



# Greenprint Performance Report™

VOLUME 4, 2012



**ULI Greenprint Center  
for Building Performance**

# Greenprint Members



## Strategic Alliances



## Innovation Partners





## ULI Greenprint Center for Building Performance

The Urban Land Institute 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. Greenprint is a member-driven nonprofit organization that achieves its goals through measurement, action, and education. It strives to reduce greenhouse gas emissions by 50 percent by 2030, in line with the goals of the Intergovernmental Panel on Climate Change.<sup>1</sup>

Greenprint is a catalyst for change, taking meaningful and measurable actions to advance environmental performance. In order to meet its goals, Greenprint is leading the real estate industry in harmonizing global standards for environmental performance metrics, benchmarking, and indices. It is also providing a framework to demonstrate the correlation between environmental performance and enhanced property value.

Greenprint provides an environmental management platform for members to measure and track energy, emissions, water, and waste performance for properties, funds, and portfolios. The platform has evolved from an annual data tracking and reporting tool to a more granular system that captures tenant and space use characteristics. The enhanced platform supports comprehensive data management and analysis, which enables Greenprint members to take actions toward improving environmental performance.

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*<sup>™</sup>. Greenprint members receive customized reports detailing individual property, fund, and portfolio performance against appropriate benchmarks derived from the consolidated portfolio.

# Letter to Greenprint Stakeholders

The past year marks a significant milestone for Greenprint as we concluded our first full year as part of the Urban Land Institute. The ULI organization supports our mission, resulting in new members and partners and furthering the impact and potential of Greenprint. As we introduce Volume 4 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. The increased depth and breadth of the data combined with enhanced data technology and the potential for meaningful educational content positions Greenprint well for the future.

We would once again like to acknowledge the outstanding leadership of our membership, which has resulted in substantial growth of the Greenprint portfolio since Volume 3. This report includes 3,232 properties (a 20 percent increase) across 75 million square meters of building area (a 15 percent increase), representing over 160 property funds (a 33 percent increase).

Now 31 strong, our membership has not only provided us with data on more properties, but also provided us with historical data for new properties. This allows us to compare data from one year to the next for the same set of properties, creating the foundation for a like-for-like analysis across 2,345 properties (a 33 percent increase). In this report, we highlight that energy consumption decreased 3.2 percent and greenhouse gas emissions decreased 3.4 percent on a like-for-like basis from 2011 to 2012. I am pleased to report that this is the third year in a row that Greenprint members have decreased their energy consumption and emissions year over year.

As part of our goal to harmonize the various reporting standards across the industry, Greenprint has taken substantial steps toward establishing a best-in-class set of environmental performance methodologies and metrics, and an innovative environmental performance software platform. This platform allows us to capture more granular data on a more frequent basis in a comprehensive way, increasing the amount of data we maintain to 4 million data points, an increase of nearly 500 percent from 2011 to 2012. Incorporating how tenants use buildings with meter-level data not only allows annual reporting, but also enables members to take action to improve the environmental performance of their properties, funds, and portfolios. We have established a significant alliance with New York University's Center for Urban Science and Progress to take our next steps in analyzing this wealth of information to support data-driven insights and better investment decision making.

We know that finding solutions to the complex challenges we face requires us to work in collaboration not only across our membership, but also together with industry partners. We continue to evolve and strengthen our collaboration with the National Resources Defense Council and the London Better Buildings Partnership. Over the past year, Greenprint has also forged new alliances with the U.S. Environmental Protection Agency's Energy Star program, the C40 Cities Climate Leadership Group, and the Downtown DC ecoDistrict program. These relationships create tremendous opportunity to further harmonize and scale standards and tools across the global real estate industry, while carefully addressing specific needs of individual markets.

Though 2012 was a monumental year for Greenprint, it is the prospects for our future that are most exciting to us. Greenprint continues to drive progress in improving the environmental performance of the real estate industry in ways that enhance the long-term value of our investments. We are proud of the progress we have made, but know we can achieve more through leadership, commitment, and stakeholder engagement. Thank you to our members, partners, and collaborators for your contributions to date, and the inspiration and influence to encourage others to collaborate and contribute. We look forward to continuing our work together.

Sincerely,



Charles B. Leitner III  
Chairman, ULI Greenprint Center



Helen A. Gurfel  
Executive Director, ULI Greenprint Center

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# Greenprint Performance Report Guide

The *Greenprint Performance Report*<sup>TM</sup>, Volume 4, is based on 3,232 property submissions representing 75 million square meters (807 million ft<sup>2</sup>) across 44 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, and water use across the global real estate industry. The enhanced environmental management platform available to Greenprint members 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 2011 through 2012.<sup>2</sup>

- The 2011–2012 like-for-like portfolio includes 2,345 properties with consistent historical data, which represents a 33% increase from 2011.
- The increase in number of properties and floor area are 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, and water use.

- The **Energy Profile** 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.
- The **Greenhouse Gas Emissions** (GHG) section details current-year emissions, provides like-for-like comparisons, and displays various emission equivalencies.
- The **Water Profile** section contains like-for-like analysis and water intensity normalized for floor area, full-time equivalents, multifamily units, and hotel rooms.

**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<sub>2</sub>e/m<sup>2</sup>) 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 of Terms, and Emission Coefficients.

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



# 1 Executive Summary

# Greenprint at a Glance

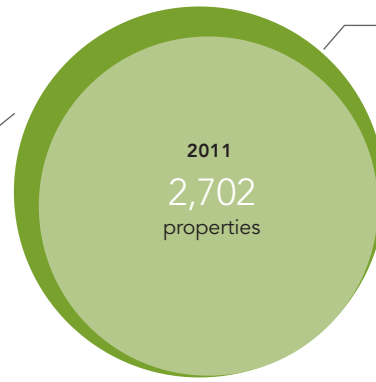
YEAR OVER YEAR

The Greenprint portfolio experienced tremendous growth in 2012.

