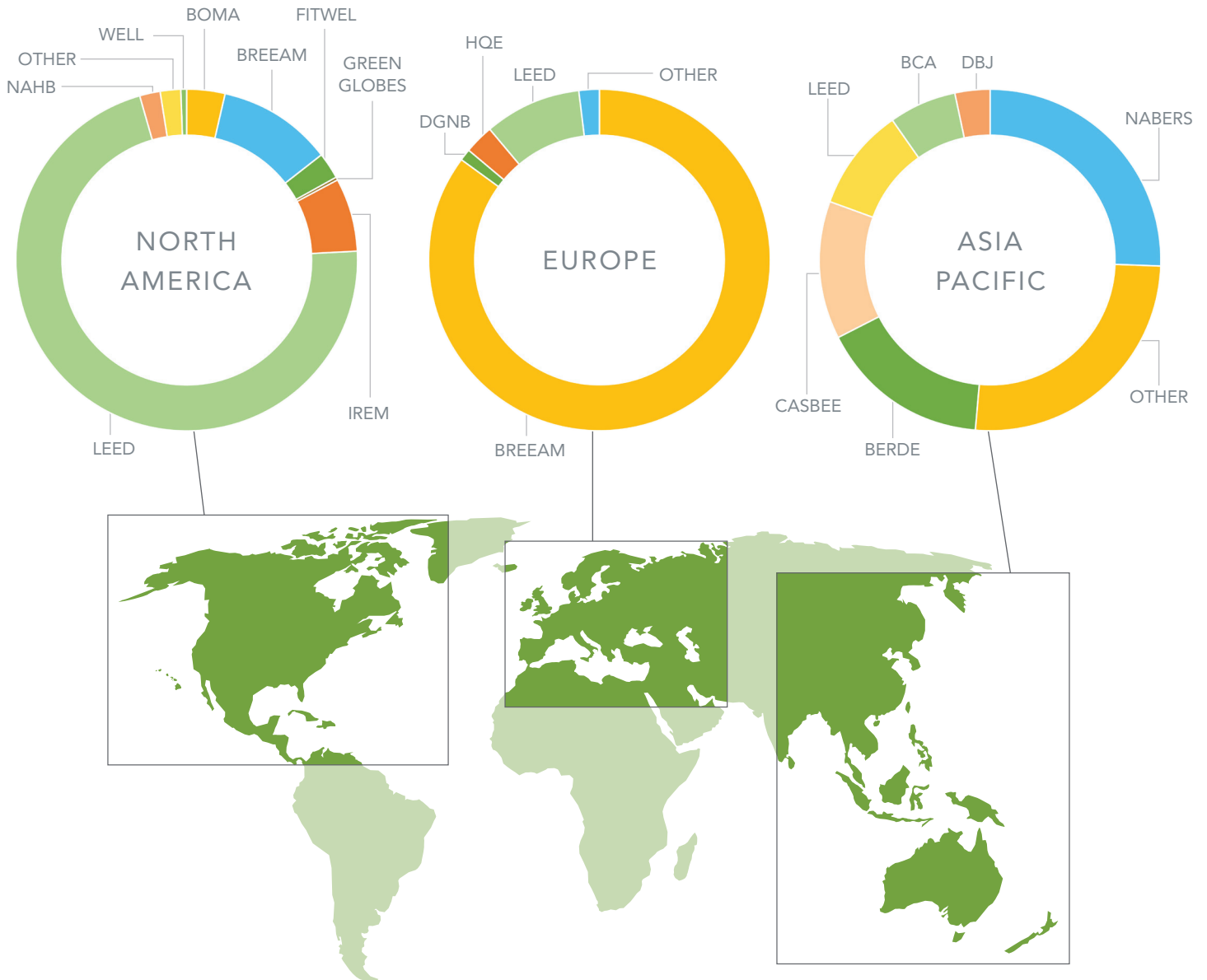
—CBRE's International Green Building Adoption Index⁴

In 2018, the Greenprint portfolio reported that 442 green building certifications were achieved in 21 countries, covering 143 million ft² (13 million m²) of space, up 49 percent from the 297 certifications reported in 2017. North American properties achieved 69 percent of those certifications, the most of all global regions. North American properties also had the most diverse group of certifications, originating from more than nine certifying bodies. The most common certifications vary by region, with National Australian Built Environment Rating System (NABERS) being the most common in the Asia Pacific region, LEED most common in North America, and Building

Research Establishment Environmental Assessment Method (BREEAM) most common in Europe.

As green building expectations change over time, certifications like LEED and BREEAM have also evolved to update responsible material sourcing strategies and to consider social equity in projects. In addition, new building certifications continue to be developed to consider health and wellness, like the Center for Active Design's Fitwel program and the International Well Building Standards' WELL certification, as well as certifications for resilience, like the C3 Living Design Project's RELi program.

GREEN BUILDING CERTIFICATIONS, BY REGION



Greenprint Member Project Examples

The following examples represent Greenprint members' carbon, waste, and water reduction success stories. They span a variety of project types, size of investment, and returns.

GREEN LEASING FOR MULTIFAMILY HOUSING

With the over \$40 million that Greenprint members report investing on ESG projects in 2018, many elements of those investments (such as lighting retrofits, occupancy sensors, and even building envelope upgrades) can be considered when incorporating sustainability into leases. Landlords and tenants continue to bridge the gap and overcome the split incentive—the issue that arises when one party pays the utility costs and the other pays for building upgrades such as a more efficient building envelope, HVAC, or other base building systems. Green, or “energy aligned” leasing, is a way to overcome this.

GID Investment Advisers, a multifamily real estate developer, investor, and operator with properties across the United States, developed a “green lease addendum,” which was incorporated into all master lease forms by the end of 2016. By the end of 2018, GID had executed over 26,000 green leases.

GID also plans to roll out an internal “Green Lease Guide” in 2019 outlining best practices for green leasing. It will cover

scope and responsibilities, goals, performance metrics, annual reporting requirements, and the green lease clauses from the green lease addendum. It also will contain additional resources for GID employees to learn more about the benefits of green leasing for both residents and property owners.

“While green leasing may not be common in the multifamily sector, GID realizes the importance of aligning our lease structure with our broader sustainability mission,” explains Matthew Bernstein, asset manager at GID. “The lease is a central tool that sets the stage for landlord-resident collaboration and moves properties to deeper energy, waste, and water reductions across our entire portfolio.”

Both GID’s green lease addendum and “Green Lease Guide” are aligned with GRESB and industry best practices, and applicable to multifamily housing. GID is exploring creating a green lease program for the industry that would better address some distinctive issues in multifamily properties. For example, cost-recovery clauses are inherently difficult in multifamily properties because residents typically have their own utility accounts and pay for their own use separate from rent. The U.S. Department of Energy’s Green Lease Leaders program currently requires that participants insert a cost-recovery clause in their leases, which prohibited GID as a multifamily property owner and operator from achieving recognition.

