



# Greenprint Performance Report™

VOLUME 3, 2011



**ULI Greenprint Center  
for Building Performance**

# Greenprint Members




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## Strategic Alliances




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## Innovation Partners





## ULI Greenprint Center for Building Performance

The ULI Greenprint Center is a worldwide alliance of leading real estate owners, investors, financial institutions and other stakeholders committed to improving the environmental performance of the global real estate industry with a focus on emissions and energy reduction. Greenprint is a catalyst for change, taking meaningful and measurable actions to generate solutions that improve the environment through energy efficiency while demonstrating the correlation with increased property values. Greenprint is a member-driven nonprofit organization that achieves its goals through measurement, action, and education. The Greenprint Foundation, founded in 2009, was acquired by Urban Land Institute (ULI) in 2012 to form the ULI Greenprint Center for Building Performance.

Greenprint's mission is to lead the global real estate community toward value-enhancing carbon reduction strategies that support the Intergovernmental Panel on Climate Change (IPCC) goals for global greenhouse gas stabilization by 2030.<sup>1</sup>

Greenprint provides an information platform for individual members to measure and track property-level energy, emissions, water, and waste performance data. Each year Greenprint publishes a consolidated view of participating properties, detailing environmental performance by geography and property type in the Greenprint Performance Report™. Each Greenprint member receives a customized report tailored to their needs and individual portfolios.

# Letter from the Chairman

I am pleased to present Volume 3 of the Greenprint Performance Report™. The transformative alliance of the Greenprint Foundation and Urban Land Institute (ULI) to create the ULI Greenprint Center for Building Performance has resulted in many partnership opportunities, including furthering the potential and impact of the Greenprint Performance Report. The report continues to be the largest global collection of transparent, verifiable, and comprehensive data that provides aggregate benchmarks and performance trends. Volume 3 expands on our mission of providing a clear and consistent standard of greenhouse gas emission measurement and energy performance by taking the first steps toward including water and waste metrics to provide a truly comprehensive and useful set of environmental performance benchmarks for the real estate industry.

I would like to acknowledge the outstanding leadership of our membership, which has resulted in a substantial increase in the size and scope of the Greenprint portfolio since Volume 2. This report includes 2,703 properties (66% increase), which represents 65 million square meters of building area (108% increase). We have achieved this growth both from the expanding participation of our initial members and the impressive engagement of our 11 new members.

Now 29 strong, our membership has not only provided us with data on more properties but also provided us with historical data for properties. This allows us to compare data from one year to the next for the same set of properties, creating the foundation for a true "Like for Like" analysis and for useful benchmarking over time. This report covers both a comparison of 2010 to 2011 as well as longer-term performance data, looking at the same property performance from inception in 2009 to the present. I am pleased to report that energy consumption decreased 2.5%, greenhouse gas emissions decreased 5.9%, and water consumption decreased 11.9% on a Like for Like basis from 2009 to 2011. While the Greenprint Performance Report is rich with both information and potential, we still consider ourselves to be in the early stages in terms of data and statistical relevance. Accordingly, the growth of our portfolio continues to be one of our top priorities. The remarkable expansion of our database moves us closer to our goal of creating a useful set of tools for the industry.

The Greenprint Performance Report is unique in that it provides an open standard for measuring, benchmarking and tracking energy usage and resulting emissions on an industry, asset class, portfolio or property level. The Greenprint Performance Committee guided our procurement of a web-enabled platform that allows rigorous data quality controls set forth in Appendix A. Data was provided by professional property and sustainability managers, vetted by senior asset and operations managers, and reviewed by Greenprint to ensure robust and meaningful industry benchmarks. Greenprint plans to lead the industry in transparency by completing an in-depth third party review of our methodology that will be provided publicly in 2013.

Greenprint continues our quest to have a positive impact on our environment in ways that also enhance the long-term value of our investments. We are off to a great start but still need to achieve a more complete adoption by the real estate industry through leadership, commitment and stakeholder collaboration. Thank you to our members, partners and collaborators for your contributions to date. I look forward to working with you in the future, as well as welcoming new members and partners into the Greenprint community.

Sincerely,



Charles B. Leitner III  
Chairman, ULI Greenprint Center

# Table of Contents

Letter from the Chairman	iv
Guide to the Greenprint Performance Report	vi
<b>1 EXECUTIVE SUMMARY</b>	<b>1</b>
<b>Greenprint At-A-Glance</b>	<b>2</b>
Performance Snapshot	3
Distribution by Geography	4
Distribution by Property Type	6
<b>2 ANNUAL RESULTS</b>	
<b>2.1 Energy Consumption</b>	<b>7</b>
Energy Consumption	8
Energy Use Intensity by Property Type and Global Region	9
Energy Use Intensity of Office Properties by Country	10
Energy Use Intensity of Office Properties by City	11
Energy Use Intensity Benchmark by Property Type Whole Building and Common Area	12
<b>2.2 Greenhouse Gas Emissions (GHGs)</b>	<b>13</b>
Methodology	14
Absolute Emissions	15
Emissions	15
Emissions by Global Region	16
Emission Equivalencies by Global Region	17
Emissions Averted Due to Renewable Energy	18
Emissions Profile by Global Region	19
<b>2.3 Water Profile</b>	<b>21</b>
Water Usage	22
Water Intensity	22
<b>3 LONG-TERM PERFORMANCE</b>	<b>23</b>
<b>Historical Performance</b>	<b>24</b>
Greenprint Carbon Index™ (GCX)	26
Greenprint Office Carbon Index™ (GCX)	27
<b>4 APPENDICES</b>	<b>28</b>
<b>APPENDIX A</b> Quality Controls & Verifications	29
<b>APPENDIX B</b> Emissions Coefficients	30
<b>APPENDIX C</b> Glossary of Terms	32
<b>APPENDIX D</b> Endnotes	32

# Guide to the Greenprint Performance Report

The results of the Greenprint Performance Report™, Volume 3 are based on 2,703 property submissions representing 65 million square meters across 46 countries.

Greenprint sets the global standard for a common system to measure and benchmark energy, emissions, and water usage across the global property industry. The Greenprint database is built from records of individual properties, and is completely 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".

**Executive Summary** provides a snapshot of the Greenprint portfolio's growth and performance from 2010 to 2011.<sup>2</sup>

- The 2010–2011 Like for Like portfolio includes 1,628 properties with consistent historical data.
- Changes in occupancy are also calculated on a Like for Like basis and include 964 properties.

**Annual Results** details current year benchmarks and Like for Like performance for energy, emissions, and water usage. Data is normalized to allow comparison and benchmarking for buildings of different sizes.

- The Energy Profile section provides benchmarks based on geography and property types.
- The Greenhouse Gas Emissions (GHG) section details current year emissions as well as reporting methodology, including emission boundaries and calculations in line with GHG Protocol.

**Long-Term Performance** provides Greenprint's Historical Performance and the Greenprint Carbon Index™.

- The Historical Performance summarizes Greenprint's performance since inception. The 2009–2011 Like for Like portfolio includes properties with three years of consecutive data, and is composed of 1,158 properties
- The Greenprint Carbon Index™ (GCX) is the normalized emissions intensity ( $\text{kg CO}_2\text{e} / \text{m}^2$ ) of Greenprint members' properties with energy consumption for each year.

**Appendix** – includes Quality Control & Verifications 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.



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# 1 Executive Summary

# Greenprint At-A-Glance

YEAR OVER YEAR – ABSOLUTE

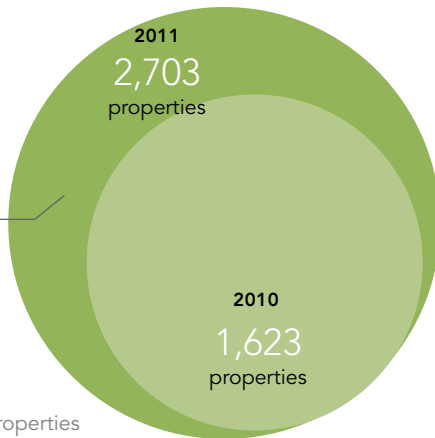
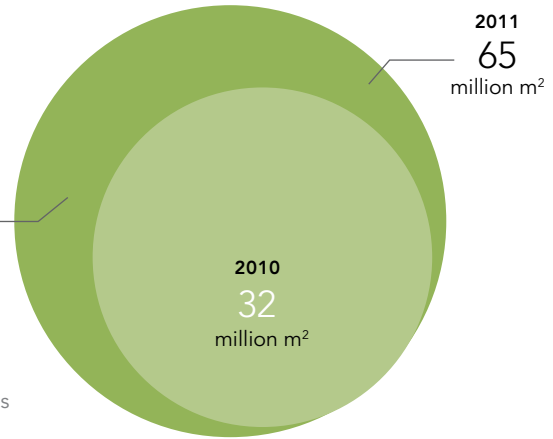
IN 2011

The Greenprint portfolio experienced tremendous growth in 2011.