PROPERTIES IN 2012

**19.6%**

increase in properties

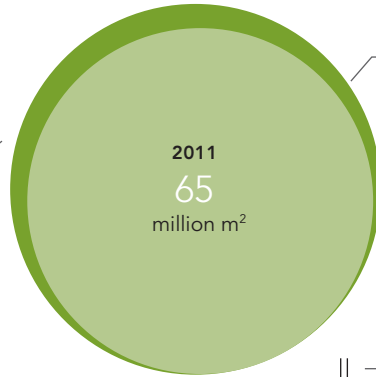


2012  
3,232  
properties

SQUARE METERS IN 2012

**14.9%**

increase in building area



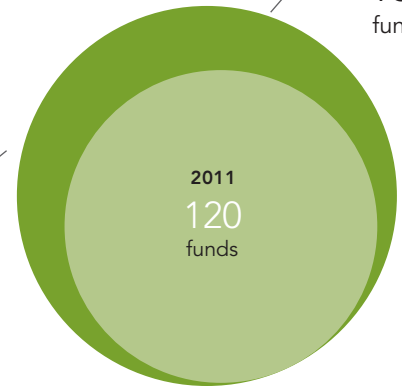
2012  
75  
million m²

2011  
65  
million m²

PROPERTY FUNDS IN 2012

**33.3%**

increase in property funds



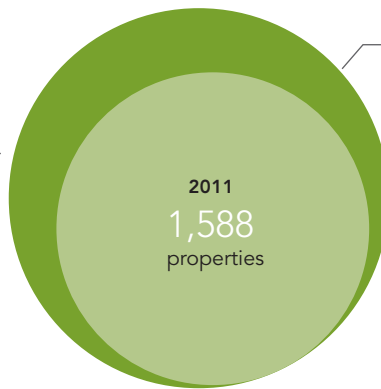
2012  
160  
funds

2011  
120  
funds

PROPERTIES WITH LIKE-FOR-LIKE DATA IN 2012

**33.3%**

increase in properties with like-for-like data



2012  
2,345  
properties

2011  
1,588  
properties

## GREENPRINT PORTFOLIO FACTS



over €450 billion

real estate assets under management by Greenprint members



1,128,435

number of employees working in Greenprint buildings



408,000 m<sup>2</sup>

largest building: Lisbon, Portugal



c.1723

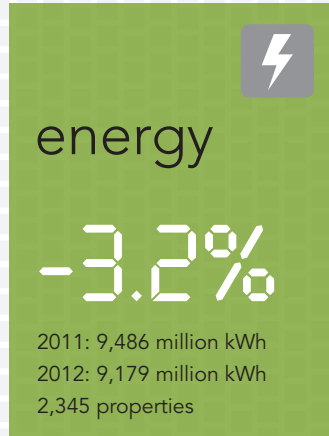
oldest building: London, England



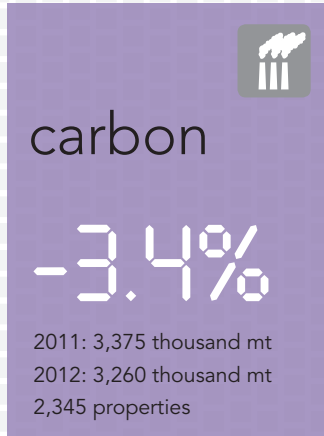
# Performance Snapshot

YEAR OVER YEAR—LIKE FOR LIKE

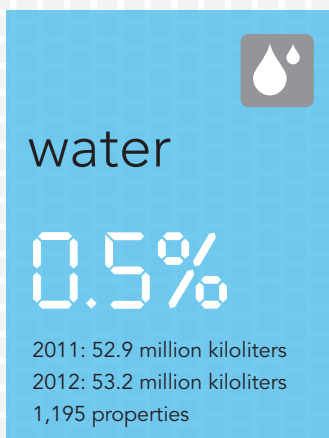
## ENERGY CONSUMPTION



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



## WATER USE



## DENSITY



## WASTE AND RECYCLING



## COST



## 2012 EMISSION REDUCTION EQUIVALENTS<sup>4</sup>



**268,400**

barrels of oil not consumed



**24,044**

cars taken off the road



**5,940**

homes not consuming energy



**2,959,282**

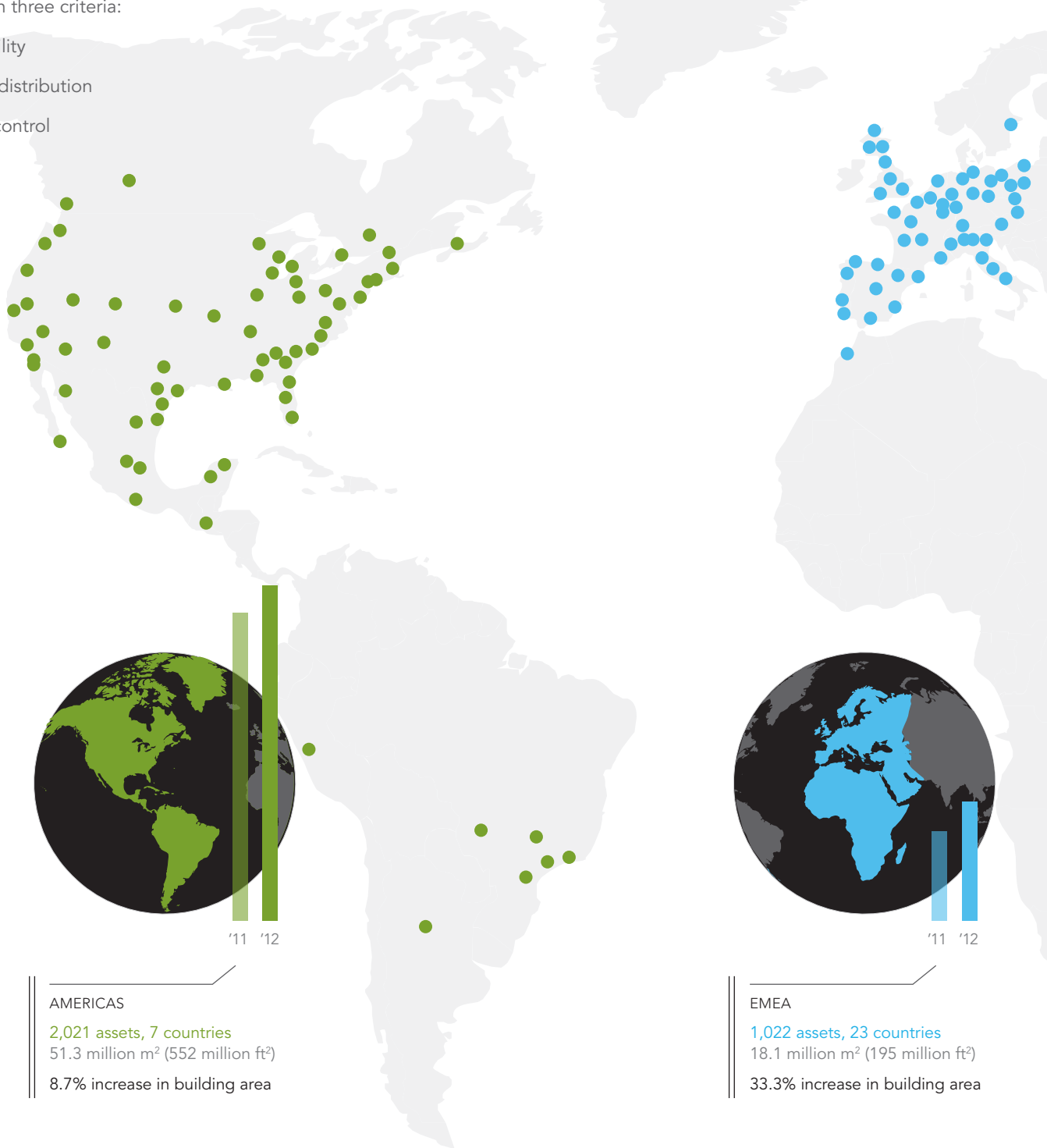
trees planted

# 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. Greenprint members have selected which assets to submit based on three criteria:

- Data availability
- Geographic distribution
- Managerial control

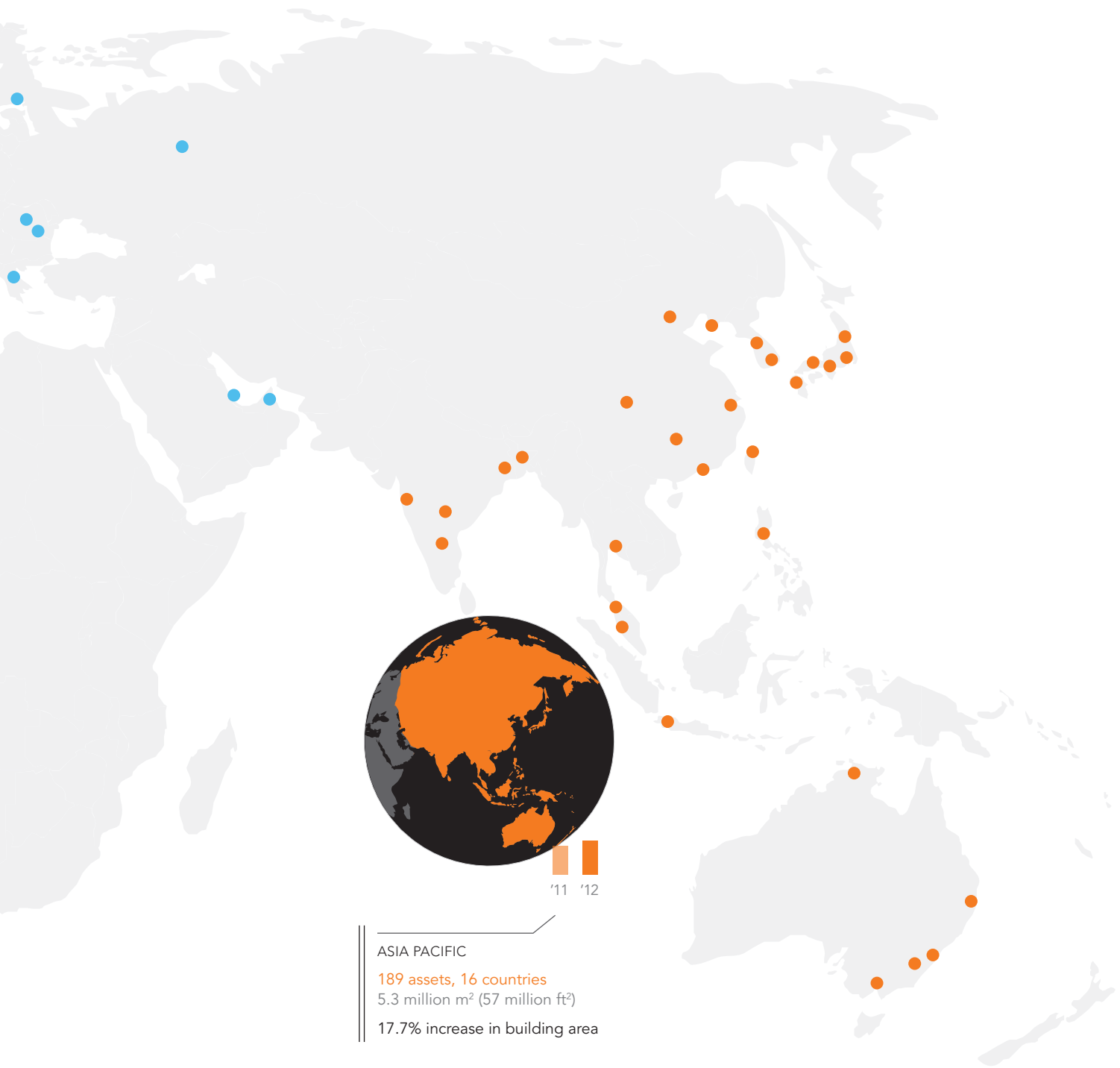


### AMERICAS

2,021 assets, 7 countries  
51.3 million m<sup>2</sup> (552 million ft<sup>2</sup>)  
8.7% increase in building area

### EMEA

1,022 assets, 23 countries  
18.1 million m<sup>2</sup> (195 million ft<sup>2</sup>)  
33.3% increase in building area

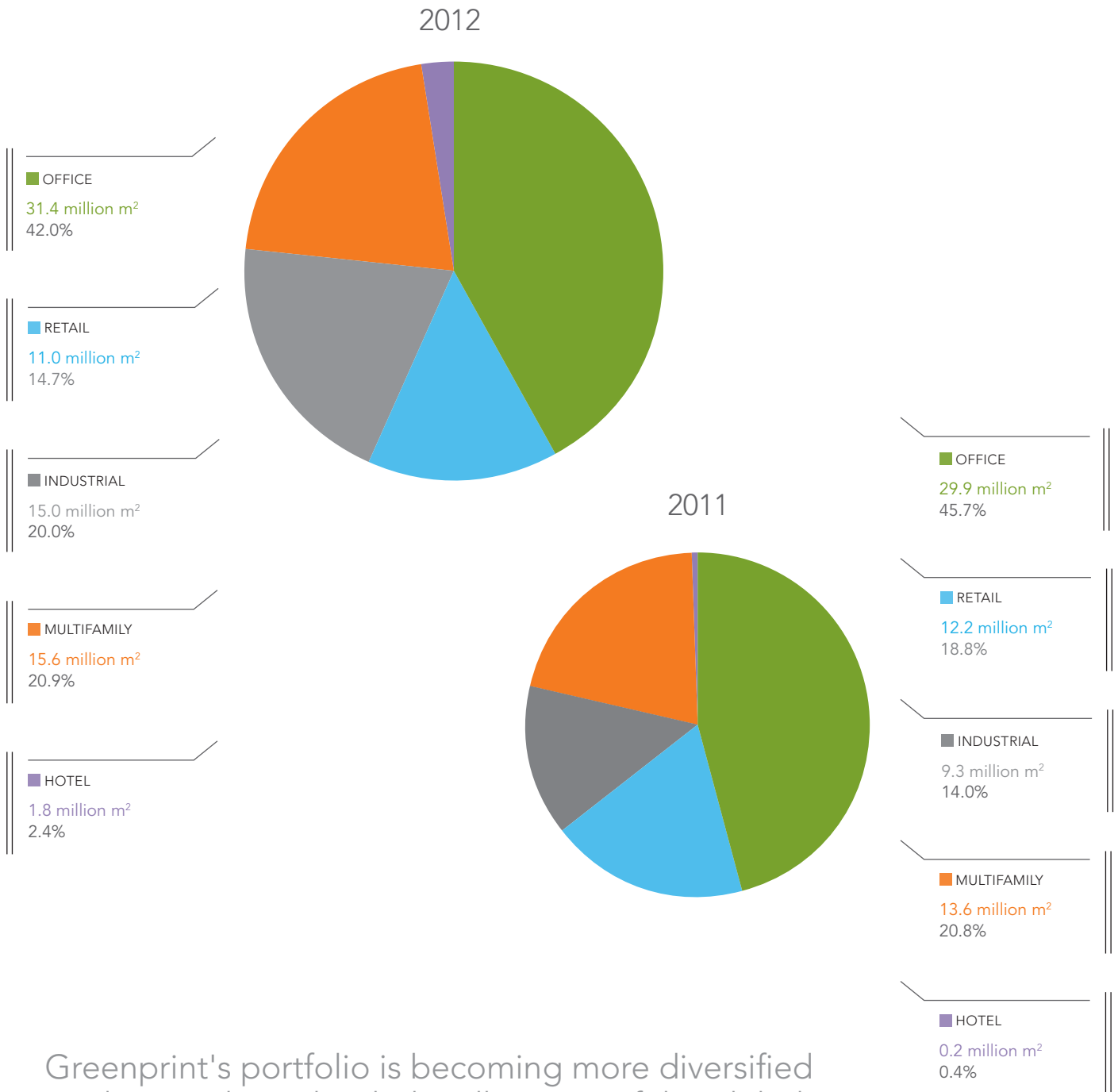


The global Greenprint portfolio increased 15% by floor area and 20% by number of properties.

# Distribution by Property Type

## YEAR OVER YEAR

The *Greenprint Performance Report*™ includes all major property types, with an emphasis on office, followed by multifamily, industrial, and retail.



Greenprint's portfolio is becoming more diversified and more aligned with the allocation of the global real estate investment markets.