GID’S GREEN LEASE ADDENDUM

Among the clauses GID Investment includes in its green lease addendum are the following:

- Permission to obtain resident utility use data, including water, wastewater/sewer, electricity, natural gas, or any other energy source.
- A requirement that residents cooperate with a utility’s request for authorization to access individual resident data.
- Agreement that residents will operate the apartment in a manner that will conform with sustainability practices (in general), including that the resident
 - will use best efforts to comply with utility demand response requests;
 - will allow GID to set controls on thermostats to avoid freezing pipes or mold growth;
 - will use best efforts to not use VOCs;
 - will not improperly use products known to be harmful to the environment; and
 - will only use water-based paints for any painting projects within units.
- Agreement to cooperate with GID in all efforts to certify the community as compliant with any energy efficiency rating scheme, including efforts to recertify the property.
- Agreement to fill out occupant comfort and transportation surveys, as well as participate in any other sustainability-related initiatives needed.



GID

GID

ENHANCED TENANT ENGAGEMENT

Greenprint members reported investing over \$300,000 in 2018 in tenant and occupier engagement. While this number may seem small in comparison with other project investments, the cost of labor and efforts put in often results in a return on investment in the form of benefits such as lower tenant turnover, fewer vacancies, and rental premiums.

SL Green, a New York City-based fully integrated real estate investment trust (REIT), launched an internal amenity program called Living Green in September 2018 in partnership with Better Spaces, a tenant engagement software platform, aimed at addressing the critical need for tenant and occupier engagement. Tenant engagement has consistently been a focus of Greenprint members as more companies seek to go beyond the sustainability status quo and integrate sustainability and health and wellness initiatives in all facets of their business strategy. According to an analysis, for every dollar spent on wellness programs, medical costs fall by as much as \$3.27 and absenteeism costs fall by as much as \$2.73.⁵ Knowing this, more asset owners could consider health and wellness when addressing bottom-line financials and occupant satisfaction.

SL Green's program uses vacant suites to offer tenants a common space outside their offices to work, lounge, and participate in wellness programs, including yoga, meditation, educational events, and health food pop-ups. Since the program's launch, 3,000 tenants downloaded the custom mobile app that allows users to book conference rooms, sign up for wellness programs, and control the music and lighting in the Living Green space.

| **"SL Green is committed to cultivating healthy and productive workplace environments for our employees and tenants,"**
| **says Laura Vulaj, senior vice president and director of sustainability for SL Green. "Through Living Green, we've**
| **been able to redefine standard office suites to create**
| **an amenitized experience through flexible workspaces,**
| **wellness programs, and a culture of community."**

SL Green has held nearly 100 events in a dozen buildings and plans to implement Living Green programs across its entire Manhattan portfolio. Living Green is creating a workplace culture that promotes community, productivity, and health for SL Green's tenants.



SL GREEN



SL GREEN



SL GREEN

NET-ZERO ENERGY

As more cities enact clean energy plans and pass mandatory benchmarking ordinances, building owners and investors across the country are increasingly looking toward net-zero energy (NZE) as their next goal to continue reducing carbon emissions in the built environment. In 2018, Greenprint members invested over \$2.5 million in renewable energy technologies, some of which were targeted to support aspiring NZE buildings. Achieving NZE in owner-occupied and -operated single-tenant buildings is significantly easier than in multi-tenant buildings.

Despite this lofty challenge, Morgan Creek Ventures, a medium-sized Colorado-based developer founded in 2001, completed construction in 2018 of one of the first multi-tenant buildings aspiring to achieve NZE, Boulder Commons in Boulder, Colorado. By early 2019, the building was fully leased and ready to begin the certification process to become an official NZE building.

The estimated energy use of Boulder Commons—before installation of a solar photovoltaic (PV) array—is 26 EUI (or about 7.6 kilowatts), about 70 percent less than the average building in Boulder. Morgan Creek estimates that compared with traditional office buildings in the city, Boulder Commons registers annual energy savings of \$146,000. The solar PV array installed on the roof and southeast facade generates 575 kilowatts of electricity, enough to offset the entire building's energy use, excluding the restaurant.

To ensure that tenants are operating efficiently and helping the building stay within the realm of NZE, Morgan Creek sets each tenant a plug load budget of 7 EUI (or about 24 kilowatts

per square meter). If tenants go over their energy budget, they must purchase renewable energy credits (RECs) to offset the additional use. If the building's base systems use more energy than allowed, or the solar arrays fail to produce enough energy, Morgan Creek will purchase the RECs to cover that difference. This agreement is not only outlined in a green lease between landlord and tenants, but also communicated on a regular basis via monthly and annual energy reports to each tenant.

| **“The value to building to NZE standards is twofold,”**
| **says Andy Bush, principal of Morgan Creek Ventures.**
| **“First, there is value in the development team’s ability to**
| **design NZE buildings by choosing appropriate building**
| **systems and materials for achieving optimal energy use**
| **and production to drive industry standards to more NZE**
| **building. In addition to the value to developers, the value**
| **to the tenants and residents who reside in NZE buildings**
| **is seen in the productivity and comfort increase associated**
| **with an energy-efficient building.**

| **“The ability to create a product that challenges the industry**
| **to be innovative and think about development from an**
| **energy consumption and production perspective from**
| **concept to creation creates unparalleled value for not only**
| **the industry and future of development, but for the people**
| **who reside in the buildings we create.”**



MORGAN CREEK VENTURES



MORGAN CREEK VENTURES



MORGAN CREEK VENTURES

SOCIAL EQUITY AND WORKFORCE DEVELOPMENT

Though ESG is what broadly defines many Greenprint members' sustainability strategies, integrating the social into business practices often comes with a distinctive set of challenges.

In an effort to expand socially minded programs, Prologis launched the Community Workforce Initiative (CWI). CWI aims to address the labor shortage concerns of many Prologis customers through a comprehensive program and agenda. The program includes partnerships with local workforce development organizations to offer mentorship, skills training, internships, and job placement assistance for workers in the logistics, distribution, and transportation sectors—all of which are currently experiencing labor shortages. CWI aims to raise awareness of career opportunities, create a pipeline of employees for Prologis customers, demonstrate sound corporate ESG citizenship, and support economic development.

Formally launched in Los Angeles in September 2018 in partnership with the nonprofit organization EXP, the program focuses heavily on underserved populations or those who may

not have a clear path to college after high school graduation. After its launch, CWI expanded to Miami and Chicago, and Prologis will expand the program to other markets in 2019 and beyond. The Los Angeles program enrolled 160 participants in its first year, and the Miami Springs High School program will include about 150. Prologis plans to continue rolling out the program and engaging with other cities and states to make workforce development the new normal in logistics, distribution, and transportation.

"As more of our customers face labor challenges in the logistics industry, Prologis recognizes the important role job training programs play in building a qualified, diverse workforce," says Jeannie Renné-Malone, vice president, ESG, at Prologis. "The collaboration between Prologis and workforce development organizations provides individuals with an opportunity to gain critical skills in this growing sector while furthering economic growth at a local level."



PROLOGIS



PROLOGIS



PROLOGIS

HIGH-EFFICIENCY WATER FIXTURES

Water efficiency remains a relatively easily achievable goal for both companies continuing down a path of sustainability and for those just starting. Greenprint members reported over \$2.3 million in water efficiency investments in 2018.

Clarion Partners, a U.S. real estate investment manager with over \$50 billion in total assets, stands out as a leader in water efficiency in the hotel industry. With over 55 hotel properties and more than 8,000 guest rooms, Clarion saw a large savings opportunity in water efficiency. The company began a complete upgrade of bathroom fixtures, including toilets, faucet aerators, and showerheads, throughout its portfolio.