SQUARE METERS IN 2011

108%

increase in square metres



PROPERTIES IN 2011

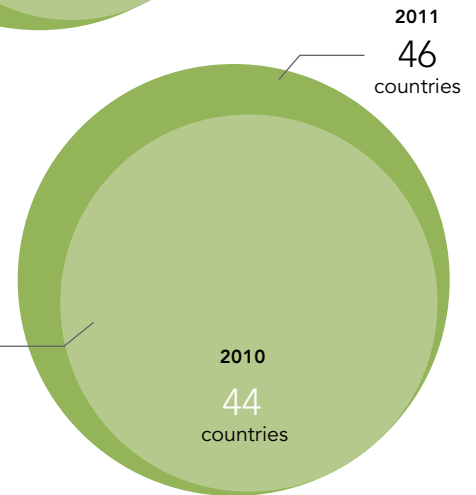
66%

increase in Greenprint properties

COUNTRIES IN 2011

5%

increase in countries



ULI and Greenprint Foundation merged in 2012 to form the ULI Greenprint Center for Building Performance.



ULI Greenprint Center for Building Performance

## MISSION

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

50% by 2030

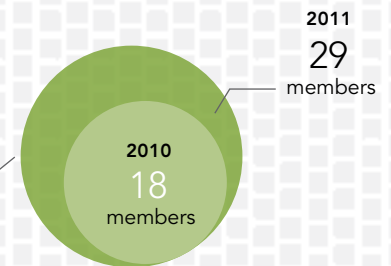
compared to the 2009 baseline, is in line with the Intergovernmental Panel on Climate Change (IPCC) greenhouse gas stabilization target.