## 2.1 Energy Profile

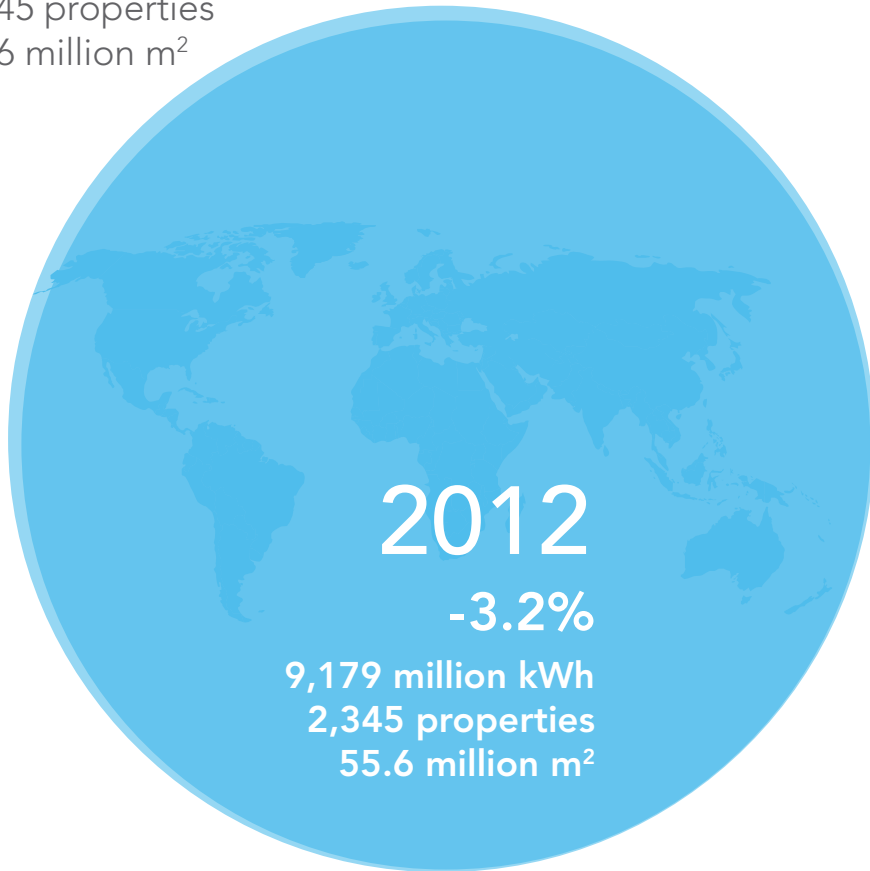
# Energy Consumption

YEAR OVER YEAR—LIKE FOR LIKE

The chart below shows the like-for-like portfolio, which consists of 2,345 properties with data from 2011 through 2012.

## 2011

9,486 million kWh  
2,345 properties  
55.6 million m<sup>2</sup>



The Greenprint portfolio's energy consumption decreased 3.2%, saving over 307 million kWh, which is equivalent to one day of electricity consumption in the Netherlands.<sup>5</sup>

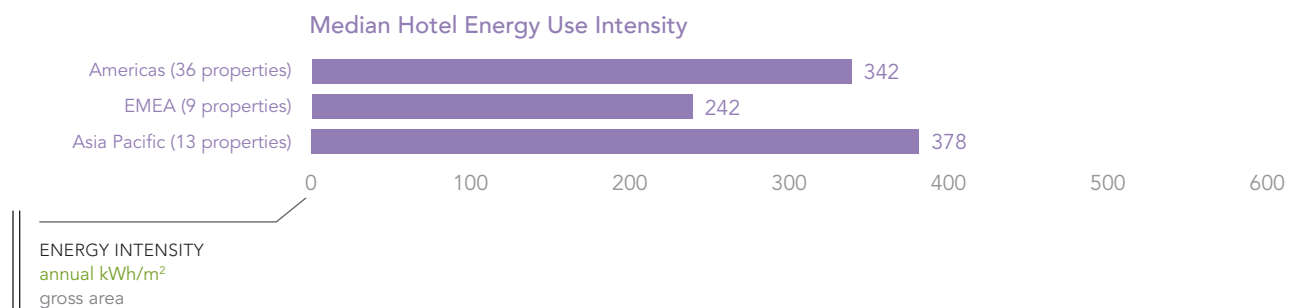
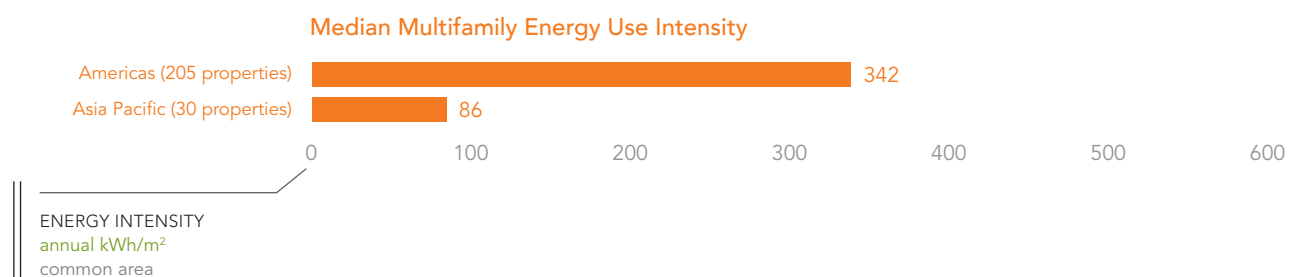
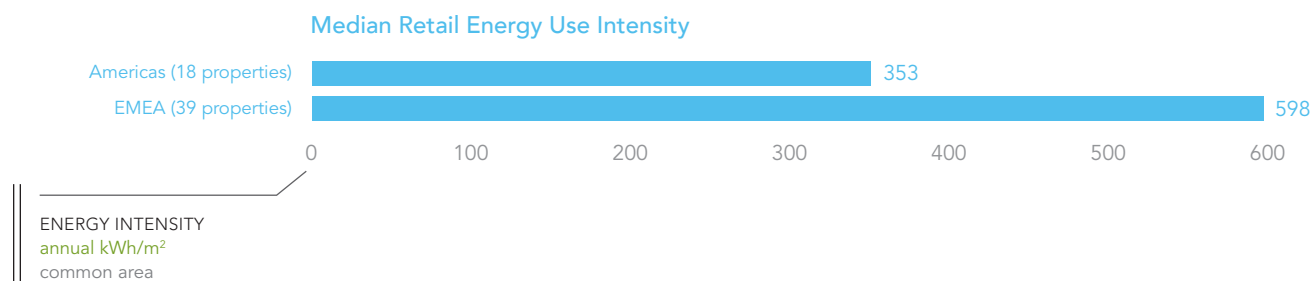
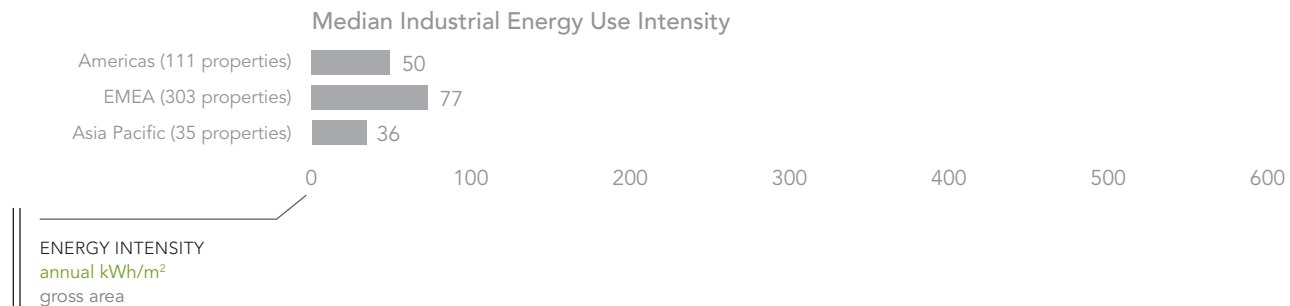


# Energy Use Intensity by Property Type and Global Region

## CURRENT YEAR

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.

The associated floor area of each benchmark below is based on managerial control, lease agreements, and property type.



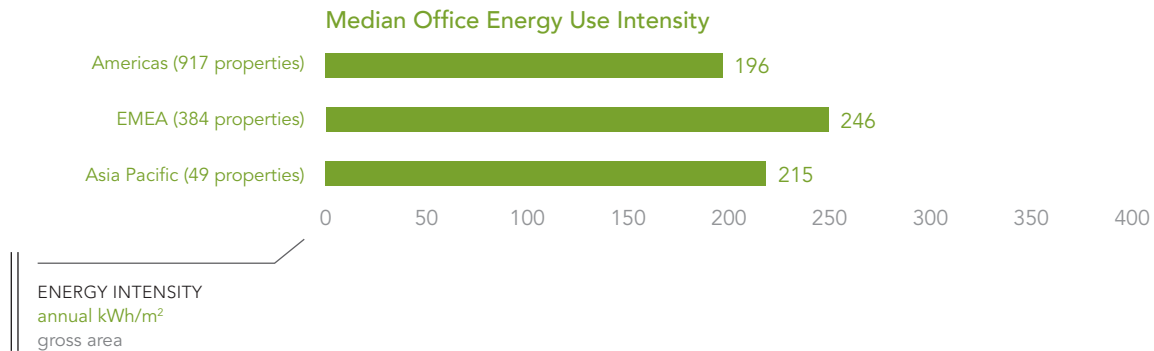
# Energy Use Intensity of Office Properties

## CURRENT YEAR

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.

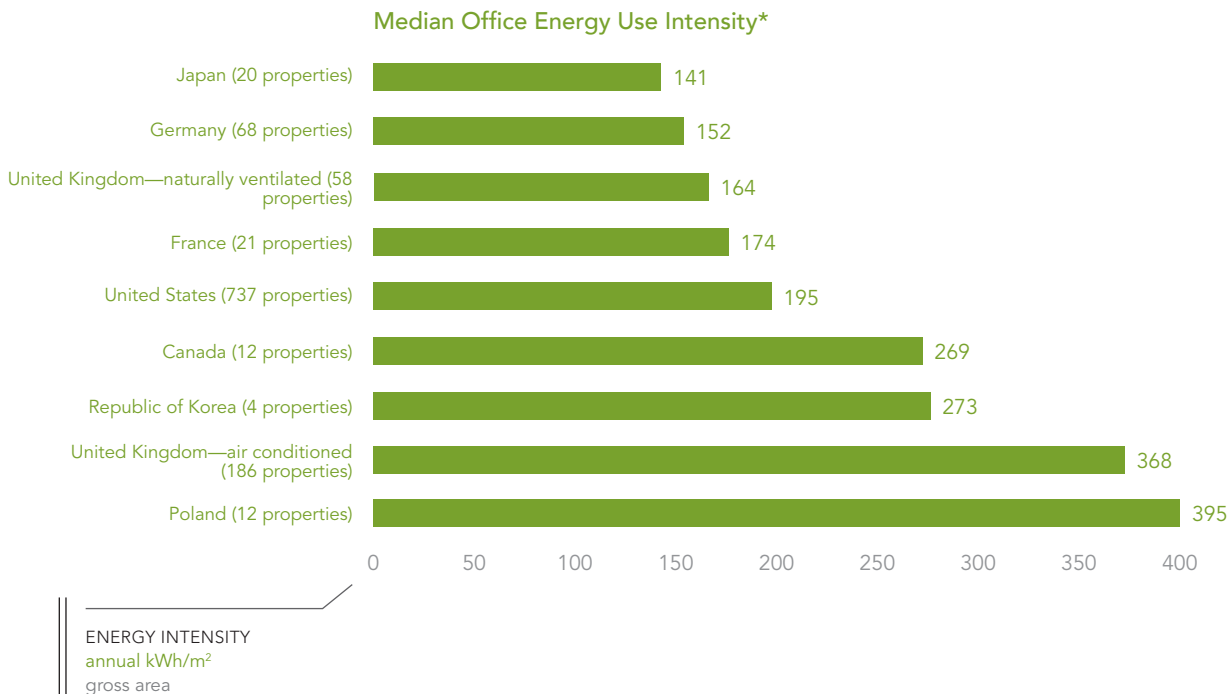
### By Global Region

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 following chart shows the median energy use intensity for Greenprint’s portfolio of office properties in eight countries.



