5

Greenprint Performance Report™

VOLUME 5, 2013

ULI Greenprint Center for Building Performance

Greenprint Members

AETOS CAPITAL REAL ESTATE

Equity Office

LaSalle Investment Management
Real estate experience. Investment expertise.

AvalonBay Communities, Inc.

First Washington Realty, Inc.

Miller Capital Advisory, Inc.

GID

Beacon Capital Partners

Paramount Group, Inc.

GI Partners

Bentall Kennedy

Parkway

GLL Real Estate Partners

Berkshire Communities

ProLogis

Granite

Prudential

BlackRock

Rudin Management Company, Inc.

Grosvenor

The Blackstone Group

Silverstein Properties

CalPERS

Hines

Sonae Sierra

CommonWealth partners

Invesco

starwood Hotels and Resorts

Deutsche Asset & Wealth Management

Jamestown

TIAA CREF Financial Services

DowntownDC

Jones Lang LaSalle

Tishman Speyer

About ULI

The mission of the Urban Land Institute is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide.

Established in 1936, the Institute today has more than 32,000 members worldwide, representing the entire spectrum of the land use and development disciplines. ULI relies heavily on the experience of its members. It is through member involvement and information resources that ULI has been able to set standards of excellence in development practice. The Institute has long been recognized as one of the world's most respected and widely quoted sources of objective information on urban planning, growth, and development.

About ULI Greenprint Center

The ULI Greenprint Center 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 education, Greenprint and its members strive to reduce greenhouse gas emissions by 50 percent by 2030, in line with the goals of the Intergovernmental Panel on Climate Change.[1]

Greenprint is a catalyst for change, helping members take meaningful and measurable actions to advance environmental performance. In order to meet its objectives, Greenprint is bringing to light sustainability best practices and helping lead the real estate industry toward harmonized global standards for environmental performance metrics and benchmarking. Our members collectively use the Greenprint Environmental Management Platform to track, report, benchmark, and analyze energy, emissions, water, and waste performance for properties, funds, and portfolios. The platform supports comprehensive data management and analysis, which enables members to take actions toward improving environmental performance and reducing emissions. We endeavor to demonstrate the correlation between environmental performance and enhanced property value.

Each year, Greenprint publishes a consolidated view of the portfolio of participating properties, highlighting environmental performance by geography and property type in the *Greenprint Performance Report*™. Members also receive reports detailing individual property, fund, and portfolio performance against appropriate benchmarks, which allows them to better manage their portfolios and demonstrate environmental progress.

Patrick L. Phillips
Global Chief Executive Officer, ULI
President, ULI Foundation

Letter to Greenprint Stakeholders

Greenprint turns 5!

Five years ago, Greenprint was just an idea, and through the foresight, hard work, and dedication of the Greenprint membership and the Urban Land Institute, that idea was turned into an established and thriving organization. Greenprint is unique in that it does not provide a label or a score, nor is it required by a mandatory disclosure. Greenprint exists because leading real estate owners and investors find value in having the ability to track, analyze, and benchmark property-level performance and to work together with peers to share ideas and knowledge on how to further improve the performance of their properties. As we introduce Volume 5 of the *Greenprint Performance Report*™, it continues to be the largest global collection of transparent, verifiable, and comprehensive data that provides aggregate benchmarks and performance trends for the real estate industry.

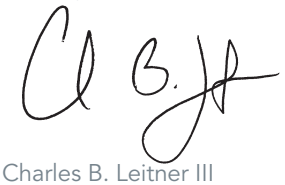
We would like to acknowledge the outstanding leadership of our members, which has resulted in substantial growth of the Greenprint portfolio. This year's report includes 4,001 properties (a 24 percent increase) across 95 million square meters of building area (a 26 percent increase), surpassing 1 billion square feet of building area. In this report, we highlight that energy consumption decreased 1.9 percent and greenhouse gas emissions decreased 4.6 percent on a like-for-like basis for over 2,600 properties from 2012 through 2013. We are pleased to report that this is the fourth year in a row that Greenprint members have lowered their energy consumption and emissions.

Continuous improvement across Greenprint properties has prompted the question, "How do we replicate this across the industry?" To help address this question, we have taken several steps. For one, we have included seven case studies focusing on various topics to help explain how companies are making improvements to their properties and portfolios. We have also launched a ULI-wide webinar series focused on presenting innovative ideas, research, and best practices to share experiences and promote the many strategies that our members and partners are using to lead the real estate industry toward improved performance.

Challenges still remain, such as, gaining broader industry engagement in the midst of a fragmented market, growing participation in Europe and Asia, and establishing even more valuable ways to use the data. To help address some of our challenges we continue our quest to partner with like-minded organizations. Many organizations are doing important sustainability work, and working together to elevate our mission is key to making progress and creating lasting changes. This year we established a new relationship with the DowntownDC Business Improvement District (BID) in Washington, D.C., and the DowntownDC ecoDistrict, as well as strengthened our relationship with the Better Buildings Partnership (BBP). In partnership with the DowntownDC BID and ecoDistrict we created our first city specific report. And through our collaboration with the BBP, the Greenprint benchmark was enhanced with over 600 U.K.-based properties. It is through relationships like these that we are able to establish stronger city-specific benchmarks and examine attributes that define high performers within a city or region. Aligning how energy and environmental data are used around the world enables Greenprint's members and partners to manage properties and collect metrics that present a more holistic view of property performance.

The five-year milestone marks an important time in Greenprint's evolution. As an organization with a diverse range of global stakeholders, we strive to understand and report on a range of risks and opportunities that are driving the real estate industry toward more responsible property management and operations. In an effort to help our members and the industry generate lasting asset value, we are working across ULI to better integrate our work with various programs such as Capital Markets, Building Healthy Places, and the Urban Resilience Program. Greenprint is not thinking about the past five years, but rather about collaborating with our stakeholders to develop strategies for the real estate industry for the next century. We are proud of the progress we have made so far, and it is only through your leadership, commitment, and stakeholder engagement that we can continue to have an impact. Thank you to our members, partners, and collaborators for your contributions and inspiration. We look forward to working with you in the years ahead.

Sincerely,



Charles B. Leitner III
Chairman, ULI Greenprint Center

Helen A. Gurfel
Executive Director, ULI Greenprint Center

Contents

Greenprint Performance Report Guide

The *Greenprint Performance Report*™, Volume 5, is based on 4,001 property submissions representing 95 million square meters (1.0 billion sq ft) across 50 countries. The Greenprint portfolio consists of five main property types: office, retail, industrial, multifamily, and hotel.

Greenprint sets the standard for a common system to measure and benchmark energy consumption, emissions, water use, and waste across the global real estate industry. The Greenprint Environmental Management Platform ensures continued alignment with the growing number of global disclosure programs. The Greenprint database is created from records of individual properties and is transparent in terms of property characteristics used and calculations applied. The report provides not only current-year benchmarks, but also a comparison of data from one year to the next for the same set of properties, "like for like."

The **EXECUTIVE SUMMARY** provides a snapshot of the Greenprint portfolio's growth and performance from 2012 through 2013.[2]

- The 2012–2013 like-for-like portfolio includes 2,608 properties with consistent historical data, which represents an 11 percent increase from 2012.
- The increase in number of properties and floor area is captured by showcasing the property distribution across property types and global regions.

The **ANNUAL RESULTS** section highlights current-year absolute benchmarks and like-for-like performance for energy consumption, emissions, water use, and waste disposal.

Each year Greenprint tracks the environmental performance of thousands of properties, many of which greatly improve their environmental performance year over year. This year, some insights on how real estate companies are taking steps toward better performance are provided. Throughout the report you will find case studies highlighting successful performance-improvement strategies, ranging from property-specific no-/low-cost operational improvements to more comprehensive portfolio-wide approaches. Property owners and operators are motivated to improve performance for many reasons: to reduce expenses/increase income, to comply with regulations, to drive tenant satisfaction and retention, to conserve natural resources, and to reflect their organization's sustainability values.

- The **ENERGY** section provides like-for-like performance on a global scale, as well as energy use intensity (EUI), by property type, region, country, and city. Data are normalized by building area, full-time equivalents, and core operating hours. Greenprint uses site energy rather than source energy for all reported energy metrics. This is a conscious decision so that energy reductions at the site level can be isolated and global methodologies for analysis can remain consistent. Site energy is translated into source emissions to take into account the variations in energy mix used across the numerous local and national electricity grids.
- The **GREENHOUSE GAS (GHG) EMISSIONS** section details current-year emissions, provides like-for-like comparisons, and displays various emission equivalencies.
- The **WATER** section contains like-for-like analysis and water intensity normalized for floor area, full-time equivalents, multifamily units, and hotel rooms.
- The **WASTE** section details waste metrics throughout the Greenprint portfolio and includes a breakdown of waste reported by diversion method and property type.

LONG-TERM PERFORMANCE captures Greenprint's Historical Performance and the Greenprint Carbon Index.

- The **Historical Performance** section summarizes Greenprint's growth and performance since inception.
- The **Greenprint Carbon Index** (GCX) is the normalized emissions intensity (kg CO_2e/m^2) of Greenprint members' properties, with energy consumption for each year since inception.

The **APPENDIXES** contain Quality Control and Verification processes in line with ISO 14064, Glossary, Property Subtype Definitions, and Emission Coefficients.

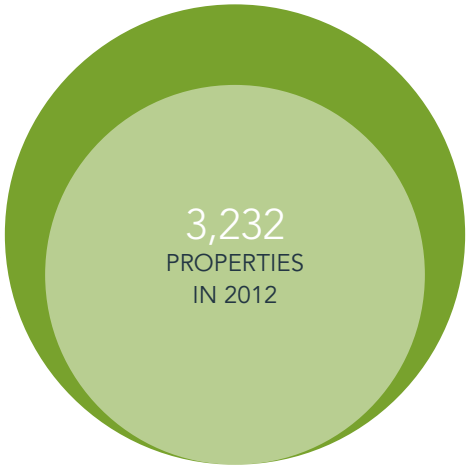
As a global organization, Greenprint has decided to present this report mainly in the International System of Units (SI) and euro currency. Where appropriate, we included imperial units. Individual member reports are customized to provide local metrics and currency.

1 EXECUTIVE SUMMARY

Greenprint at a Glance

YEAR OVER YEAR

The Greenprint portfolio continues to grow through member engagement and strengthened partnerships.



4,001 PROPERTIES IN **2013**

23.8% increase in properties

95 MILLION SQUARE METERS IN **2013**
(1 BILLION SQUARE FEET)

26.7% increase in building area

188 PROPERTY FUNDS IN **2013**

17.5% increase in property funds

Greenprint Portfolio Facts

over €540B
(US $690B)
real estate assets under management by Greenprint members

1,143,126
number of employees working in Greenprint buildings

50
number of countries represented in the portfolio

Performance Snapshot

YEAR OVER YEAR—LIKE FOR LIKE

ENERGY CONSUMPTION

energy
-1.9%

2012: 10,382 million kWh
2013: 10,181 million kWh
2,608 properties

CO_2e EMISSIONS

carbon
-4.6%

2012: 4,572 thousand mt
2013: 4,363 thousand mt
2,608 properties

COST

cost of energy[3]
-3.4%

2012: €489.7 million ($605.3 million)
2013: €473.2 million ($604.3 million)
1,584 properties

ELECTRICITY

electricity
-2.8%

2012: 7,587 million kWh
2013: 7,372 million kWh
2,608 properties

WATER USE

water
-1.7%

2012: 63.8 million kiloliters
2013: 62.7 million kiloliters
1,958 properties

DENSITY

occupancy
+0.2%

2012: 92.6%
2013: 92.8%
2,107 properties

2013 Emission Reduction Equivalents[4]

486,581
BARRELS OF OIL NOT CONSUMED

44,048
CARS TAKEN OFF THE ROAD

19,090
HOMES NOT CONSUMING ENERGY

5,364,872
TREES PLANTED

102,058
METRIC TONNES OF COAL NOT BURNED

Distribution by Geography

YEAR OVER YEAR

The Greenprint portfolio spans the globe, with the largest number of assets located in the Americas; Europe, Middle East, and Africa (EMEA); and a growing Asia Pacific portfolio. We recognize that the Greenprint benchmark would benefit from greater participation in EMEA and Asia Pacific. Property growth in EMEA and Asia Pacific is a priority for Greenprint in the coming years. Greenprint members have selected which assets to submit based on three criteria:

- Data availability
- Geographic distribution
- Managerial control

AMERICAS

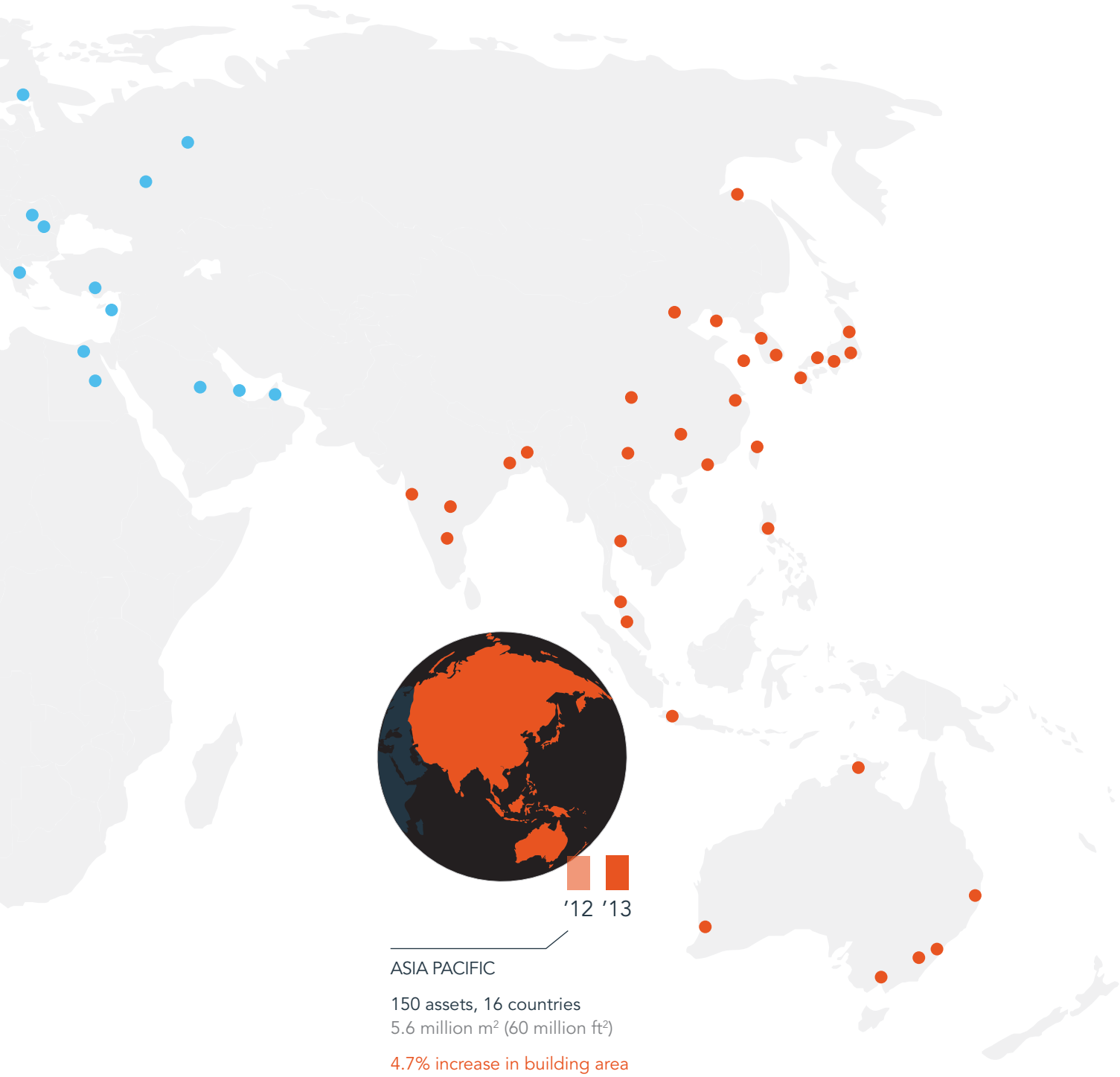
2,286 assets, 7 countries
57.7 million m^2 (620 million ft^2)

12.3% increase in building area

EMEA

1,565 assets, 23 countries
31.6 million m^2 (339 million ft^2)

73.8% increase in building area



ASIA PACIFIC

150 assets, 16 countries
5.6 million m^2 (60 million ft^2)

4.7% increase in building area

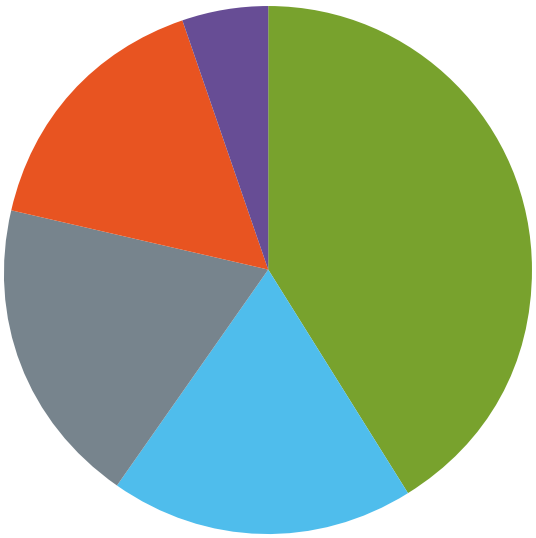
The Global Greenprint portfolio increased 27% by floor area and 24% by number of properties.

Distribution by Property Type

YEAR OVER YEAR

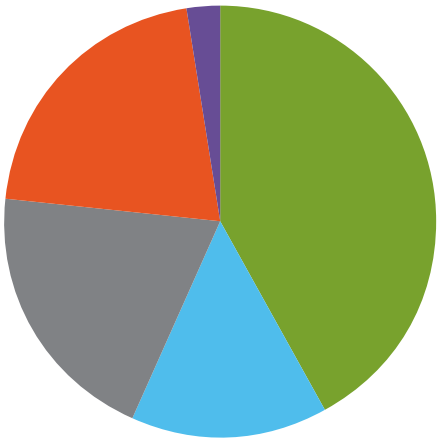
The *Greenprint Performance Report*™ includes all major property types, with an emphasis on office, followed by industrial, retail, multifamily, and hotel. To further analyze and explain property performance, each property type is divided into industry-recognized subtypes.