## ORGANIZATION AND MEMBERSHIP

MEMBERS IN 2011

61%

increase in membership

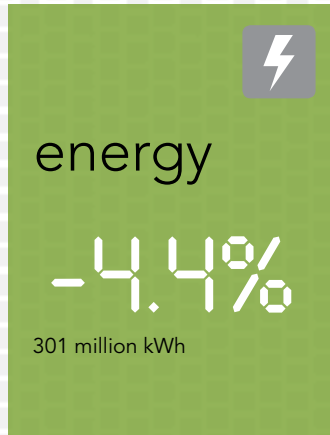




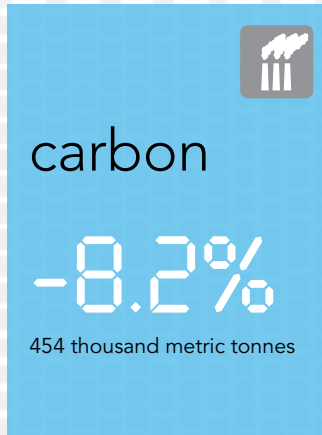
# Performance Snapshot

YEAR OVER YEAR – LIKE FOR LIKE

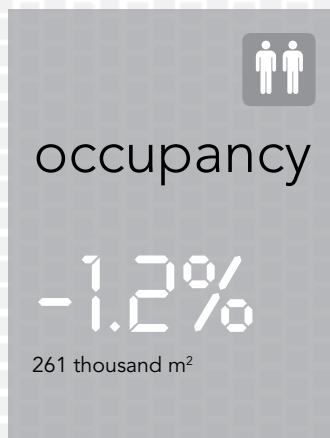
## OPERATION



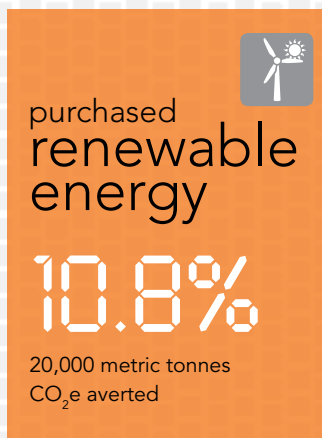
## CO<sub>2</sub> EMISSIONS



## DENSITY



## CERTIFIED SOURCES



## WATER



## COST



## 2011 EMISSION REDUCTION EQUIVALENTS



**1,056,830**

barrels of oil not consumed



**89,106**

cars taken off the road



**39,345**

homes not consuming energy



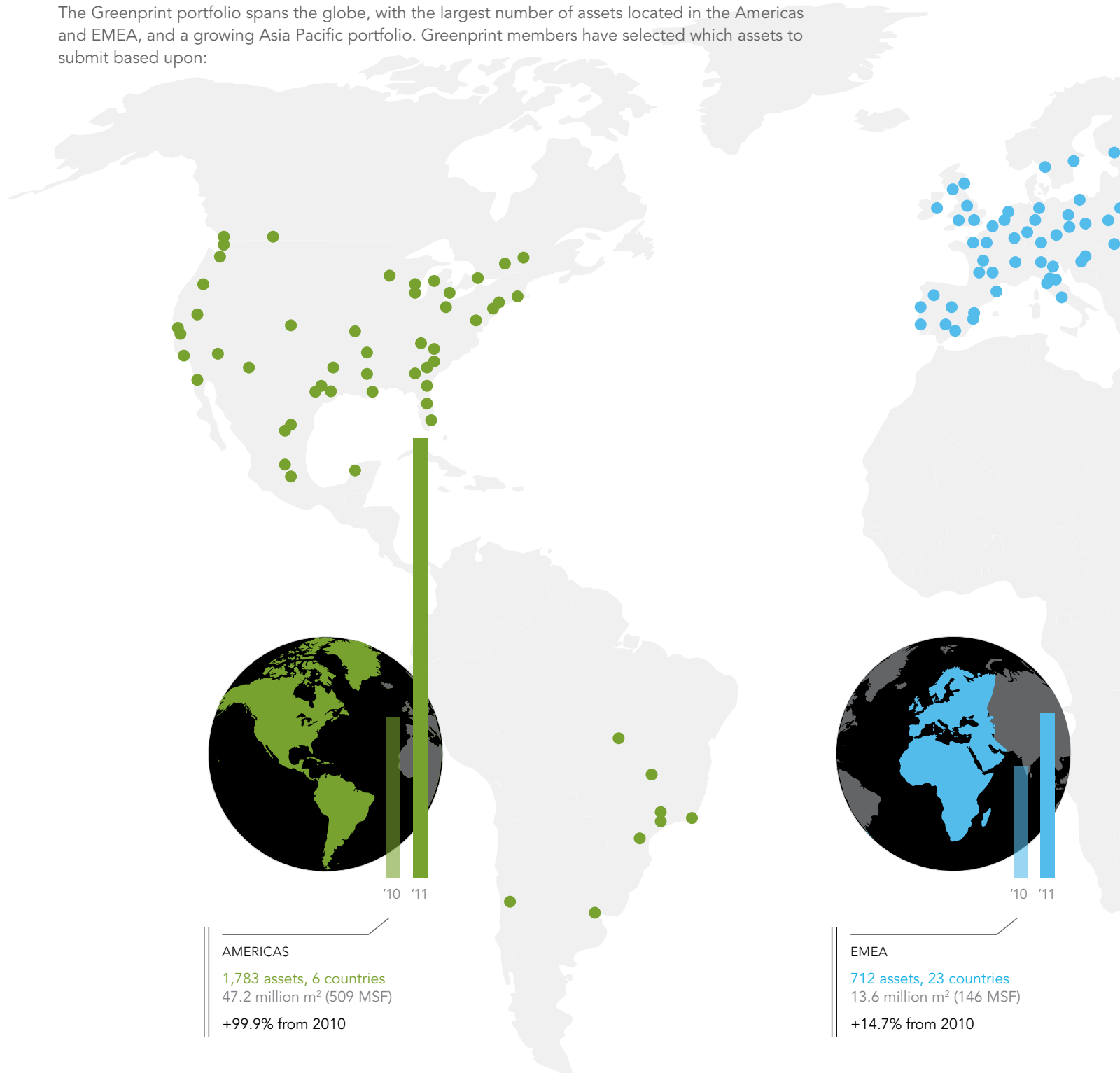
**11,652,231**

trees planted

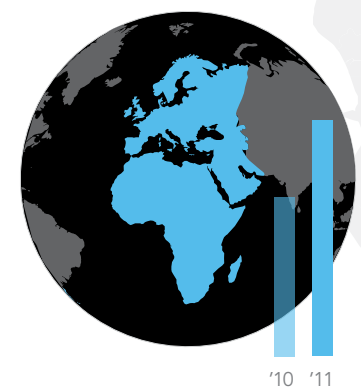
# Distribution by Geography

## YEAR OVER YEAR – ABSOLUTE

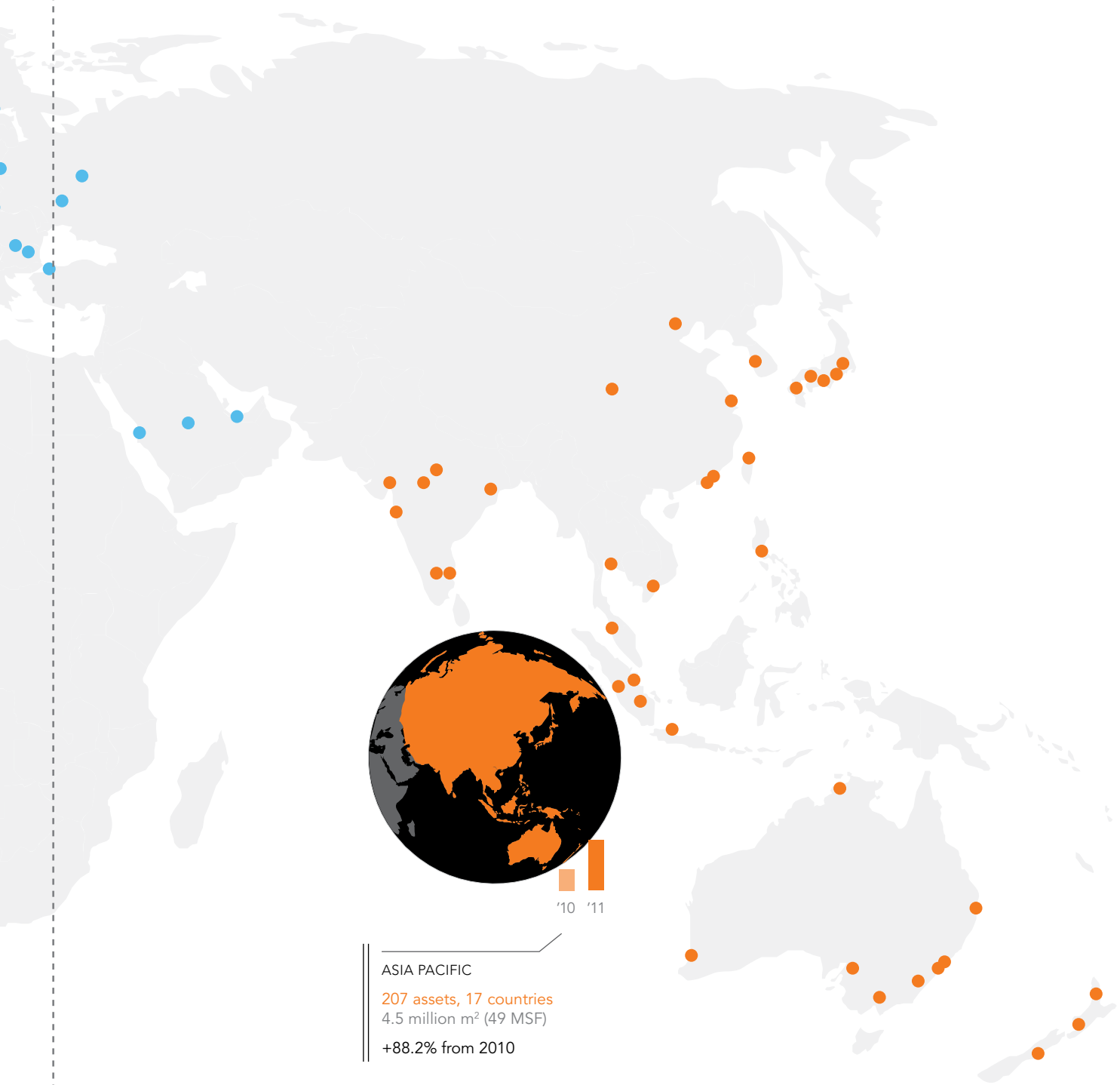
The Greenprint portfolio spans the globe, with the largest number of assets located in the Americas and EMEA, and a growing Asia Pacific portfolio. Greenprint members have selected which assets to submit based upon:



AMERICAS  
1,783 assets, 6 countries  
47.2 million m<sup>2</sup> (509 MSF)  
+99.9% from 2010



EMEA  
712 assets, 23 countries  
13.6 million m<sup>2</sup> (146 MSF)  
+14.7% from 2010



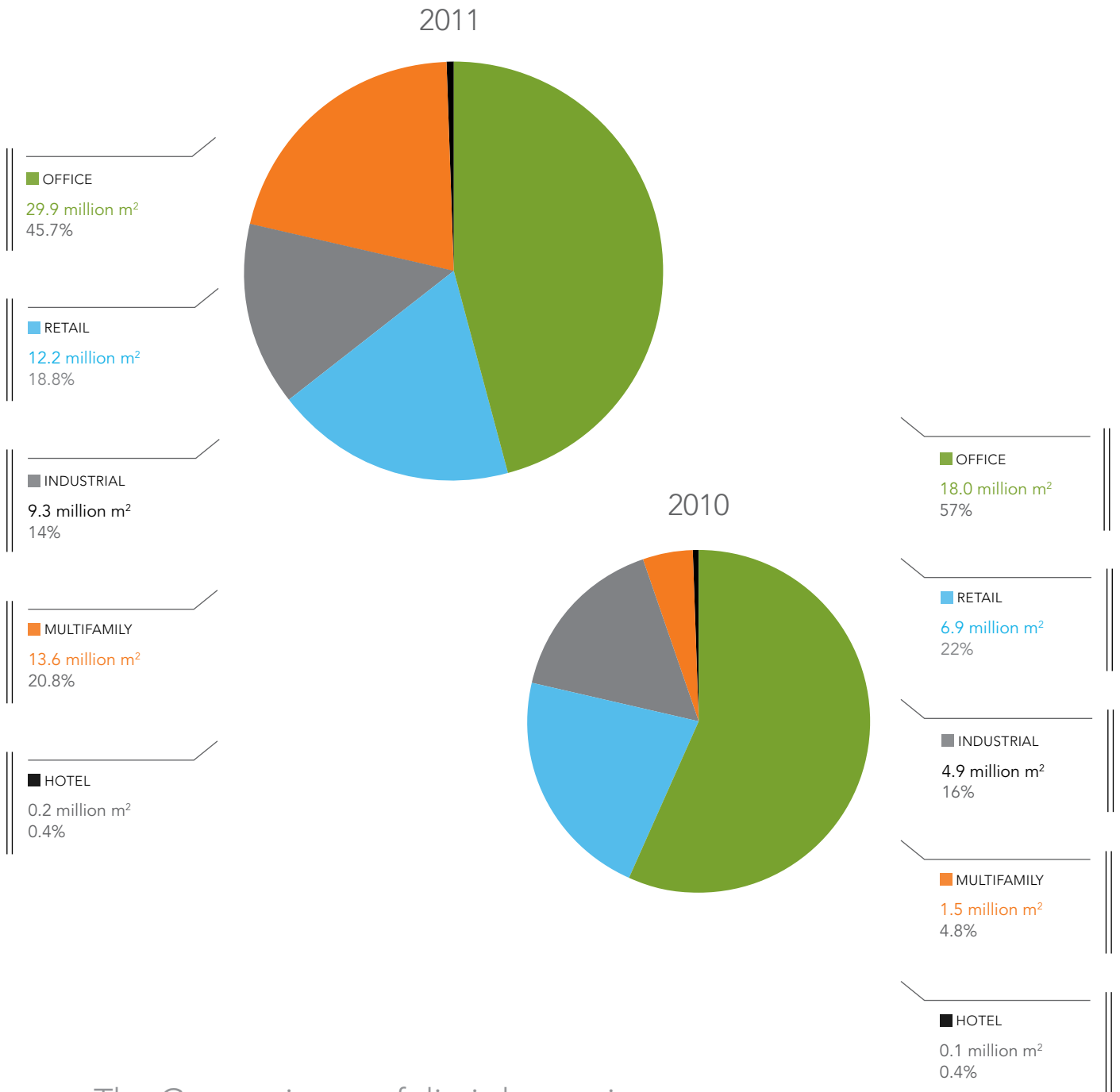
ASIA PACIFIC  
 207 assets, 17 countries  
 4.5 million m<sup>2</sup> (49 MSF)  
 +88.2% from 2010

The global Greenprint portfolio increased 108% by floor area and 66% by number of properties.

# Distribution by Property Type

## YEAR OVER YEAR – ABSOLUTE

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



The Greenprint portfolio is becoming more diversified over time.



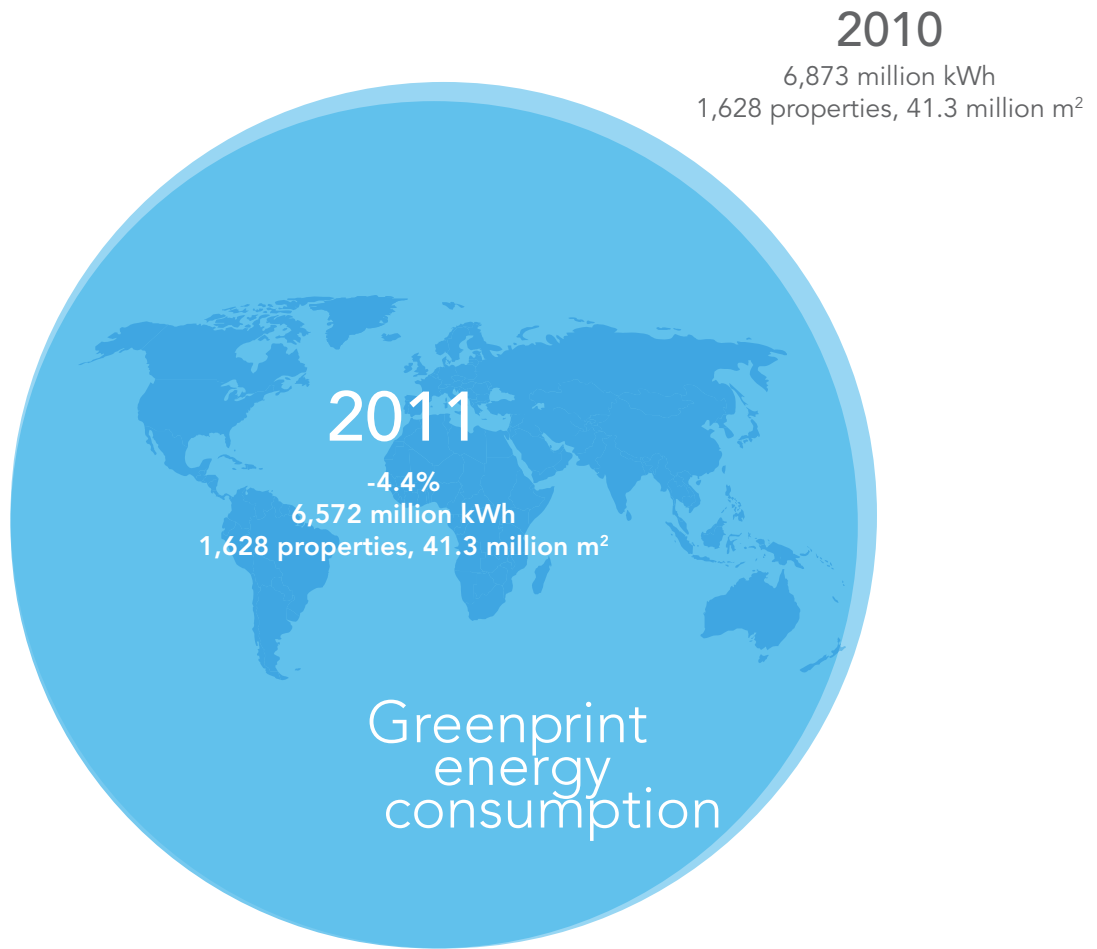
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## 2.1 Energy Profile

