



• August 15-18, 2010 • Dallas, Texas •
• Dallas Convention Center •



Green Globes

What is Green Globes?

- Green Globes environmental criteria
- How Green Globes works
- What Green Globes does best



How Green Globes works

- A web-based tool to assess, monitor, and improve the energy and environmental performance of the design and operation of buildings
- Data inputted by the design or property management team is gathered using a questionnaire
- Report, which identifies opportunity for improvement, is immediately and automatically generated
- Independent, third party verification and Certification



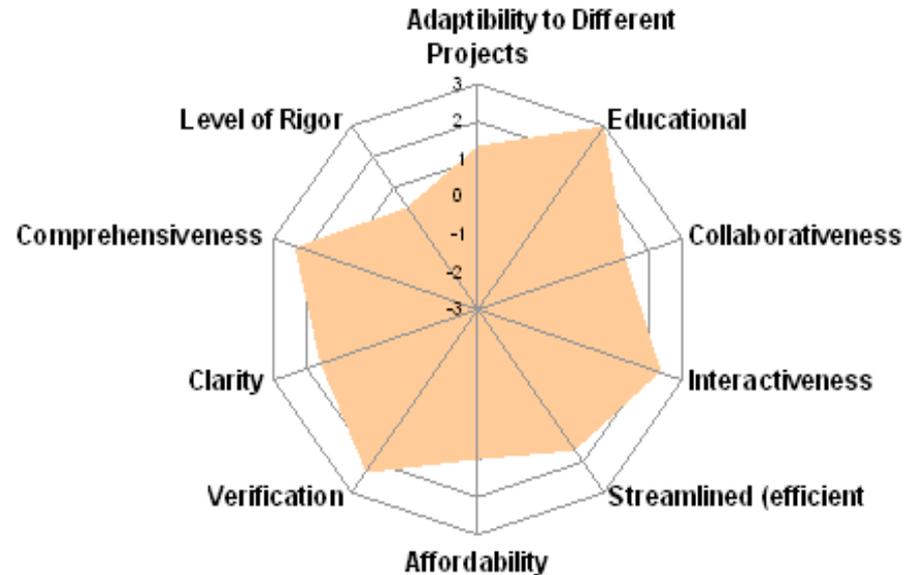
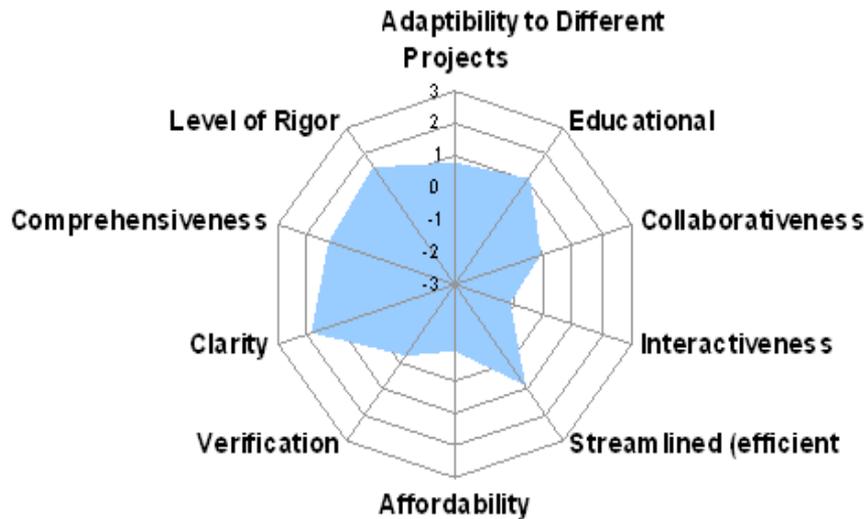
Stanford University Comparative Study 2007



LEED



before ANSI



Comparison of Green and LEED for Existing Buildings



LEED EB



Comprehensiveness



User-friendliness



Support



Value



Education



Versatility



Challenge



Management Support



Assessment of Tools for Rating the Performance of Existing Buildings: A Report on the Options, Prepared for the GVRD

By Elisa Campbell Consulting in conjunction with Innes Hood Consulting April 2006

GovEnergy 2010

Why Green Globes?

Fast and user-friendly questionnaire takes few hours to complete

Inexpensive low-cost makes assessment of smaller projects affordable

Portfolio Reports measure environmental impact of multiple assets



Green Globes website www.greenglobes.com

Green Globes

PRODUCT SELECTION ABOUT CASE STUDIES TOUR CONTACT US

The Practical Building Rating System

The **Green Globes system** is a revolutionary building environmental design and management tool. It delivers an online assessment protocol, rating system and guidance for green building design, operation and management. It is interactive, flexible and affordable, and provides market recognition of a building's environmental attributes through third-party verification.



Select an assessment tool:

To begin using Green Globes, select an assessment tool from the list below

Design of New Buildings or Significant Renovation

Management and Operation of Existing Buildings

Building Emergency Management

Building Intelligence

Fit-Up



Development of Green Globes



Plus 1132
BREEAM—CANADA
An environmental performance assessment for existing office buildings
Building Materials and Products

1-1996

PROGRESS TOWARDS SUSTAINABLE DEVELOPMENT COMMITMENTS EVALUATION GUIDE

- Draft for Comment -

2-1998

Prepared for:
PWGSC Property Management

Prepared by:
ECD Energy and Environment Canada Ltd.

FEBRUARY 8, 1998




3-1999

Checklist

Remember to:

- Contact the "Green Leaf" building agencies regarding membership to "Green Leaf" and the "Green Leaf" program.
- Review the "Green Leaf" program and the "Green Leaf" program.
- Review the "Green Leaf" program and the "Green Leaf" program.
- Review the "Green Leaf" program and the "Green Leaf" program.

Suggestion:

The members of the building agencies should be encouraged to review the "Green Leaf" program and the "Green Leaf" program.

Federation of Canadian Municipalities

Municipal Building Retrofit Program: A Comprehensive Process

4-1999

Assessment	Identify project leader and team members	Understand the decision-making process
Operational Assessment	Building inventory: type, area, age, occupancy	"Green Leaf" assessment

Staff from the Municipal Building Retrofit Program will walk through every step with you, as well as put you in touch with years and service providers

PM's Municipal Building Retrofit Program is offered through a contribution agreement with Natural Resources Canada's Office of Energy Efficiency (CEE) and the Renewable Energy Development Initiative (REDI)



Green Globes Design Environmental Assessment For New Buildings

Home Criteria Stages Users Case Studies

8-2003

Design Development

The approved concept is expressed in the preliminary technical documents and drawings. A substantive estimate and schedule should be provided and the quality plan updated.

Stages

Project Requirements, Criteria Analysis, Programing, Concept Development, Design Development, Construction, Distribution Documents



PWGSC BREEAM Green Leaf

Environmental Performance of Buildings

Integrating the green design process with PWGSC contract and project delivery

7-2002

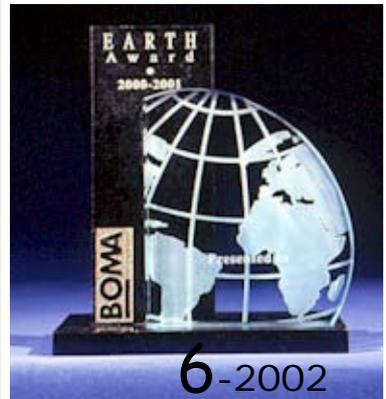


Canada

EARTH AWARD 2000-2001

BOMA Earth Awards

6-2002



Green Globes Environmental Assessment of Buildings

Home Criteria Building Owners Building Managers Forum

5-2000

What it is

Slide Show: Turning environmental investment into market advantage

FAQs

Screen Shots

Privacy

Terms of Use

Contact

Assess your building

Office Building

Multi-Residential

Click here for BOMA Earth Awards

An online audit for building owners and managers to measure energy, indoor health and environmental performance against best practice standards. Using a confidential questionnaire, the program generates a comprehensive online report.

To Register, Log In, or View Reports



Development of Green Globes

11-2010



ANSI/GBI 01-2010

Green Building Assessment Protocol
for Commercial Buildings

An American National Standard

April 1, 2010

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10-2005

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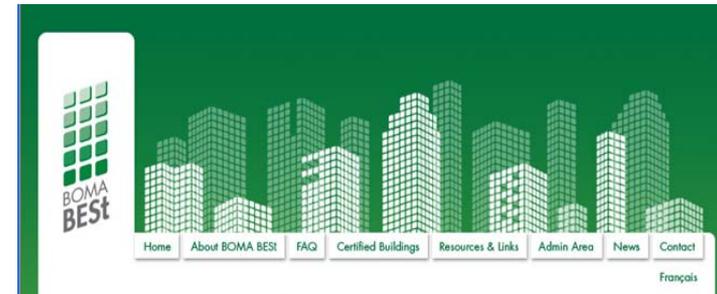
Contact GBI / Login

GREEN BUILDING INITIATIVE COMMERCIAL GREEN BUILDING [Join the GBI Today!](#)
click here ▶

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9-2005

- Offices
- Enclosed Malls
- Retail
- Industrial
- *Multi-residential*



The Green Globes™ system

It's like having a 24-hour sustainability design consultant online.



The Green Globes system is a revolutionary green management tool that includes an assessment protocol, rating system and guide for integrating environmentally friendly design into commercial buildings. Once complete, it also facilitates recognition of the project through third-party review and assessment. It's an interactive, flexible and affordable approach to environmental design.