The new, water-efficient toilets reduced water use from three gallons (11.4 liters) per flush to 0.8 (3 liters). This resulted in average annual savings of \$9,000 per hotel. Faucet aerators reduced annual water consumption by about 91,000 gallons (344,000 liters), resulting in \$1,000 average annual savings per hotel. Last, Clarion upgraded showerheads across 95 percent of its portfolio with fixtures that reduced water consumption from 2.5 gallons (9.5 liters) per minute to 1.75 (6.6 liters).

Guest experience and satisfaction inevitably affects the bottom line of hotels, and Clarion was committed to ensuring a pleasant guest experience. Several asset and hotel managers brought different low-flow showerheads home to test and compare them in order to ensure that the guest experience would not be diminished by the more efficient options. The showerheads saved over 500,000 gallons (18.9 million liters) of water across the portfolio and achieved over \$5,000 in water savings and \$1,700 in natural gas savings, for a total savings of over \$7,000 annually per hotel. In all, the implemented water efficiency measures saved each hotel over \$17,000 per year.

| **“Implementing sustainable practices that help our environment while ensuring guest comfort shouldn’t have to be mutually exclusive,” says Chuck Lathem, managing director at Clarion Partners. “Hotels host millions of travelers annually, so we have a real opportunity to not only demonstrate that we are taking quantifiable action to improve our planet, but we are doing so in ways that complement the guest experience.”**

SUSTAINABILITY IN HOTELS

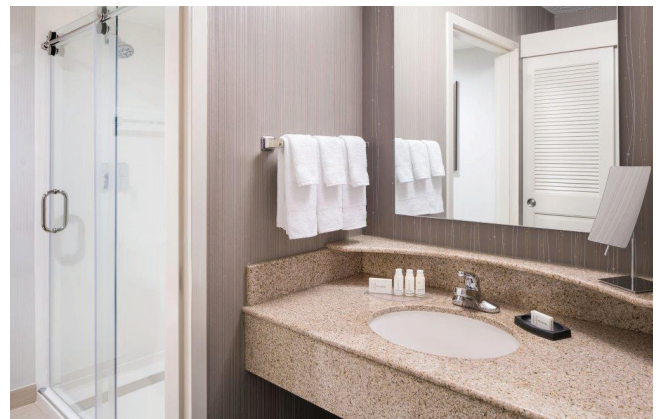
For more information on how to improve the environmental performance of a hotel asset, see ULI’s recent report *Sustainability in Hotels: Opportunities and Trends Shaping the Future of Hospitality*, available at uli.org/hotelsustainability. The report assesses the state of sustainability in the hotel sector; identifies best practices in energy efficiency, water conservation, and waste reduction; and highlights industry trends to watch.



CLARION PARTNERS



CLARION PARTNERS



CLARION PARTNERS

HEALTH AND WELLNESS BUILDING CERTIFICATIONS

While tracking health and wellness metrics and their impact on the built environment is still an evolving practice, many Greenprint members are reaching for certifications such as WELL and Fitwel that push owners and occupants to consider the impact buildings have on occupants beyond traditional energy use and sustainability.

The goal of the Fitwel certification program is to create healthier buildings and motivate landlords and tenants to invest in wellness initiatives throughout the building. Unlike certification systems such as LEED, Fitwel does not award points for upgrades to systems such as HVAC or lighting and sensors, but instead for elements of active design such as offering a wellness room for nursing mothers and giving every employee access to a fitness center.

MORE INFORMATION ON HEALTH AND WELLNESS CERTIFICATIONS

Currently leading the market in health and wellness building certifications are the Fitwel and WELL programs. While distinctive in their own regards, each certification aims to go beyond energy efficiency and sustainability to improve how buildings affect occupants' health and well-being.

FITWEL CERTIFICATION

In 2011, the U.S. Centers for Disease Control and Prevention (CDC) and the U.S. General Services Administration (GSA) partnered with New York City to develop Fitwel, a rating system for optimizing buildings in support of health. Designed initially for healthy fit-outs of existing buildings, Fitwel was piloted in 89 GSA buildings. Fitwel's evidence-based criteria are informed by a team of advisers in the areas of public health, design, development, statistics, and research, and are supported by more than 3,000 research studies. The Fitwel standard focuses on 12 wellness health factors: location, building access, outdoor spaces, ground floor, stairwells, interior environmental quality, workspaces, shared spaces, water supply, cafeterias, vending machines, and emergency procedures.

WELL CERTIFICATION

Pioneered in 2012 by Delos, a New York City-based wellness real estate and technology firm, the WELL Building Standard was launched in 2014 by the International WELL Building Institute (IWBI) as a performance-based system for measuring, certifying, and monitoring features of the built environment that affect human health and well-being. WELL combines best practices in building design, construction, and management with evidence-based medical and scientific research on environmental health, behavioral factors, health outcomes, and demographic risk factors that affect health. Certification of buildings and communities and the WELL AP professional credentialing program are third-party administered through IWBI's collaboration with Green Business Certification Inc. WELL projects are certified according to three levels—Silver, Gold, and Platinum.

Kilroy Realty Corporation is one Greenprint member leading the way in health and wellness. The company ended 2018 with more Fitwel certifications than any other nongovernment landlord, with 15 across 38 percent of its portfolio and certification planned for more projects in 2019. In addition to the Fitwel certifications, Kilroy also has the first WELL-certified residential rental units in the world, with another building targeting WELL certification in late 2019.

For its over 5 million square feet (465,000 sq m) of Fitwel-certified space, Kilroy employs a number of initiatives, including low-VOC-emitting materials for better air quality, increased access to healthy snack and drink options, access to daylight and natural views, inclusion of fitness centers, use of active and open stairwells, and a mother's room for new mothers, all of which lead to lower absenteeism and fewer health claims.

| **"We recognize that our buildings have human impacts both within and outside their walls, and we want our buildings to help our tenants and employees maximize their health and productivity,"** says Sara Neff, senior vice president of sustainability at Kilroy. **"Fitwel directs us towards active design features that are scientifically proven to promote positive health outcomes for building occupants, which is why we are so committed to Fitwel certification in our portfolio."**



KILROY



KILROY



KILROY

ASSESSING CLIMATE RISK AND RESILIENCE

Sustainability and energy efficiency are critical to ensuring longevity in real estate and avoiding premature obsolescence. However, more owners and investors are realizing the long-term importance of addressing climate risk and resilience in their portfolios. Failure to focus on these issues can result in damage to assets from increasing frequency of storms, higher turnover of tenants, inability to lease spaces, and a negative impact on investment returns.

Global real estate investment management firm Heitman has rolled climate risk and resilience into its core business strategy. Heitman recently set out to analyze its portfolio's disaster preparedness and climate risk but found minimal publicly available data to help guide that analysis. For example, floodplain maps from the Federal Emergency Management Agency (FEMA) were often out of date. Heitman turned to Four Twenty Seven, a private climate risk assessment firm, for an analysis of the risks to which each of the assets in its portfolio was exposed.

Four Twenty Seven combines next-generation climate maps with historical disaster incidence data to calculate climate risks. Using the Four Twenty Seven technology, Heitman mapped out its risks in 30-by-30-meter (9.1 by 9.1 ft) areas. Every asset is allocated a score from 0 to 100 on parameters such as risk related to cyclones, floods, earthquakes, sea-level rise, heat stress, and water stress, and benchmarked to a database of over 1 million properties.