# Energy Consumption

YEAR OVER YEAR – LIKE FOR LIKE

The chart below shows the Like for Like portfolio, which consists of 1,628 properties with data from 2010 to 2011.



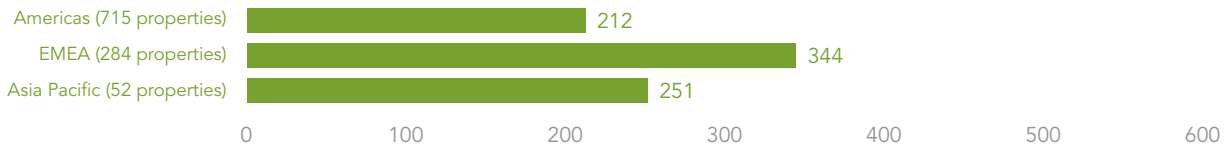
The Greenprint portfolio's energy consumption decreased 4.4%, saving over 140 million kWh.

# Energy Use Intensity by Property Type and Global Region

## CURRENT YEAR

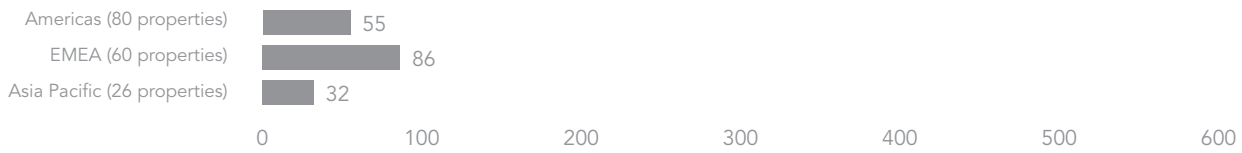
Energy use intensity is annual energy consumption divided by the floor area of the space. With energy, less is more, so higher efficiency comes from properties with a lower energy intensity.

### Median Office Energy Use Intensity



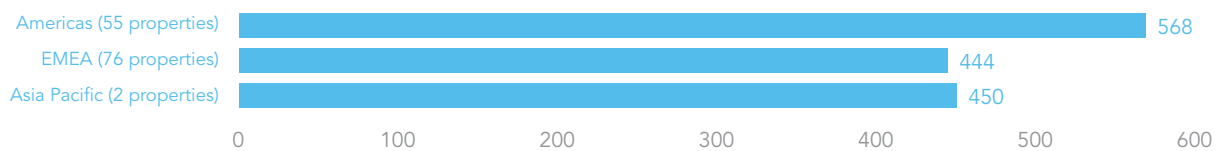
ENERGY INTENSITY  
annual kWh / m<sup>2</sup>  
rentable area

### Median Industrial Energy Use Intensity



ENERGY INTENSITY  
annual kWh / m<sup>2</sup>  
gross area

### Median Retail Energy Use Intensity



ENERGY INTENSITY  
annual kWh / m<sup>2</sup>  
common area

### Median Multifamily Energy Use Intensity



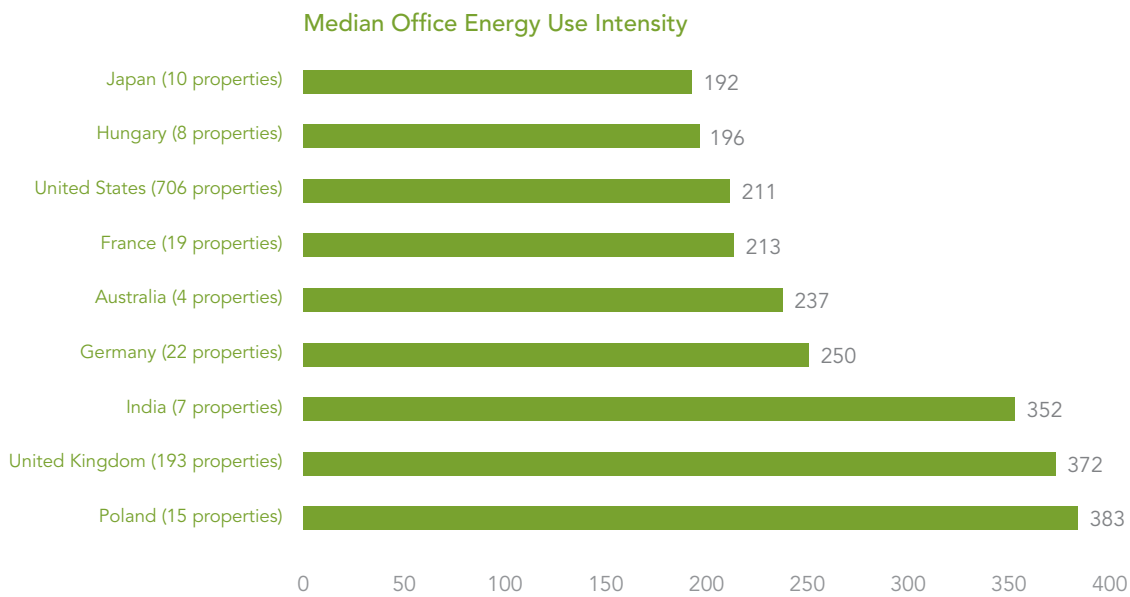
ENERGY INTENSITY  
annual kWh / m<sup>2</sup>  
common area

# Energy Use Intensity of Office Properties by Country

CURRENT YEAR

The following chart shows the median energy use intensity for Greenprint’s portfolio of office properties in nine countries. The countries displayed represent the markets with the largest number of assets of whole-building energy data submitted for the Greenprint Performance Report.

As the Greenprint database grows and diversifies, we expect that the median energy intensities will become increasingly representative of property subtypes in cities, countries and regions.



ENERGY INTENSITY  
annual kWh / m<sup>2</sup>  
rentable area

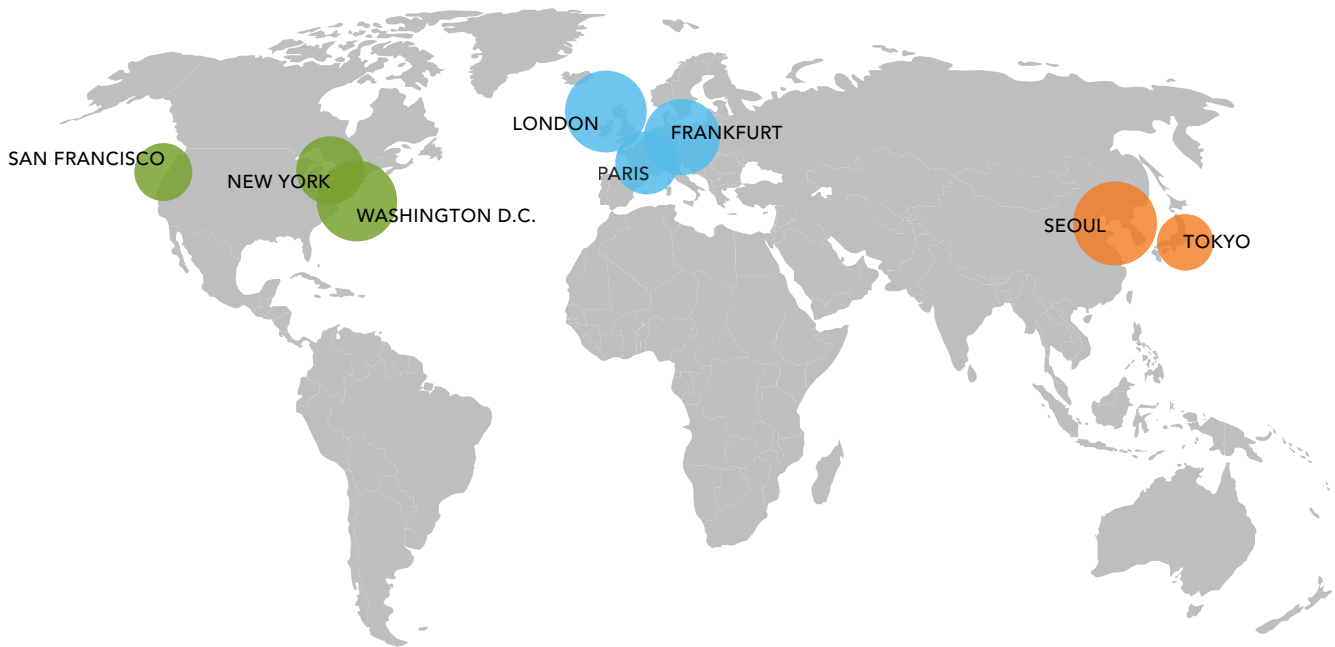
Building energy use intensity is impacted by a variety of factors, including base building equipment, tenant energy use, worker density, and weather.