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

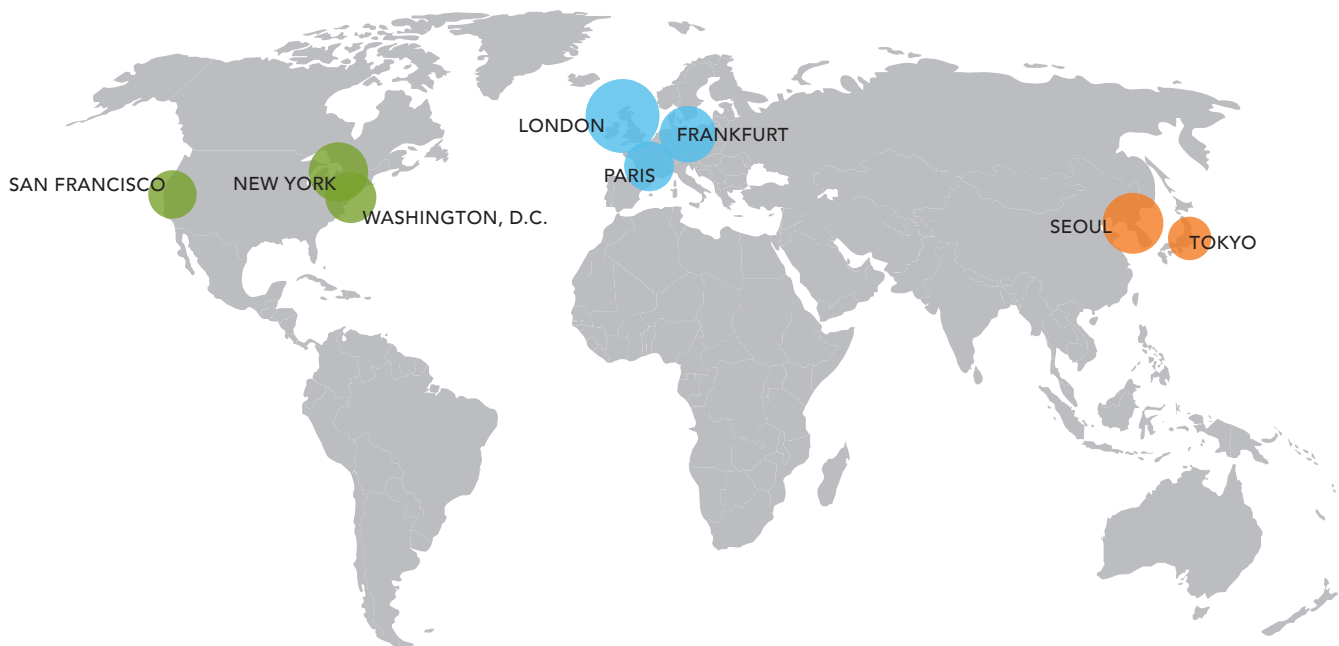




# Energy Use Intensity of Office Properties by City

## CURRENT YEAR

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



SAN FRANCISCO  
60 properties

173 annual kWh/m<sup>2</sup>

NEW YORK  
44 properties

260 annual kWh/m<sup>2</sup>

LONDON  
167 properties

403 annual kWh/m<sup>2</sup> \*

TOKYO  
17 properties

139 annual kWh/m<sup>2</sup>

WASHINGTON, D.C.  
83 properties

192 annual kWh/m<sup>2</sup>

PARIS  
17 properties

183 annual kWh/m<sup>2</sup>

FRANKFURT  
15 properties

236 annual kWh/m<sup>2</sup>

SEOUL  
4 properties

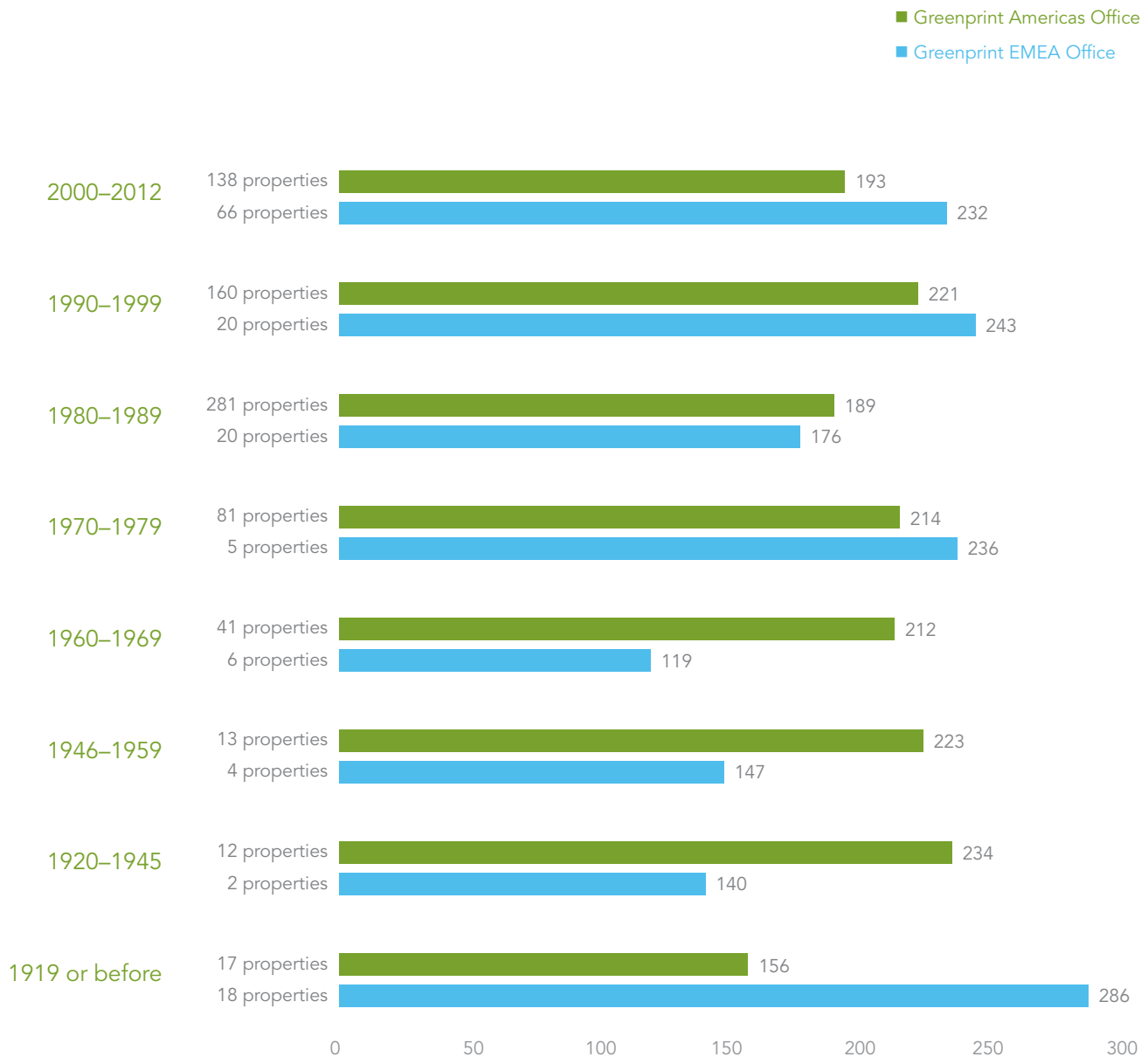
273 annual kWh/m<sup>2</sup>

\* The median energy intensity of 57 naturally ventilated office buildings in London is 163 kWh/m<sup>2</sup>, not represented above.

# Energy Use Intensity by Building Age

## CURRENT YEAR

This chart shows the median energy intensity of Greenprint's office portfolio in the Americas and EMEA. The energy intensity of buildings built between 1920 and 1969 is lower in EMEA, while buildings built after 1970 are generally more efficient in the Americas.



In line with industry studies, building age has a low correlation with energy performance.<sup>6</sup>

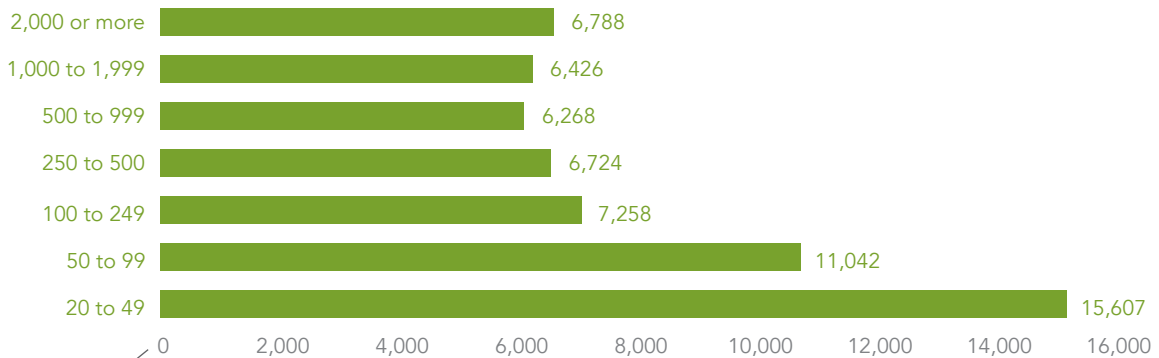
# Energy Use Intensity

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. Higher worker density shows diminishing energy use per FTE until a property has more than 1,000 FTEs.

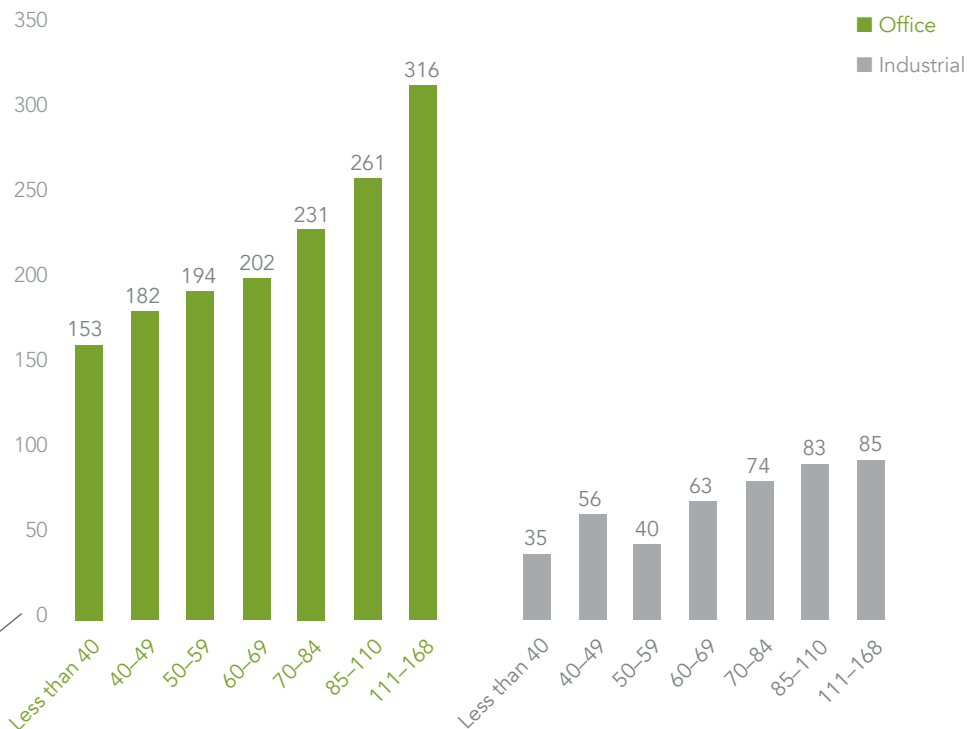
Number of FTEs per property



ENERGY INTENSITY  
annual kWh/FTE  
full-time equivalents

## By Operating Hours






The chart below shows the median energy use intensity by weekly operating hours of Greenprint's global office and industrial portfolios with whole-building energy consumption. The energy intensity of office properties tends to increase as weekly operating hours increase.