2013



- OFFICE
  37.8 million m² (407 million ft²)
  39.8%
- RETAIL
  18.0 million m² (194 million ft²)
  19.0%
- INDUSTRIAL
  18.6 million m² (200 million ft²)
  19.6%
- MULTIFAMILY
  15.6 million m² (168 million ft²)
  16.4%
- HOTEL
  4.9 million m² (53 million ft²)
  5.2%

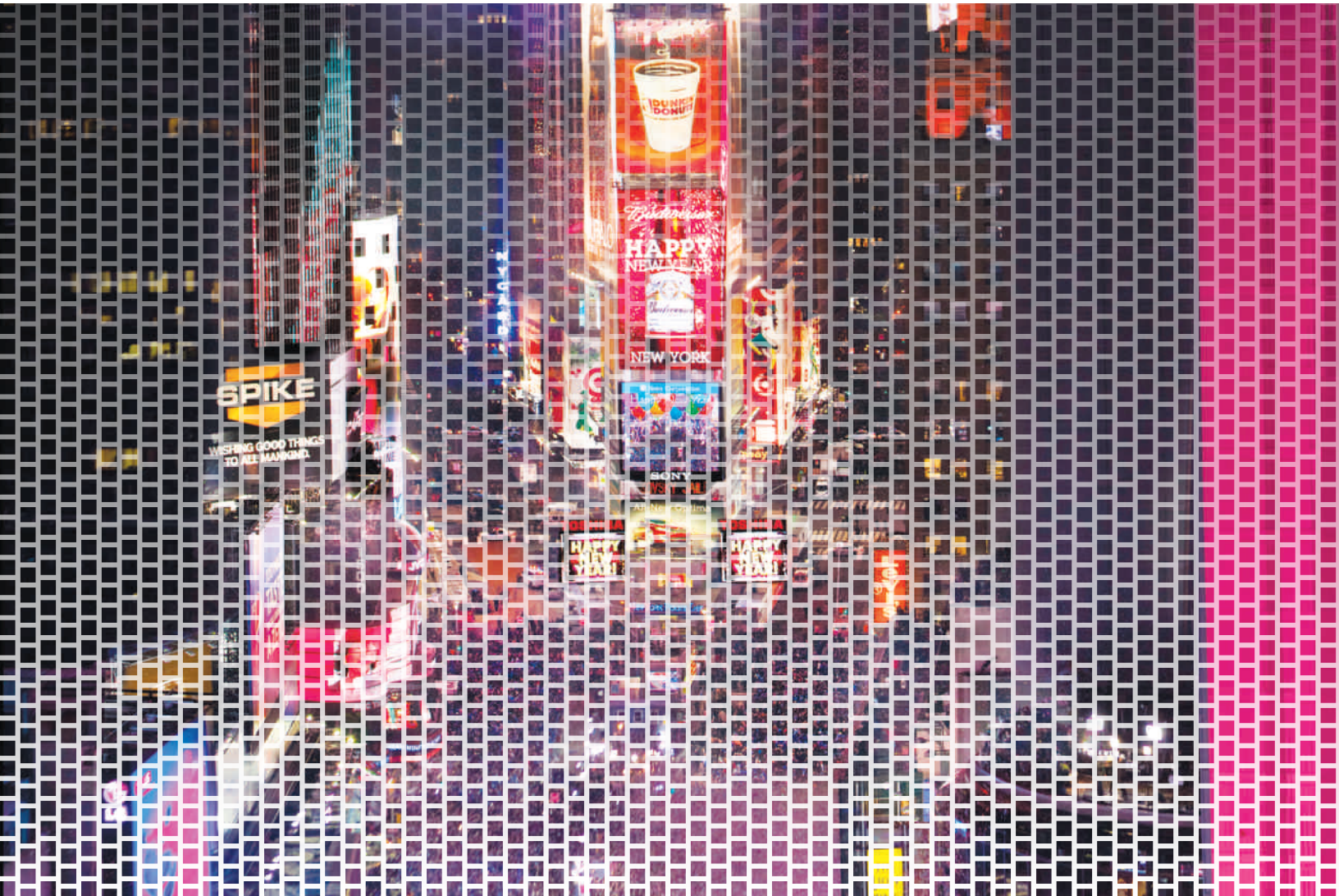
2012



- OFFICE
  31.4 million m² (338 million ft²)
  42.0%
- RETAIL
  11.0 million m² (118 million ft²)
  14.7%
- INDUSTRIAL
  15.0 million m² (161 million ft²)
  20.0%
- MULTIFAMILY
  15.6 million m² (168 million ft²)
  20.9%
- HOTEL
  1.8 million m² (19 million ft²)
  2.4%

Greenprint's portfolio continues to become more diversified.


HAPPY
NEW
YEAR!


SPIKE
HAPPY
NEW YORK

Energy Consumption

YEAR OVER YEAR—LIKE FOR LIKE

The chart below shows the like-for-like portfolio, which consists of 2,608 properties with 65.4 million m^2 (704 million ft^2) of space, with data from 2012 through 2013.

2012

10,382 million kWh

The Greenprint portfolio's energy consumption decreased 1.9%, saving over 201 million kWh—nearly equivalent to one day of electricity consumption in Singapore, Ireland, Costa Rica, and Greenland combined.[5]

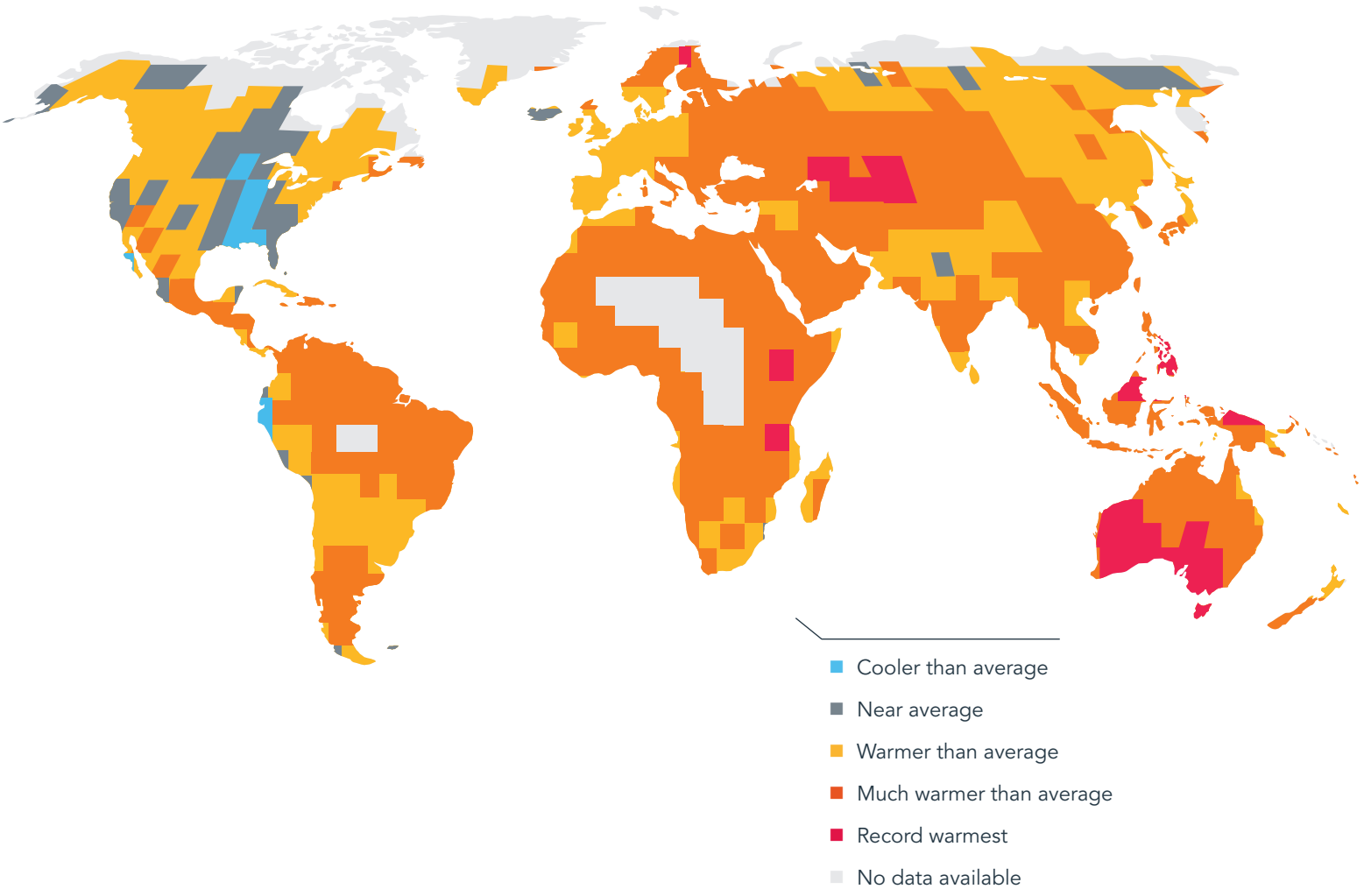
Relationship between Energy and Weather

ENERGY USE

Weather can significantly affect energy used for heating, ventilation, and air conditioning (HVAC). In commercial and residential buildings, heating and cooling account for 40 percent of a building's energy consumption. Variations in weather can increase or decrease energy consumption by 7 percent from normal operating conditions.[6] Understanding how local weather deviation affects a building's energy needs and consumption is important in order to develop consistent comparisons from one period to the next.

The graphic below represents how weather across the globe in 2013 diverged from the 30-year average. If the Greenprint portfolio were normalized for weather, it is likely that the decrease in like-for-like energy consumption would be greater than the reported 1.9 percent reduction.

Temperature Deviations from the Norm, January to December 2013[7]



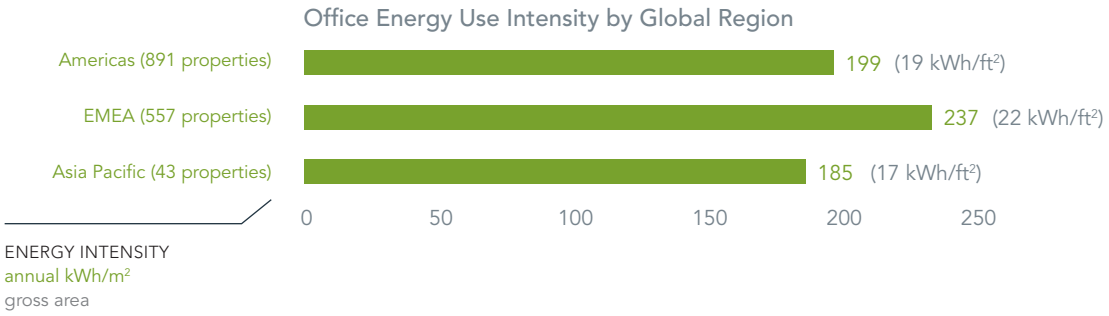
Energy Use Intensity of Office Properties

CURRENT

Energy use intensity is annual energy consumption divided by the floor area of the space. Building energy use intensity is affected by a variety of factors, including tenant energy data, worker density, and weather. As the Greenprint database grows and diversifies, the median energy intensities are expected to become increasingly representative of property subtypes in cities, countries, and regions.

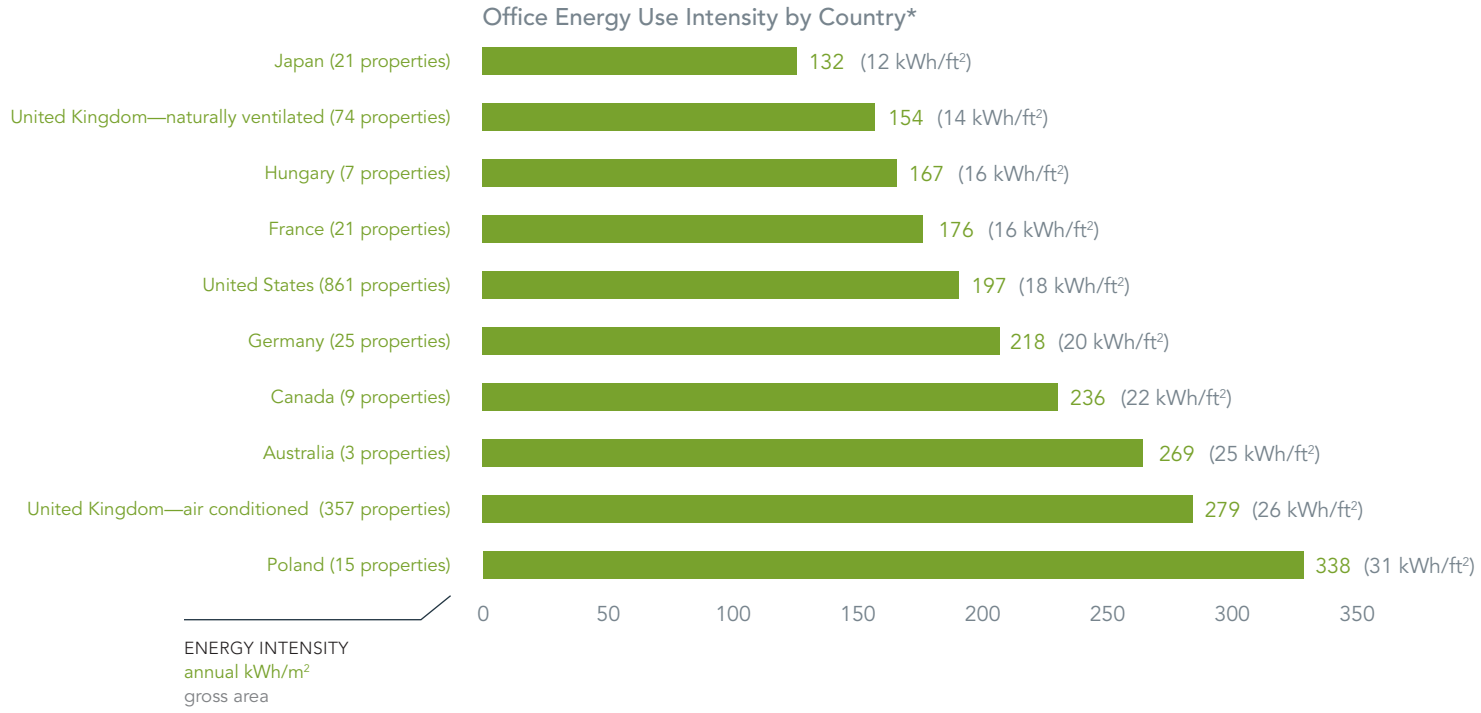
By Global Region

The chart below shows the median energy use intensity for Greenprint's portfolio of office buildings for whole-building energy by global region.



By Country

The chart below shows the median energy use intensity for Greenprint's portfolio of office properties in nine countries.



* All property benchmarks represent air-conditioned office properties unless otherwise noted.

Energy Use Intensity of Office Properties by City

CURRENT YEAR

This chart presents the median energy use intensity for Greenprint air-conditioned office properties in eight cities across the globe.

SAN FRANCISCO
96 properties
199 annual kWh/m² (19 annual kWh/ft²)

NEW YORK CITY
67 properties
271 annual kWh/m² (25 annual kWh/ft²)

LONDON*
251 properties
275 annual kWh/m² (26 annual kWh/ft²)

TOKYO
15 properties
125 annual kWh/m² (12 annual kWh/ft²)

WASHINGTON, D.C.
134 properties
197 annual kWh/m² (18 annual kWh/ft²)

PARIS
13 properties
163 annual kWh/m² (15 annual kWh/ft²)

FRANKFURT
11 properties
214 annual kWh/m² (20 annual kWh/ft²)

SYDNEY
2 properties
299 annual kWh/m² (28 annual kWh/ft²)

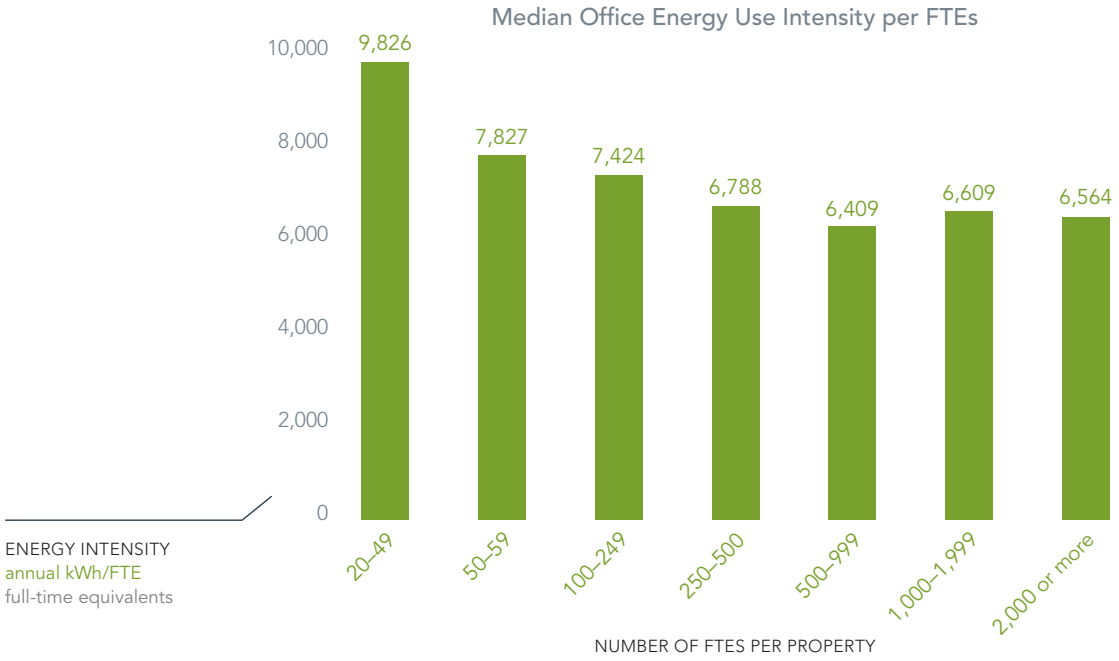
* The median energy intensity of 50 naturally ventilated office buildings in London is 138 kWh/m², not represented above.