# Energy Use Intensity of Office Properties by City

## CURRENT YEAR

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



<p>SAN FRANCISCO 65 properties 200 annual kWh / m<sup>2</sup></p>	<p>NEW YORK 31 properties 275 annual kWh / m<sup>2</sup></p>	<p>LONDON 165 properties 398 annual kWh / m<sup>2</sup></p>	<p>TOKYO 21 properties 190 annual kWh / m<sup>2</sup></p>
<p>WASHINGTON D.C. 44 properties 235 annual kWh / m<sup>2</sup></p>	<p>PARIS 18 properties 236 annual kWh / m<sup>2</sup></p>	<p>FRANKFURT 10 properties 345 annual kWh / m<sup>2</sup></p>	<p>SEOUL 4 properties 420 annual kWh / m<sup>2</sup></p>

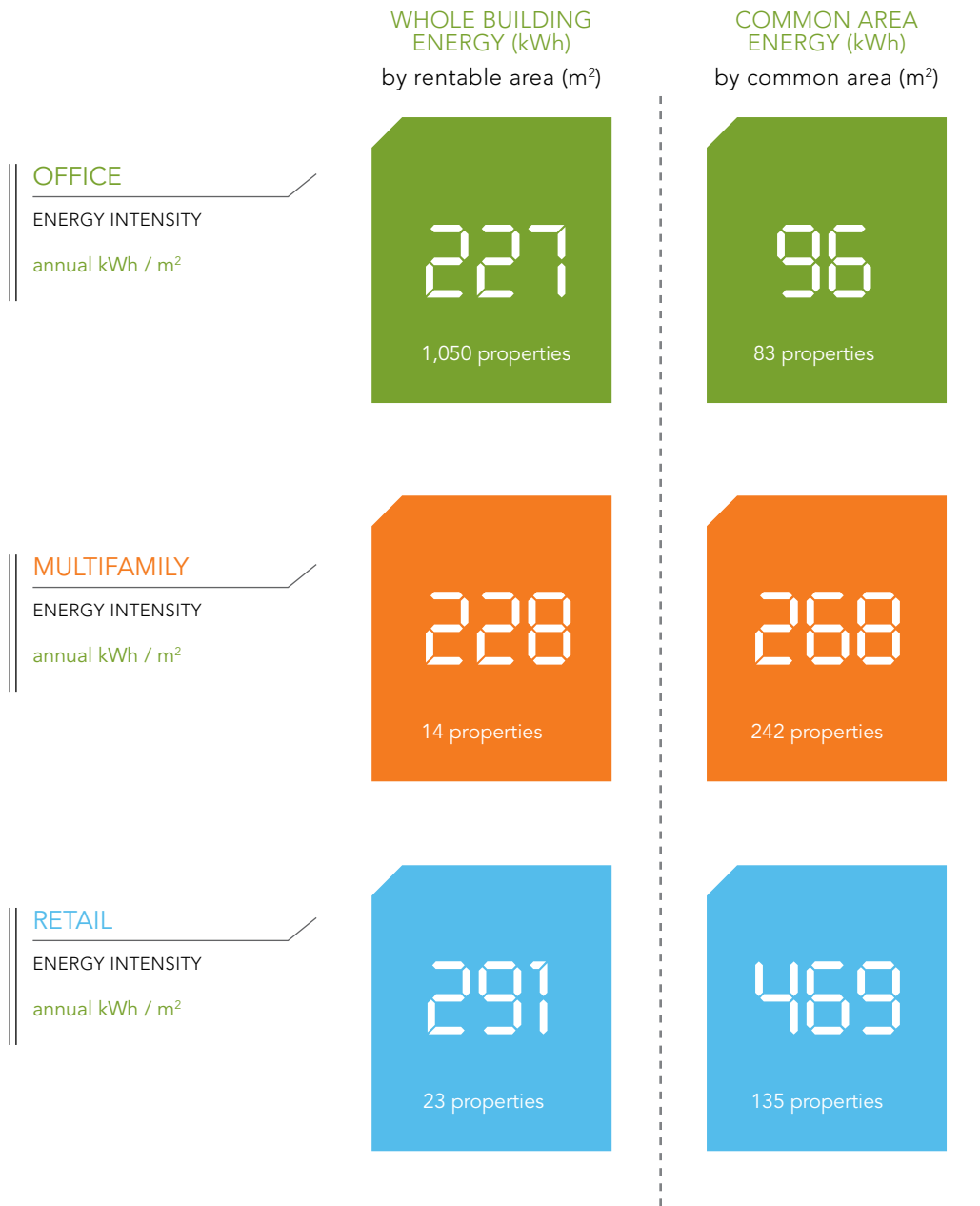
# Energy Use Intensity Benchmark by Property Type

## Whole Building and Common Area

CURRENT YEAR

Members provided whole building energy consumption data for 1,087 properties and common area energy consumption for 460 properties. Below are benchmarks of median energy use intensity for whole building and common areas in office, retail and multifamily properties. Energy use intensity for properties with whole building energy data was calculated by dividing energy by rentable area.

These values are not directly comparable, but offer meaningful property benchmarks.





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## 2.2 Greenhouse Gas Emissions (GHGs)

# Methodology

The Greenprint Performance Report separates Greenhouse Gas Emissions (GHG) 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 from transport, building construction or waste disposal are not included within this report's scope.

## Defining Scope

### SCOPE 1

Covers emissions generated onsite. It includes:

### SCOPE 2

Covers emissions from purchased electricity and are attributed to the organization paying the energy bill, unless the energy is passed through on a submetered basis to another organization.

These emissions are associated with energy (electricity or thermal energy) generated at sources controlled by a third party and consumed at the building.

- Owner Scope 2: emissions from purchased energy that is not submetered to tenants.
- Tenant Scope 2: emissions from energy accounted for through direct metering from utility or landlord submetering.

### SCOPE 3

Covers emissions from energy consumption attributable to tenants through direct tenant metering or submetering. It includes:

- Owner Scope 3: Energy consumed onsite that is attributable to tenants through direct utility metering or landlord-provided submetering.
- Tenant Scope 3: emissions from energy that is paid for on a prorated basis (by floor area).

Scope 1+2+3 = Total Building Emissions

## Calculating Greenhouse Gas Emissions

Greenhouse gas emissions are calculated using the following formula:

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

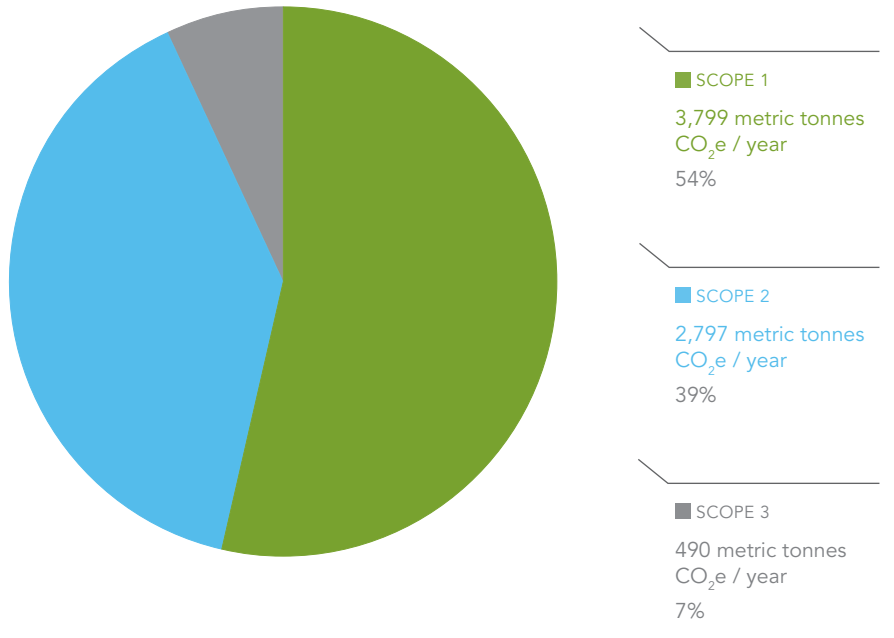
Emissions factors are used to calculate the total amount of CO<sub>2</sub>e generated. These factors do not account for losses in transmission and distribution. Developing and applying accurate emissions' factors is critical to reliable GHG emissions reporting. Emissions factors are listed in Appendix B.

# Absolute Emissions

## CURRENT YEAR – ABSOLUTE

The chart below shows the absolute greenhouse gas emissions by Scope, in line with Greenhouse Gas Protocol. **Scope 1 and 2** includes 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).