ENERGY INTENSITY  
annual kWh/m<sup>2</sup>  
by operating hours

# Global Trends in Benchmarking and Disclosure

Over the past decade, energy and environmental benchmarking and disclosure for buildings have emerged as global policy tools. As environmental performance plays an increasing role in investment and leasing decisions, benchmarking and disclosure provide companies with the opportunity to better manage risk, drive energy and emissions reductions, and empower stakeholders such as tenants and investors. Below are some examples of environmental benchmarking and disclosure initiatives.

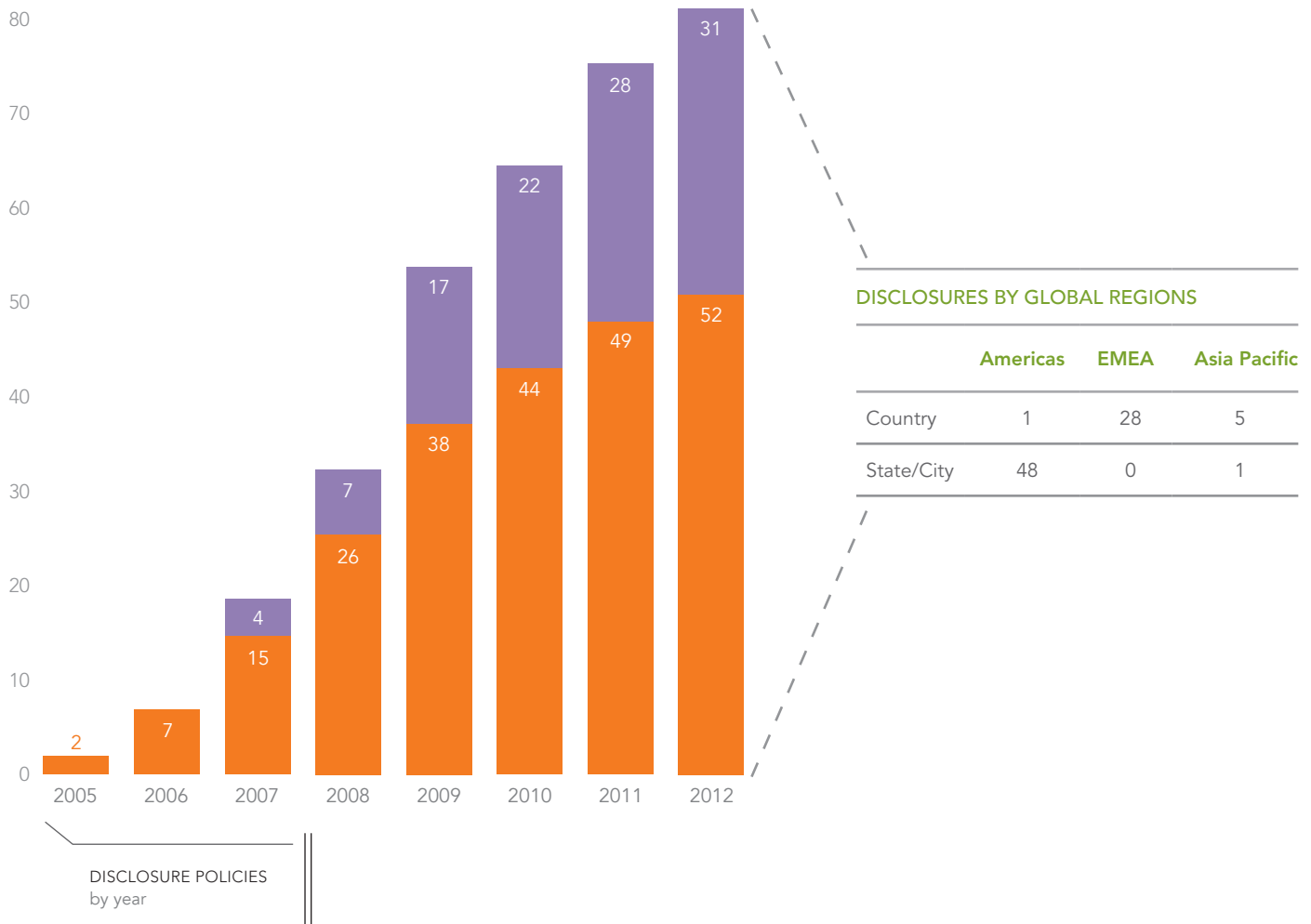
Policy	Jurisdiction	Year Enacted	Property Type	Threshold	Description
<b>SAN FRANCISCO</b> Existing Commercial Building Energy Performance Ordinance		2011	Office Retail Industrial Hotel	>10,000 ft <sup>2</sup> by April 1, 2013	Mandates energy benchmarking through Energy Star Portfolio Manager and public disclosure. Complements California's AB 1103 initiative, which requires energy performance disclosure upon financial transactions.
<b>NEW YORK CITY</b> Greener, Greater Buildings Plan		2009	Office Retail Industrial Hotel Multifamily	>10,000 ft <sup>2</sup> for public >50,000 ft <sup>2</sup> for private	Mandates the use of Energy Star Portfolio Manager to benchmark energy and water consumption. Public disclosure of energy intensity and Energy Star rating is required annually.
<b>UNITED KINGDOM</b> CRC Energy Efficiency Scheme		2010	Office Retail Industrial Hotel	>6,000 MWh consumed annually across an organization	Participating organizations and institutions must purchase carbon allowances to offset the emissions stemming from their energy use. One allowance, which costs £12, must be surrendered for each ton of CO <sub>2</sub> e emitted.
<b>TOKYO</b> Metropolitan Government Emissions Trading Scheme		2010	Office Retail Industrial	>1,500 kl of crude oil equivalent	Building owners must track and publicly disclose energy use and emissions. Emissions must be reduced 6% by 2014 from a 2010 baseline. Data must be audited, and violators are publicly reported and subject to a €3,848 fine.
<b>AUSTRALIA</b> Commercial Building Disclosure Program		2010	Office	>2,000 m <sup>2</sup> of office space	Sellers or lessors must obtain a Building Energy Efficiency Certificate (BEEC), which is obtained through facility assessments using National Australian Built Environment Rating System (NABERS) guidelines.

# Energy and Carbon Disclosure Policies

The chart below shows the aggregate growth in benchmarking and disclosure programs at the local, regional, and national levels. Greenprint strives to harmonize the data being captured and tracked in the Greenprint database with the information requested by these programs. In Europe and Asia Pacific, disclosure policies are established at the country level, whereas in the Americas, many of the policies are being developed at the local (state/city) level.

## Cumulative Number of Disclosure Policies per Year

- Voluntary
- Mandatory



For global real estate owners and investors, establishing consistent standards, metrics, and tools for benchmarking and disclosure is valuable for portfolio management.





## 2.2 Greenhouse Gas Emissions

# Methodology

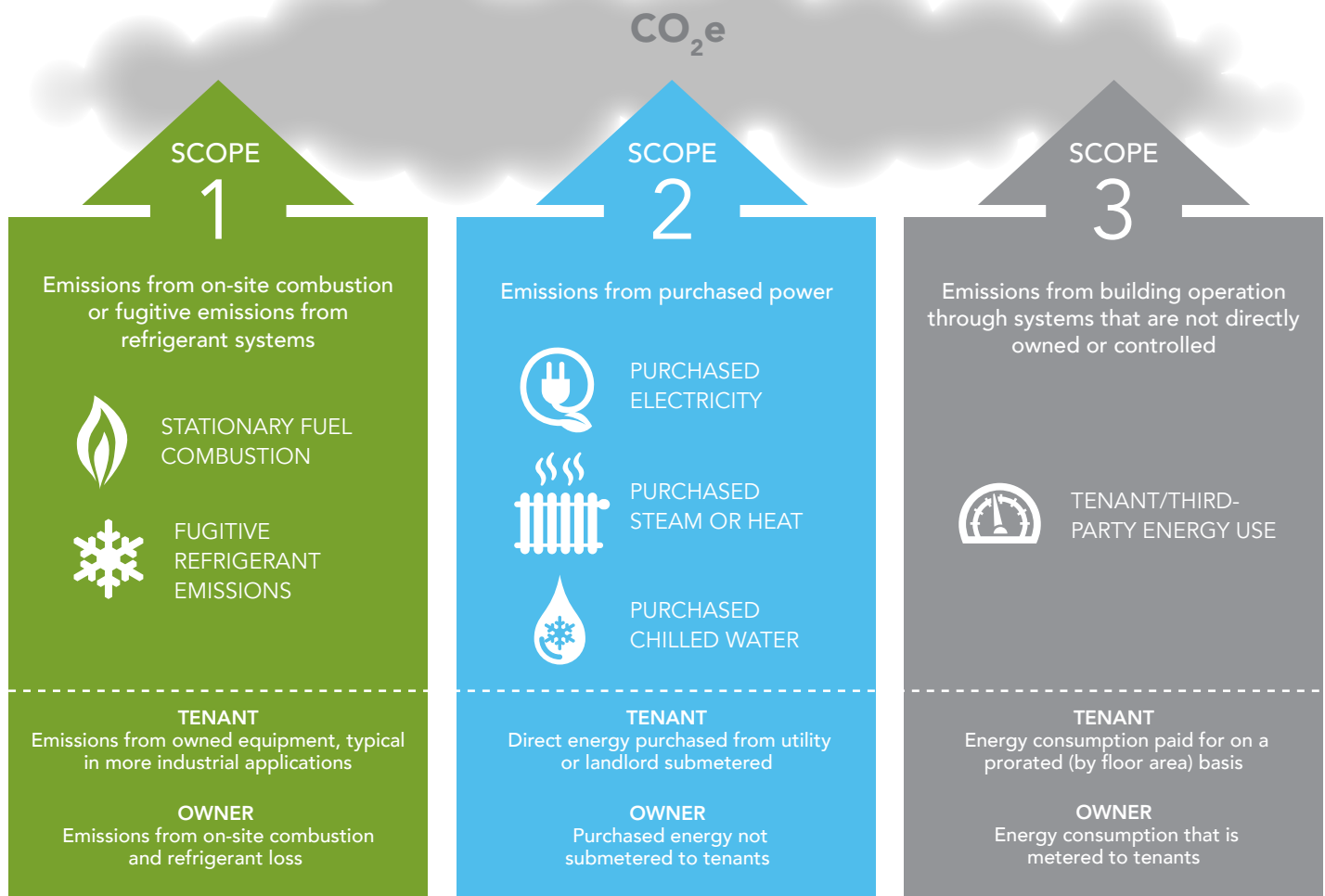
The *Greenprint Performance Report*™ separates greenhouse gas emissions (GHGs) into three categories: Scopes 1, 2, and 3. This reporting system is aligned with the World Resources Institute/WBCSD's Greenhouse Gas Protocol. Categorizing emissions by scope enables separate accounting of GHG sources by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

$$\text{Energy [kWh]} \times \text{Emissions Factor [kg CO}_2\text{e/kWh]} = \text{Greenhouse Gas Emissions [kg CO}_2\text{e]}$$

Emissions factors are used to calculate the total amount of CO<sub>2</sub>e generated. Developing and applying accurate emissions factors are critical to reliable GHG emissions reporting. Emissions factors are listed in appendix B. The same emissions factor sets have been applied to all sources since inception.