This allowed Heitman to analyze risk at the property level and create retrofit budgets accordingly. It also allows the firm to calculate climate risk at the portfolio level, shaping future investment decisions. By arming itself and its investors with these data, Heitman integrates risk and resilience decisions into everything from due diligence to acquisition strategy and building upgrade opportunities.

“Our clients expect us to quantify risk and opportunity at the property level, to guide our investment choices,” says Mary Lugdin, senior managing director/head of global research, Heitman. “Climate-related risk has been largely ignored by the real estate investment industry until recently. Investors counted on insurance to protect them against such risks. We see that approach as short-sighted. New tools are being developed that allow us to make smart investment choices that will hold up through the holding period for assets.”

In addition to internal practices, Heitman desired to understand investor perspectives and industry best practices. As part of that effort, the firm partnered with ULI to jointly publish the research report *Climate Risk and Real Estate Investment Decision-Making*.



Managing What Is Measured

You can't manage what you don't measure. This oft-used phrase is just as relevant today as it has ever been. Data benchmarking continues to be the backbone of Greenprint—as it has been over its 10-year tenure—to ensure that members of the real estate community hold themselves accountable for reporting on and reducing portfolio-wide carbon emissions over time.

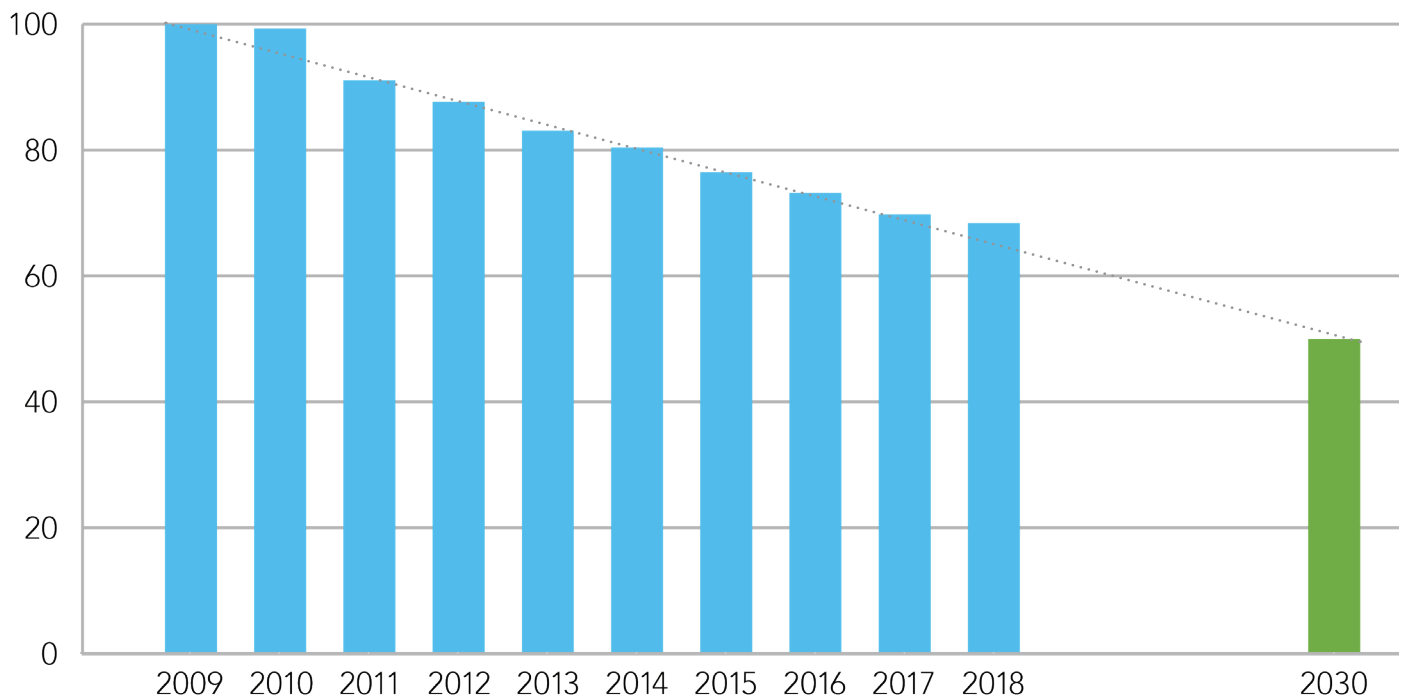
Long-Term Results: From 2009 to Now

Greenprint's mission is to lead the global real estate community toward value-enhancing carbon-reduction strategies to ensure that collective emissions continue to decline over time and

remain on track to meet the goal of 50 percent reduction by 2030. 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.

Since 2009, Greenprint properties have improved their energy use intensity, with the median EUI of office properties in the United States improving from over 220 kWh/m² to 183 kWh/m², a 17 percent decrease. The most recent year-over-year performance shows a 1.5 percent reduction in carbon emissions.

GREENPRINT CARBON REDUCTIONS OVER TIME (percentage)



Annual Results

Greenprint members' buildings across the globe collectively continue to reduce energy and water use, waste generation, and carbon emissions year over year, as shown in the figures below.