### 2011 Total Greenprint Emissions



# Emissions

## YEAR OVER YEAR – LIKE FOR LIKE

The table below shows the change in absolute emissions by property type from 2010 to 2011. Individual member reports will provide greater insight into the comparative performance of their portfolios.

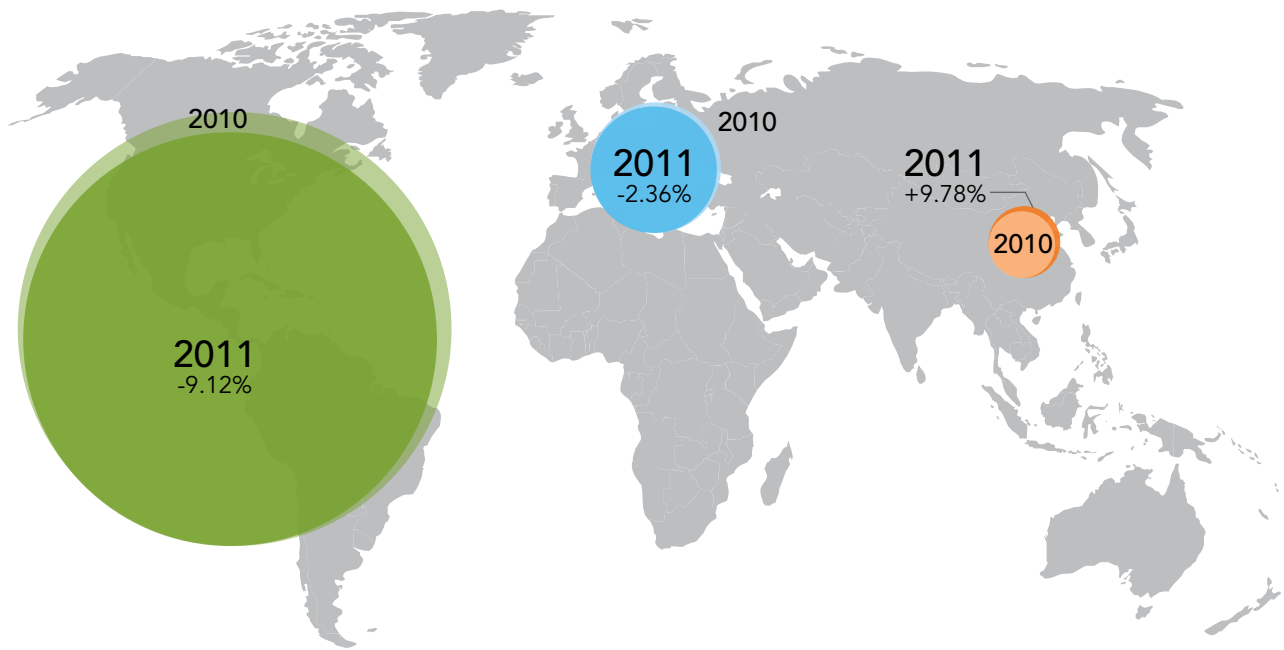
Thousand Metric Tonnes CO <sub>2</sub> / year			
	2010	2011	2010–2011 % Change
Office Portfolio (990 properties)	5,120	4,707	-8.1% ↓
Industrial Portfolio (141 properties)	57	63	11.2% ↑
Retail Portfolio (124 properties)	148	149	0.3% ↑
Multifamily Portfolio (371 properties)	193	144	-25.1% ↓
Hotel / Lodging (2 properties)	1.8	1.5	-18.9% ↓
<b>GREENPRINT TOTAL</b>	<b>5,517</b>	<b>5,063</b>	<b>-8.2% ↓</b>

# Emissions by Global Region

YEAR OVER YEAR – LIKE FOR LIKE

This map illustrates the change in emissions (Scopes 1, 2 and 3) from 2010 to 2011 for the Like for Like portfolio for each global region.

- Americas
- EMEA
- Asia Pacific



**AMERICAS**

1,247 assets  
34.2 million m<sup>2</sup>

2010: 4,991 thousand metric tonnes CO<sub>2</sub>e  
2011: 4,536 thousand metric tonnes CO<sub>2</sub>e

-9.12% decrease

**EMEA**

269 assets  
5.8 million m<sup>2</sup>

2010: 419 thousand metric tonnes CO<sub>2</sub>e  
2011: 410 thousand metric tonnes CO<sub>2</sub>e

-2.36% decrease

**ASIA PACIFIC**

112 assets  
1.2 million m<sup>2</sup>

2010: 109 thousand metric tonnes CO<sub>2</sub>e  
2011: 119 thousand metric tonnes CO<sub>2</sub>e

+9.78% increase

The Greenprint portfolio's emissions decreased 8.2% on a Like for Like portfolio basis from 2010 to 2011.




# Emission Equivalencies by Global Region

## YEAR OVER YEAR – LIKE FOR LIKE

The chart below details the change in the Greenprint portfolio's emissions from 2010 to 2011. 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, Victoria, Australia produces power from coal plants and has a factor of 1.23 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 utilization of onsite renewable energy technologies and purchasing renewable energy contracts varies by location according to natural factors, such as water availability and sunlight intensity.

### Emissions by Global Region Comparison<sup>5</sup>

	Americas		EMEA		Asia Pacific	
	2010	2011	2010	2011	2010	2011
Number of properties	1,247	1,247	269	269	112	112
Floor Area (million m <sup>2</sup> )	34.2	34.2	5.8	5.8	1.2	1.2
CO <sub>2</sub> e emissions (Thousand metric tonnes) (Scopes 1, 2 and 3)	4,991	4,536 ↓	419	410 ↓	109	119 ↑
 Barrels of oil equivalent to amount of CO <sub>2</sub> e emissions	11,607,147	10,548,591 ↓	975,437	952,442 ↓	252,793	277,516 ↑
 Cars on the road in a year equivalent to amount of CO <sub>2</sub> e emissions	978,642	889,391 ↓	82,243	80,304 ↓	21,314	23,398 ↑
 Number of trees needed to sequester the equivalent amount of CO <sub>2</sub> e emissions	127,976,231	116,304,974 ↓	10,754,821	10,501,282 ↓	2,787,205	3,059,795 ↑
 Number of homes equivalent amount of CO <sub>2</sub> e emissions	432,128	392,718 ↓	36,315	35,459 ↓	9,411	10,332 ↑

# Emissions Averted Due to Renewable Energy

## YEAR OVER YEAR – LIKE FOR LIKE

Greenprint members are committed to increasing the use of onsite renewable energy, such as rooftop photovoltaic panels, as well as 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 onsite 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 onsite by the property.



PERCENTAGE

of Emissions

2011 compared to 2010

EMEA leads the pack in averting emissions through the purchase of renewable energy.



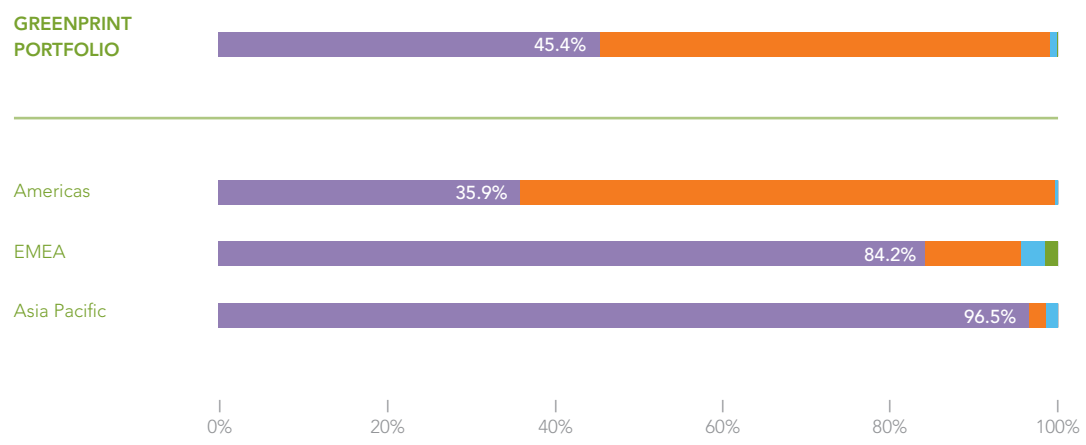
# Emissions Profile by Global Region

## CURRENT YEAR – ABSOLUTE

The chart below shows each Greenprint's emissions by global region and source of energy for the current year. Greenhouse gas emissions (CO<sub>2</sub>e) vary due to:

- Geographic distribution of individual portfolios
- Regional policies and incentives
- Property type allocation
- 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 onsite CHP (including Scope 3 exported electricity)
- CO<sub>2</sub>e EMITTED from fugitive emissions (refrigerants)



PERCENTAGE OF EMISSIONS  
by energy type  
2011

ENERGY STAR Portfolio Manager does not specifically label Combined Heat and Power generation (CHP), therefore properties submitted via Portfolio Manager cannot be categorized as CHP above.