Energy Use Intensity of Office Properties

CURRENT YEAR

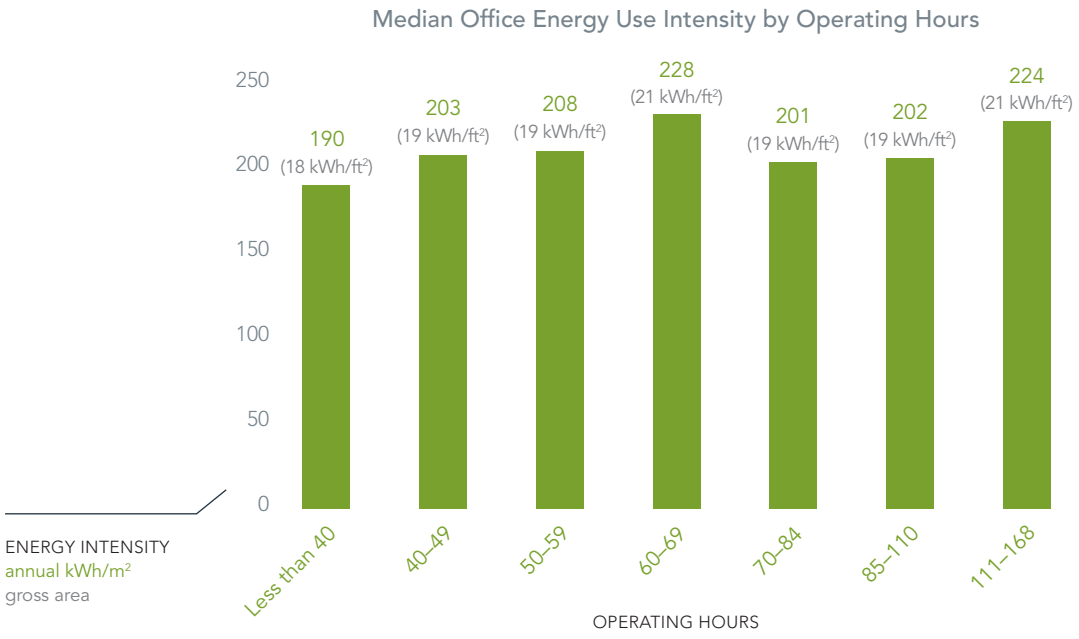
By Full-Time Equivalents

The chart below shows the median annual energy use per full-time equivalent (FTE) of Greenprint's global office portfolio with whole-building energy consumption. Generally, higher worker density shows diminishing energy use per FTE until a property has more than 1,000 FTEs.



By Operating Hours

The chart below shows the median energy use intensity by weekly operating hours of Greenprint's global office portfolios with whole-building energy consumption. The energy intensity of office properties tends to increase as weekly operating hours increase, except that between 70 and 110 operating hours per week, energy intensity decreases compared with the figure for 60–69 operating hours per week.



Energy Case Study

TISHMAN SPEYER

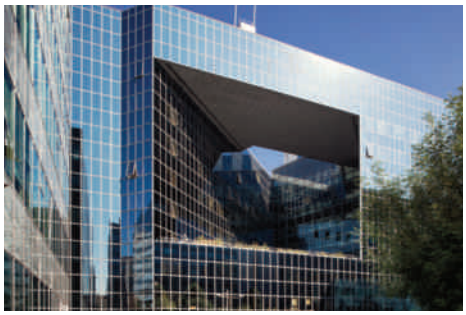
Tishman Speyer acquired Le Delta in 2011. At which point, Tishman Speyer's in-house property management team embarked on a simple yet effective strategy, demonstrating that a combination of informed operational changes can have a big cumulative impact on a building's total energy consumption. The improvement process had three key focuses: limiting waste; optimizing existing plant, equipment, and operations; and constant performance improvement while minimizing the need for significant capital expenditures. It was estimated that approximately 30 percent of the reductions were achieved through rebalancing the building's mechanical and system configurations.

Specific initiatives targeted at reducing electricity, heating, and water consumption were developed in the following ways:

- Operating hours were optimized in coordination with the heating and cooling needs of the occupants throughout the year.
- A high-efficiency, variable-speed motor was installed on the main air-handling unit. This increased the efficiency and flexibility of the HVAC systems, making it possible to adjust the ventilation rates to align with the building's occupancy.
- Plant and equipment that was incorrectly installed, set up, or redundant was repaired or removed as appropriate.
- Lighting loads were reduced by replacing more than 800 light fixtures with LED lamps, decreasing the brightness of lighting in the car parks at night and over the weekends, and fitting the large interior atrium with an automatic dimming controller linked to natural light levels.
- Surveillance of the water fixtures was increased to track and eliminate leaks; infrared mixing valves (sensors) with an output of 3 liters/minute were installed on taps.
- Signage was used to build tenant awareness and buy-in.

Cost

Most efficiencies were achieved through operational changes and thus required no investment. The average return on investment of the minor capital expenditures, such as the heat-recovery wheel, was two years.



GOAL
Improve the energy performance of the building while reducing operating costs and enhancing tenant comfort

APPROACH
Detailed operational review followed by ongoing targeted actions

BUILDING TYPE
Office

BUILDING LOCATION
Boulogne-Billancourt, Paris, France

BUILDING AREA
24,991 m^2 (269,000 ft^2)

YEAR BUILT
1992, refurbished in 2007

Consumption Reductions and Savings from 2011 to 2013 (Base Case 2010)

3.8 million kWh	10%	781	€694,000
TOTAL ENERGY REDUCTION 56% reduction in energy consumption	WATER REDUCTION	EMISSIONS ($MTCO_2e$)	TOTAL SAVINGS

Benefits

In addition to the financial and environmental benefits, Le Delta is now one of only four buildings in France to have received the full 14 "Tres Performant" ratings ("Excellent") out of 14 in the HQE Exploitation certification process (Haute Qualité Environnementale label, similar to LEED EBOM).

Challenges

Making a significant impact requires a combination of experience, commitment, and appropriate technology. Establishing partnerships with all those working in the building is critical to achieving the building's full potential.

Energy Case Study

RUDIN MANAGEMENT

Rudin Management partnered with an integrated systems specialist and Columbia University to build a next-generation Digital Building Operating System Solution (Di-BOSS). Di-BOSS integrates a variety of building data on a common platform that provides total awareness to building operators. The system proscriptively recommends real-time system adjustments, identifies operational inefficiencies, targets preventative maintenance, and provides 24/7, 365 building recommissioning. Rudin Management intends to implement the Di-BOSS system at 16 of its New York City buildings and has already piloted the system at two locations.

Two Pilot Results of Rudin Management's Di-BOSS Implementation

	345 Park Avenue	560 Lexington Avenue
ELECTRICITY REDUCTION	7.5 million kWh	2.5 million kWh
ELECTRICITY REDUCTION (%)	7%	9%
EMISSIONS REDUCTION	2,100 $MTCO_2e$	708 $MTCO_2e$
COST TO IMPLEMENT	$500,000	$290,000
ANNUAL TOTAL SAVINGS	$900,000	$300,000
SIMPLE PAYBACK	7 months	11 months

GOAL
Improve operational efficiencies, reduce expenses, advance sustainability performance, and enhance the tenant experience by implementing an integrated operating system

APPROACH
Portfolio-wide technology implementation

BUILDING TYPE
Commercial office and multifamily

BUILDING LOCATION
16 properties in Manhattan

BUILDING AREA
929,030 m^2 (over 10 million ft^2):
Location 1: 1.8 million ft^2;
Location 2: 330,000 ft^2

Benefits

Energy reductions and costs savings were achieved, along with increased tenant satisfaction.

- A 33 percent reduction in tenant temperature complaints, which freed up the facility engineers to provide higher-value services to the occupants and owners.

Outside of immediate financial benefits, Di-BOSS provides benefits, such as advanced energy use forecasting and energy demand management.

Challenges

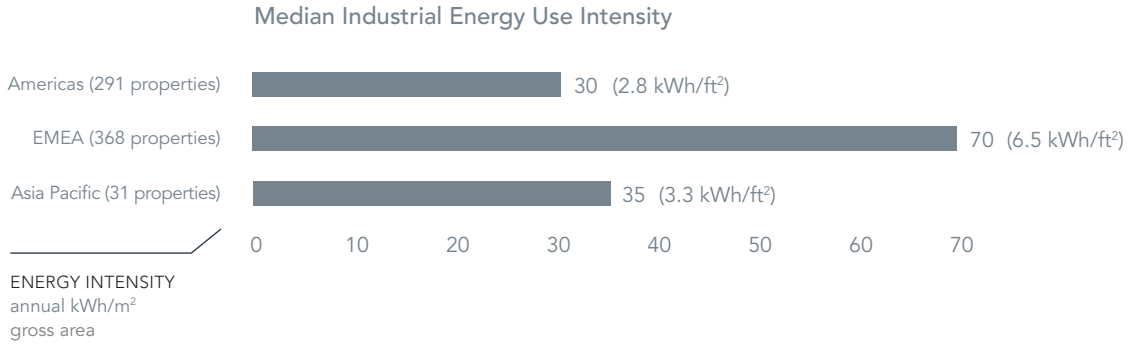
Implementing a solution across multiple properties is a challenge because each facility has unique operations, controls, staff, and technologies. Integrating Di-BOSS with existing disparate building systems and making the tool universally applicable is resource intensive and necessitates an on-site champion to promote the tool and train the staff.

Energy Use Intensity of Industrial Properties

CURRENT YEAR

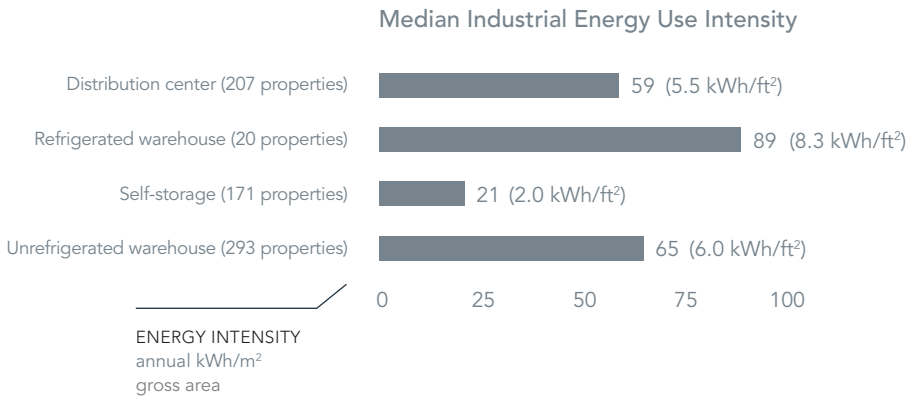
By Global Region

The chart below shows the median energy intensity of industrial properties with whole-building data broken down by region. Industrial properties in EMEA have higher energy intensities due to the subtype property mix.



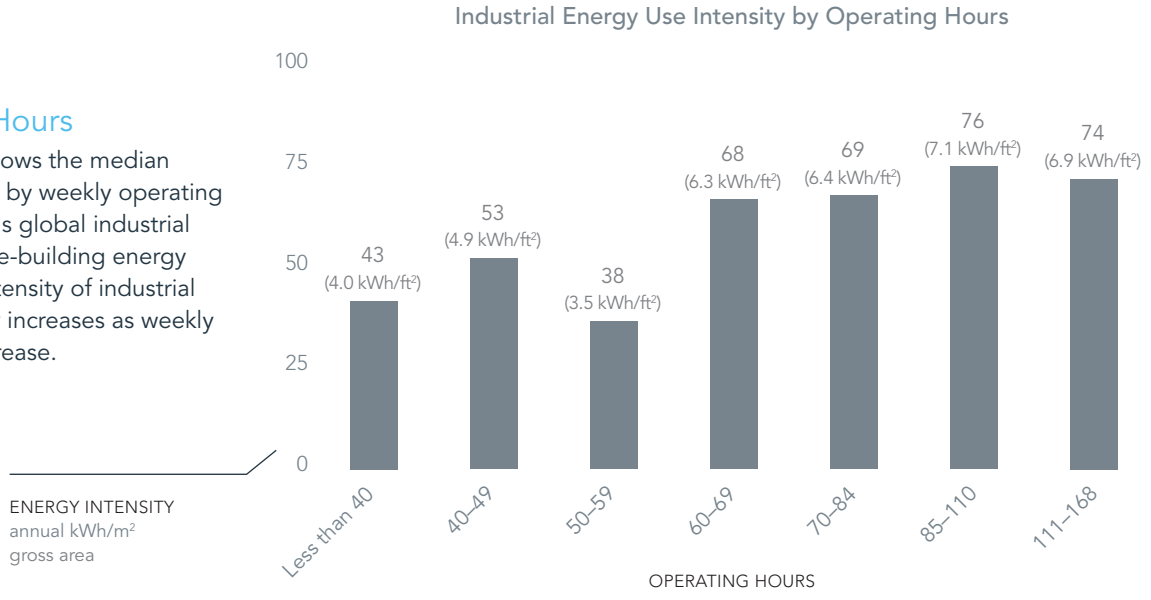
By Subtype with Whole-Building Data

The benchmark for the industrial properties below is based on median energy intensity with whole-building data.



By Operating Hours

The chart at right shows the median energy use intensity by weekly operating hours of Greenprint's global industrial portfolios with whole-building energy data. The energy intensity of industrial properties generally increases as weekly operating hours increase.

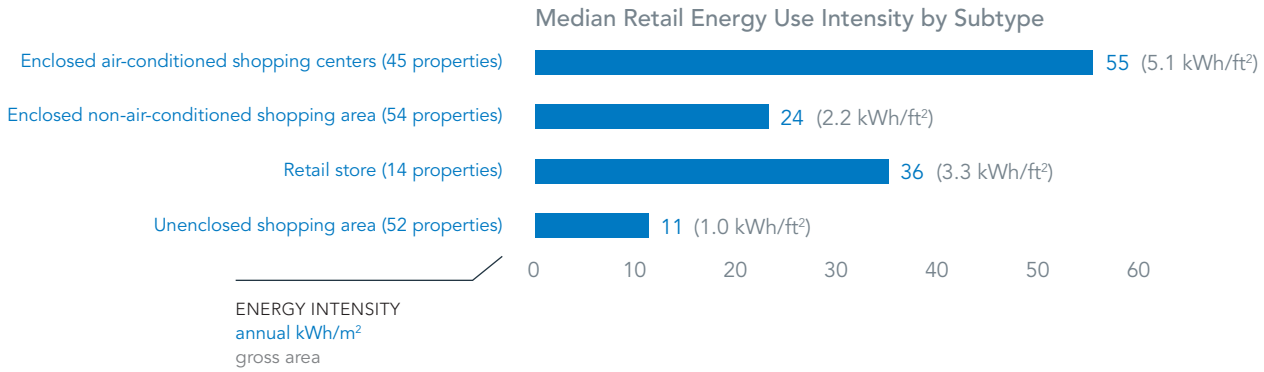


Energy Use Intensity of Retail Properties

CURRENT YEAR

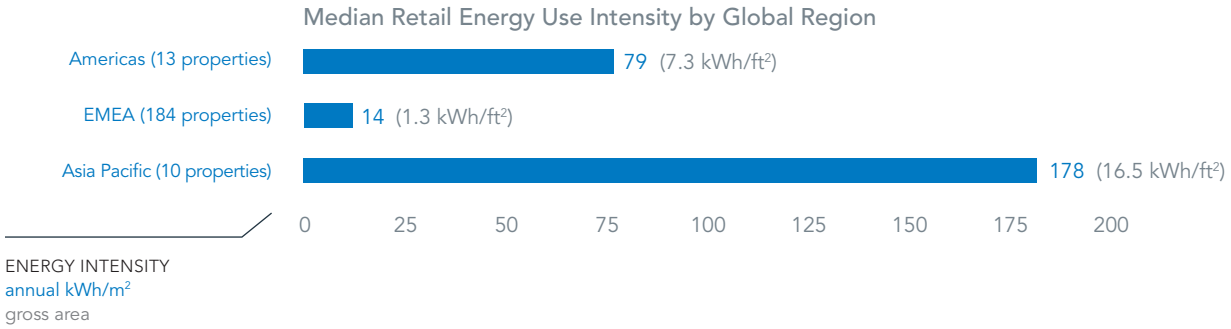
By Subtype with Whole-Building Data

The subtype benchmark for retail properties is based on properties that provide whole-building energy data. As expected, enclosed air-conditioned shopping centers are the most energy intensive while unenclosed shopping areas are the least.



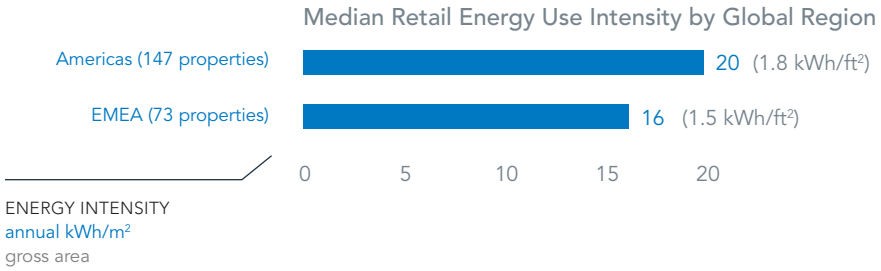
By Global Region

The chart below shows the median energy intensity with whole-building data separated by regions. EMEA properties use the least energy per square meter of floor area, and Asia Pacific properties use the most. This is due to the variation in property subtypes in each region in the Greenprint portfolio. EMEA has more unenclosed shopping areas whereas retail properties in Asia Pacific are mostly composed of enclosed air-conditioned shopping centers.