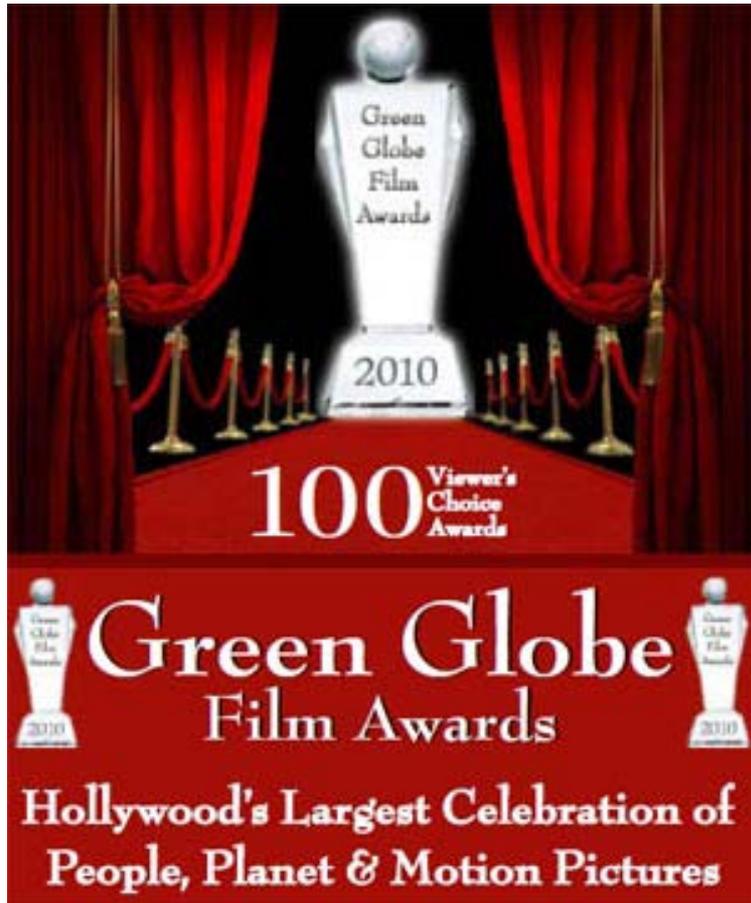
Try Green Globes Now

To try out the Green Globes system, please [click here](#)



GovEnergy 2010

...not to be confused



Houston Zoo Green Globes Awards



Green Globes Designations

A summary of rating levels is:

Green Globes™ Ratings		
85-100%		Reserved for select buildings that serve as national or world leaders in reducing environmental impacts and efficiency of buildings.
70-84%		Demonstrates leadership in energy and environmentally efficient buildings and a commitment to continual improvement.
55-69%		Demonstrates excellent progress in reducing environmental impacts by applying best practices in energy and environmental efficiency.
35-54%		Demonstrates movement beyond awareness and a commitment to good energy and environmental efficiency practices.



Results of the comparison of dual certification

Evaluated Buildings	Green Globes	LEED
Clinton Presidential Center	Two Globes (68%)	Silver (34 out of 69 points (49%))
Alberici Headquarters	Four Globes (93%)	Platinum (60 out of 69 points (87%))
Pfizer Clinical Research Unit	Three Globes (70%)	Silver (33 out of 69 points (47%))
Blakely Hall	Two Globes (64%)	Silver (34 out of 69 points (49%))
Wis. Elect. Employees Benefit Fund	Two Globes (55%)	Certified (26 out of 69 points (38%))
RenewAire Facility	Two Globes (66%)	Silver (33 out of 69 points (49%))
Home Saving Bank Branch	Two Globes (55%)	Silver (33 out of 69 points (49%))



Harmonization



Green Globes



LEED



Certified	50-60%
Silver	61-70%
Gold	71-80%
Platinum	81+%

USA - 4 Globes

Two approaches for different needs

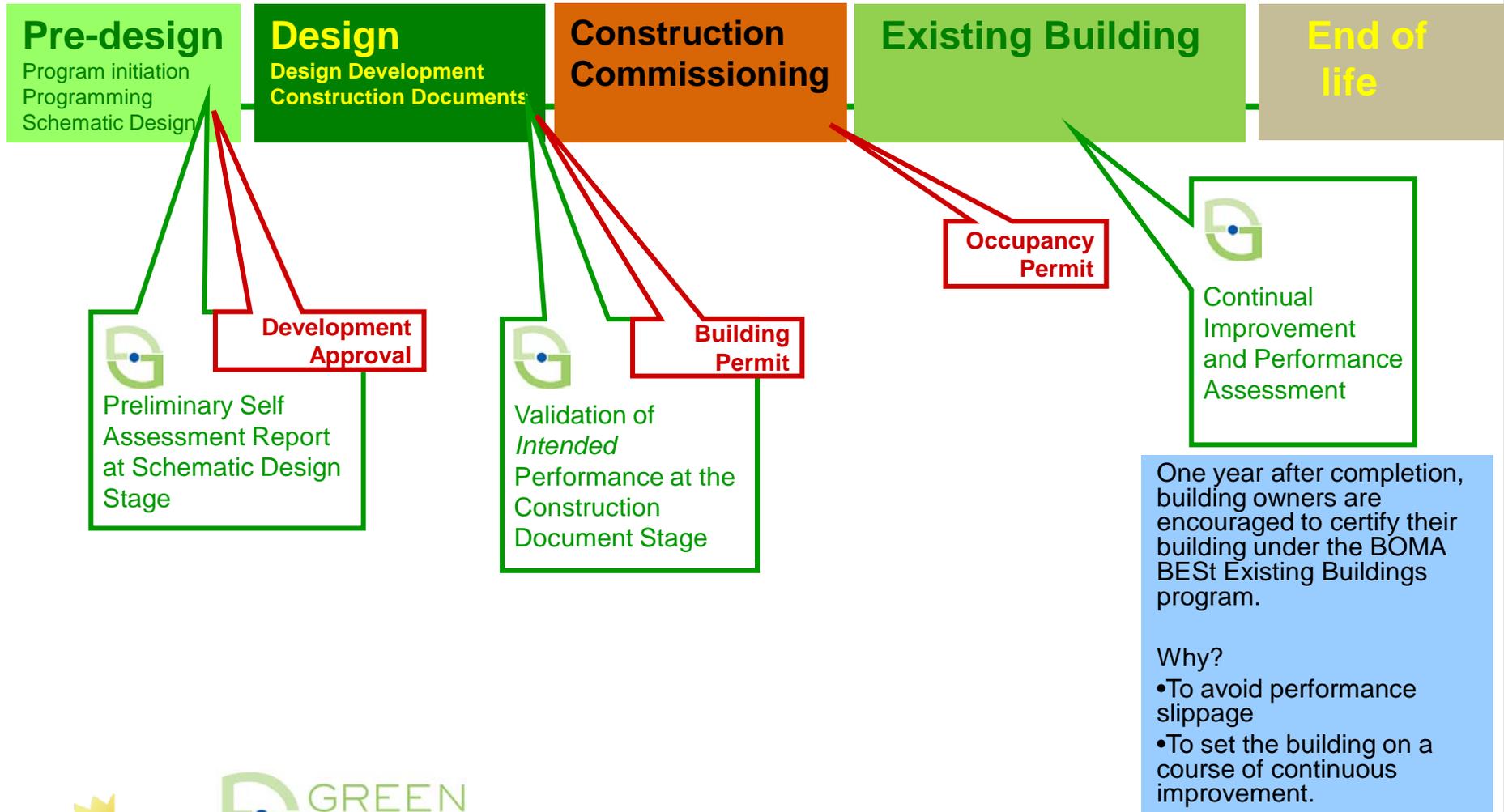
Green Globes

- Asset management tool
- Residential component
- Inexpensive and user-friendly
- Baseline & benchmark your building
- Individual buildings or portfolios
- Certification optional
- ANSI standard (LCA approach)
- Focused on:
 - Environmental Management
 - Site
 - Energy & Carbon
 - Water
 - Recycling & Resource Management
 - Emissions, effluents
 - Indoor environment

LEED

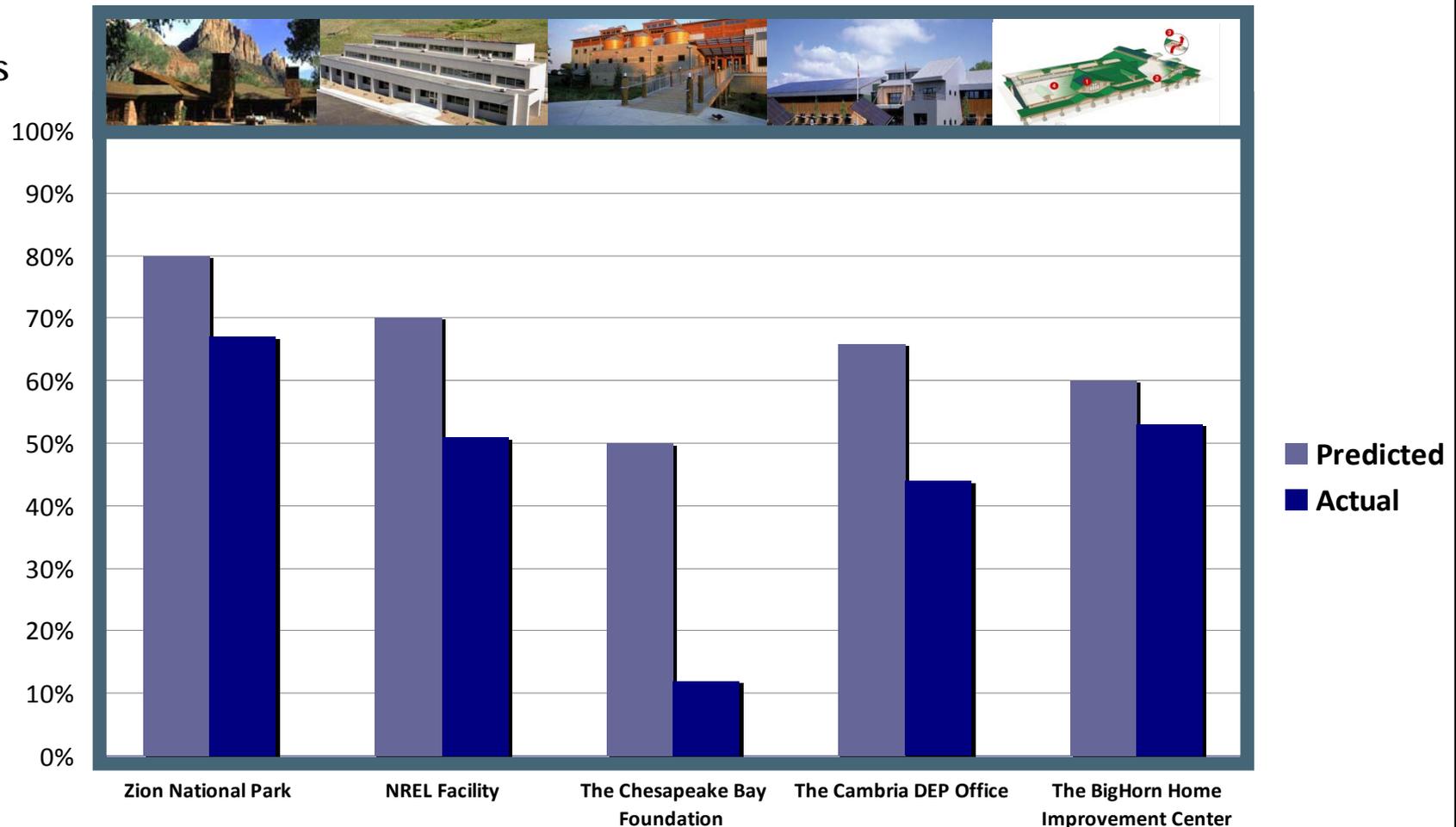
- Certification
- No residential component
- Costly and time intensive
- Individual buildings
- Certification based
- Consensus document
- Focused on:
 - Site
 - Energy & Atmosphere
 - Water
 - Resources
 - Indoor environment
 - Innovation