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## 2.3 Water Profile

# Water Usage

## YEAR OVER YEAR – LIKE FOR LIKE

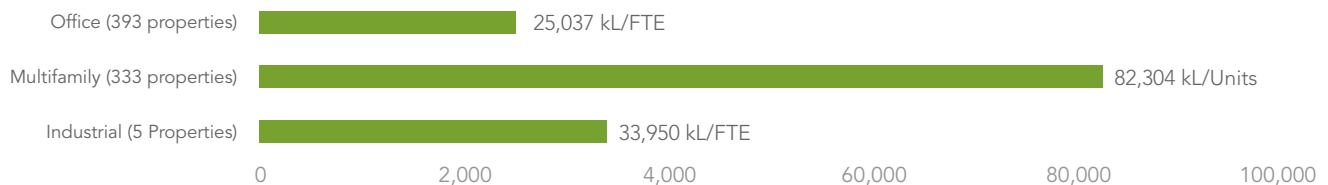
The table below shows the change in water consumption by property type from 2010 to 2011 on the Like for Like portfolio of 621 properties. In real estate, water may be consumed for indoor use, outdoor use, and irrigation purposes. This report only takes into account water consumption specifically for indoor use (when available) and whole meter data otherwise.

	# of Properties	2010 (kiloliters)	2011 (kiloliters)	Change 2010-2011	
Office	355	154,826,401	149,947,885	-3.2%	↓
Retail	37	723,391	757,803	4.8%	↑
Industrial	5	27,271	35,721	30.9%	↑
Multifamily	224	1,427,432	1,382,263	-3.2%	↓
<b>GREENPRINT TOTAL</b>	<b>621</b>	<b>157,004,495</b>	<b>152,123,673</b>	<b>-3.1%</b>	<b>↓</b>

# Water Intensity

## CURRENT YEAR

Water intensities for office and industrial properties are based on the number of full-time employees (FTE). Water intensity for multifamily properties is based on the total number of apartment units.



WATER INTENSITY

kiloliters / unit

2011

Water consumption decreased 3.1% on a Like for Like basis. This is equivalent to saving 4.9 million kL or 1.3 billion gallons per year.



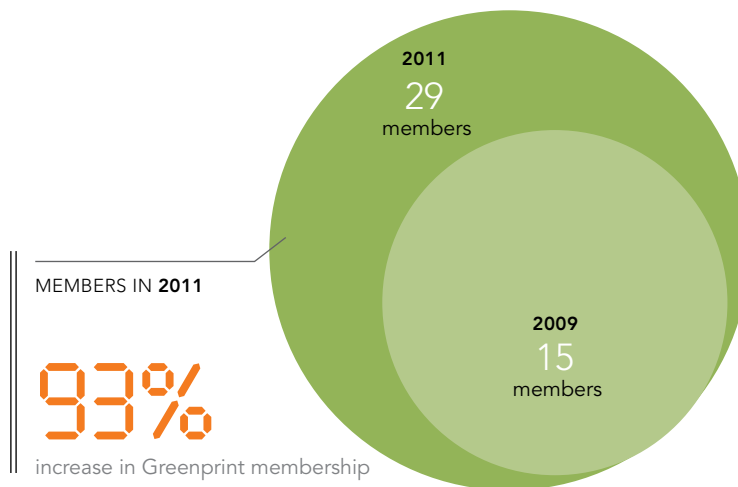
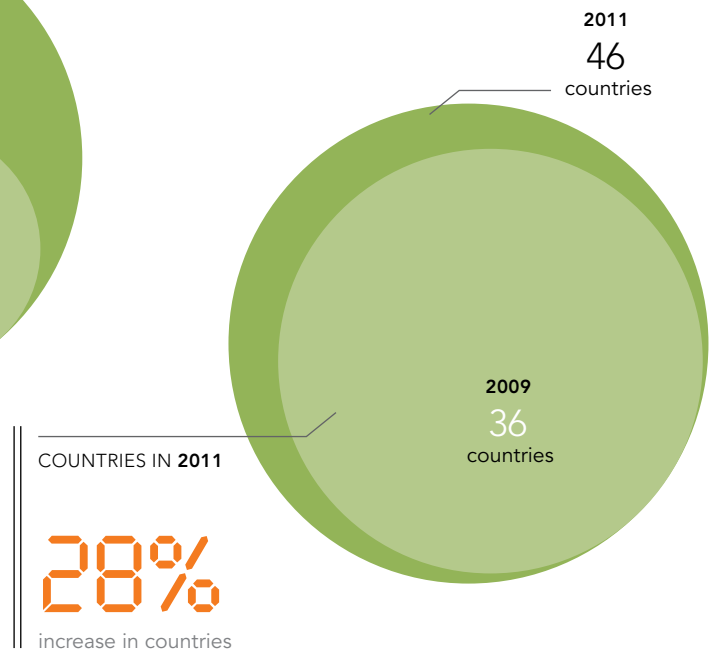
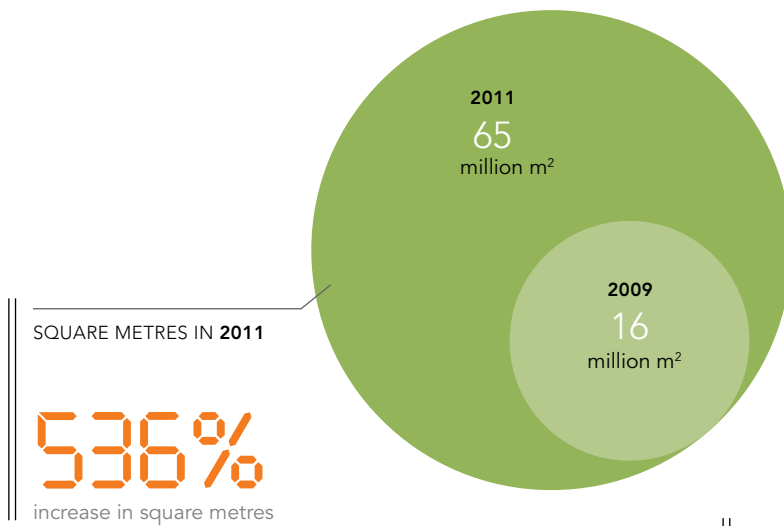
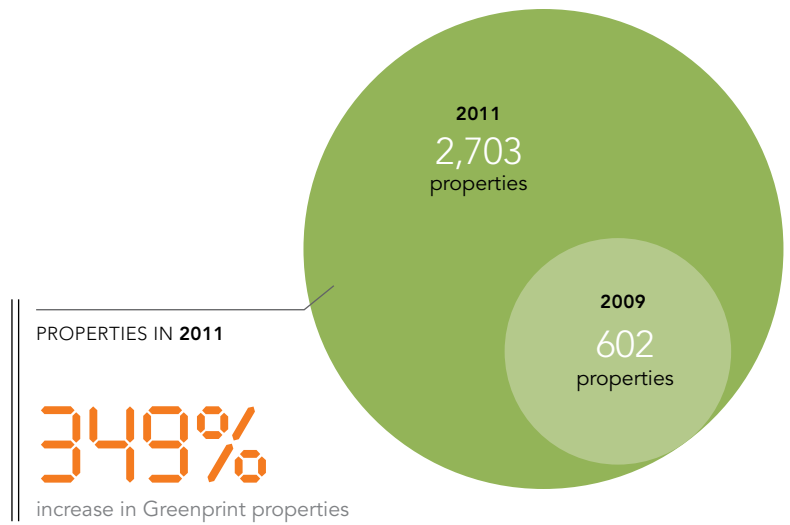
**ULI Greenprint Center  
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## 3 Long-Term Performance

# Historical Performance

## YEAR OVER YEAR – SINCE INCEPTION

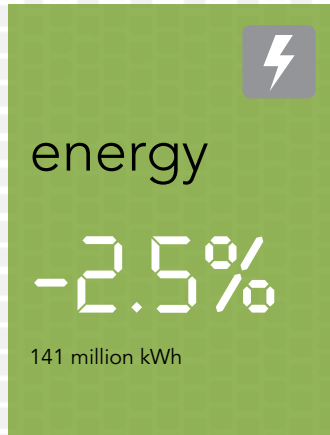
The growth of data from new member submissions and existing members resulted in additional historical data. The Greenprint portfolio has been updated to account for new and revised data creating a 2009–2011 Like for Like portfolio composed of 1,156 properties. For the provided data set, energy, emissions and water usage increased from 2009 to 2010, and decreased from 2010 to 2011 for an overall decrease of the Like for Like portfolio from 2009 to 2011.