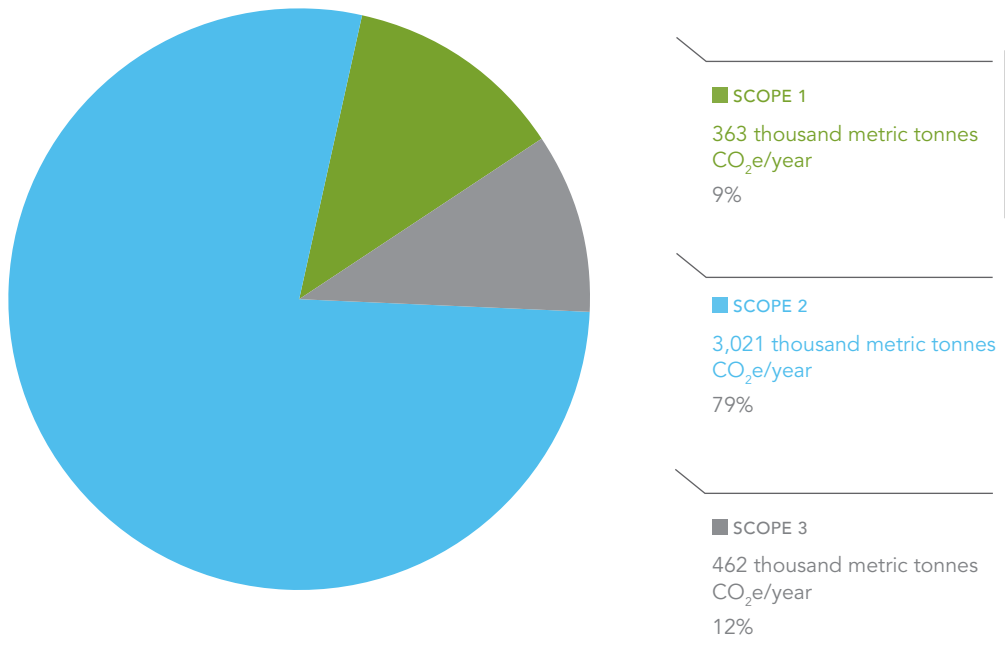


# Absolute Emissions

## CURRENT YEAR

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

### 2012 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 2011 to 2012. Individual member reports provide greater insight into the comparative performance of their portfolios. The increase in emissions at industrial facilities is likely linked to higher occupancy rates.

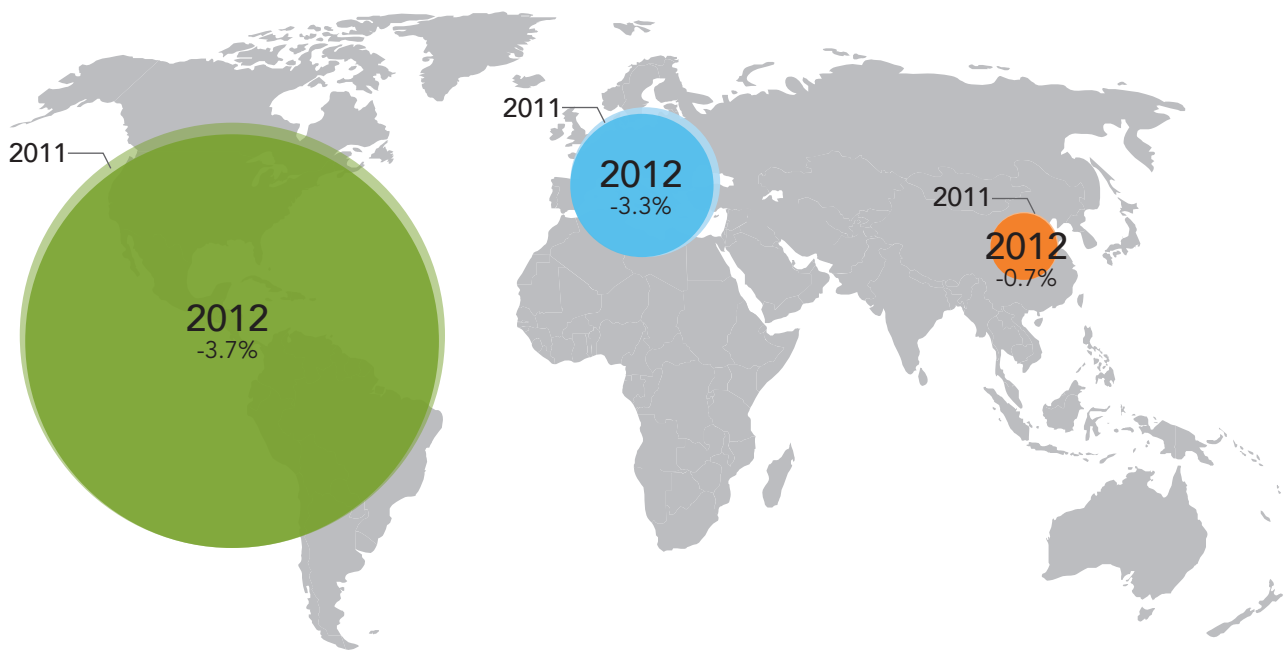
	Thousand Metric Tonnes CO <sub>2</sub> e/Year			
	2011	2012	2011–2012 % Change	2011–2012 Occupancy % Change
Office (1,279 properties)	2,521	2,425	-3.8% ↓	0.9%
Industrial (206 properties)	134	139	3.7% ↑	3.0%
Retail (290 properties)	259	249	-3.8% ↓	0.7%
Multifamily (513 properties)	241	232	-3.7% ↓	-0.1%
Hotel/lodging (57 properties)	221	215	-2.6% ↓	1.0%
<b>GREENPRINT TOTAL</b>	<b>3,376</b>	<b>3,260</b>	<b>-3.4% ↓</b>	<b>0.9%</b>

# Emissions by Global Region

YEAR OVER YEAR—LIKE FOR LIKE

This map illustrates the change in emissions (Scopes 1, 2, and 3) from 2011 through 2012 for the like-for-like portfolio for each global region.

- Americas
- EMEA
- Asia Pacific



AMERICAS  
 1,698 assets  
 44.2 million m<sup>2</sup>  
 2011: 2,455 thousand metric tonnes CO<sub>2</sub>e  
 2012: 2,365 thousand metric tonnes CO<sub>2</sub>e  
 3.7% decrease

EMEA  
 524 assets  
 8.5 million m<sup>2</sup>  
 2011: 676 thousand metric tonnes CO<sub>2</sub>e  
 2012: 653 thousand metric tonnes CO<sub>2</sub>e  
 3.3% decrease

ASIA PACIFIC  
 123 assets  
 2.9 million m<sup>2</sup>  
 2011: 245 thousand metric tonnes CO<sub>2</sub>e  
 2012: 243 thousand metric tonnes CO<sub>2</sub>e  
 0.7% decrease

The Greenprint portfolio's emissions decreased 3.4% on a like-for-like portfolio basis from 2011 to 2012.







# Emission Equivalencies by Global Region

## YEAR OVER YEAR—LIKE FOR LIKE

The chart below details the change in the Greenprint portfolio's emissions from 2011 to 2012. Properties consuming the same amount of energy can emit different amounts of CO<sub>2</sub>e for several reasons, including:

- **Utility fuel mix:** Emission factors reflect the type of fuel used at the power source. For instance, India produces power from coal plants and has an emission factor of 0.97, while Ontario, Canada, relies on hydroelectric power and, therefore, has a low factor of 0.17.
- **Government approach:** Policies and incentives to decarbonize the power supply vary. For example, combined heat and power (CHP) options are widely available in Germany due to government support, and three-quarters of French electricity is now produced by low-carbon nuclear plants.
- **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.

### Emissions by Global Region Comparison

	Americas		EMEA		Asia Pacific				
	2011	2012	2011	2012	2011	2012			
Number of properties	1,698	1,698	524	524	123	123			
Floor area (million m <sup>2</sup> )	44.1	44.1	8.5	8.5	2.9	2.9			
Occupancy rate (%)	88.4%	89.0%	↑	91.0%	92.1%	↑	89.4%	91.0%	↑
Total energy (million kWh)	6,986	6,742	↓	1,998	1,936	↓	502	500	↓
CO <sub>2</sub> e emissions (thousand mt)	2,455	2,363	↓	676	653	↓	245	243	↓
 Barrels of oil equivalent to amount of CO <sub>2</sub> e emissions	5,709,021	5,496,567		1,571,367	1,519,175		569,913	566,159	
 Cars on the road in a year equivalent to amount of CO <sub>2</sub> e emissions	511,433	492,401		140,768	136,093		51,055	50,718	
 Number of trees needed to sequester the equivalent amount of CO <sub>2</sub> e emissions	62,945,619	60,603,172		17,325,326	16,749,882		6,283,655	6,242,265	
 Number of homes equivalent amount of CO <sub>2</sub> e emissions	126,345	121,643		34,775	33,620		12,613	12,530	

# Emissions Averted Due to Renewable Energy

## YEAR OVER YEAR—LIKE FOR LIKE

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 chart below shows greenhouse gas emissions averted as a percentage of total emissions emitted by global region.

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.



PERCENTAGE  
of Emissions  
2012 compared to 2011

Even though the industry trend has shown a decrease in renewable energy procurement,<sup>7</sup> Greenprint members remain committed to purchasing energy from renewable sources.



# Emissions Profile by Global Region

## CURRENT YEAR

The chart below shows Greenprint portfolio emissions by global region and source of energy for the current year. Greenhouse gas emissions vary due to the following variables:

- Geographic distribution of individual portfolios
- Regional policies and incentives
- Property-type allocations
- Corporate sustainability policies

- CO<sub>2</sub>e EMITTED by standard grid electricity (i.e., non-certified renewable)
- CO<sub>2</sub>e EMITTED burning imported fossil fuels
- CO<sub>2</sub>e EMITTED by imported thermal energies
- CO<sub>2</sub>e EMITTED running on-site CHP
- CO<sub>2</sub>e EMITTED from fugitive emissions (refrigerants)



PERCENTAGE OF EMISSIONS  
by energy type  
2012

Note: Energy Star Portfolio Manager does not specifically label CHP generation; therefore, properties submitted via Portfolio Manager cannot be categorized as CHP above.





## 2.3 Water Profile

# Water Use

## YEAR OVER YEAR—LIKE FOR LIKE

The table below shows the change in water consumption by property type from 2011 to 2012 on the like-for-like portfolio of 1,195 properties. 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.