By Global Region with Common Area Data

An examination of retail properties that provided common-area energy data by region shows that the energy intensity for the Americas and EMEA are similar. The intensity was calculated by dividing common-area energy by gross property area.



Energy Case Study

GROSVENOR

Grosvenor invested in a comprehensive, sustainability focused renovation to reinvigorate Broadmead Village and its connection to the community. The project involved modernization of design elements while incorporating practices and technologies to reduce energy consumption, water use, and waste generation. The range of improvements typifies Grosvenor's long-term approach to shaping a sustainable urban landscape. Improvements at Broadmead include:

- Increasing energy efficiency of the buildings by installing new double-glazed, low-emissivity glass and building facades.
- Reducing water consumption by removing one water feature and replacing another with a smaller feature.
- Introducing an expanded recycling program that intends to increase recycling rates and decrease waste sent to landfills.
- Changing all new lighting to LEDs, including new common-area lighting, wayfinding lighting, and tenant signage.
- Planting only native plants and used drip irrigation that is equipped with rain sensors.
- Managing stormwater runoff by using permeable pavers around all new trees.
- Purchasing 23.56 tonnes of carbon offsets to ensure that the new heated outdoor elements, the covered seating area, and the outdoor fireplace are carbon neutral.
- Changing the center's adjoining road connection to reduce vehicular pollution and congestion at the entrance and promote bicycle riding.

Cost

$7.85 million, including environmentally responsible features and architectural design elements

Energy and Water Reductions from 2012 to 2013

36,668 kWh	4,794 kL
TOTAL ELECTRICITY SAVED	TOTAL WATER SAVED

GOAL
Revitalize a shopping center for consumers, tenants, and the surrounding community in such a way that it remains competitive and exemplifies Grosvenor's dedication to sustainability

APPROACH
Comprehensive retrofit

BUILDING TYPE
Retail: open-air, grocery-anchored neighborhood shopping center

BUILDING LOCATION
Saanich, Vancouver Island, British Columbia, Canada

BUILDING AREA
11,877 m^2 (127,834 ft^2) of gross leasable area

YEAR BUILT
1991, renovated 2012–2013

Benefits

The center is now an example that can be used to educate retailers, customers, Grosvenor personnel, and industry professionals. The upgrade has also enabled the center to achieve BOMA BESt Level 1 certification and pursue Level 2 certification.

Challenges

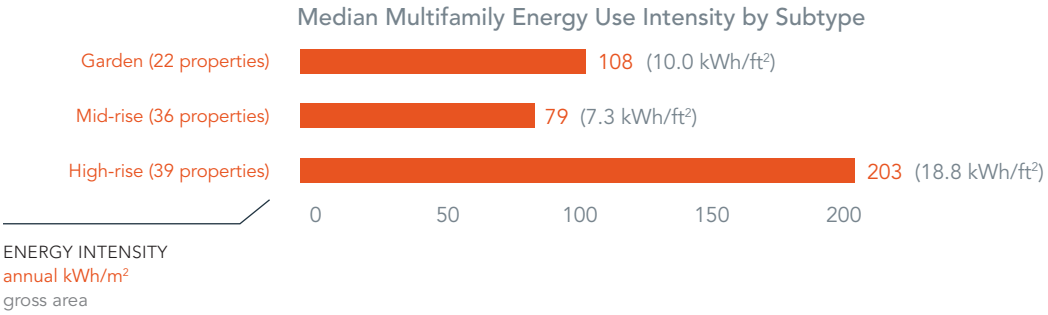
The challenges include understanding how to manage sustainability practices at a public, open-air retail environment where management has little control over consumption; how to keep sustainability at the top of mind for tenants; and how and whether to budget for improvements as capital expenditures or operating costs.

Energy Use Intensity of Multifamily Properties

CURRENT YEAR

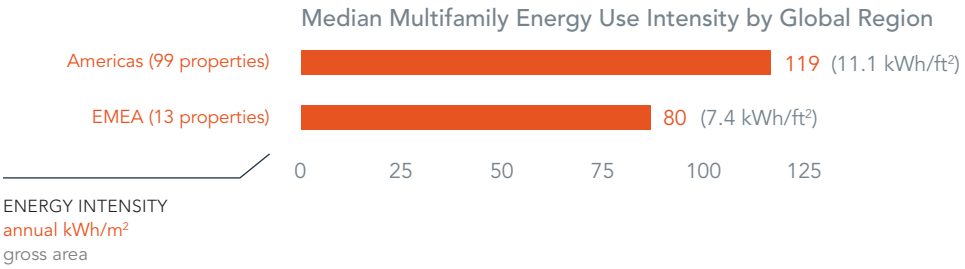
By Subtype with Whole-Building Data

Energy intensity for multifamily properties is provided by property subtype with whole-building data. Mid-rise properties have the lowest energy intensity and high-rise properties have the highest. Most high-rise properties in the Greenprint portfolio are located in New York City, where many use older, less-efficient fuel oil boilers for heating.



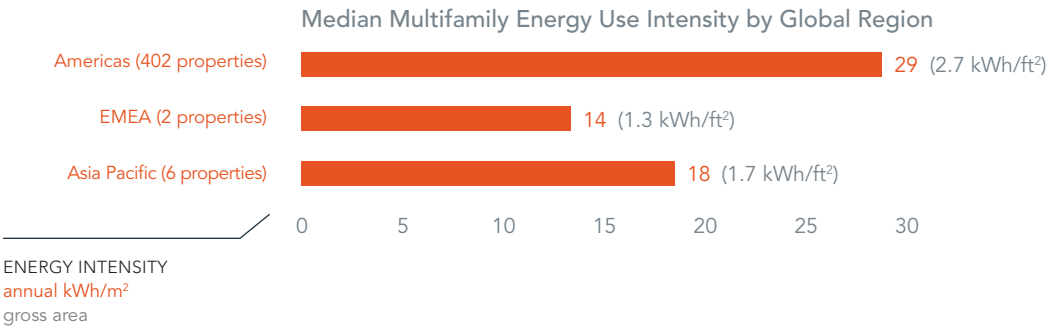
By Global Region

The chart below shows energy intensity for multifamily properties with whole-building data. The energy intensity for multifamily properties with whole-building energy data and for common-area energy data is higher in Americas.



By Global Region with Common-Area Data

The chart shows energy intensity for multifamily properties with common-area data. The intensity was calculated using common-area energy data divided by gross area.



Energy Case Study

AVALONBAY

AvalonBay participated in Maryland's Quick Home Energy Checkup program to bring energy and water reduction opportunities to residents. Maryland's Quick Home Energy Checkup program is a utility-sponsored incentive program intended to reduce energy and water consumption by providing energy and water assessments and some low-cost energy-saving technologies. At 11 AvalonBay communities, including over 3,700 apartment homes, AvalonBay worked with residents to install efficient lighting, water-fixture aerators, and low-flow shower heads.

Cost

The implemented technologies and energy assessments were provided at no cost to AvalonBay residents through the utility-sponsored incentive program.

Results and Benefits

Residents received over 36,000 CFL bulbs, 6,900 faucet aerators, and 3,700 shower heads, enabling them to reduce their electricity use and water consumption. Savings were estimated to be around $750,000 annually, which goes directly to AvalonBay residents' bottom line.

AvalonBay Estimated Consumption Reductions and Savings

TOTAL ENERGY REDUCTIONS	1,922,904 kWh
HEATING & COOLING REDUCTION	25 MMBtu
WATER SAVINGS	53.7 million gallons
EMISSIONS REDUCTIONS	2,338 metric tonnes
TOTAL SAVINGS	$764,900

Challenges

Getting buy-in from the residents can be difficult because CFLs and water aerators carry some stigmas.

GOAL
Reduce energy and water consumption while engaging residents and providing them with opportunities to decrease utility costs

APPROACH
Portfolio-wide utility incentive program participation

BUILDING TYPE
Multifamily apartment buildings

BUILDING LOCATION
11 AvalonBay properties in Maryland, United States

BUILDING AREA
~460,000 m^2 (over 5 million ft^2)

> "Participating in the Maryland QHEC program provides a great opportunity to reduce the energy and water usage of our communities and help our residents save money each month, all at no cost to us as the landlord."

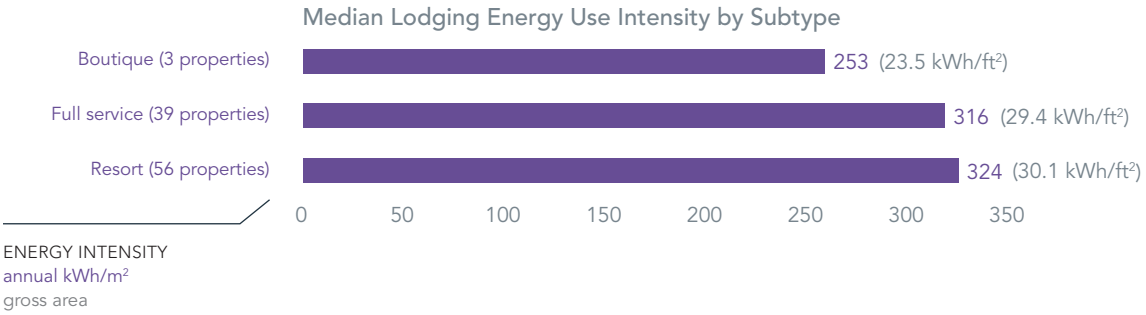
Matt Birenbaum, EVP, Corporate Strategy, AvalonBay

Energy Use Intensity of Lodging Properties

CURRENT YEAR

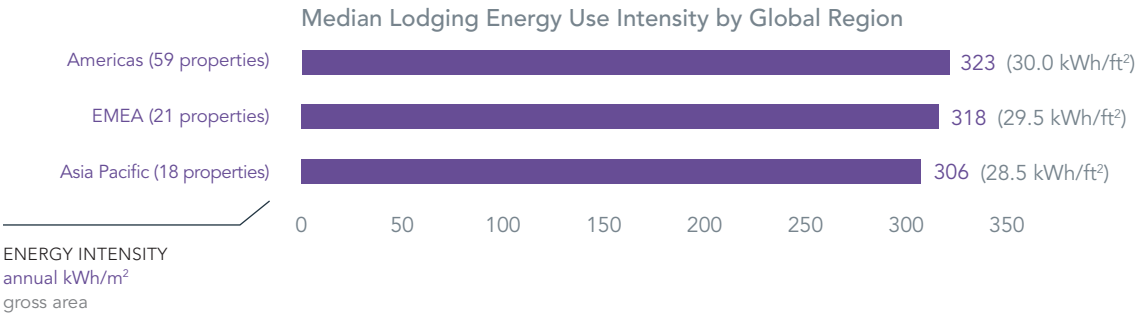
By Subtype with Whole-Building Data

The chart below shows the energy intensity of hotels broken down by subtype with whole-building data. Resorts use more energy per square meter of floor area than do full-service hotels. This may be due to the extra amenities that many resort hotels have, such as pools and spas.

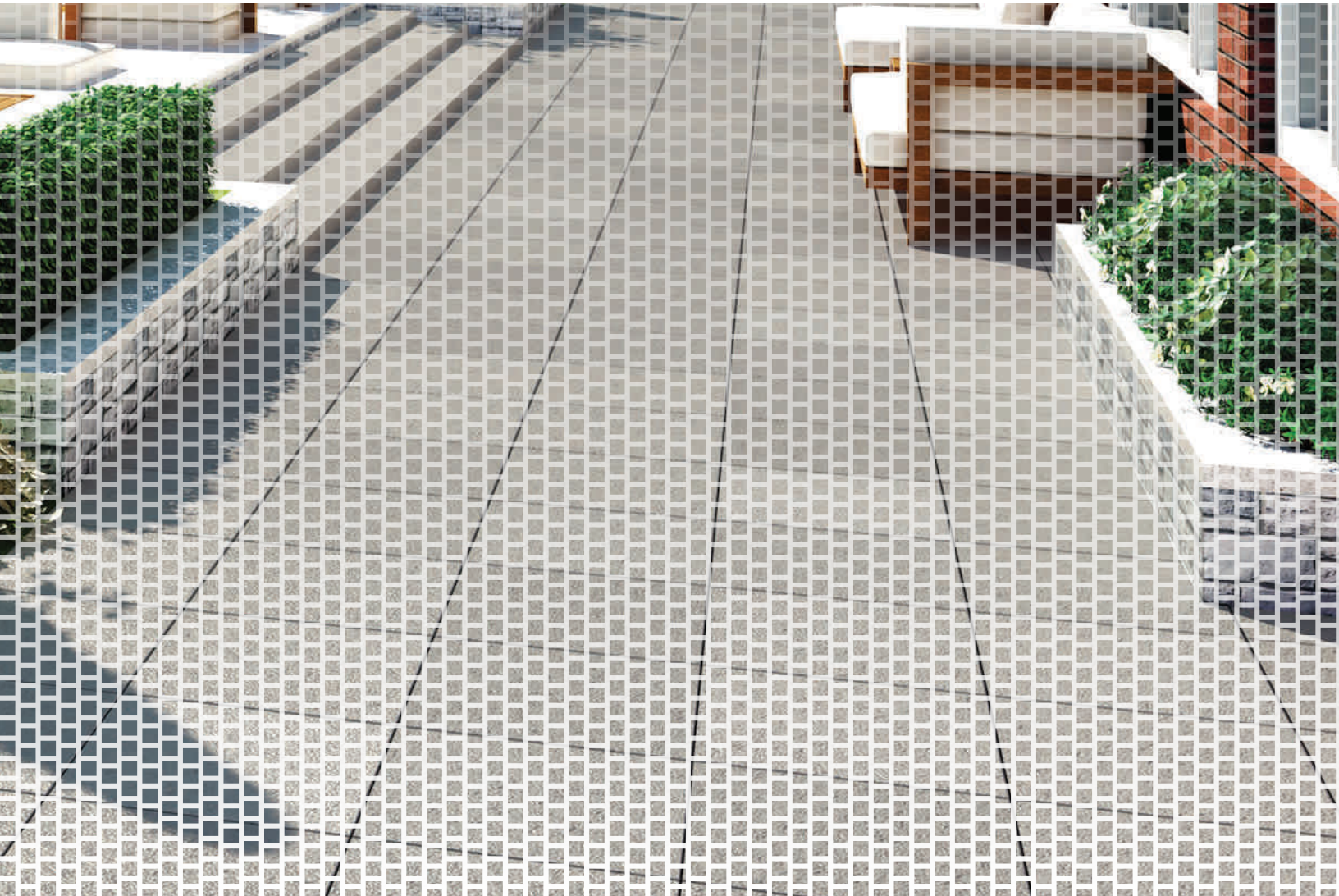


By Global Region

The chart below shows the energy intensity of hotels with whole-building data broken down by region. Energy intensity for each region varies slightly, with the Americas being the highest and Asia Pacific the lowest.



3 GREENHOUSE GAS EMISSIONS—ANNUAL RESULTS



Methodology

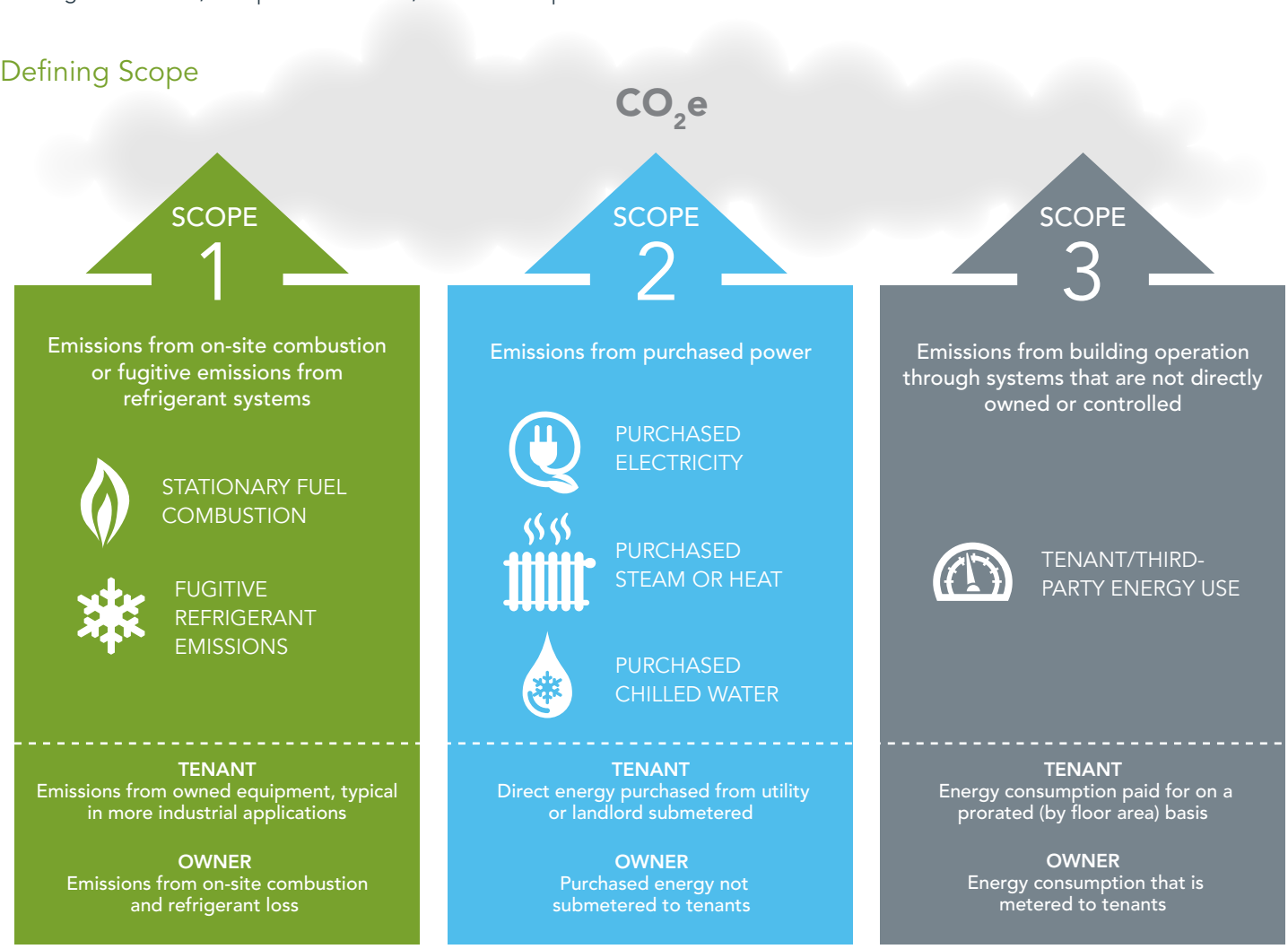
The *Greenprint Performance Report*™ separates greenhouse gas (GHG) emissions into three categories: Scopes 1, 2, and 3. This reporting system is aligned with the World Resources Institute/WBCSD's Greenhouse Gas Protocol. Categorizing emissions by scope enables separate accounting of GHG sources by different related entities, such as landlord and tenants, and also increases transparency.