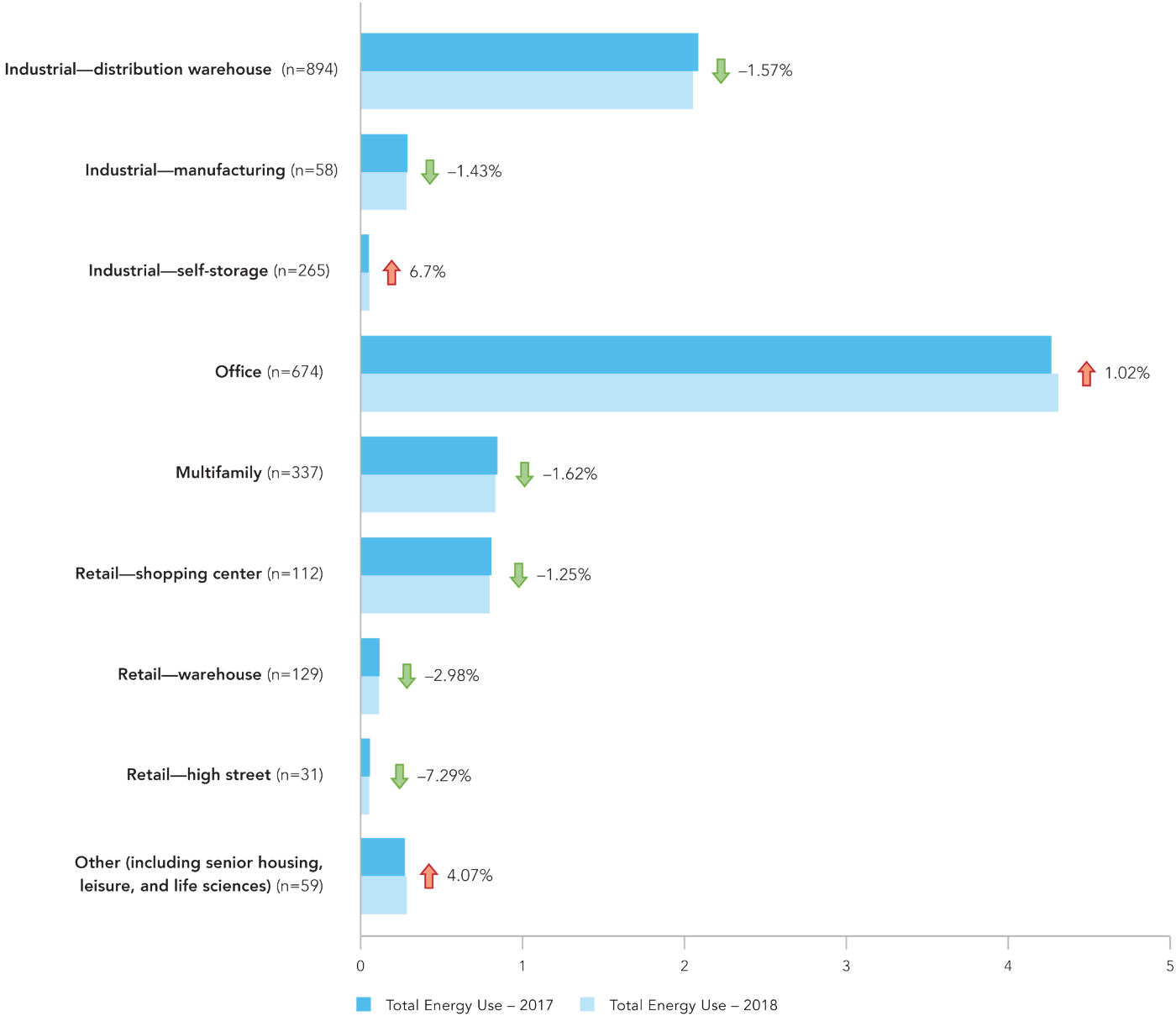
GREENPRINT PERFORMANCE SNAPSHOT: CHANGE, 2017 TO 2018



Although still on track and consistently reducing energy and water use and waste generation, Greenprint members this year reported reductions that were smaller than expected. In previous years, members achieved about 3 percent annual energy and emissions reductions.

With the large reductions achieved in early years, Greenprint members are still on track to reduce emissions by 50 percent by 2030. The aim is that members and others in the real estate industry who have hit performance plateaus work together to continue improving and innovating to meet the collective 2030 goal.

GREENPRINT ENERGY PERFORMANCE, BY PROPERTY TYPE: CHANGE, 2017 TO 2018 (billion kWh)



2018 ENERGY PERFORMANCE VARIABLES

A number of variables and complications account for the collective Greenprint energy performance holding almost steady in calendar year 2018:

- **Climate and weather events.** Greenprint member properties in the Northeast (including New York City, Boston, and Washington, D.C.) and in Texas (Houston) experienced unexpected increases in energy use. A particularly cold January in the Northeast and hotter-than-average summer temperatures in Texas may also have influenced the results. Because the data set is not normalized for weather, it is important to note these increasingly frequent heat waves and cold snaps.
- **Tenant use.** Because tenants account for over half of a building's consumption, an increase in tenant density or energy-intensive tenants (such as data centers, industrial users, and refrigerated warehouses) could increase energy use. Cities like San Francisco and Houston and the Manhattan borough of New York City have all experienced strong declines in the amount of square footage per employee,⁶ with higher tenant density resulting in higher plug load and overall building energy use.
- **Fewer easy efficiency opportunities available.** Over the years, many Greenprint members have collected the "low-hanging fruit" of energy efficiency opportunities like LED lighting, HVAC upgrades, or building retro-commissioning. These changes require a limited amount of upfront capital, have a fast payback, and are easy to get approved. For Greenprint members whose properties did not decrease energy use this year, there are likely deeper retrofit opportunities available that can be identified through energy audits but that require additional planning and investment.
- **The expanding definition of sustainability.** As noted in the Best Practices section, for the first time this year, waste projects ranked second in number of projects undertaken by Greenprint members. With sustainability directors at member companies responsible for things like recycling, health and wellness initiatives, social equity, and resilience, traditional energy efficiency and water conservation projects may have taken a backseat in sharing the sustainability budget.

Detailed 2018 Analysis

The following benchmarks show the 2018 Greenprint member median energy, water, and waste intensity by property type.



To collect and analyze much of the data for this report, Greenprint relies on its sustainability software partner, Measurabl. Measurabl's tools support Greenprint members in collecting and reporting data, analyzing performance, and identifying opportunities for improvement. Measurabl has become Greenprint's recommended environmental management system: it collects asset-level utility use data, as well as tracks projects implemented, green building certifications, and other metrics. It also supports direct submission of sustainability data to reporting platforms like GRESB, CDP, and GRI.

“LaSalle gets many benefits out of our membership with Greenprint. First and foremost, I would say we leverage Greenprint’s environmental management system, which is awesome—to have a second set of eyes than just my own and my analyst on our data. It’s really nice to have someone else validating it.”

—Eric Duchon, head of global sustainability, LaSalle Investment Management

ENERGY

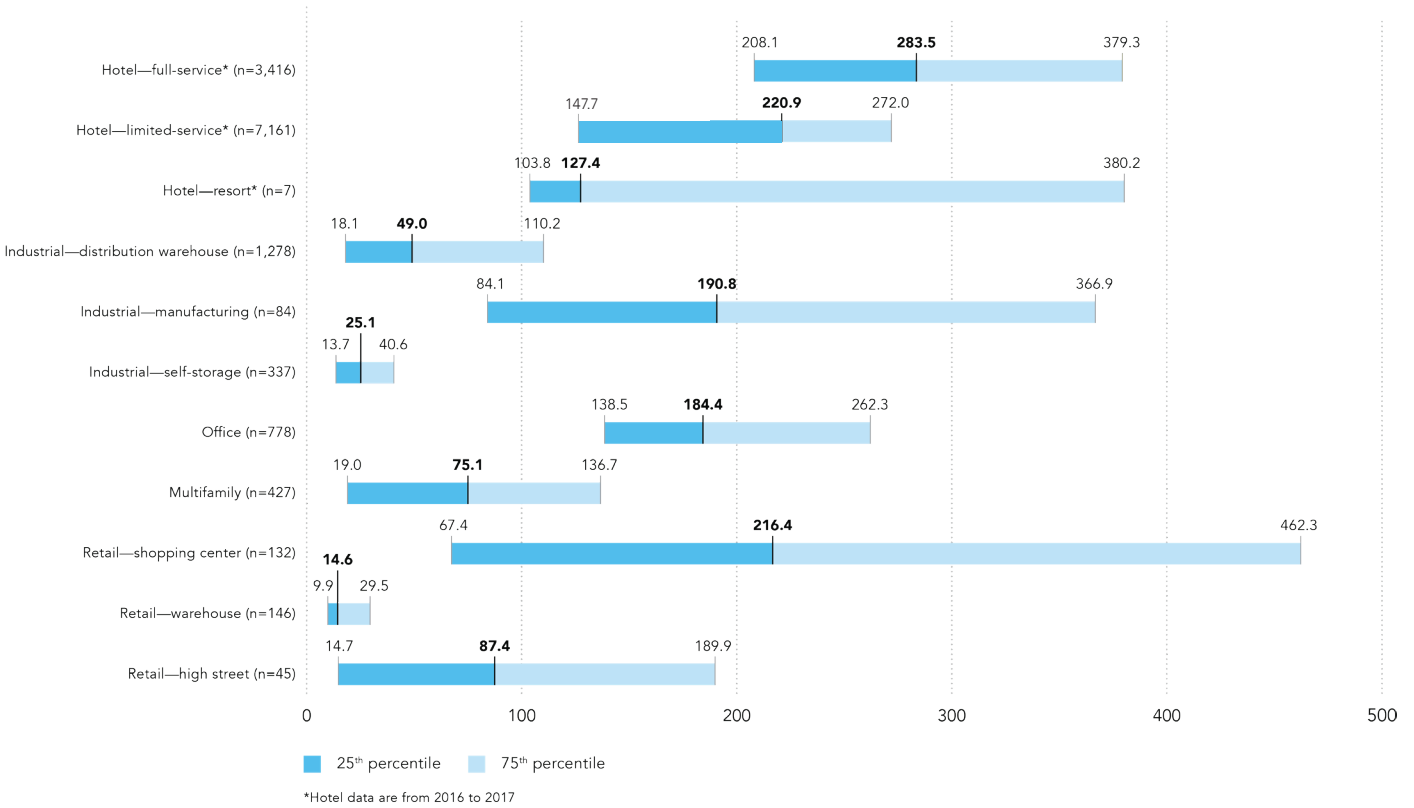
Energy benchmarks help owners better understand their building's performance in comparison with peers. Hotels once again used the most energy per square meter, followed by shopping centers. Retail warehouse properties used the least energy per square meter, followed by self-storage industrial properties.