Green Globes is harmonized with the building approvals process



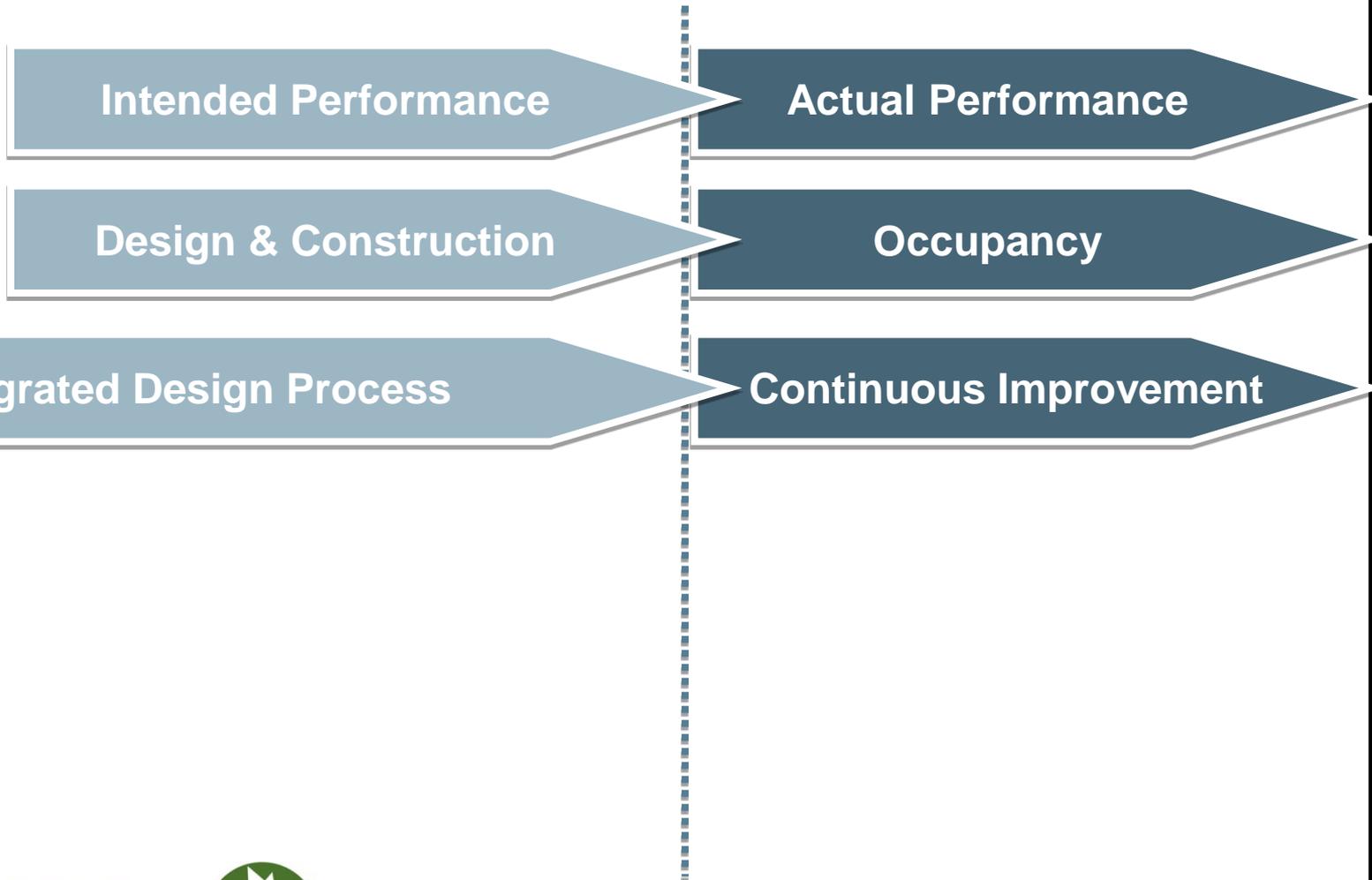
Performance Slippage

Predicted
and Actual
Energy
Savings



Source: NREL

Green Globes Continuum

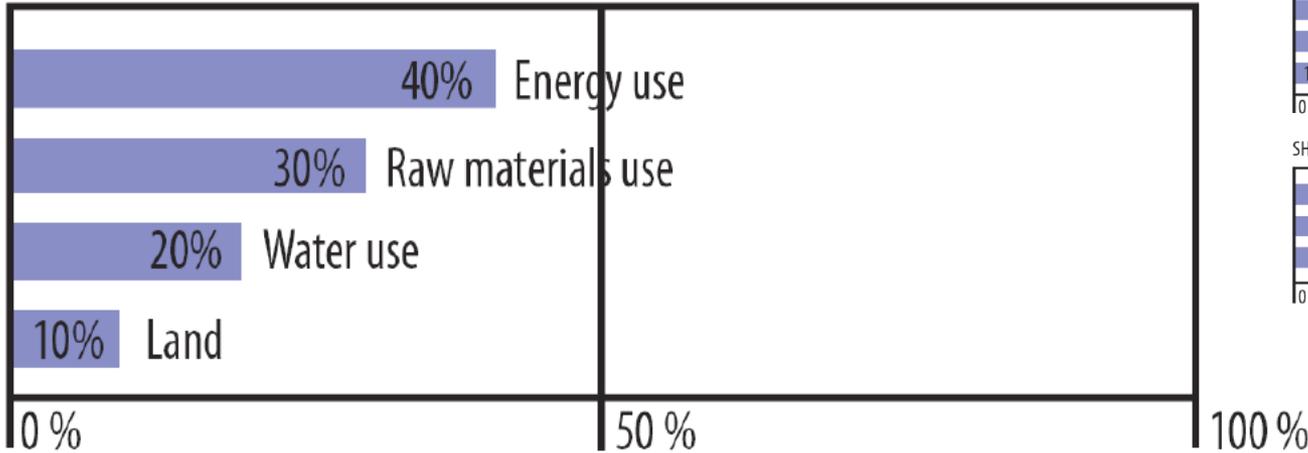


Green Globes Environmental Criteria

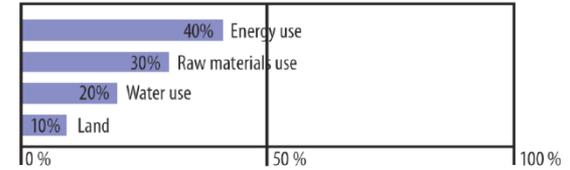


Green Globes Building Impact and Rating System

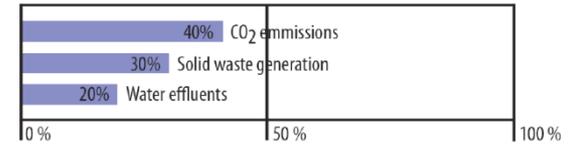
SHARE OF THE BUILT ENVIRONMENT IN RESOURCE USE



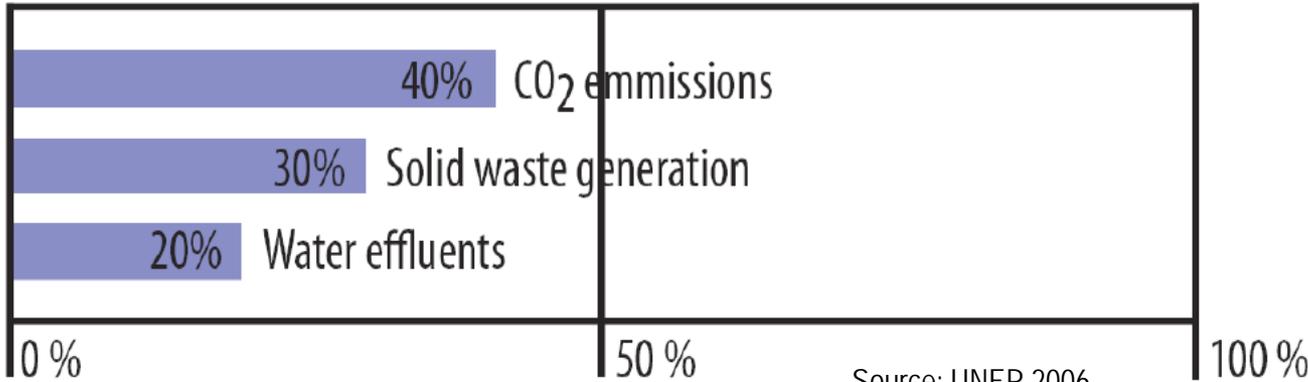
SHARE OF THE BUILT ENVIRONMENT IN RESOURCE USE



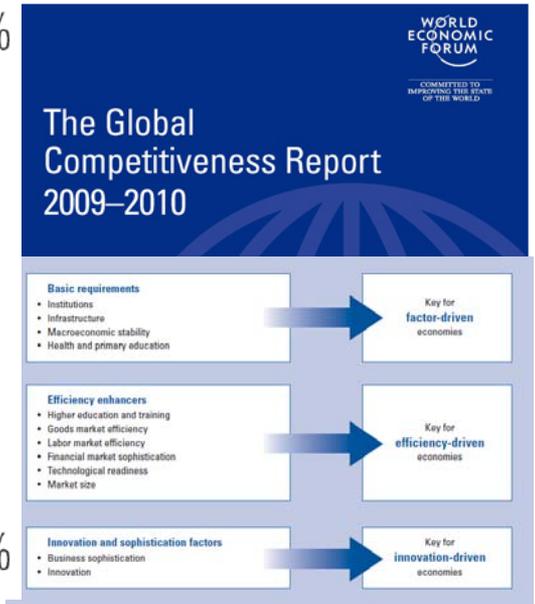
SHARE OF THE BUILT ENVIRONMENT IN POLLUTION EMISSION



SHARE OF THE BUILT ENVIRONMENT IN POLLUTION EMISSION



Source: UNEP 2006



GovEnergy 2010

Green Globes NC- Seven Areas of Assessment