Organizational Boundary

Greenprint has chosen to use the operational control approach, and defines areas under control to include all those where Greenprint members (landlord or tenant) have full authority to introduce and implement operating policies at the building.

Emissions are calculated from site energy consumption and exclude energy transmission and distribution losses, building construction, transport of materials, and waste disposal.

Defining Scope



Scopes 1+2+3 = Total Building Emissions

Calculating Greenhouse Gas Emissions

Energy [kWh] x Emissions Factor [kg CO_2e/kWh] = Greenhouse Gas Emissions [kg CO_2e]

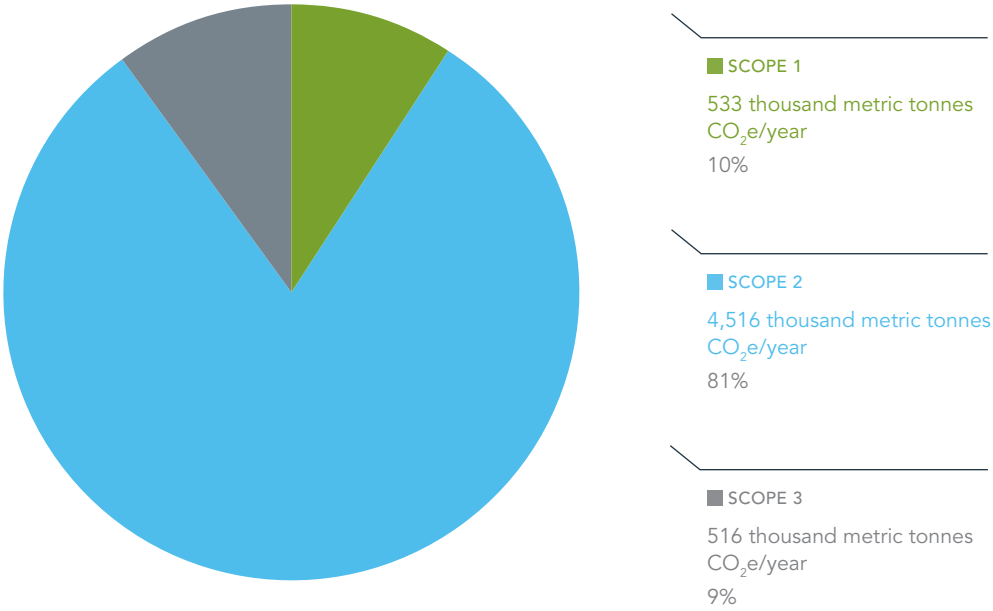
Emissions factors are used to calculate the total amount of CO_2e generated. Developing and applying accurate emissions factors are critical to reliable GHG emissions reporting. Emissions factors are listed in the appendixes. The same emissions factor sets have been applied to all sources since inception, 2009.

Absolute Emissions

CURRENT YEAR

The chart below shows the absolute greenhouse gas emissions by scope, in line with the Greenhouse Gas Protocol. **Scopes 1 and 2** include emissions that Greenprint members have direct control over. **Scope 3** emissions for landlords are associated with the directly metered or submetered energy to tenants. For occupiers, emissions are associated with energy provided by the landlord on a prorated basis (floor area).

2013 Total Greenprint Emissions



Emissions by Property Type

YEAR OVER YEAR—LIKE FOR LIKE

This table shows the change in absolute emissions by property type from 2012 to 2013. The increase in emissions at retail facilities is most likely due to increased consumer visits to shopping facilities. Within the Greenprint platform, reported retail visitors increased 5.7 percent in 2013 on a like-for-like basis.

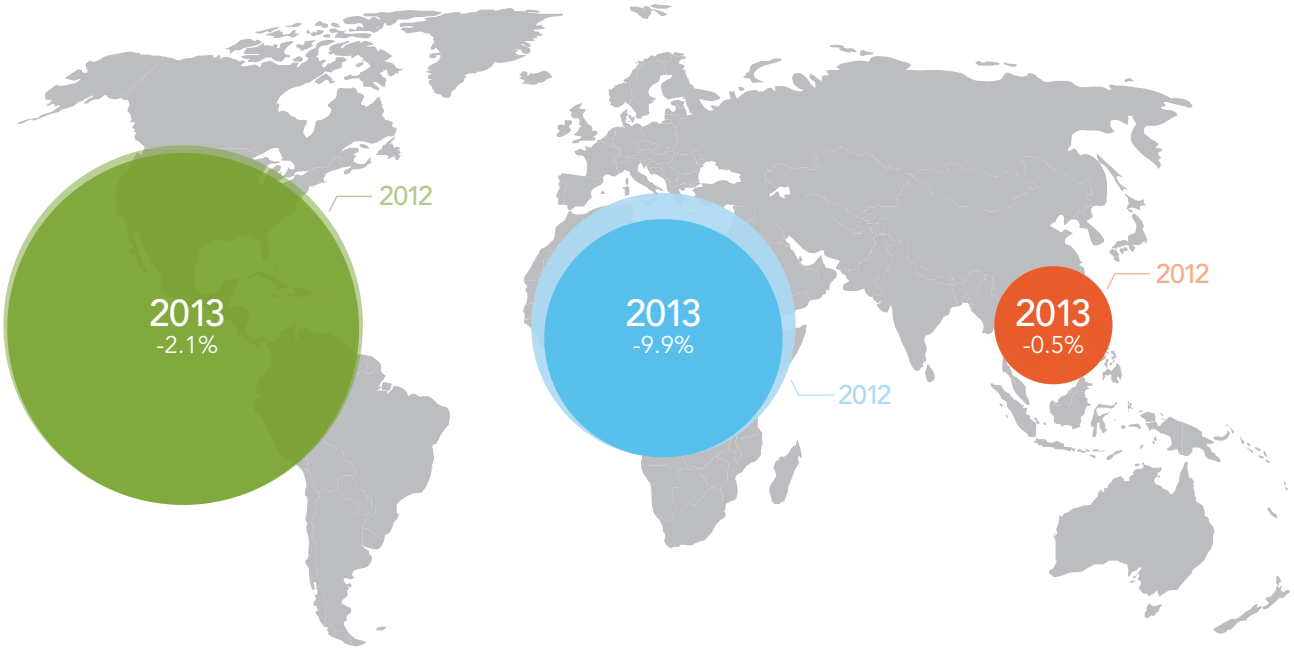
Thousand Metric Tonnes CO_2e/Year				
	2012	2013	2012–2013 % change	2012–2013 occupancy % change
Office (1,299 properties)	3,116	2,845	-8.7% ↓	0.2%
Industrial (505 properties)	204	201	-1.4% ↓	0.0%
Retail (346 properties)	565	642	13.7% ↑	-0.4%
Multifamily (365 properties)	189	188	-0.5% ↓	0.5%
Hotel/lodging (93 properties)	499	488	-2.2% ↓	1.1%
GREENPRINT TOTAL	4,572	4,363	-4.6% ↓	0.2%

Emissions by Global Region

YEAR OVER YEAR—LIKE FOR LIKE

This map illustrates the change in emissions (Scopes 1, 2, and 3) from 2012 through 2013 for the like-for-like portfolio for each global region.

- Americas
- EMEA
- Asia Pacific



AMERICAS
1,671 properties
43.9 million m² (472.5 million ft²)

2012: 2,766 thousand metric tonnes CO_2e
2013: 2,707 thousand metric tonnes CO_2e

2.1% decrease

EMEA
839 properties
18.0 million m² (193.8 million ft²)

2012: 1,500 thousand metric tonnes CO_2e
2013: 1,351 thousand metric tonnes CO_2e

9.9% decrease

ASIA PACIFIC
98 properties
3.4 million m² (36.6 million ft²)

2012: 306 thousand metric tonnes CO_2e
2013: 305 thousand metric tonnes CO_2e

0.5% decrease

The Greenprint portfolio's emissions decreased 4.6% on a like-for-like portfolio basis from 2012 through 2013.

Emission Equivalencies by Global Region

YEAR OVER YEAR—LIKE FOR LIKE

The chart below details the change in the Greenprint portfolio's emissions from 2012 to 2013. Properties consuming the same amount of energy can emit different amounts of CO_2e for several reasons, including:

- Utility fuel mix: Emission factors reflect the type of fuel used at the power source. For instance, China produces power from coal plants and has an emission factor of 0.75 $KgCO_2e/kWh$, while France relies on nuclear power and therefore has a low factor of 0.08 $KgCO_2e/kWh$.
- Government approach: Policies and incentives to decarbonize the power supply vary. For example, combined heat and power (CHP) options are widely available in the Netherlands due to government support, and a quarter of Portugal's electricity is now produced with renewable energy due to a national incentive program.
- Geographic location: The viability and use of on-site renewable energy technologies and purchase of renewable energy contracts varies by location according to natural factors, such as water availability and sunlight intensity.

Emission Equivalencies by Global Region—Like for Like

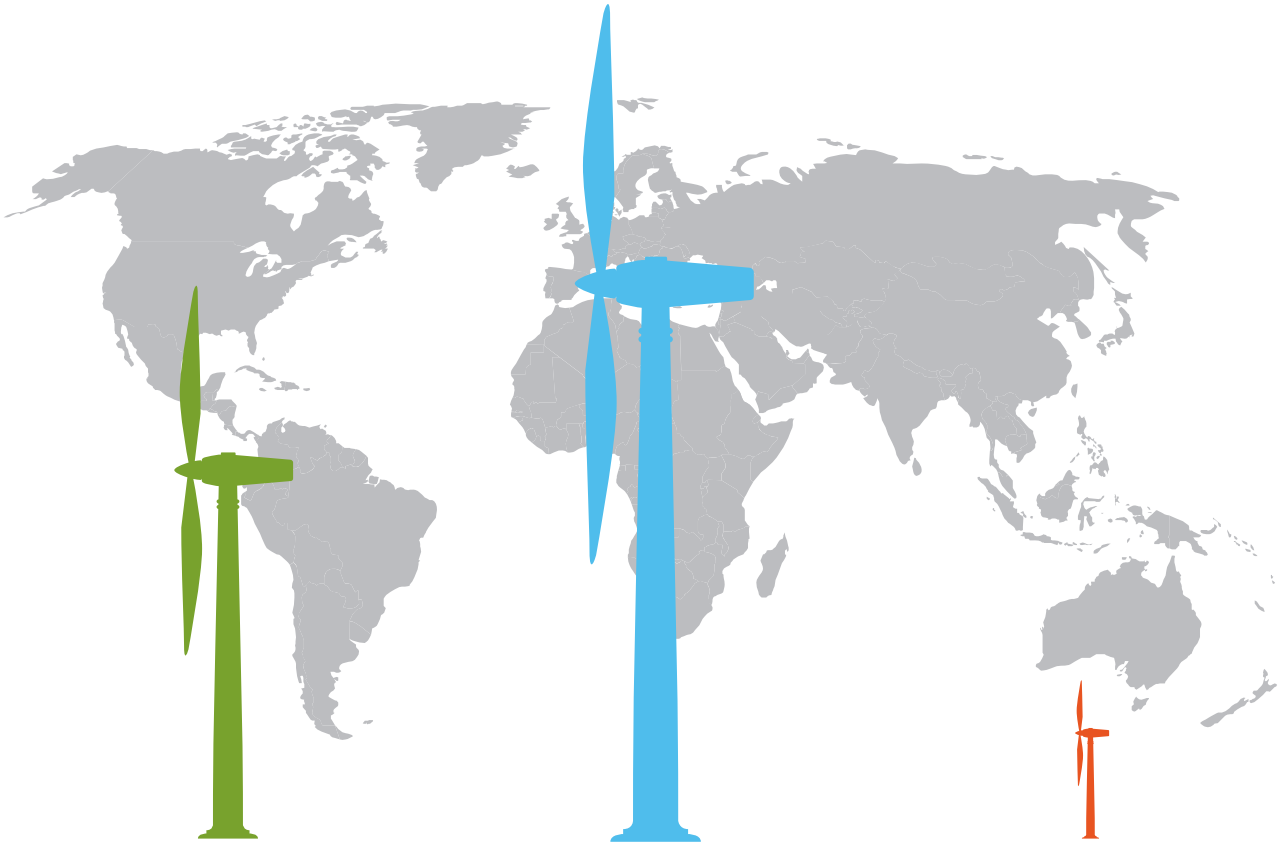
	Americas		EMEA		Asia Pacific	
	2012	2013	2012	2013	2012	2013
Number of properties	1,671	1,671	839	839	98	98
Floor area (million m^2)	43.9	43.9	18	18	3.4	3.4
Occupancy rate (%)	92.6%	92.8% ↑	94.0%	94.2% ↑	85.9%	86.0% ↑
Total energy (million kWh)	7,364	7,230 ↓	2,423	2,359 ↓	544	540 ↓
CO_2e emissions (thousand mt)	2,766	2,707 ↓	1,500	1,351 ↓	306.3	304.8 ↓
Barrels of oil equivalent to amount of CO_2e emissions	6,432,833	6,296,184	3,488,263	3,141,830	712,300	708,800
Cars on the road in a year equivalent to amount of CO_2e emissions	582,341	569,970	315,780	284,418	64,482	64,164
Number of trees needed to sequester the equivalent amount of CO_2e emissions	70,926,103	69,419,462	38,460,333	34,640,692	7,853,564	7,814,974
Number of homes equivalent amount of CO_2e emissions	252,383	247,022	136,857	123,265	27,946	27,809
Metric tonnes of coal equivalent amount of CO_2e emissions	1,347,680	1,319,052	730,792	658,215	149,227	148,494

Emissions Averted Due to Renewable Energy

CURRENT YEAR

Greenprint members are committed to increasing the use of on-site renewable energy, such as the use of rooftop photovoltaic panels and the procurement of renewable energy from power suppliers. The Greenprint portfolio showcased a 1.1 percent increase in renewable energy procurement from 2012 through 2013.

Many Greenprint members generate on-site renewable energy that is sold to third parties, such as power supply companies. This renewable energy is not included in the chart below because it is not consumed on site. The graphic below illustrates the GHG emissions averted by the use of renewable energy by global region.



AMERICAS
2013: 238,156,052 kWh
99,387 $MTCO_2e$

EMEA
2013: 220,499,349 kWh
132,235 $MTCO_2e$

ASIA PACIFIC
2013: 5,129,286 kWh
3,019 $MTCO_2e$

2013 Emission Reduction Equivalents[4]

545,679
BARRELS OF OIL NOT CONSUMED

114,320
METRIC TONNES OF COAL NOT BURNED

Greenhouse Gas Case Study

PROLOGIS

Dominion Virginia Power started a Solar Partnership Program to lease rooftops and ground space at commercial, industrial, and public facilities to expand renewable energy generation in its service territory. Dominion will be responsible for developing, owning, and operating the solar arrays and will pay the real estate owner for use of the roof space. Dominion plans to operate up to 30 megawatts of solar power under this program, generating enough power for up to 7,500 homes. Dominion will be using the partnership with Prologis to evaluate the benefits and impacts of distributed solar generation on the regional electricity grid.

- Prologis Inc., a global owner and developer of industrial real estate, partnered with Dominion to install 3,000 solar panels on the Prologis Concorde Distribution Center.
- This is the first Prologis solar photovoltaic system in Virginia, but it has more than 50 properties that house solar power generation across the globe.

Cost

This project involved no investment by Prologis. Dominion paid $2.5 million for design and construction of the solar array and will maintain it over the life of the system.

Results

- The system is designed to generate more than 800 kilowatts of renewable electricity—enough to power nearly 200 homes.
- Reduced emissions from the local grid by augmenting conventional electricity with zero-carbon solar energy.
- Provided an additional revenue source for Prologis through the 20-year term roof lease.

Consideration

Sites were selected based on a number of factors, including 1) roof size, age, warranty, and composition, 2) structural capacity, and 3) sun intensity for solar generation

GOAL
Generate a revenue stream on previously underused roof space through the use of solar energy

APPROACH
Partnership with developer and off-taker

BUILDING TYPE
Industrial

BUILDING LOCATION
Sterling, Virginia, United States

BUILDING AREA
9,476 m^2 (102,000 ft^2) of roof area across two adjacent buildings

> “Prologis is dedicated to leading the industry in sustainable development, renewable energy, and energy efficiency. This project with Dominion Virginia Power supports our efforts to improve the efficiency and profitability of our partners in the region.”

Drew Torbin, Vice President of Renewable Energy, Prologis

Breakdown of Emissions by Energy Type

CURRENT YEAR

Buildings use a mix of energy. Electricity is usually drawn from the grid, while fuels are burned on site for heating and cooking. Thermal energy is regionally available and is typically provided as steam, hot water, or chilled water. Thermal energy consumption increased from 2012 through 2013, perhaps due to colder weather in various regions that required increased heating.