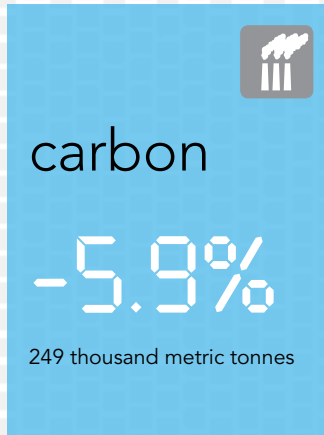
# Performance Since Inception

2009 – 2011 – LIKE FOR LIKE

## OPERATIONS



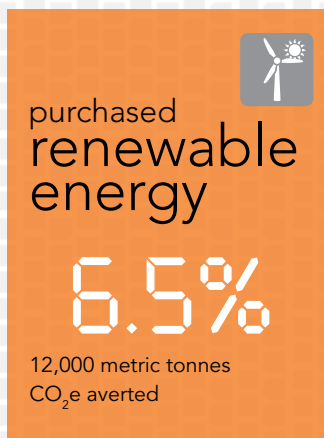
## CO<sub>2</sub> EMISSIONS



## DENSITY



## CERTIFIED SOURCES



## WATER



## COST



## 2009 – 2011 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

# Greenprint Carbon Index™ (GCX)

## 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.

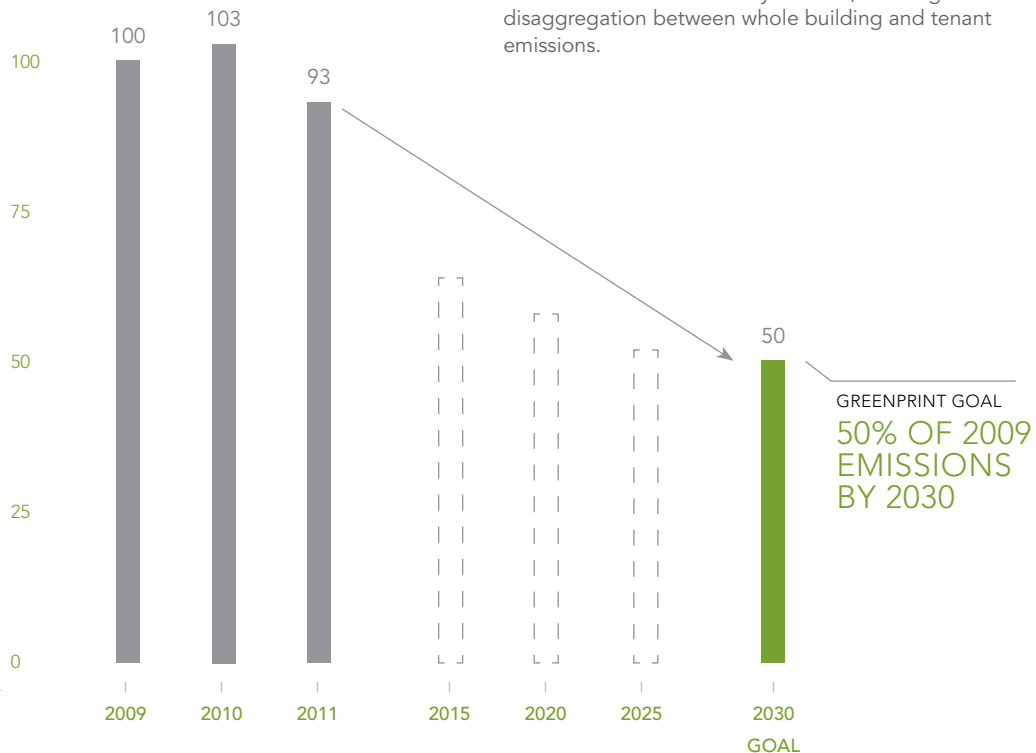
The GCX is set at 100 starting in 2009. The GCX is based on the total greenhouse gas emissions divided by the associated total floor area for submitted properties, measured in kg CO<sub>2</sub>e / m<sup>2</sup>. The GCX is weighted by the same property type proportion for each year of the index. This 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.

The GCX will continue to evolve as the size, scope, and accuracy of the data improves over time. The methodology will improve as the real estate industry draws a link between emissions performance and financial performance.

Year	Annual Emissions Intensity (kg CO <sub>2</sub> e / m <sup>2</sup> / yr)	% Change in Emissions Intensity on 2009	Number of Properties
2009	116.4		1,283
2010	120.2	3.2% ↑	1,614
2011	108.3	- 7.0% ↓	2,214

The historical index is restated due to various reasons:

- As new members join Greenprint, their historical data is 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 caught after the initial release of the Index. Errors are corrected and documented, and historical data is adjusted to update the GCX. In 2011, Greenprint ran over 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 are improving as floor area is more accurately defined, allowing for better disaggregation between whole building and tenant emissions.



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



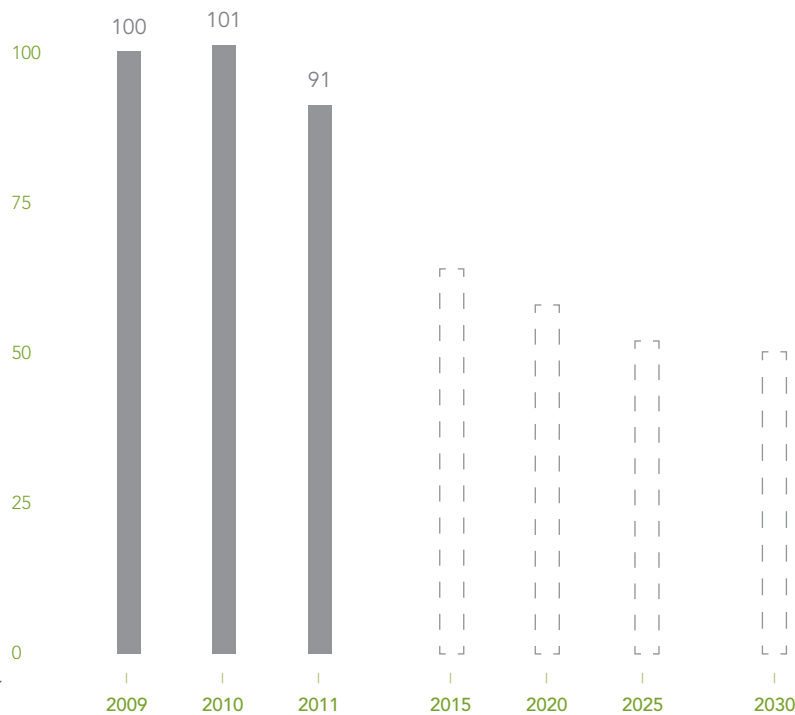
# Greenprint Office Carbon Index™ (GCX)

## YEAR OVER YEAR

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

As more data becomes 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> / yr)	% Change in Emissions Intensity on 2009	Thousand Tonnes of CO <sub>2</sub> e	Total Denominator Floor Area (millions of m <sup>2</sup> )	Number of Properties
2009	215.2		4,630	22	862
2010	218.1	1.4% ↑	5,051	23	954
2011	195.8	- 9.0% ↓	4,746	24	1,074



INDEX BASED ON

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



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## 4 Appendices

- A.  
QUALITY CONTROLS & VERIFICATIONS
- B.  
EMISSIONS COEFFICIENTS
- C.  
GLOSSARY OF TERMS
- D.  
ENDNOTES

# Quality Controls & Verifications

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

The Performance Report Committee employs a quality management procedure to ensure 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. Software 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 is submitted by professional managers, vetted by regional operations professionals at the members, and reviewed by Greenprint with assurances from owners and managers that the data is 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 GRI Stakeholder and CDP Accredited Provider contractor who administers the web-enabled questionnaire, 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 upon the records of building landlords or their building management companies. Occupier space data is based upon tenant records and lease agreements.
- Energy data based upon utility bills, invoices, power supply company records or meter readings.
- Refrigerant data based upon property maintenance logs.

Greenprint will commission verification of its report by an independent third party. The verification report will be publicly released in 2013.

# Emissions Coefficients

## Electricity Emissions Factors: kg CO<sub>2</sub> 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
Mexico	0.4400
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
Germany	0.4412
Greece	0.7312
Hungary	0.3308
Ireland	0.4862
Italy	0.3985
Luxembourg	0.3148
Netherlands	0.3921
Poland	0.6534
Portugal	0.3835
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
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
Philippines	0.4868
Singapore	0.5310
Taiwan	0.6120
Thailand	0.5291
Vietnam	0.4130

### Source

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

For the USA: US EPA 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 is 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-ghgconversion-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>

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/101006-guidelinesghg-conversion-factors.xls>"

#### 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 190, page 54: <http://www.defra.gov.uk/environment/business/reporting/pdf/091013-guidelines-ghgconversion-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)"

[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 of Terms

**CO<sub>2</sub>e averted as onsite renewable electricity** the amount of GHGs averted from the use of onsite renewable energy, e.g. wind, water, 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 onsite thermal energies** the GHGs emitted from the onsite generation of thermal heating and, or cooling.

**CO<sub>2</sub>e emitted running onsite CHP** the GHGs emitted from the operation of onsite combined heat and power (CHP) producing thermal energy and electricity (for consumption both onsite 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 non-certified 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** are the GHGs emitted through the intentional or unintentional loss of refrigerants.

**Energy Use Intensity (EUI)** is the annual energy consumption divided by floor area.

**ISO 14064** is 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** is a specific year over year analysis of the current year's properties that also have data from the previous year.

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

**Normalized** refers to an energy use metric that is independent of the size of the building by dividing energy use by corresponding floor area.

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

## Endnotes

- 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 3 primarily consists of member data from calendar year 2011, however, some member data was provided from their fiscal year 2011, ending March 2012.
- 3 <http://www.xe.com/currencytables/?from=EUR&date=2011-12-31>
- 4 Members have submitted properties for which they have a full 12-month period of energy consumption data.
- 5 <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>

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# Greenprint Team

All correspondence related to this report should be directed to:

- Helen Gurfel, Executive Director
- Adam Slakman, Vice President
- Mayra Lujan, Associate

Email: [Greenprint@uli.org](mailto:Greenprint@uli.org)

Copies of this report may be downloaded from Greenprint's web site:  
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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 data accuracy, the possibility for 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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