5% 1 Project Management

11.5 2 Site

36 3 Energy

10 4 Water

10 5 Resources

7.5 6 Emissions, Effluents

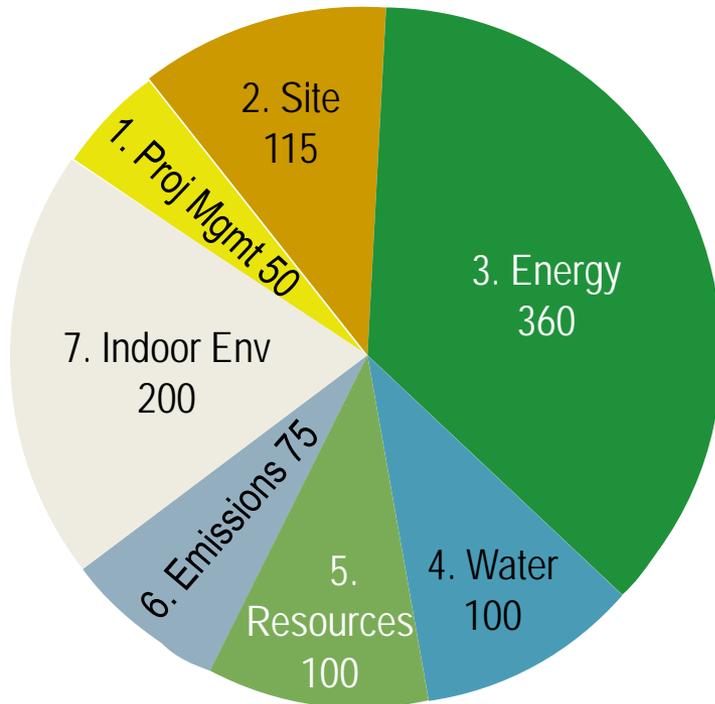
20 7 Indoor Environment

1000 points available

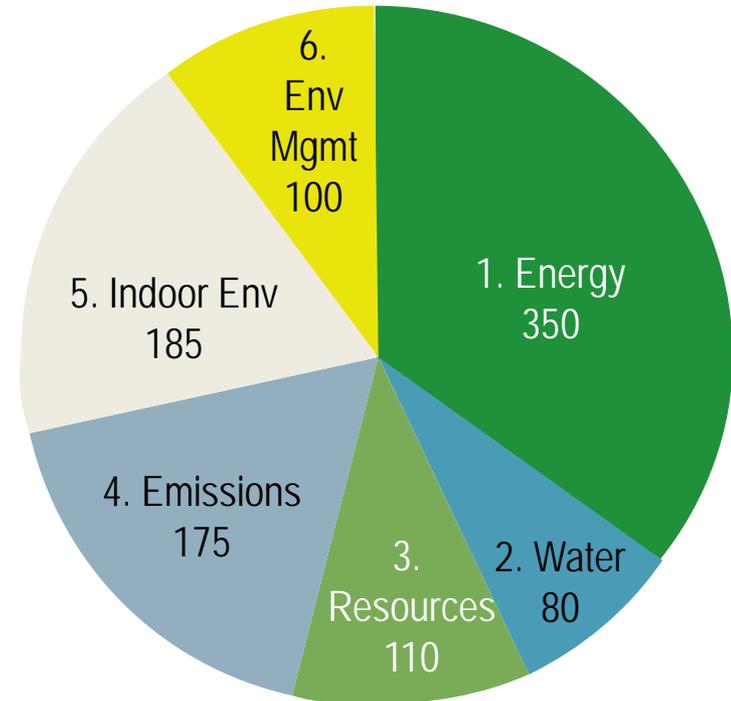


New Construction / Existing Buildings

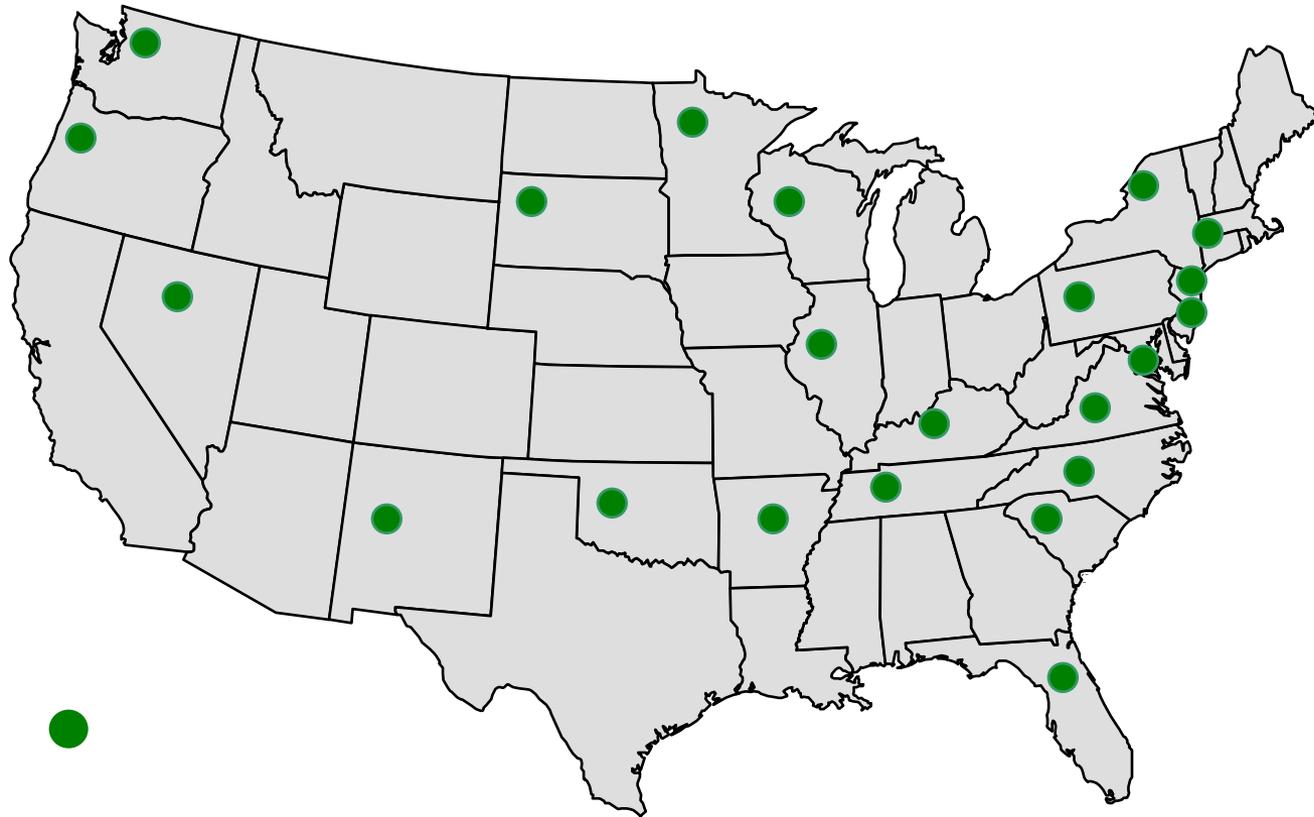
New Construction
1000 points



EB
1000 points



States Recognizing Green Globes



Green Globes

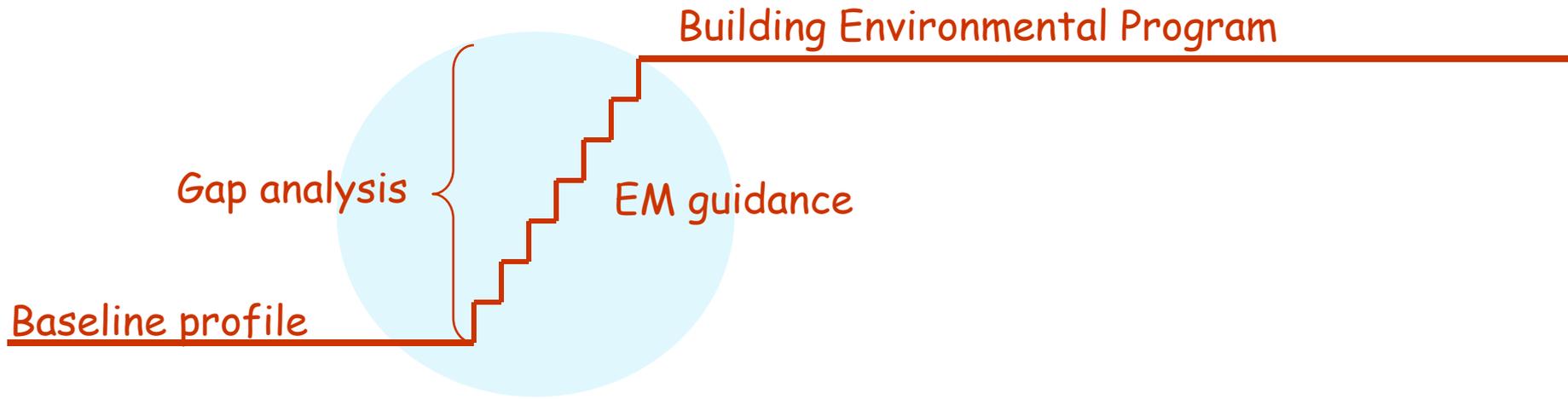


How Green Globes works



The Green Globes approach

1. Provides a baseline assessment of what has been done to date
2. Helps to articulate the targets based on best practices
3. Gap analysis between the baseline and best practices
4. Provides step-by-step guidance on how to get there



What Green Globes looks like....