ELECTRICITY
-2.8%
2012: 7,587 million kWh
2013: 7,372 million kWh

+

FUEL
-2.2%
2012: 1,939 million kWh
2013: 1,896 million kWh

+

THERMAL
6.7%
2012: 854 million kWh
2013: 912 million kWh

=

ENERGY CONSUMPTION
energy
-1.9%
2012: 10,382 million kWh
2013: 10,181 million kWh

EMISSIONS
-213,172
METRIC TONNES

+

EMISSIONS
-10,767
METRIC TONNES

+

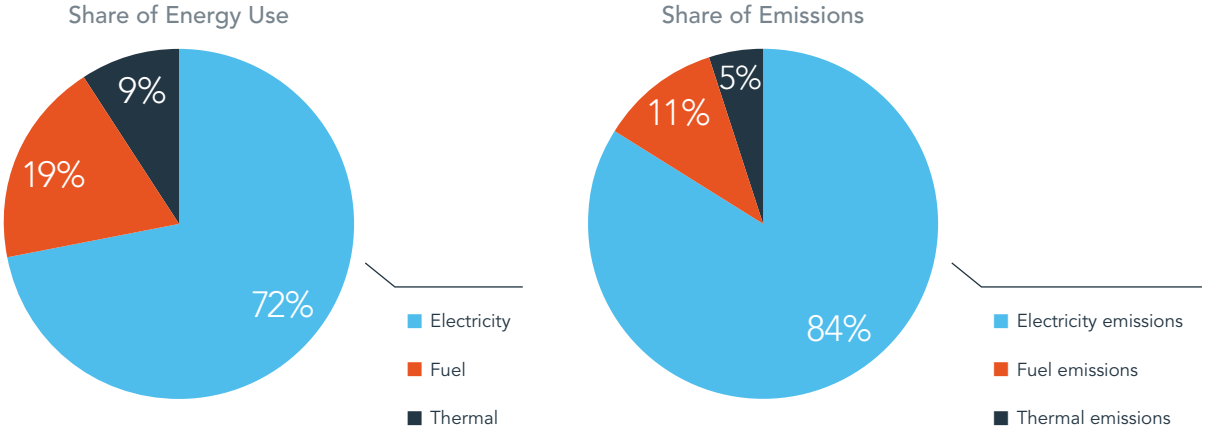
EMISSIONS
14,709
METRIC TONNES

=

CO_2e EMISSIONS
emissions
-209,230
metric tonnes

Breakdown of Energy Types in Relation to Emissions

These charts show that the average emissions factors for electricity are higher than those for fuel and thermal energy. Electricity consumption creates more emissions because it is generated off site and a portion of the energy is lost due to combustion, transmission, and distribution.



Water Use

YEAR OVER YEAR—LIKE FOR LIKE

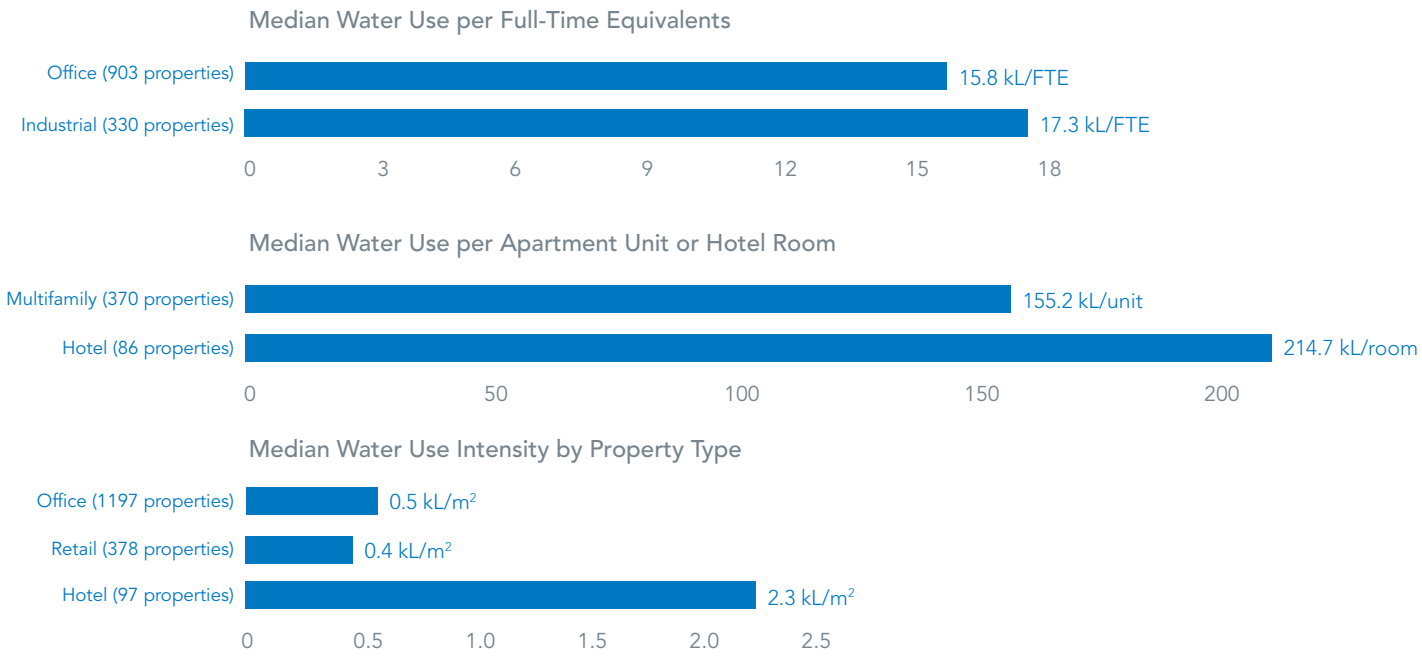
In real estate, water may be consumed for indoor use, outdoor use, and irrigation. This report takes into account water consumption specifically for indoor use when available, and whole-meter data otherwise. The increase in water use for office properties is most likely due to a 1.9 percent increase in the number of FTEs in this period.

	Number of properties	2012 (kL)	2013 (kL)	Change 2012–2013	
Office	903	29,627,594	30,366,833	2.5%	↑
Retail	278	7,032,363	6,643,064	-5.5%	↓
Industrial	354	707,957	670,158	-5.3%	↓
Multifamily	336	16,300,034	15,286,652	-6.2%	↓
Hotel	87	10,114,338	9,719,186	-3.9%	↓
GREENPRINT TOTAL	1,958	63,782,286	62,685,894	-1.7%	↓

Water Use Intensity

CURRENT YEAR

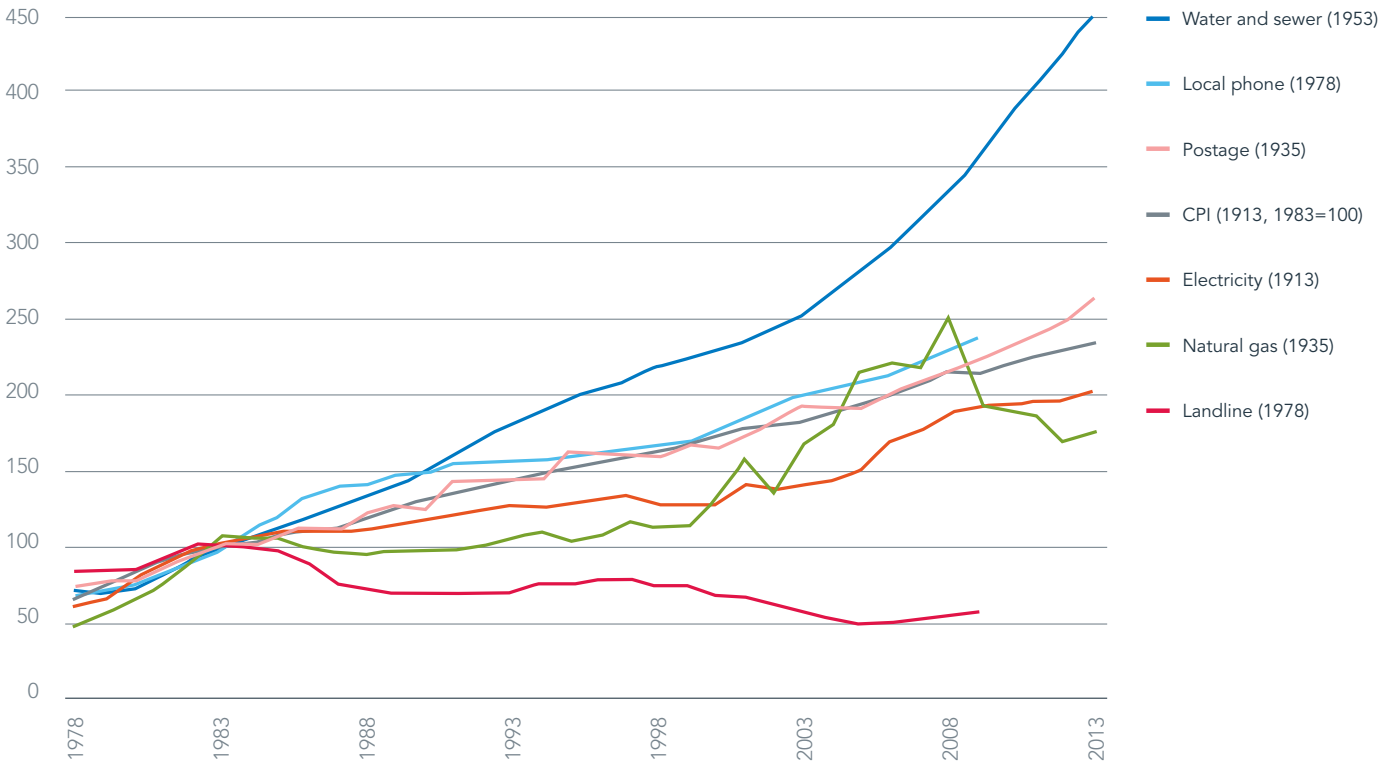
Water use intensity varies significantly by property type and function. The charts below provide a variety of intensity metrics to highlight several ways in which water use can be benchmarked.



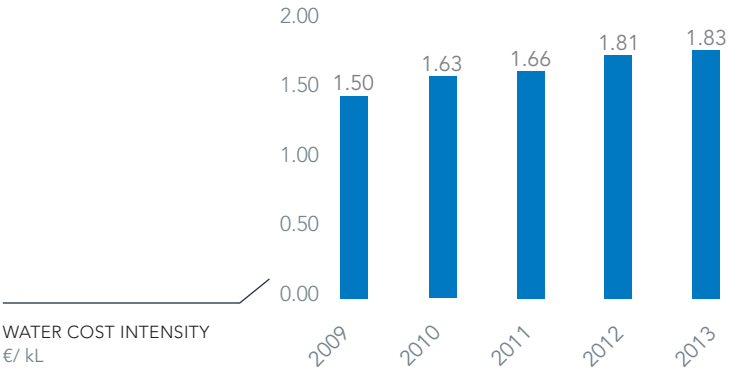
Water Cost

The graph depicts the long-term cost trends associated with multiple utilities and the Consumer Price Index (CPI). The CPI is used to measure the average change over time of prices paid for a basket of goods and services. Over the last 30 years, the cost of water has outpaced the CPI by over 200 basis points and is growing at the fastest rate of any utility. Water is now 4.5 times more expensive compared to 1983 while electricity is only twice as expensive. Because water is currently not a large expense for most properties, it is often overlooked. However, as the cost of water continues to outpace nominal inflation rates, its use will be more important to manage effectively.

Long-Term Trends in Consumer Prices (CPI) for Utilities[8]



Greenprint Member Median Cost per KL



WATER COST INTENSITY
€/ kL

Over the past five years, the cost of water for Greenprint members has increased by 22%, in line with the chart above.

Water Use Case Study

SONAE SIERRA

Sonae Sierra performed 14 water audits at its retail facilities in order to target opportunities to reduce water consumption. To perform the audits in a consistent manner, Sonae developed a tool called the Standard Shopping Centre–Water. The tool takes into account elements such as equipment/systems in place, irrigated areas, local weather, and occupancy features (e.g., visits, tenants).

The outputs of the tool aim to help:

- Assess the efficiency of the centers' water systems while pointing out technology-related and operational areas for improvement
- Calculate the expected environmental and economic benefits of investing in more efficient water systems
- Set performance targets
- Improve knowledge sharing

The tool's output, combined with effective monitoring strategies, creates opportunities for improved water efficiencies.

GOAL
Create a programmatic approach to increase water use efficiency and reduce operating expenses across the Sonae Sierra portfolio

APPROACH
Standardized audit and target-setting process

BUILDING TYPE
Retail

BUILDING LOCATION
14 shopping centers across South America and Europe

BUILDING AREA
Over 700,000 m^2 (7.5 million ft^2) across multiple shopping centers

Results

Sonae Sierra Potential Consumption Reductions and Savings

90,000 kL, or 14%	€389,000
WATER SAVINGS	TOTAL SAVINGS

Many projects were considered quick wins and have a payback of less than one year. These accounted for a savings of 30,000 kL of water and €90,000.

Benefits

The Standard Shopping Centre–Water tool identifies opportunities to reduce expenses by improving water use efficiency. In property locations that are under significant hydric stress or face water scarcity, the implementation of water-efficiency measures certainly increases asset resilience.

Challenges

Some recommendations to increase water use efficiency show poor returns on investment and may be difficult to implement.

Water Use Case Study

BENTALL KENNEDY AND BRITISH COLUMBIA INVESTMENT MANAGEMENT CORPORATION

Bentall Kennedy's operations team estimated that with the existing equipment, over 50 percent of the water used in landscaping at four properties was lost due to overspray, wind, and evaporation. Drip irrigation grids were installed at several zones across the properties. Each irrigation zone has pressure regulation, air-relief valves, and filtration installed at the zone valve, allowing accurate water application, control, and the prevention of clogs. The drip lines increased the uniformity of water application, and the lines were virtually invisible.

Results and Benefits

This upgrade from a fan-type, spray-head sprinkler system to low-volume drip irrigation led to more than a 50 percent reduction in landscaping water use across the four properties, with over 1,735,500 liters of water (the equivalent of over 10,000 bathtubs) saved annually.

Challenges

The challenges included gaining project buy-in because the cost of water in Ontario is still relatively low, and not disrupting tenant aesthetics during implementation.

Bentall Kennedy Savings from 2012 to 2013

$16,317	1,735,500 liters
TOTAL COST	TOTAL WATER SAVED
$3,365	4.8 years
TOTAL ANNUAL SAVINGS	SIMPLE PAYBACK

GOAL
To implement a sustainability initiative that reduces resource use while also benefiting financially from that initiative

APPROACH
Technology implementation

BUILDING TYPE
Multitenant industrial

BUILDING LOCATION
Four locations in Ontario, Canada

BUILDING AREA
19,313 m^2 (207,886 ft^2)

> "Our approach to sustainability is thoughtful and collaborative. We look for value-add enhancements aimed at supporting client and tenant objectives while also considering the environmental impacts of our operations."

John Purcell, Senior Vice President and Portfolio Manager, Bentall Kennedy

5 WASTE—ANNUAL RESULTS

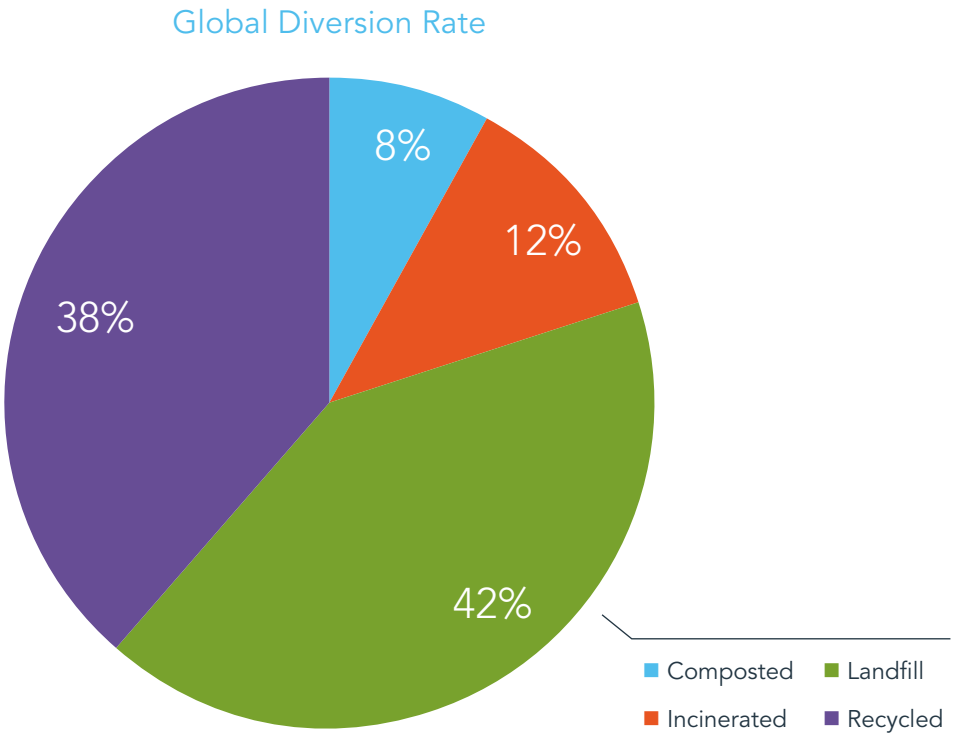
Waste Generation by Office Properties

CURRENT YEAR

Globally, across markets and property types, collecting waste data can be challenging because the waste stream is varied, decentralized, and inconsistent. Also, waste management contracts typically have not included language regarding capturing metrics, so some haulers may not have the infrastructure to quantify the amounts and types of waste collected.

Greenprint collects waste information in the form of diversion methods, which include landfill, recycling, incinerating, and composting, as well as waste type (e.g., the type of material that is being discarded). This is the third year that Greenprint has collected waste information. As we have seen with other environmental metrics such as energy and water, data accuracy, consistency, and quality improves over time. This year, Greenprint members were able to record 2013 waste data for 611 properties.

The chart below shows that landfill disposal and recycled waste account for a majority of the waste stream reported for Greenprint properties.