A key driver of energy use in buildings is the tenant makeup: two similar properties will perform very differently depending on the occupant type and density of use. To address these variables, many Greenprint members implement green lease language across building types to set expectations and overcome the split

incentive that comes with energy efficiency investments during fit-outs. (See GID's green leasing example in the Best Practices section.) Upon tenant occupancy, these Greenprint members run tenant engagement programs that educate tenants on the benefits of reducing their environmental impact.

Buildings in areas with high energy costs like New York City and Hong Kong have the greatest potential for cost savings and increased asset value, though savings are not limited to certain cities or property types. Energy efficiency projects, like those discussed in the Best Practices section, drive EUI reductions and remain a major focus for Greenprint members.

2018 ANNUAL ENERGY USE INTENSITY, BY BUILDING TYPE (kWh/m²)



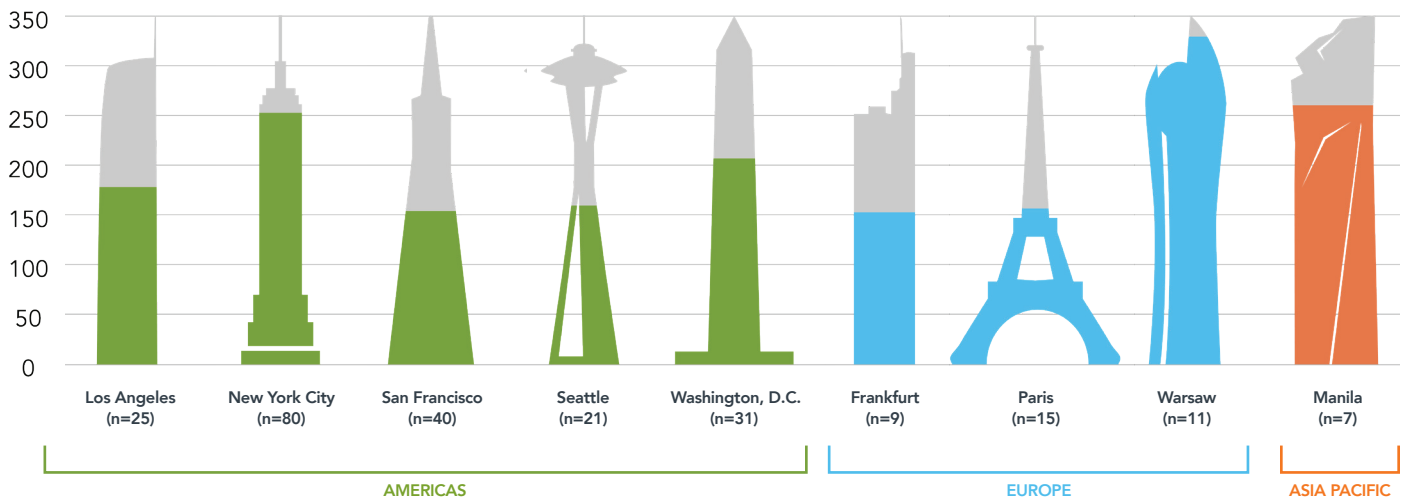
CITY-SPECIFIC BENCHMARKS

Many cities are setting ambitious climate goals, as noted in the Trends section of this report, aiming to reduce emissions by 50 percent, 80 percent, or 100 percent by 2050. The focus on cities is important because energy used in cities makes up the bulk of a country's carbon emissions—a share that will increase as the world becomes more urbanized.

EUI varies significantly across markets and is driven by many local factors, including the climate, economy, tenant mix,

building codes, and property operating standards. In the Greenprint portfolio, office properties in Paris, Frankfurt, Brisbane, and San Francisco use less energy per square meter than those in other major cities. This likely is because these properties are subject to some of the strictest global environmental regulations—as well as benefit from a comparatively mild local climate.

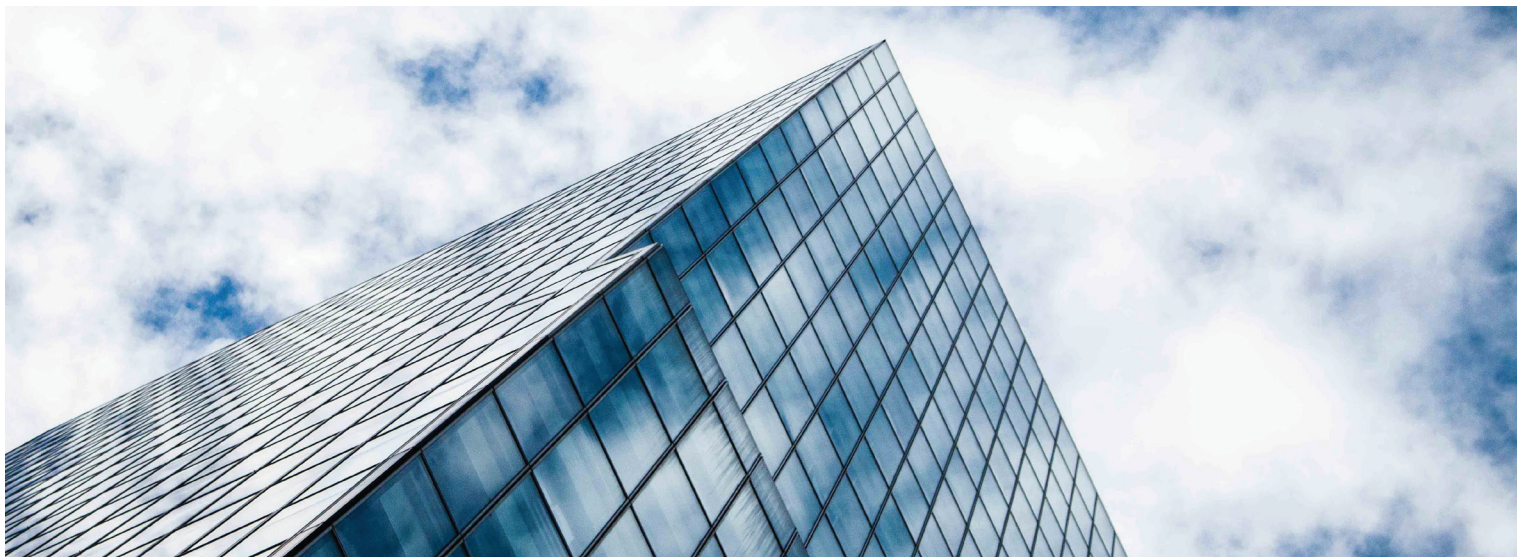
2018 MEDIAN OFFICE ENERGY USE INTENSITY, BY CITY (kWh/m²)



ENERGY STAR PORTFOLIO MANAGER



ULI is an Energy Star partner. For 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 and water consumption and waste generation. Sixty-eight percent of Greenprint member properties in the United States and Canada collect their environmental data in Portfolio Manager.