Dashboard

YOUR PROJECT LIST | INSTRUCTIONS

MANAGE MY ACCOUNT | LOGOUT

SELECT/ADD
BUILDING

BUILDING
DASHBOARD

SELECT
SECTION

COMPLETE
QUESTIONNAIRE

VIEW
REPORT

go to Section ->

100 Main Street, - Small Office Building

User: ustest

[Edit Basic Building Information](#)

[Download Green Globes survey for Offices in PDF format \(135 Kb\)](#)

Current Building Rating



23%

Progress key:



Not started



In Progress



Completed

Building Dashboard Click on any box to go to questionnaire	Sections							
	Energy	Water	Resources	Emissions	Indoor Environ.	Environ. Mgmt.	Total Questions Answered	% of Points Earned
Building Overview	Completed	Completed	Completed	Completed	Completed	Completed	Completed	In Progress

What Green Globes looks like ... Online Questionnaire

What was the building's total water bill for the 12 month period specified? \$

What was the total water consumption, in total or by month, for the 12 month period specified?

Water month 1:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 2:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 3:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 4:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 5:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 6:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 7:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 8:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 9:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 10:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 11:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>
Water month 12:	cu. ft.	<input type="text"/>	Cost \$	<input type="text"/>

Questionnaire Screen

Other than entering the tombstone information and data from energy and water bills, most questions are “yes” or “no”.

What Green Globes looks like ...

Online Questionnaire

Water Conserving Features		32
---------------------------	--	----

Are there the following water-conserving fixtures:

- | | | |
|--|--|---|
| • low flow toilets that use less than 1.5 GPF? | <input type="radio"/> Yes <input type="radio"/> No | 5 |
| • ultra low flush urinals that use less than 1.0 GPF? | <input type="radio"/> Yes <input type="radio"/> No | 5 |
| • automatic valve controls and/or proximity detectors? | <input type="radio"/> Yes <input type="radio"/> No | 5 |

Does the landscaping minimize the need for irrigation?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A	5
--	--	---

Are other sources of water used for irrigation such as:

- | | | |
|------------------------------|--|---|
| • Rainwater? | <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A | 3 |
| • Graywater? | <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A | 3 |

Save and Continue

What Green Globes looks like ...

INTRODUCTION

Automated Report

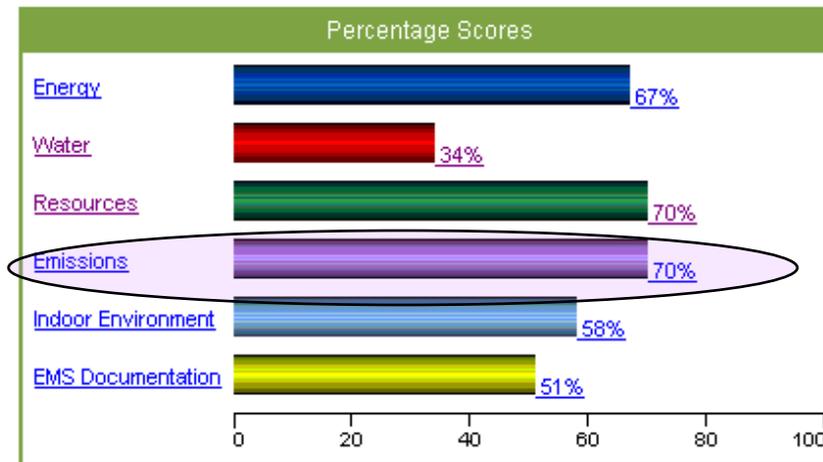
Sample office is a 44,000 square foot building that was built in 1981. It has 3 stories.

Sample office is described as follows:

Sample office is a general office building.

The principal tenant is Global Corporation. The building is owned by Grand Properties and managed by J. Smith.

Percentage of points achieved by Sample office for each module:



Report Screen

Chart shows percentage of points achieved for each section in meeting the best green design practice

Summary of Your Achievement: Sample office achieved an overall rating of 61%.

To find out how the performance of Sample office compares to other buildings that have been assessed, and to obtain certification, the data must be verified by a licensed assessor who has undergone the Green Globe training and certification.

What Green Globes looks like ...

Achievements

WATER

Rating Earned: 39%

This section assesses the water-conserving features of the building as well as its water management. A successful water management program begins with an understanding of how the facility and its occupants use and dispose of water. This makes it possible to plan effective measures to achieve reductions.

Sample office achieved 39% for installing water-conserving features and implementing water-management best practices. Water costs were \$1,067.

Summary of Your Achievements

Water Conserving Features

The building uses the following water-conserving fixtures:

- low flow toilets that use less than 1.6 Gal/flush
- low flush urinals that use less than 1.0 Gal/flush
- automatic valve controls and/or proximity detectors
- low or laminar flow faucets (7.5 liters/min.)

Xeriscaping is practiced to decrease the amount of water needed for landscaping.

The cooling systems avoid once-through water.

Water Management

A water audit has been done within the last three years.

There are regular procedures for checking for and fixing water leaks.

Opportunities for improvement

What Green Globes looks like ...

Recommendations

WATER

Rating Earned: 39%

Opportunities for improvement

Water Conserving Features	
RECOMMENDATION	
Recommendations	Supplementary Information
As water fixtures need replacing, or even earlier, consider installing:	
Links to more information about this recommendation:	
<p>Opportunities for Improvement</p> <ul style="list-style-type: none"> ◆ Principles of water retrofitting and conservation ◆ Water Conservation (WBDG) ◆ Plumbing Fixtures (EPA) 	
low flow toilets that use less than 1.6 GPF	low flush (1.6 GPF) toilets as per the EPACT of 1992 can save as much as \$75 USD/ toilet/yr. At an estimated replacement cost of \$180/ toilet, the simple payback is less than 3 years. Be sure to purchase 1.6 GPF/toilets to ensure proper performance. 1.6 GPF toilets should have the CSA International or Warnock Hersey label. Check refer to the supplier where the same models have been used. This toilet has passed primary performance and maintenance tests
Links to more information about this recommendation:	
<ul style="list-style-type: none"> ◆ Dual-Flush Toilet Fixtures: Field Studies and Water Savings ◆ Best Practices- Toilets and Urinals ◆ Ultra-low-flush Toilets 	

Recommendations

Supplementary information

Hyperlinked web references

Address <http://www.cmhc-schl.gc.ca/publications/en/rh-pr/tech/02-124-e.html>

R RESEARCH HIGHLIGHTS

Dual-flush Toilet Testing

Introduction

CMHC, in partnership with 12 municipalities across Canada, conducted a pilot study to select a short flush (three litres) or long flush (six litres). See Figure 1.

Figure 1 & 2 : Dual-Flush Toilet & Flush Selection



This study monitored water consumption, toilet performance and customer satisfaction.

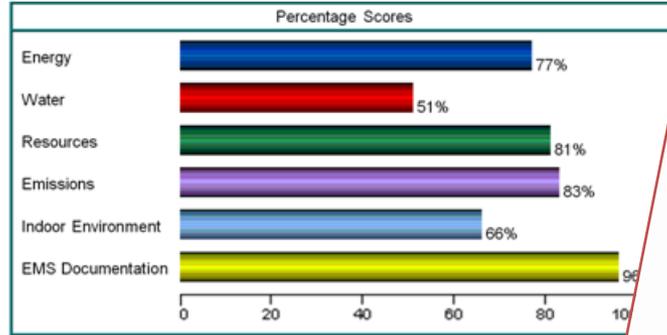
Green Globes Report

Green Globes

Sample Building
January

INTRODUCTION

Sample Building is a 1,120,380 square foot building located in San Diego, California. It has 5 stories and is described as follows: Garden style development with stucco on podium



Sample Building achieved an overall rating of 76%.

Overview

The management of multi-residential buildings has strong jurisdiction over the common areas, but has relatively little control over the tenants' suites. With regards to energy consumption, control is limited to outdoor, parking and service area lighting. With regards to water, control is limited to common areas. The best opportunities for an intervention are through working with or advising tenants on energy and environmental policies. This is particularly applicable in the time of new lease agreements. Having energy and environmental policies would also empower the management to act on environmental issues. Such "best practice" policies and procedures may include:

- Energy
 - Energy Audit
 - Energy Management (Reduction) Plan
- Water
 - Written Policy to Minimize Water Use
 - Water Audit
- Waste Reduction and Site
 - Recycling Program
 - Waste Audit
 - Construction, Renovation and Demolition Waste Management Plan
- Emissions and Effluents
 - Hazardous Materials Survey
 - Hazardous Products Management Plan
- Indoor Environment
 - Means for Addressing Tenant/Occupant Concerns
- Environmental Management System
 - Tenant Criteria Manual

WASTE REDUCTION AND SITE

Buildings consume many resources, including the land they are built on. During construction, the products used for their maintenance, and the equipment used by the tenants. This section evaluates the waste generated by the building as well as the original building materials used in the construction of the building and the waste stewardship of existing buildings.

Sample Building achieved 81% for managing resources through waste reduction and recycling.

Waste Reduction and Recycling

Buildings generate a large quantity of waste in addition to waste paper. Sample Building achieved 56% for implementing best practices for waste management.

HIGHLIGHTS

Facilities for Storing and Handling Recyclable Materials

- There are separate storage/handling facilities for paper products, glass, metal and plastic waste.
- There are collection points to separate paper, glass, metal and plastic waste is generated.

Waste Reduction Workplan

- There is a construction, renovation and demolition waste management plan on-site source separation for recycling
- The waste audit has been approved and is in the process of implementation.

OPPORTUNITIES FOR IMPROVEMENT

Facilities for Storing and Handling Recyclable Materials

- Consider providing composting, either on-site or centralized (off-site) for occupant scraps and any outdoor or indoor landscape waste.