	Number of Properties	2011 (kL)	2012 (kL)	Change 2011–2012
Office	535	9,363,891	9,547,143	2.0% ↑
Retail	141	4,822,397	4,740,501	-1.7% ↓
Industrial	65	215,796	212,666	-1.5% ↓
Multifamily	401	33,917,523	34,255,600	1.0% ↑
Hotel	53	4,601,881	4,416,638	-4.0% ↓
<b>GREENPRINT TOTAL</b>	<b>1,195</b>	<b>52,921,488</b>	<b>53,172,549</b>	<b>0.5% ↑</b>

# 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.

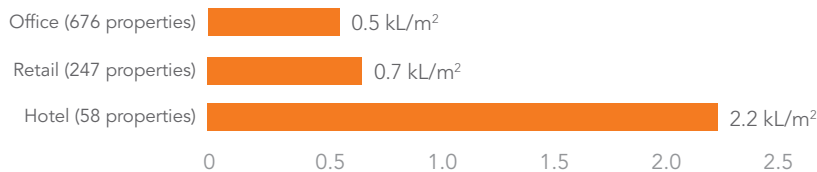
### Water Use per Full-Time Equivalents



### Water Use per Apartment Unit or Hotel Room



### Water Use Intensity





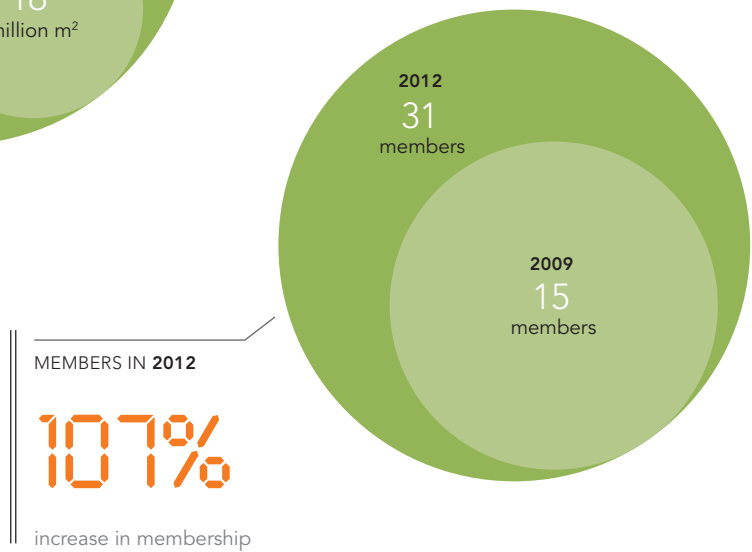
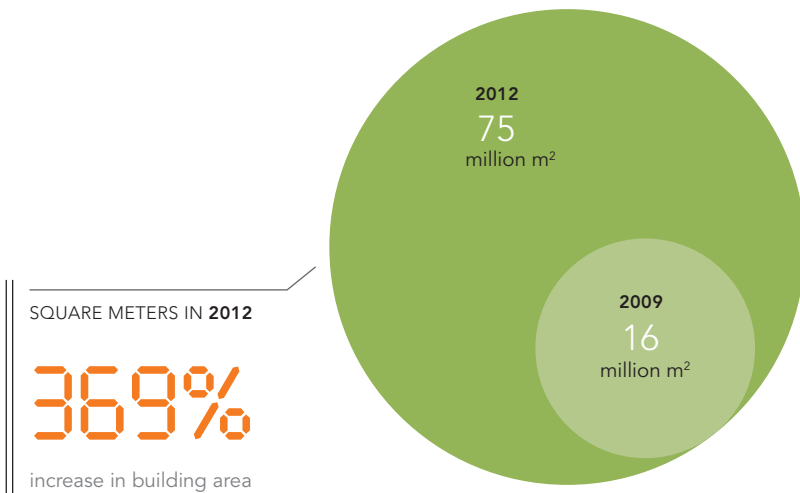
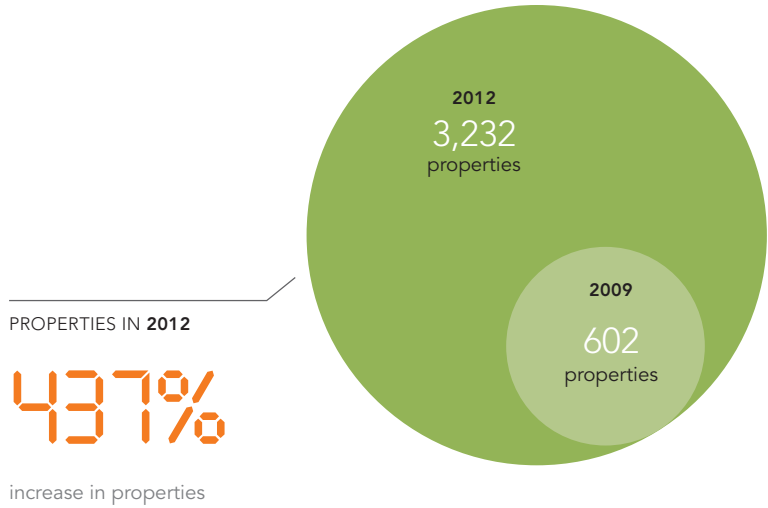


## 3 Long-Term Performance

# 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 2009–2012 like-for-like portfolio composed of 879 properties.



Greenprint's goal to reduce overall building emissions in its portfolio by

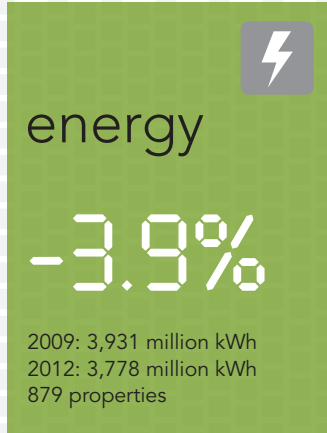
**50% by 2030**

compared to the 2009 baseline is in line with the Intergovernmental Panel on Climate Change (IPCC) greenhouse gas stabilization target.

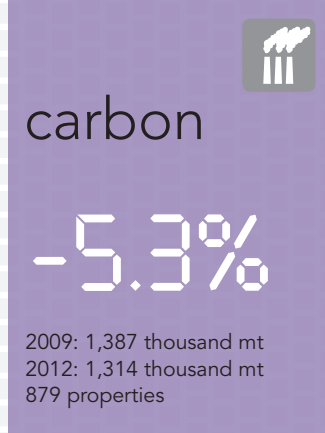
# Performance Since Inception

2009 TO 2012—LIKE FOR LIKE

## ENERGY CONSUMPTION



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



## 2009 TO 2012 EMISSION REDUCTION EQUIVALENTS



**600,319**

barrels of oil  
not consumed



**50,615**

cars taken  
off the road



**22,349**

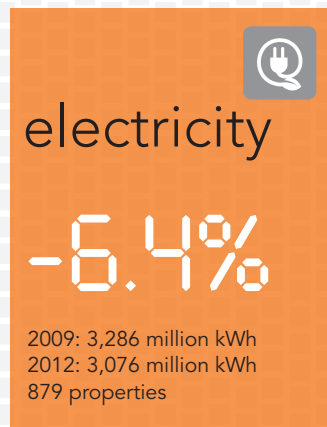
homes not consuming  
energy



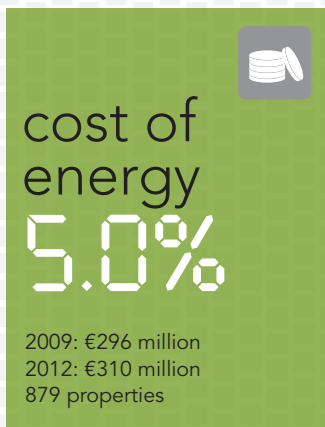
**6,618,898**

trees planted

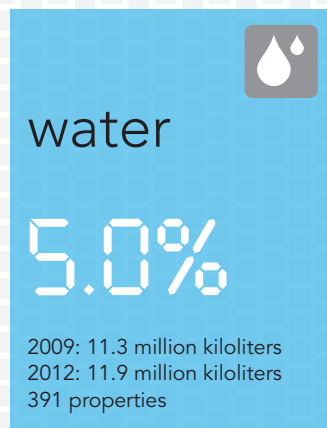
## ELECTRICITY



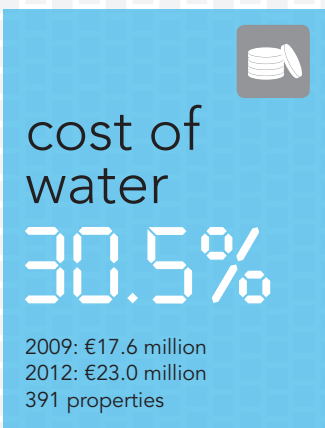
## COST OF ENERGY



## WATER USE



## COST OF WATER



# Greenprint Carbon Index™

## YEAR OVER YEAR

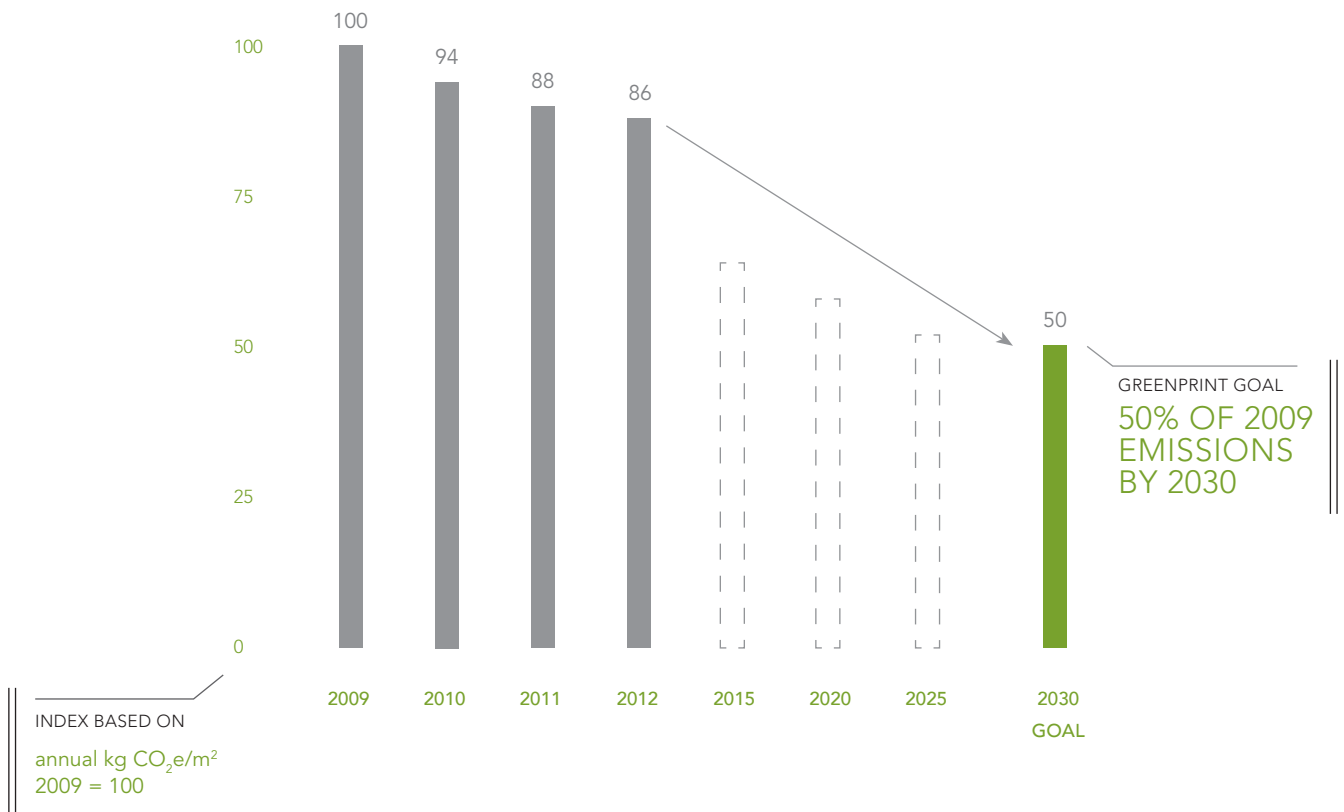
Greenprint’s mission is to lead the global real estate community toward value-enhancing carbon-reduction strategies that support global greenhouse gas stabilization by 2030 in line with IPCC goals. The Greenprint Carbon Index™ (GCX) was created to track progress toward this goal. The GCX is calculated 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<sub>2</sub>e/m<sup>2</sup>. 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 <sub>2</sub> e/m <sup>2</sup> )	% Change in Emissions Intensity from 2009	Number of Properties
2009	101.2	—	1,187
2010	95.3	-6% ↓	1,655
2011	89.1	-12% ↓	2,111
2012	87.0	-14% ↓	2,414

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 2012, Greenprint ran more than ten validation routines through a multi-user workflow to check for consistent and accurate data at each property. See appendix A.
- Measurement of building boundaries is improving as floor area is more accurately defined, allowing for better disaggregation between whole-building and tenant emissions.