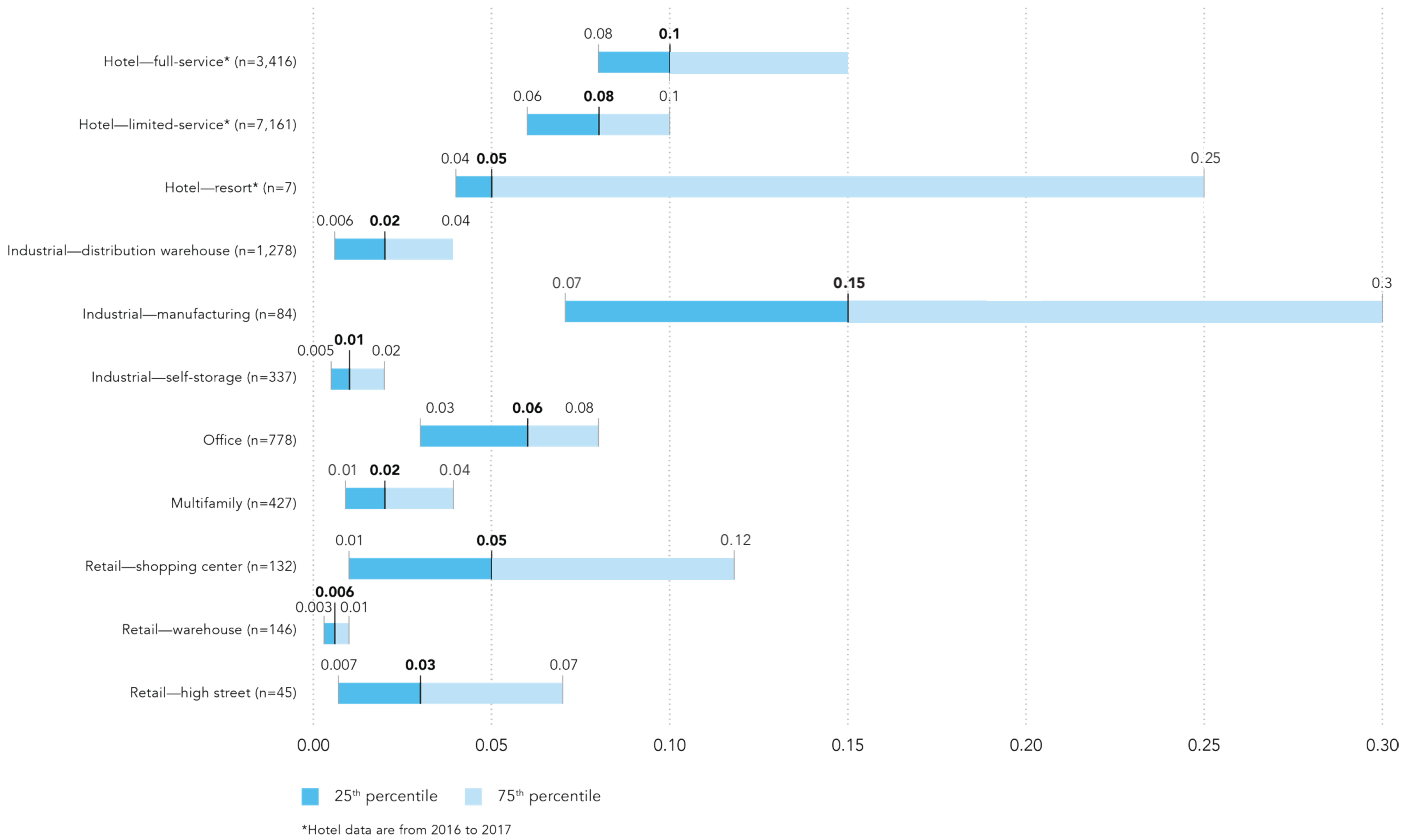
CARBON EMISSIONS

Greenprint benchmarks carbon emissions across the portfolio. On a per-square-meter basis, manufacturing and full-service hotels properties showed the highest carbon emissions intensity; both are also highly energy-intensive property types. Retail warehouses and self-storage industrial properties reported the lowest carbon emissions intensity.

Carbon emissions by building are tied to energy use, yet year-over-year carbon emissions across the Greenprint portfolio

dropped 1.5 percent while the reduction in energy use was only 0.1 percent. This is partly due to the “greening” of the grid: utilities are providing, and building owners are requesting, that a higher proportion of energy supplied be from renewable sources. Further, many building owners such as Morgan Creek Ventures (whose net-zero building is described in the Best Practices section) are installing distributed energy resources like solar panels at their properties to more directly control and curb their carbon emissions.