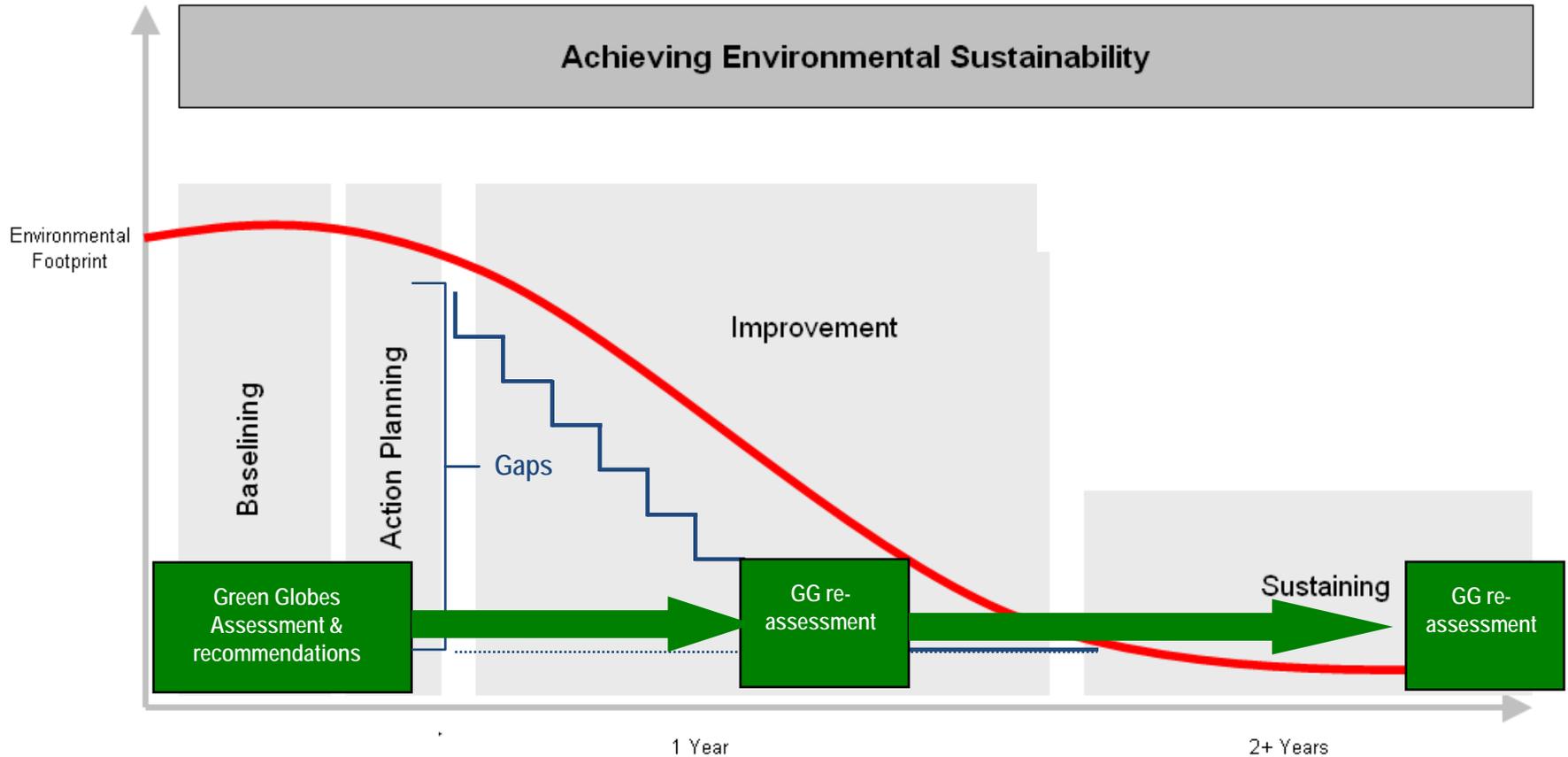
Waste Reduction Workplan

Useful as a portfolio management tool for:

- Establishing a baseline
- Identifying areas of stellar performance...as well as problem areas
- Action planning
- Monitoring and benchmarking improvements



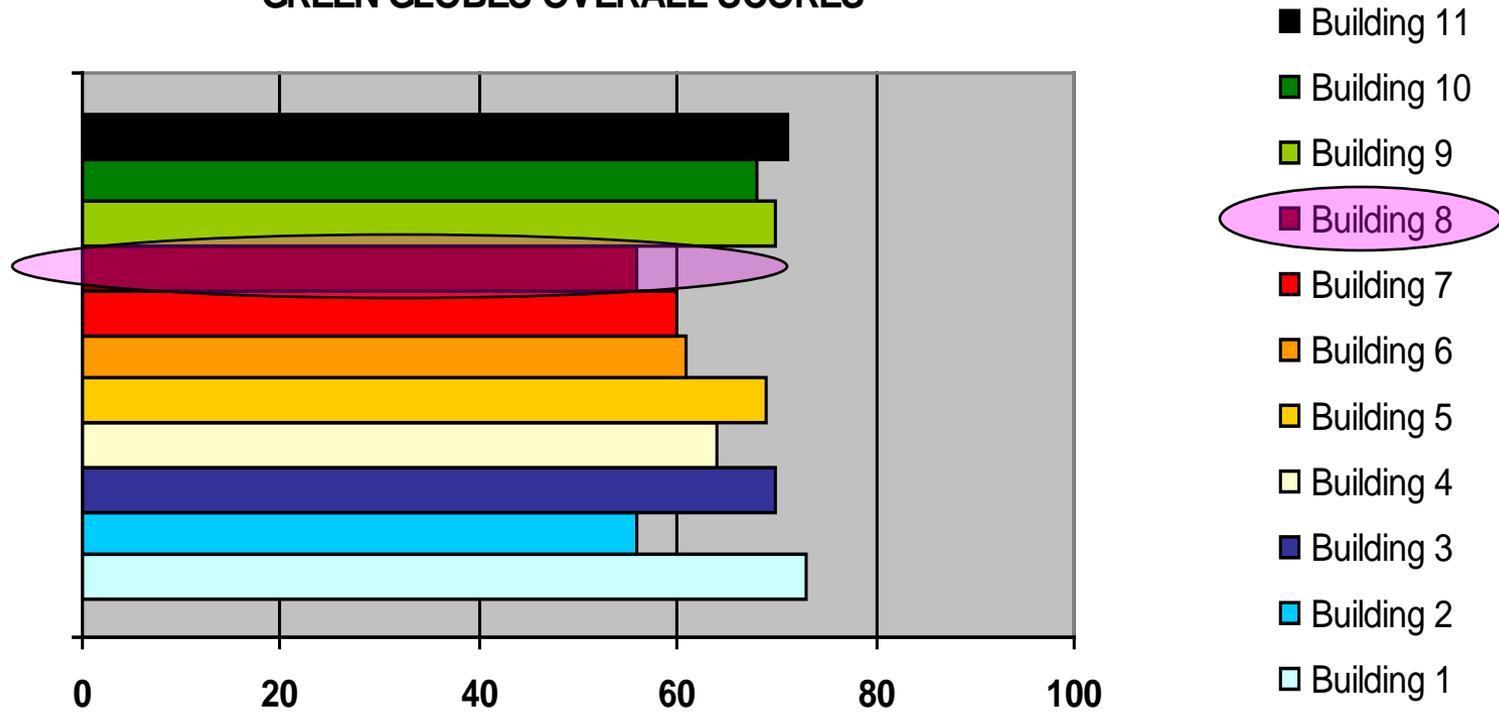
Path to sustainability



Green Globes Portfolio Case Study

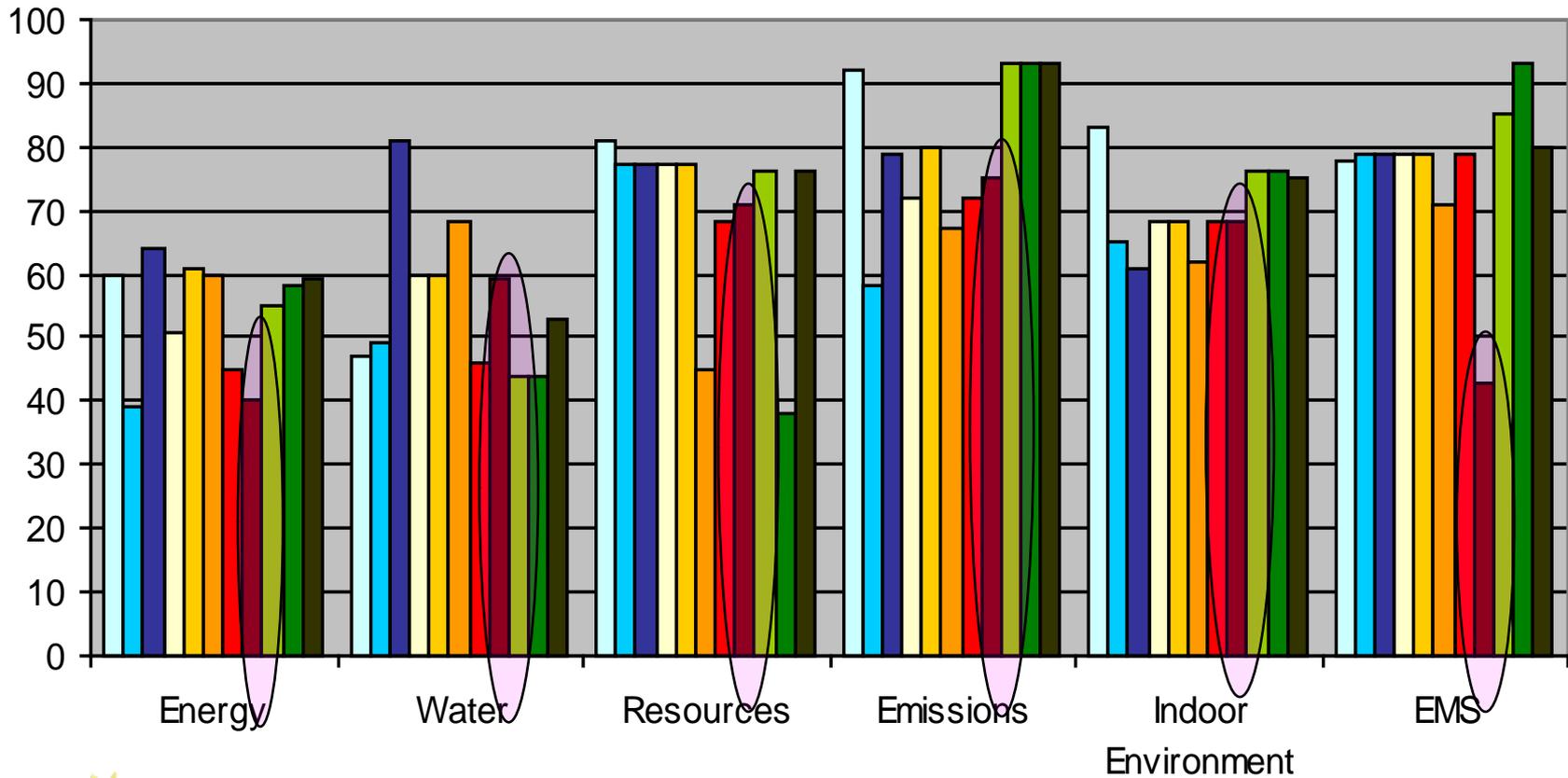
- Sustainable asset management means not just a **single** building approach, but **complete portfolio management**.