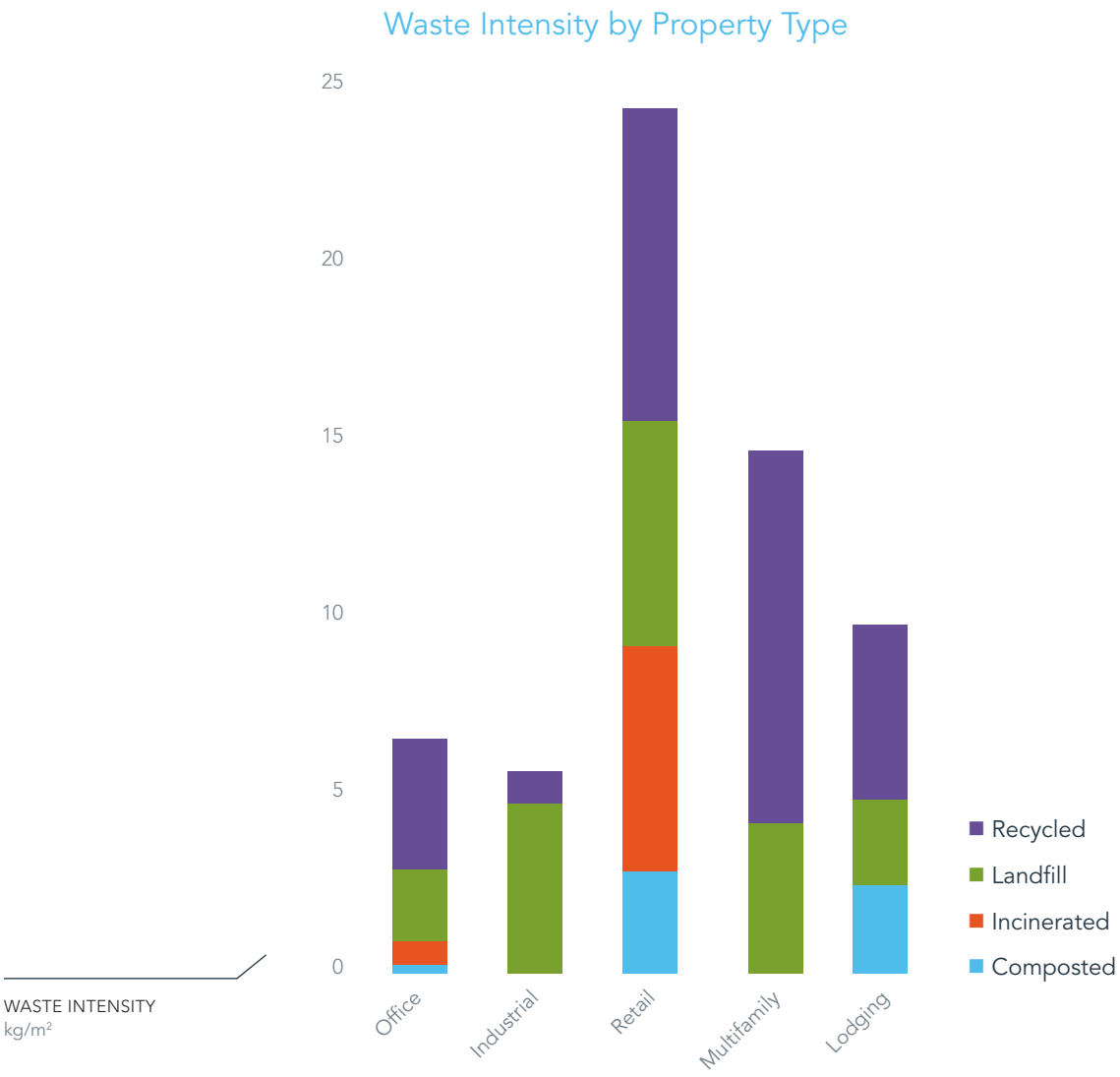


Waste generation highly correlates with national income level. As less-developed nations become more developed, it is likely that waste management will become more expensive and challenging. Put in context, the average per capita waste generation (kg/person/year) in sub-Saharan Africa is 0.65; in east Asia, 0.95; in Latin America, 1.10; in Sweden, 1.27; in Germany, 1.60; and in the United States, 2.00. A conscious shift in consumption, waste production, and disposal is needed before more land is converted to landfills or air is polluted by waste incineration.

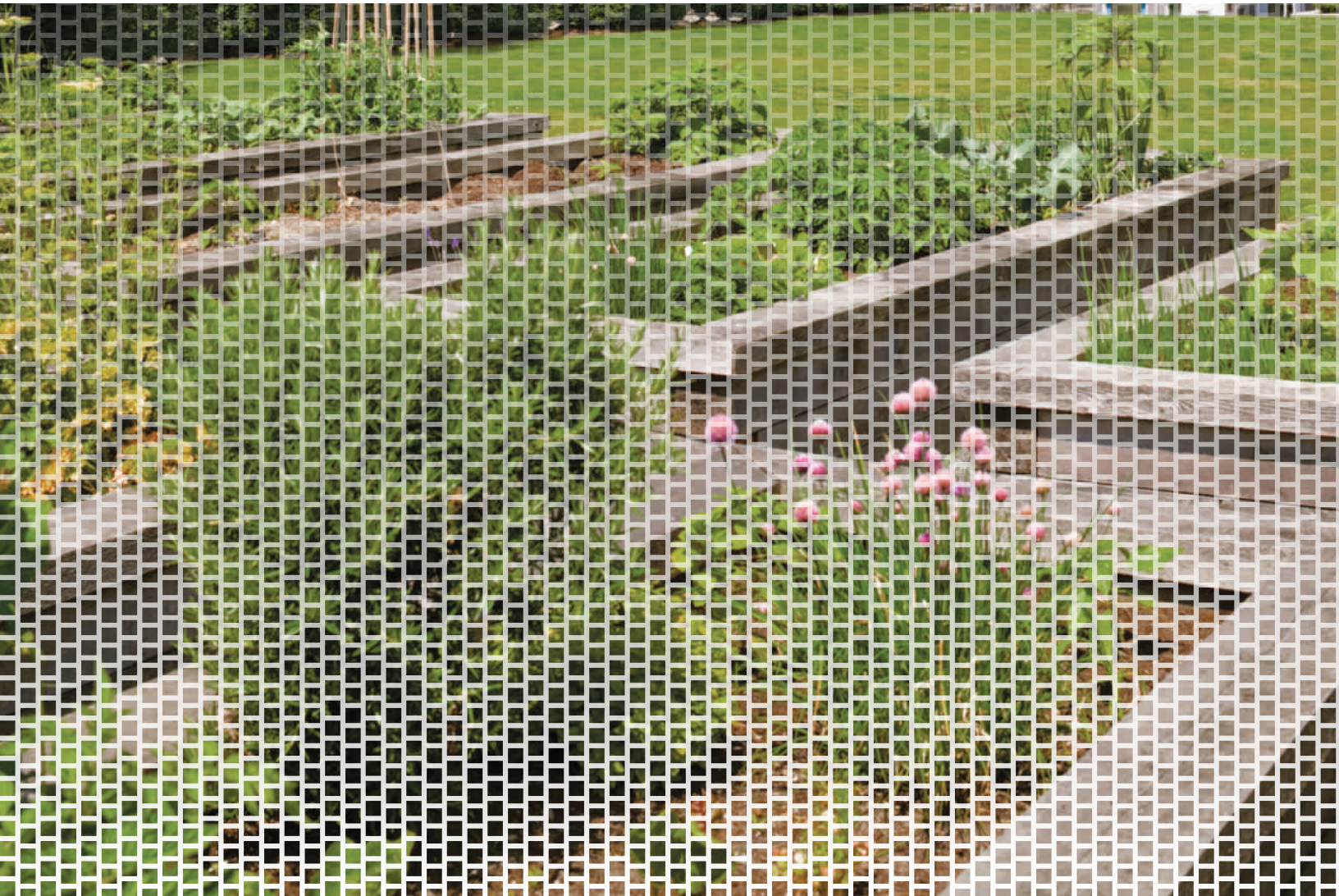
Waste Intensity by Property Type

CURRENT YEAR

The chart below shows the waste intensity by property type and waste disposal method across the Greenprint portfolio. Industrial properties create the least waste per square meter of gross floor area while retail properties create the most. Landfill disposal and recycling are the most prominent disposal methods for all property types. In order to improve performance over time, the property owners should first attempt to reduce waste intensities across all property types and then increase recycling rates.



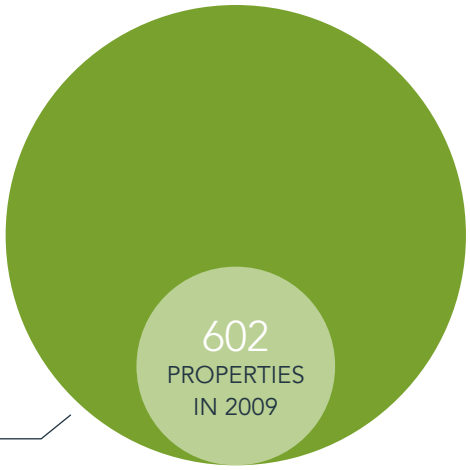
6 LONG-TERM PERFORMANCE



Historical Performance

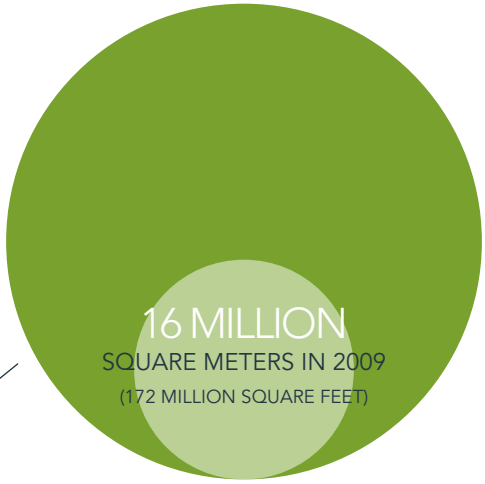
YEAR OVER YEAR—SINCE INCEPTION

The growth of data from new member submissions and existing members resulted in additional historical data. The Greenprint portfolio has been updated to account for new and revised data, creating a 2009–2013 like-for-like portfolio composed of 1,126 properties.



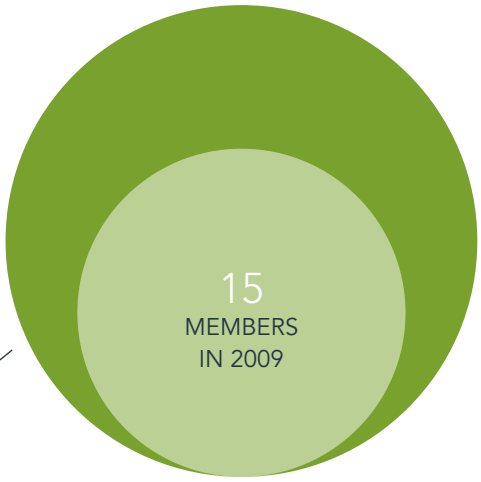
4,001 PROPERTIES **2013**

565% increase in properties



95 MILLION SQUARE METERS IN **2013**
(1 BILLION SQUARE FEET)

491% increase in building area



34 MEMBERS IN **2013**

127% increase in membership

Greenprint's goal to reduce overall building emissions in its portfolio by **50% BY 2030** compared with the 2009 baseline is in line with the Intergovernmental Panel on Climate Change (IPCC) greenhouse gas stabilization target.

Performance Snapshot

YEAR OVER YEAR—LIKE FOR LIKE

ENERGY CONSUMPTION

energy
-9.0%

2009: 6,390 million kWh
2013: 5,816 million kWh
1,126 properties

CO_2e EMISSIONS

carbon
-6.7%

2009: 2,767 thousand mt
2013: 2,582 thousand mt
1,126 properties

COST

cost of energy[3]
-1.4%

2009: €276 million ($369.0 million)
2013: €272 million ($347.4 million)
724 properties

ELECTRICITY

electricity
-11.2%

2009: 5,125 million kWh
2013: 4,553 million kWh
1,126 properties

WATER USE

water
-7.5%

2009: 14.7 million kiloliters
2013: 13.6 million kiloliters
511 properties

COST

cost of water
-9.2%

2009: €14.40 million ($19.3 million)
2013: €13.08 million ($16.7 million)
308 properties

2009 to 2013 Emission Reduction Equivalents[4]

430,351
BARRELS OF OIL NOT CONSUMED

38,958
CARS TAKEN OFF THE ROAD

16,884
HOMES NOT CONSUMING ENERGY

4,744,923
TREES PLANTED

90,159
METRIC TONNES OF COAL NOT BURNED

Greenprint Carbon Index™

YEAR OVER YEAR

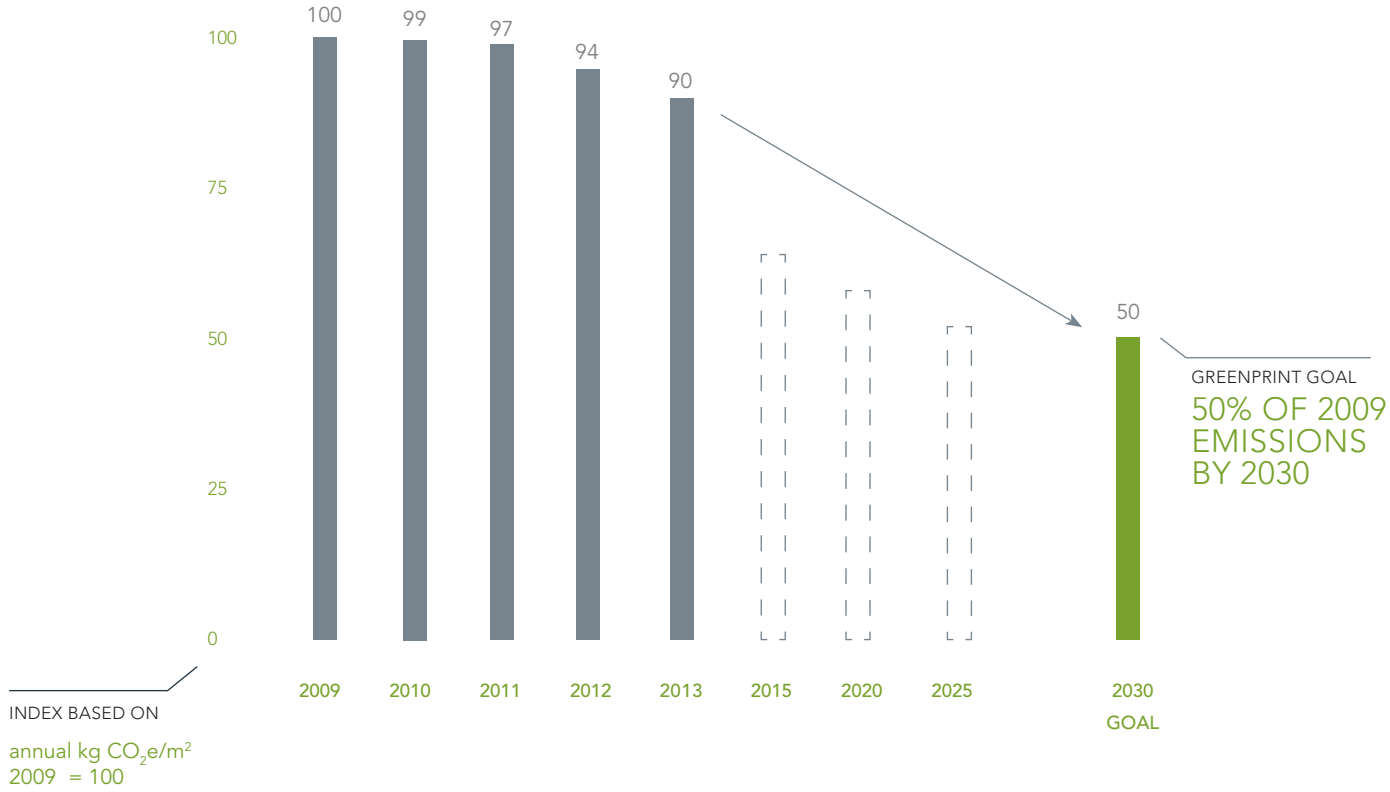
Greenprint's mission is to lead the global real estate community toward value-enhancing carbon-reduction strategies that support global greenhouse gas stabilization by 2030 in line with IPCC goals. The Greenprint Carbon Index™ (GCX) was created to track progress toward this goal. The GCX is calculated as an annual time series of normalized emissions intensity of the Greenprint portfolio.

The GCX is set at 100 starting in 2009. The GCX is based on the total greenhouse gas emissions divided by the associated total floor area for submitted properties, measured in kg CO_2e/m^2. The GCX is weighted by the same property-type proportion for each year of the index. This is done to ensure that the property mix from year to year remains constant. The Greenprint portfolio is becoming more diversified and creates a proxy for a balanced property-type allocation. This year, the property-type weightings are equivalent to the Distribution by Property Type on page 6 in the Executive Summary of this report.

Year	Annual emissions intensity (kg CO_2e/m^2)	% change in emissions intensity from 2009	Number of properties
2009	69.1	—	1,304
2010	68.2	-1% ↓	1,716
2011	67.1	-3% ↓	2,134
2012	65.1	-6% ↓	2,805
2013	61.9	-10% ↓	3,123

The historical index is updated and restated for various reasons:

- As new members join Greenprint, their historical data are put into the database to improve the size and scale of the GCX.
- Properties adjust energy use after the end of the reporting year to reflect updated invoice and meter information.
- Data errors are caught and corrected after the initial release of the GCX. In 2013, Greenprint ran more than ten validation routines through a multi-user workflow to check for consistent and accurate data at each property. (See the appendixes.)
- Measurement of building boundaries is improving as floor area is more accurately defined, allowing for better disaggregation between whole-building and tenant emissions.