2018 CARBON EMISSIONS INTENSITY, BY BUILDING TYPE (mt CO₂e/m²)



WATER USE

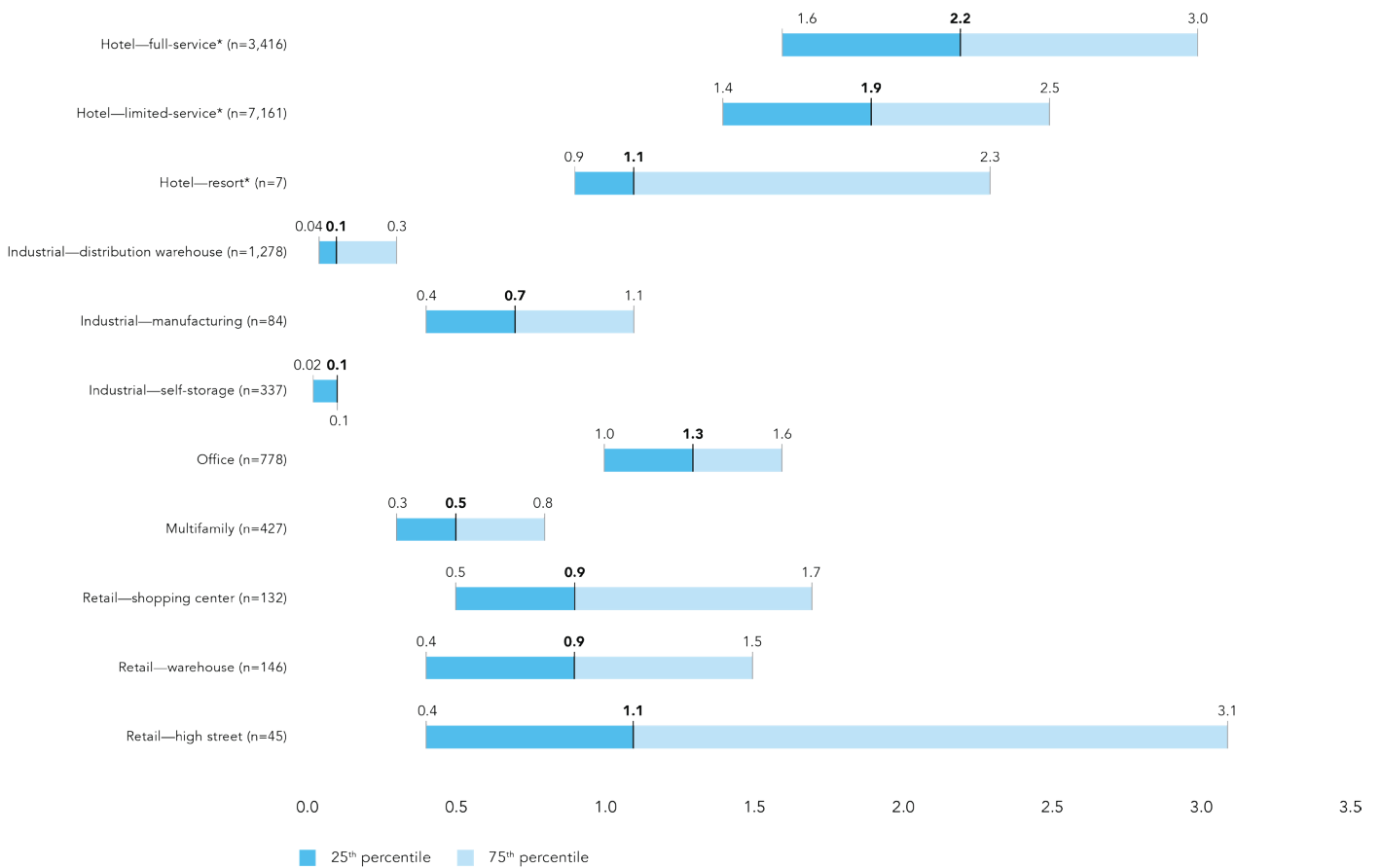
Once again, hotels reported the highest water use per square meter, and industrial distribution warehouses and self-storage properties reported the lowest. This result is intuitive: hotels operate pools, laundry facilities, and showers whereas industrial properties have minimal bathroom fixtures and landscaping needs.

While water conservation projects are often overlooked because water costs are low compared with energy costs—and drought conditions have been less severe in dry climates in recent years—there is still a strong business case for implementing water-conservation projects beyond simple savings on utility costs. With climate change expected to increase the frequency and intensity of droughts, buildings in affected areas may

soon again face water restrictions. Anticipating future drought conditions, California in 2018 adopted permanent water restrictions, setting limits on water use per person per day by 2022 and further lowering the limits over time.

In addition, there is a strong correlation between water consumption and energy use. Reducing water use can also lower energy consumption and costs: energy is required to heat water for showers and the laundry facilities, to move water around a building, and to support heating and cooling. The Clarion Partners water efficiency profile in the Best Practices section provides insights on reducing water use in hotel properties.

2018 WATER USE INTENSITY, BY BUILDING TYPE (kL/m²)



*Hotel data are from 2016 to 2017

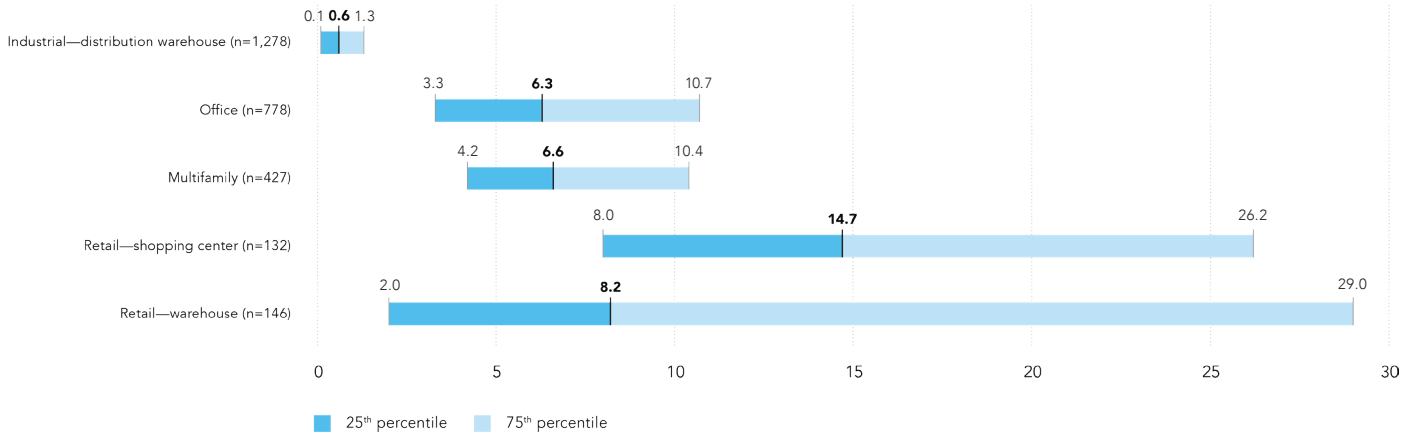
WASTE

Across the Greenprint portfolio, retail properties again produced the most waste per square meter, and distribution warehouse facilities reported the lowest waste intensity.

In 2018, waste projects were the second-most-common project type reported at Greenprint member properties, with 144 projects. The majority of implemented projects were recycling

programs, from recycling of electronics waste to tenant education programs on recycling. This tracks with the 7 percent improvement in waste diversion from 2017 to 2018 across the Greenprint portfolio. Other waste projects included green cleaning janitorial programs, solar-powered trash compactors, and composting.

WASTE USE, BY BUILDING TYPE (kg/m²)



THE HOWARD HUGHES CORPORATION



Guide to Report Terms and Charts

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.

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 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, and/or with energy use intensities between 3.15 and 3,156 kilowatt-hours per square meter. The analysis does not account for additional variables such as heating and cooling degree days, vacancy rates, and occupant density.

About the Urban Land Institute

The Urban Land Institute is a global, member-driven organization comprising more than 45,000 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 50 percent by 2030.

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Since 2017, Greenprint has partnered with Measurabl to leverage its software tool in support of Greenprint member data collection, analysis, and reporting.

Notes

- ¹ "The Making of Circl: The Story of a 'Circular' Pavilion in Amsterdam's Zuidas District," September 2017, <https://circl.nl/themakingof/en/>.
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- ³ "Energy Optimization Initiative for Real Estate," CalPERS website, <https://www.calpers.ca.gov/docs/energy-optimization-initiative.pdf>.
- ⁴ "'Green' Building Certifications on the Rise in Major International Markets," Business Wire, April 23, 2018 <https://www.businesswire.com/news/home/20180423005097/en/%E2%80%9CGreen%E2%80%9D-Building-Certifications-Rise-Major-International-Markets>.
- ⁵ Katherine Baicker, David Cutler, and Zirui Song, "Workplace Wellness Programs Can Generate Savings," *Health Affairs* 29, no. 2 (February 2010), <https://www.healthaffairs.org/doi/10.1377/hlthaff.2009.0626>.
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