GREEN GLOBES OVERALL SCORES



Green Globes Portfolio Case Study

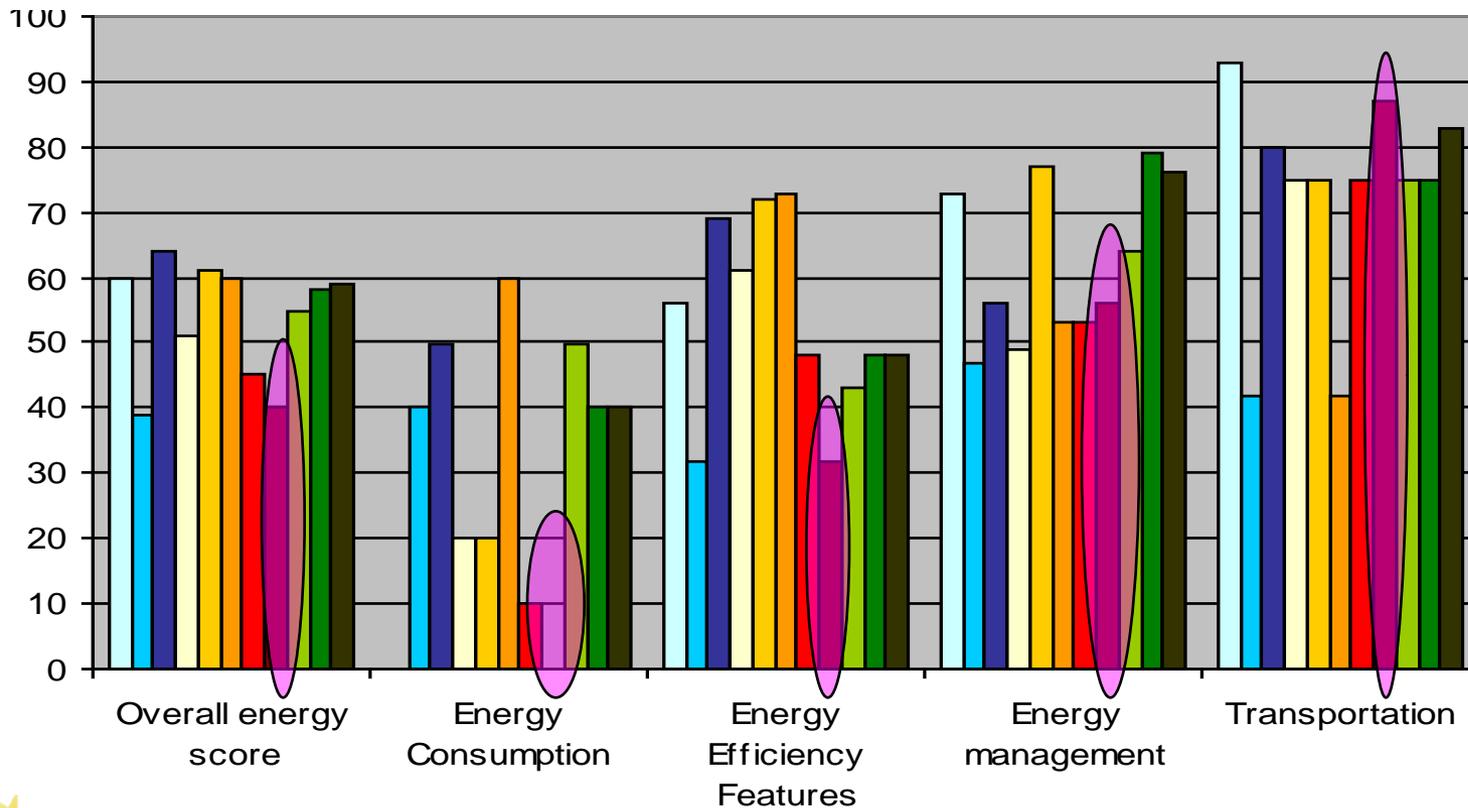
- Building 1 □ Building 2 □ Building 3 □ Building 4 □ Building 5 □ Building 6
- Building 7 ■ Building 8 ■ Building 9 ■ Building 10 ■ Building 11



Green Globes Portfolio Case Study

ENERGY

Building 1 Building 2 Building 3 Building 4 Building 5 Building 6
Building 7 Building 8 Building 9 Building 10 Building 11



Green Globes Portfolio Case Study

ENERGY EFFICIENCY FEATURES

BUILDING	1	2	3	4	5	6	7	8	9	10
Re-lamping	partial	✓	✓							
Lighting controls	✓	✗	✓	✓	✓	✗	✗	✗	✓	✓
High eff. boilers	N/A	N/A	N/A	✓	N/A	N/A	✓	N/A	N/A	N/A
Vent dampers	N/A	N/A	N/A	✓	N/A	N/A	✗	N/A	N/A	N/A
Temp. setback	✓	✓	✗	✓	✓	✗	✓	✗	✓	✓
BAS	✓	✓	partial	✓	partial	partial	✓	partial	✓	✓
Efficient hot water heaters	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗
Hot water saving fixtures	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗
Water temp. 50-55°C	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗

Portfolio Sustainability Program

Issue:

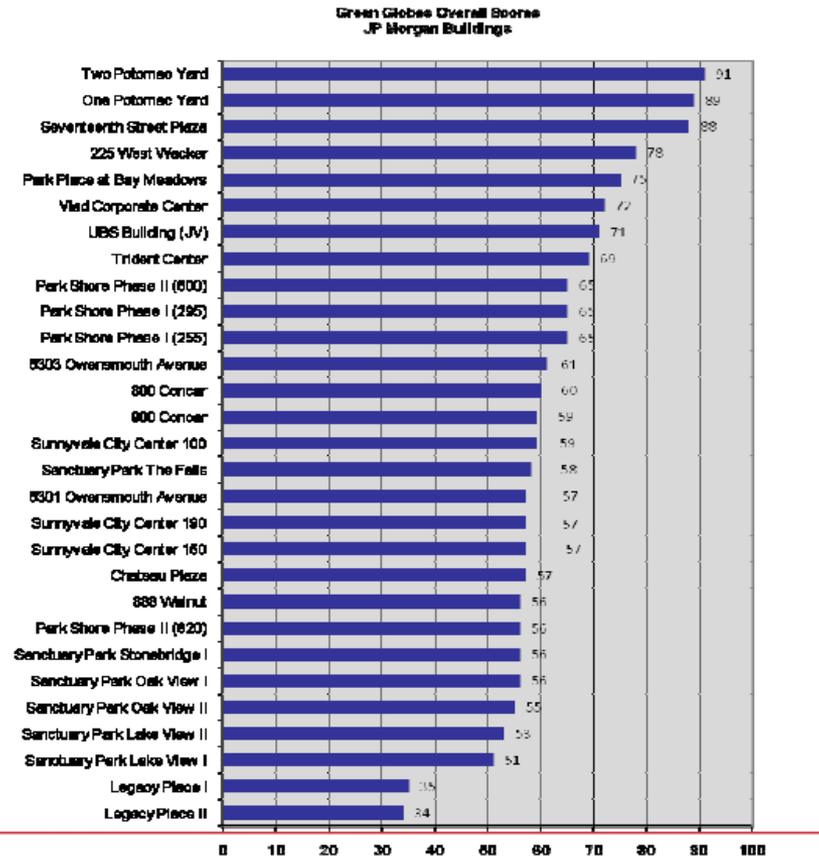
- Client needed a way to mitigate risk and increase asset values for a portfolio of investment properties.

Solution:

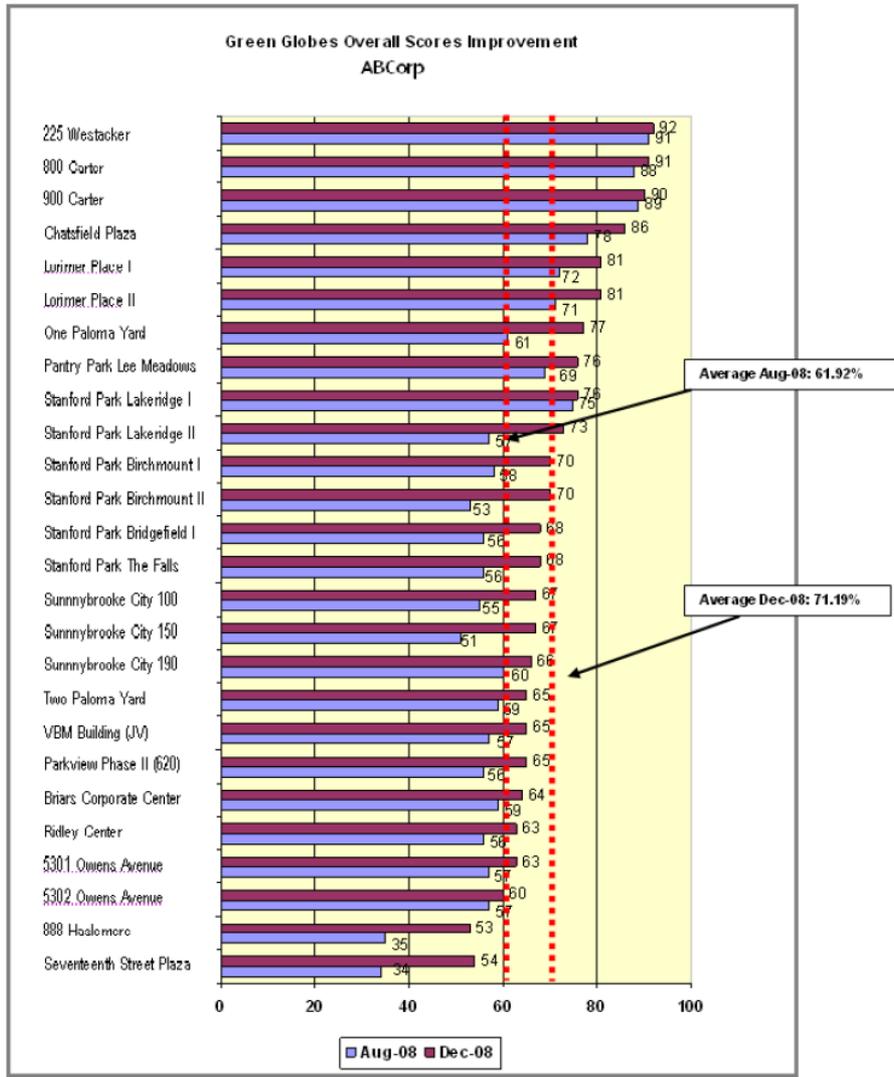
- JLL brought on as program developer and manager in a year-long program to baseline buildings in the portfolio by using Green Globes, devise building-level and portfolio-level strategies and action plans, implement the action plans and measure results.