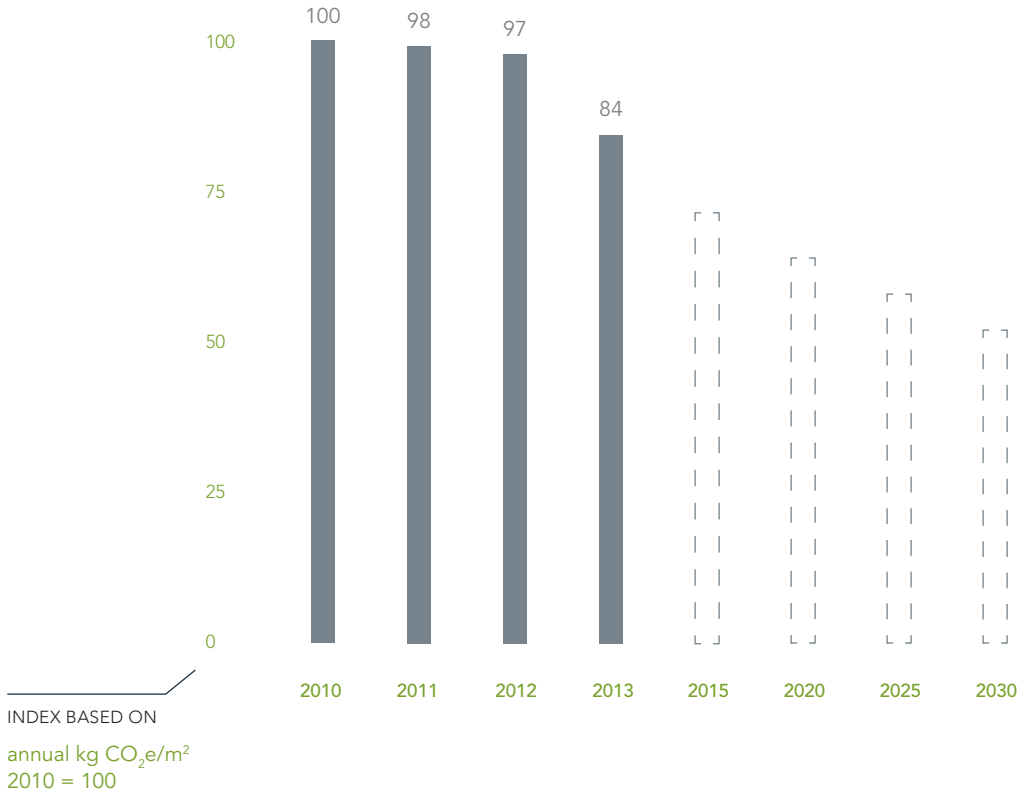
Greenprint Industrial Carbon Index™

YEAR OVER YEAR

The Greenprint Industrial Carbon Index (GICX) is a subset of the GCX used to measure long-term emissions performance of the Greenprint industrial portfolio. Similar to the GCX, the GICX is based on the total annual greenhouse gas emissions divided by the associated total floor area for industrial properties. The GICX provides real estate investors and stakeholders with a new index for research and performance measurements. The GICX is provided this year instead of the Greenprint Office Carbon Index to provide another data set that can help the industry track performance over time.

The 14 percent reduction in carbon emissions from 2012 to 2013 is due to the addition of over 170 self-storage centers. These self-storage centers have a median energy intensity of 21.1 kWh/m^2 while the median energy intensity for industrial properties in general is 49.5 kWh/m^2.

Year	Annual emissions intensity (kg CO_2e/m^2)	% change in emissions intensity from 2009	Thousand tonnes of CO_2e	Total denominator floor area (millions of m^2)	Number of properties
2010	28.0	—	77.8	2.8	141
2011	27.3	-2% ↓	90.3	3.3	204
2012	27.3	-3% ↓	284.8	10.4	649
2013	23.5	-16% ↓	338.2	14.4	766



7 APPENDIXES

Quality Controls and Verifications

Greenprint employs a data collection, verification, and calculation process aligned with the Greenhouse Gas Protocol and the principles of ISO 14064.

Greenprint employs a quality management procedure to ensure that accurate and verifiable results adhere to the following steps:

Process Step	Role Responsible
1. Identification of sites	Member approver
2. Input of property data	Member respondent
3. Data plausibility checks	Software platform
4. Review and approval of data	Member approver
5. Verification of data	Greenprint and software platform
6. Calculation of GHG emissions	Software platform
7. Verification of results	Greenprint

Data are submitted by professional managers, vetted by regional operations professionals at the member organization, and reviewed by Greenprint with assurances from owners and managers that the data are correct.

Roles

- Member approver: A senior-level employee from each Greenprint member who selects sites for inclusion in the report and provides oversight of the review process on behalf of the member firm.
- Member respondents: Property-level employees from each Greenprint member who collect property data.
- Software platform: Provided by a GRI stakeholder and CDP Accredited Provider contractor who administers the web-enabled system, manages the software plausibility checks, and performs GHG emissions calculations.
- Greenprint: Greenprint's team provides oversight of the software architecture, data collection, and results, and creates workflow process with member approvers.

Data Sources

- Property data based on the records of building landlords or their building management companies. Occupier space data are based on tenant records and lease agreements.
- Energy data based on utility bills, invoices, power-supply company records, or meter readings.
- Refrigerant data based on property maintenance logs.

Data Quality and Verification Steps

- Data plausibility checks are based on a review of the data that are not possible, such as occupancy rates that are greater than 100 percent and occupied hours per week greater than 168 hours.
- Data validation checks are based on reviewing data that are submitted and removing outliers for energy intensities by property type. Outliers are defined as four times or 25 percent of the median for whole-building energy intensity. This is not performed on properties that do not provide whole-building energy data.
- Like-for-like data checks where properties that increase consumption by 100 percent or decrease consumption by 80 percent are not considered like-for-like. Data points that are reviewed in this manner include total energy, electricity, fuel, thermal energy, and total water.

Greenprint will commission verification of its report by an independent third party.

Greenprint is committed to providing its membership with the best-in-class environmental management system. We continually scan the software landscape for the most comprehensive solution. To date, we have worked closely with Credit360 to jointly create the Greenprint Environmental Management Platform, which our members use collectively.

Emissions Coefficients

Electricity Emissions Factors (kg CO_2e per kWh electricity generated)

Americas	
Argentina	0.3660
Brazil	0.0889
Canada	0.1806
Alberta	0.8800
British Columbia	0.0200
Ontario	0.1700
Quebec	0.0020
Chile	0.4115
Guatemala	0.3357
Mexico	0.4400
Panama	0.2732
United States (by eGRID subregion)	0.5891
ERCOT all	0.5380
FRCC all	0.5360
MRO West	0.7429
NPCC—subregion unknown	0.2986
NPCC Long Island	0.6141
NPCC New England	0.3331
NPCC NYC/Westchester	0.2776
NPCC Upstate NY	0.2270
RFC East	0.4321
RFC Michigan	0.7569
RFC West	0.6934
SERC—subregion unknown	0.5687
SERC Midwest	0.7979
SERC Mississippi Valley	0.4564
SERC South	0.6045
SERC Tennessee Valley	0.6191
SERC Virginia/Carolina	0.4725
SPP North	0.8279
SPP South	0.7286
WECC—subregion unknown	0.4341
WECC California	0.2999
WECC Northwest	0.3735
WECC Rockies	0.8316
WECC Southwest	0.5428

EMEA	
Austria	0.1828
Belgium	0.2490
Czech Republic	0.5439
Egypt	0.4598
Finland	0.1871
France	0.0827
Georgia	0.0807
Germany	0.4412
Greece	0.7312
Hungary	0.3308
Ireland	0.4862
Italy	0.3985
Luxembourg	0.3148
Malta	0.9887
Morocco	0.7178
Netherlands	0.3921
Poland	0.6534
Portugal	0.3835
Qatar	0.5339
Romania	0.4166
Russian Federation	0.3255
Saudi Arabia	0.7542
Slovakia	0.2172
Spain	0.3259
Sweden	0.0399
Switzerland	0.0274
Turkey	0.4953
Ukraine	0.3861
United Arab Emirates	0.8421
United Kingdom	0.5246

Asia Pacific	
Australia (NGER determination)	0.8833
Australian Capital Territory	0.9000
New South Wales	0.9000
Queensland	0.8900
South Australia	0.7200
Victoria	1.2300
Bangladesh	0.5737
China	0.7450
Hong Kong	0.7574
India	0.9682
Indonesia	0.7261
Japan	0.4365
Korea, Republic of	0.4592
Macao	0.7509
Malaysia	0.6559
New Zealand	0.2135
Pakistan	0.4511
Philippines	0.4868
Singapore	0.5310
Taiwan	0.6120
Thailand	0.5291
Vietnam	0.4130

Sources

For Canada: http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=AC2B7641-1.

For the United States: US EPA eGRID2012 (2009 data) Version 1.0; http://www.epa.gov/cleanenergy/energy-resources/egrid/.

For Australia: National Greenhouse and Energy Reporting (Measurement) Determination 2008, Chapter 6; http://www.environment.gov.au/climate-change/greenhouse-gas-measurement/nger/determination.

Emission factor data are from International Energy Agency Data Services, 2006 and 2008 for "CO_2 Emissions per kWh Electricity and Heat Generated" and mainly sourced from the GHG Protocol website, http://www.ghgprotocol.org/calculation-tools (as cited in table 10a of 2012 *Guidelines to Defra/DECC's GHG Conversion Factors for Company Reporting*, Version 1.2. FINAL, Updated 19/08/2012; http://archive.defra.gov.uk/environment/business/reporting/pdf/110819-guidelines-ghg-conversion-factors.pdf.

Fuel Emissions Factors	kg CO_2e per kWh
Diesel	0.2692
Fuel oil	0.2845
LPG	0.2299
Natural gas	0.2042
Petrol	0.2545

Source

Table 10d of 2012 *Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting;*

Table 1D http://archive.defra.gov.uk/environment/business/reporting/pdf/110819-guidelines-ghg-conversion-factors.pdf;

as well as table 1D from v. 1.2.1 "Table 10d of 2010 *Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting*, Version 1.2.1: FINAL, Updated 6/Oct/2010; http://archive.defra.gov.uk/environment/business/reporting/pdf/110819-guidelines-ghg-conversion-factors.pdf."

Notes:

Within this report, the same fuel emissions factors have been used across countries. This is in keeping with the following:

"… companies reporting on their emissions may need to include emissions resulting from overseas activities. Whilst many of the standard fuel emissions factors are likely to be similar for fuels used in other countries, grid electricity emission factors vary very considerably. It was therefore deemed useful to provide a set of overseas electricity emission factors to aid in reporting where such information is hard to source locally."

Paragraph 196, page 63: http://archive.defra.gov.uk/environment/business/reporting/pdf/101006-guidelines-ghg-conversion-factors-method-paper.pdf.

Thermal Energies Emissions Factors	kg CO_2e/kWh
District steam	0.2695
District cooling	0.2269
District hot water	0.2694

Source

"Greenhouse Gas Emissions in Portfolio Manager July 31, 2013; Figure 3 United States and Canada (District Heating and Cooling) (page 8); https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf.

Glossary

Carbon dioxide equivalent (CO_2e)—the metric used to compare emissions from various greenhouse gases based on their global warming potential and includes carbon dioxide, methane, and nitrous oxide.

CO_2e averted as on-site renewable electricity—the amount of GHGs averted from the use of on-site renewable energy, e.g., potential sources are wind, hydroelectric, solar, and geothermal energy.

CO_2e averted as certified renewable—the amount of GHGs averted through the purchase of certified renewable electricity from power supply companies.

CO_2e emitted from on-site thermal energies—the GHGs emitted from the on-site generation of thermal heating and/or cooling.

CO_2e emitted running on-site CHP—the GHGs emitted from the operation of an on-site combined heat and power (CHP) plant producing thermal energy and electricity (for consumption both on site and exported).

CO_2e emitted from all imported fossil fuels—the GHGs emitted from the consumption of fossil fuels purchased by the landlord or tenant(s) from power supply companies.

CO_2e emitted from noncertified grid electricity—GHGs emitted from the consumption of standard grid electricity

CO_2e emitted from fugitive emissions—the GHGs emitted through intentional or unintentional refrigerant leaks and other industrial processes.

Energy use intensity (EUI)—the annual energy consumption divided by floor area.

Full-time equivalent (FTE)—the number of employees working an eight-hour interval, e.g., one employee working eight hours equals one FTE, and two employees working four hours also equals one FTE. This does not include visitors such as clients or customers, but does include subcontractors and volunteers.

ISO 14064—an International Organization for Standardization (ISO) globally recognized standard for quantification, monitoring, and reporting of sources of greenhouse gas emissions, as well as the validation of emissions data and assertions.

Like for like—a specific year-over-year analysis of the current year's properties that also have data from the previous year, with at least 350 days of data available for each year.

Median—the value lying at the midpoint of a distribution of observed values.

Normalized—a reference to adjusting values on a different scale to a common scale, such as energy intensity that is independent of the size of the building by dividing energy use by corresponding floor area.

Occupancy—the percentage of rentable floor area that is leased.

Site energy—the amount of heat and electricity consumed by a building as reflected in utility bills.

Source energy—the total amount of raw fuel that is required to operate a building, including all transmission, delivery, and production losses.

Waste diversion—the prevention and reduction of generated waste through source reduction, recycling, reuse, or composting.

Property Subtype Definitions

Greenprint worked closely with its members to appropriately define property subtypes based on industry standards.

Office

Air conditioned or naturally ventilated are the only subtypes.

Industrial

Refrigerated warehouse—refrigerated buildings that are used to store perishable goods or merchandise under refrigeration at temperatures below 50 degrees Fahrenheit.

Distribution center—unrefrigerated buildings that are used for the temporary storage and redistribution of goods, manufactured products, merchandise, or raw materials.

Unrefrigerated warehouse—unrefrigerated buildings that are used to store goods, manufactured products, merchandise, or raw materials.

Self-storage—buildings that are used for private storage. Typically, a single self-storage facility will contain a variety of individual units that are rented out for the purpose of storing personal belongings.

Retail

Enclosed air-conditioned shopping center—buildings that house multiple stores, often "anchored" by one or more department stores and with interior walkways. Most stores will not have entrances accessible from outside, with the exception of the "anchor" stores. The common areas are air conditioned.

Enclosed non-air-conditioned shopping center—buildings that house multiple stores, often "anchored" by one or more department stores and with interior walkways. Most stores will not have entrances accessible from outside, with the exception of the "anchor" stores. The common areas are not air conditioned.

Subtype Definitions (cont.)

Retail store—individual stores used to conduct the retail sale of nonfood consumer goods such as clothing, books, toys, sporting goods, office supplies, hardware, and electronics.

Unenclosed shopping center—mixed-use commercial development that includes retail stores and leisure amenities, where individual retail stores typically contain an entrance accessible from the outside and are not connected by internal walkways. Unenclosed shopping centers have an open-air design and often include landscaped pedestrian areas, as well as streets and vehicle parking.

Lodging

Boutique—establishment that provides lodging and sometimes meals, entertainment, and various personal services for the public. It may not be part of a national chain and has fewer than 200 rooms.

Full-service—establishment that provides lodging and sometimes meals, entertainment, and various personal services for the public; usually also has room service and on-site restaurant.

Resort—establishment that provides lodging and sometimes meals, entertainment, and various personal services for the public. Usually has a large amount of land and is situated in a resort location or near a beach. Property might also have a golf course, water park, or amusement facility.

Multifamily

Garden—one- to four-story buildings that usually do not contain an elevator and have a courtyard or single family-type setting and a wide range of units.

Mid-rise—four to nine stories serviced by elevators and usually located in the inner city or dense suburbs with limited range of unit types.

High-rise—buildings with ten or more stories that sometimes have underground parking and security, with full-service and standard plan and limited unit types.

Notes

1 *Contribution of Working Group III to the Fourth Assessment Report of IPCC* (2007), Chapter 3: Issues Related to Mitigation in the Long-Term Context, p. 173: "Using the 'best estimate' assumption of climate sensitivity, the most stringent scenarios (stabilizing at 445–490 ppmv CO_2-equivalent) could limit global mean temperature increases to 2–2.4 degrees Celsius above the pre-industrial level, at equilibrium, requiring emissions to peak before 2015. Global CO_2 emissions would return to 2000 levels no later than 2030."

2 The *Greenprint Performance Report*, Volume 5, primarily consists of member data from calendar year 2013; however, some member data were provided from members' fiscal year 2013, ending March 2013.

3 Oanda - http://www.oanda.com/currency/historical-rates/

4 U.S. Environmental Protection Agency, Greenhouse Gas Equivalencies Calculator. www.epa.gov/cleanenergy/energy- resources/calculator.html

5 Central Intelligence Agency, 2013 The World Fact Book. https://www.cia.gov/library/publications/the-world-factbook/

6 Tianzhen Hong, Wen-kuei Chang, Hung-wen Lin. A Fresh Look at Weather Impact on Peak Electricity Demand and Energy Use of Buildings Using 30-Year Actual Weather Data. May 2013 (http://eetd.lbl.gov/sites/all/files/lbnl-6280e.pdf.

7 National Oceanic Atmospheric Administration Data Service. http://www.ncdc.noaa.gov/sotc/service/global/map-percentile-mntp/201301-201312.gif.

8 Bureau of Labor Statistics, 2013 Consumer Price Index. http://www.bls.gov/cpi/.

We would like to thank our members who provided the photographs used throughout this report: CommonWealth Partners, Equity Office, Grosvenor, Hines, Jamestown, Prudential, and Tishman Speyer.

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Special thanks to our Performance Committee members, who have been instrumental to this report:

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Partnerships and collaborations with like-minded organizations help move the ULI Greenprint Center's mission forward.

CUSP CENTER FOR URBAN SCIENCE+PROGRESS

DOWNTOWNDC

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GBPN Global Buildings Performance Network

LONDON LEADING TO A GREEN LONDON | BETTER BUILDINGS PARTNERSHIP

NRDC THE EARTH'S BEST DEFENSE

BBP Partners

The ULI Greenprint center would like to thank the Better Buildings Partnership (BBP) and its members. The BBP is a collaboration of the United Kingdom's leading commercial property owners that are working together to improve the sustainability of existing commercial building stock. This year, the BBP enhanced the Greenprint benchmark with over 600 U.K.-based properties.

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