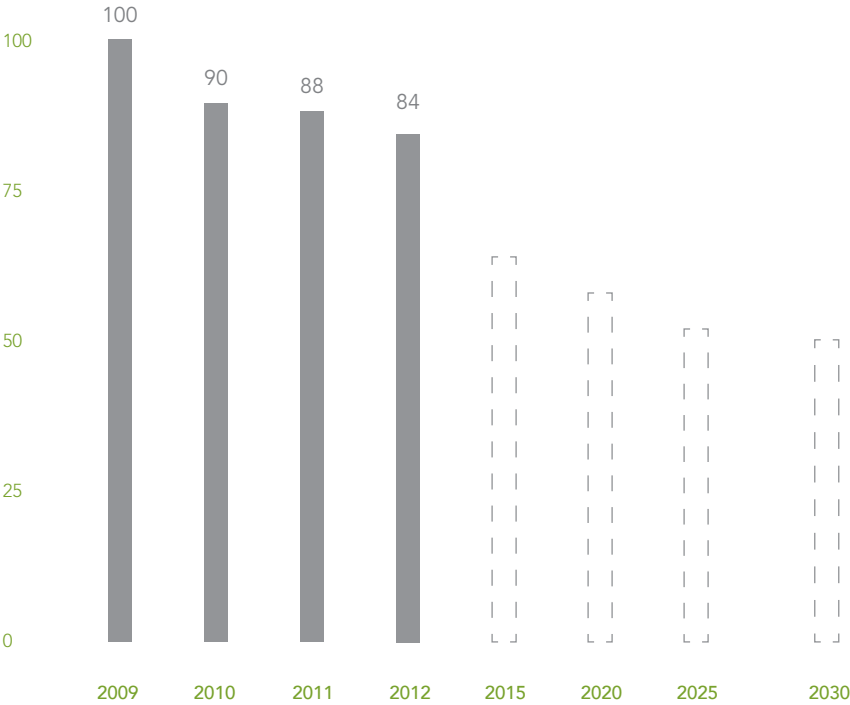
# Greenprint Office Carbon Index™

## YEAR OVER YEAR

The Greenprint Office Carbon Index™ (GOCX) is a subset of the GCX used to measure the long-term emissions performance of the Greenprint office portfolio. Similar to the GCX, the GOCX is based on the total annual greenhouse gas emissions divided by the associated total floor area for office properties. The GOCX provides real estate investors and stakeholders with a new index for research and performance measurement.

As more data become available, it will be possible to create additional indices for other property types that will provide richer resources to the real estate industry.

Year	Annual Emissions Intensity (kg CO <sub>2</sub> e/m <sup>2</sup> )	% Change in Emissions Intensity from 2009	Thousand Tonnes of CO <sub>2</sub> e	Total Denominator Floor Area (millions of m <sup>2</sup> )	Number of Properties
2009	102.5	—	2,539	25	1,051
2010	92.7	-10% ↓	2,503	27	1,104
2011	90.6	-12% ↓	2,583	29	1,165
2012	86.1	-16% ↓	2,698	31	1,200



INDEX BASED ON  
 annual kg CO<sub>2</sub>e/m<sup>2</sup>  
 2009 = 100



## 4 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.

The Greenprint Performance Committee employs a quality management procedure to ensure that accurate and verifiable results adhering 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 members' regional operations professionals, 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 respondent:** A property-level employee from each Greenprint member that collects property data.
- **Software platform:** Provided by a Global Reporting Initiative (GRI) stakeholder and Carbon Disclosure Project (CDP) accredited provider contractor who administers the web-based environmental management platform, manages the software plausibility checks, and performs GHG emissions calculations.
- **Greenprint:** Greenprint's team provides oversight review of the software architecture, data collection and results, and creates workflow process with members' approvers.

Data sources include:

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

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

# Emissions Coefficients

## Electricity Emissions Factors

kg CO<sub>2</sub>e per kWh electricity generated

Americas		EMEA		Asia Pacific	
Argentina	0.3660	Austria	0.1828	Australia (NGER determination)	0.8833
Brazil	0.0889	Belgium	0.2490	Australian Capital Territory	0.9000
Canada	0.1806	Czech Republic	0.5439	New South Wales	0.9000
Alberta	0.8800	Egypt	0.4598	Queensland	0.8900
British Columbia	0.0200	Finland	0.1871	South Australia	0.7200
Ontario	0.1700	France	0.0827	Victoria	1.2300
Quebec	0.0020	Germany	0.4412	China	0.7450
Chile	0.4115	Greece	0.7312	Hong Kong	0.7574
Mexico	0.4400	Hungary	0.3308	India	0.9682
United States (by eGRID subregion)	0.5891	Ireland	0.4862	Indonesia	0.7261
ERCOT all	0.5380	Italy	0.3985	Japan	0.4365
FRCC all	0.5360	Luxembourg	0.3148	Korea, Republic of	0.4592
MRO West	0.7429	Netherlands	0.3921	Macao	0.7509
NPCC—subregion unknown	0.2986	Poland	0.6534	Malaysia	0.6559
NPCC Long Island	0.6141	Portugal	0.3835	New Zealand	0.2135
NPCC New England	0.3331	Romania	0.4166	Philippines	0.4868
NPCC NYC/Westchester	0.2776	Russian Federation	0.3255	Singapore	0.5310
NPCC Upstate NY	0.2270	Saudi Arabia	0.7542	Taiwan	0.6120
RFC East	0.4321	Slovakia	0.2172	Thailand	0.5291
RFC Michigan	0.7569	Spain	0.3259	Vietnam	0.4130
RFC West	0.6934	Sweden	0.0399		
SERC—subregion unknown	0.5687	Switzerland	0.0274		
SERC Midwest	0.7979	Turkey	0.4953		
SERC Mississippi Valley	0.4564	Ukraine	0.3861		
SERC South	0.6045	United Arab Emirates	0.8421		
SERC Tennessee Valley	0.6191	United Kingdom	0.5246		
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				

### Sources

For Canada: <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=EAF0E96A-1>.

For the United States: U.S. Environmental Protection Agency eGRID2010 (2009 data) Version 1.1; [http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2010V1\\_1\\_year07\\_SummaryTables.pdf](http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2010V1_1_year07_SummaryTables.pdf).

For Australia: *National Greenhouse and Energy Reporting (Measurement) Determination 2008*, Chapter 6; <http://www.comlaw.gov.au/Details/F2010C00563/Html/Text#param538>.

Emission factor data are from International Energy Agency Data Services, 2006 and 2008 for “CO<sub>2</sub> 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 *2011 Guidelines to Defra/DECC’s GHG Conversion Factors for Company Reporting*, Version 1.2. FINAL, Updated 19/08/2011; <http://archive.defra.gov.uk/environment/business/reporting/pdf/110819-guidelines-ghg-conversion-factors.pdf>).



Fuel Emissions Factors	kg CO <sub>2</sub> e per kWh
Diesel	0.2692
Fuel oil	0.2845
LPG	0.2299
Natural gas	0.2042
Petrol	0.2545

#### Source

Table 10d of 2011 *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>.

Also: 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://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CDMQFjAB&url=http%3A%2F%2Farchive.defra.gov.uk%2Fenvironment%2Fbusiness%2Freporting%2Fpdf%2F101006-guidelines-ghg-conversion-factors.xls&ei=zOT\\_Udn7OeH84AOn14GwAg&usg=AFQjCNFUHnwNzF6lammV3vAlvqx6eqyl2Q&sig2=gCI74HQT5Nj3CuQe1vllLg&bvm=bv.50165853,d.dmg&cad=rja](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CDMQFjAB&url=http%3A%2F%2Farchive.defra.gov.uk%2Fenvironment%2Fbusiness%2Freporting%2Fpdf%2F101006-guidelines-ghg-conversion-factors.xls&ei=zOT_Udn7OeH84AOn14GwAg&usg=AFQjCNFUHnwNzF6lammV3vAlvqx6eqyl2Q&sig2=gCI74HQT5Nj3CuQe1vllLg&bvm=bv.50165853,d.dmg&cad=rja).

#### Note

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://www.defra.gov.uk/environment/business/reporting/pdf/101006-guidelines-ghg-conversion-factors-method-paper.pdf>.

Thermal Energies Emissions Factors	kg CO <sub>2</sub> e/kWh
District steam	0.2695
District cooling	0.2269
District hot water	0.2694

#### Source

"Greenhouse Gas Inventory and Tracking in Portfolio Manager," August 31, 2009: Table 2; Indirect Greenhouse Gas Emission Factors (District Energy) (page 3); [http://www.energystar.gov/ia/business/evaluate\\_performance/Emissions\\_Supporting\\_Doc.pdf](http://www.energystar.gov/ia/business/evaluate_performance/Emissions_Supporting_Doc.pdf).

# Glossary

**Carbon dioxide equivalent (CO<sub>2</sub>e)**—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<sub>2</sub>e averted as on-site renewable electricity**—the amount of GHGs averted from the use of on-site renewable energy, e.g., wind, hydroelectric, solar, and geothermal energy.

**CO<sub>2</sub>e averted as certified renewable**—the amount of GHGs averted through the purchase of certified renewable electricity from power supply companies.

**CO<sub>2</sub>e emitted from on-site thermal energies**—the GHGs emitted from the on-site generation of thermal heating and/or cooling.

**CO<sub>2</sub>e 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<sub>2</sub>e 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<sub>2</sub>e emitted from noncertified grid electricity**—GHGs emitted from the consumption of standard grid electricity purchased by the landlord or tenant(s).

**CO<sub>2</sub>e 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**—a 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.

**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.

## 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<sub>2</sub>-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<sub>2</sub> emissions would return to 2000 levels no later than 2030."
- 2 The *Greenprint Performance Report*, Volume 4, primarily consists of member data from calendar year 2012; however, some member data were provided from members' fiscal year 2012, 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](http://www.epa.gov/cleanenergy/energy-resources/calculator.html).
- 5 International Energy Agency, 2012 Key World Energy Statistics. <https://www.iea.org/publications/freepublications/publication/kwes.pdf>.
- 6 Stuart Brodsky, ENERGY STAR®: Why Rate Whole Building Energy Performance, February 1, 2006. <http://hightech.lbl.gov/dctraining/docs/server-conference/why-rate-whole-builds.pdf>.
- 7 Deloitte, *The Power Shift: Businesses Take a New Look at Energy Strategy*, 2013. [http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Energy\\_us\\_er/us\\_er\\_reSources2013Business\\_July2013.pdf](http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Energy_us_er/us_er_reSources2013Business_July2013.pdf).

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## Disclaimer

All calculations presented in this report are based on data submitted to the ULI Greenprint Center. While every effort has been made to ensure the accuracy of the data, the possibility of errors exists. This report is not intended to be a flawless accounting of carbon emissions by Greenprint's membership. Greenprint does not accept responsibility for the completeness or accuracy of this report, and it shall not be held liable for any damage or loss that may result, either directly or indirectly, as a result of its use.



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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 nearly 30,000 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.

Patrick L. Phillips  
Chief Executive Officer, ULI  
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