Results to date:

- All of the buildings in the portfolio have been baselined with building level actions identified and quick-wins beginning. The portfolio-level report was developed with opportunities for improvement being identified and prioritized.



Green Globes helps to measure and track improvements



Internal benchmarks drive continuous improvements over time. As the portfolio improves over time, the bar is raised.

The process of reporting strengthens accountability, enhances transparency and reinforces staff commitment to improve performance in time for the next reporting milestone. This leads to a culture shift and an organizational framework that supports continuous improvement.

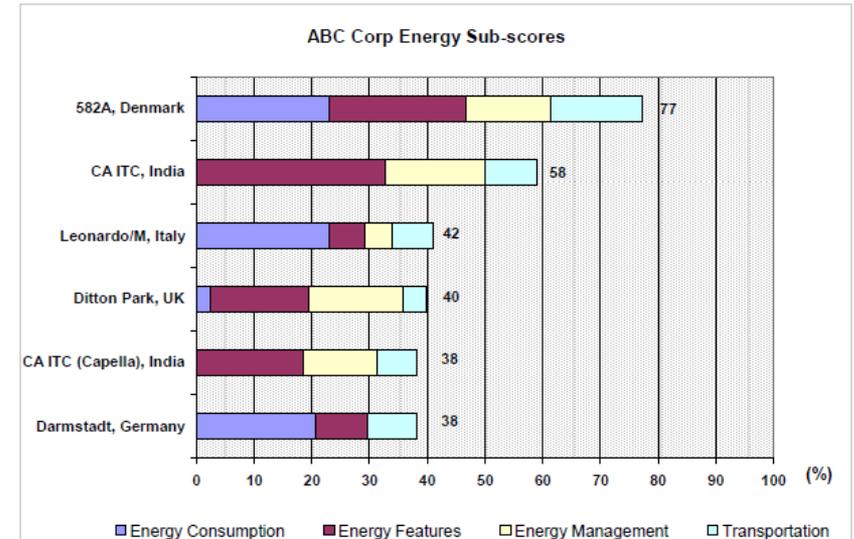
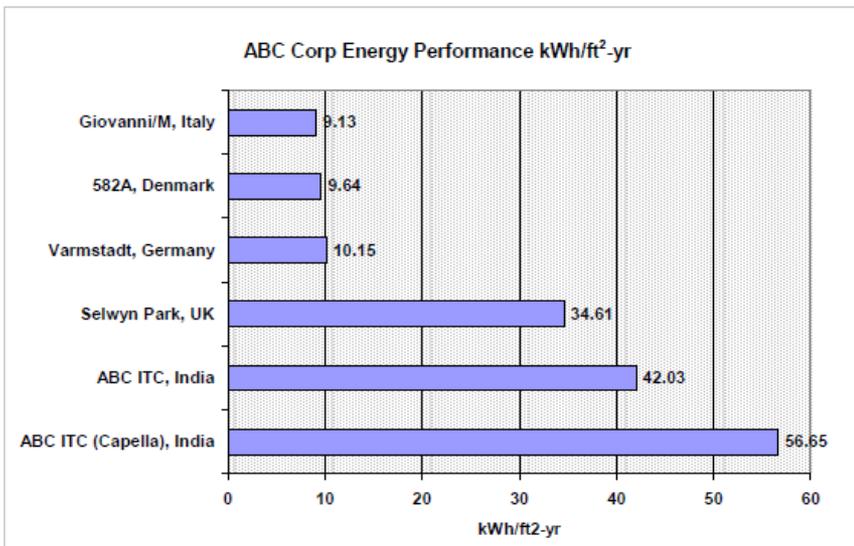
WATER WATER-CONSERVING FIXTURES (toilets, urinals and faucets)						
Building	Water-conserving toilets	Water-conserving urinals	Valve controls and/or proximity sensors	Water-conserving faucets	Water conservation policy	Water consumption monitoring
Building 1	✓	✓	✓	⊙	✓	✓
Building 2	✓	✓	✓	✓	✓	✓
Building 3	X	✓	✓	⊙	✓	✓
Building 4	✓	✓	✓	✓	✓	✓
Building 5	⊙	⊙	X	X	X	✓
Building 6	✓	✓	✓	✓	X	X
Building 7	X	X	✓	✓	X	✓
Building 8	X	X	✓	X	✓	✓
Building 8	✓	X	✓	✓	✓	✓
Building 10	✓	✓	✓	✓	✓	✓
Building 11	✓	⊙	X	✓	X	X
Building 12	✓	✓	X	✓	X	X
Building 13	✓	✓	X	X	X	✓

⊙ Shows improvements between August 08 to December 08

Global Green Globes Portfolio Assessment

Table 3- ABC Corp Buildings – Energy Score and sub-scores

Building Name	Energy	Energy Consumption	Energy Features	Energy Management	Transportation	Total GHG Tonnes/yr	Energy Performance kWh/ft2
Selwyn Park, UK	40	10	46	76	25	4055.27	34.61
Varmstadt, Germany	38	100	21	0	50	584.33	10.15
582A, Denmark	77	100	64	64	92	161.19	9.64
Giovanni/Marconi, Italy	42	Incomplete data	17	21	42	611.47	Incomplete data
ABC ITC, India	58	0	88	76	55	9197.53	42.03
ABC ITC (Capella), India	38	0	53	55	42	2500.39	56.65

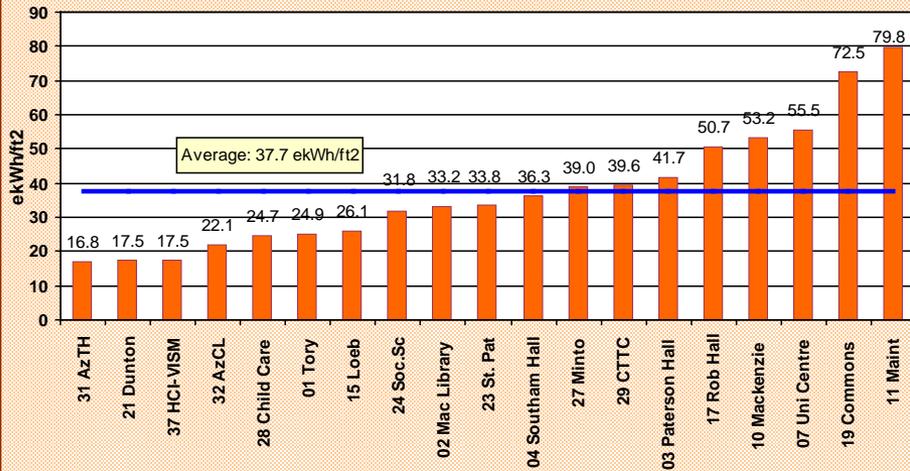


Green Globes Campus Module

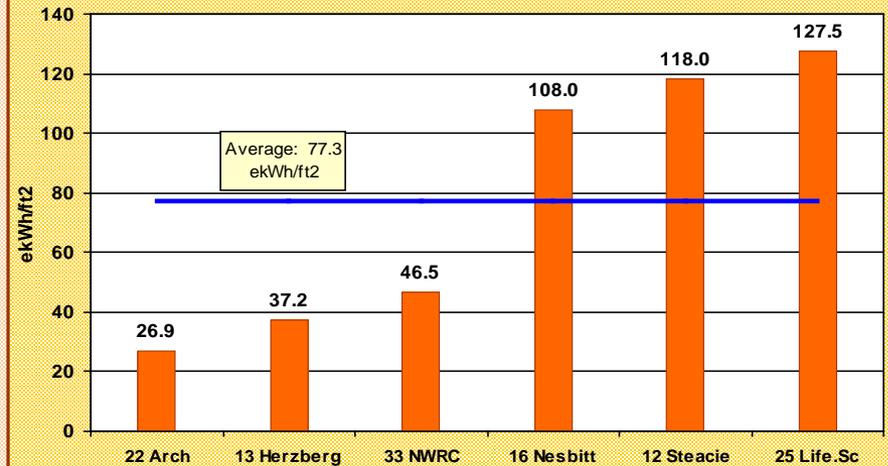


Energy Performance

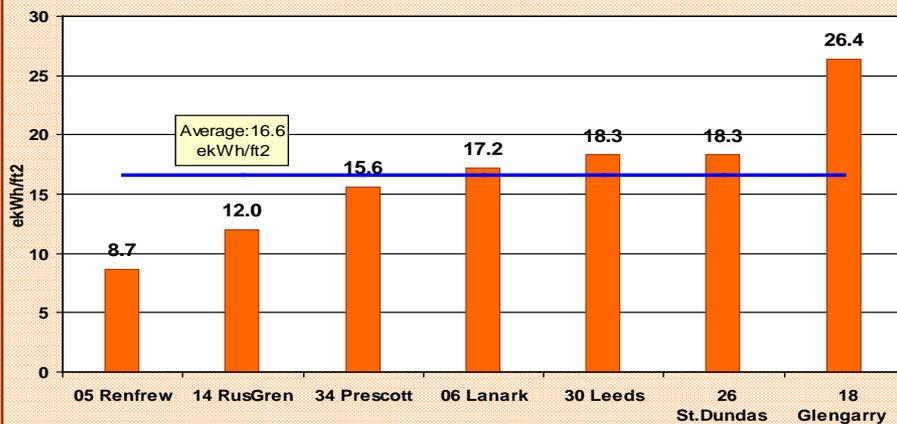
Energy Performance
Office/Academic Buildings



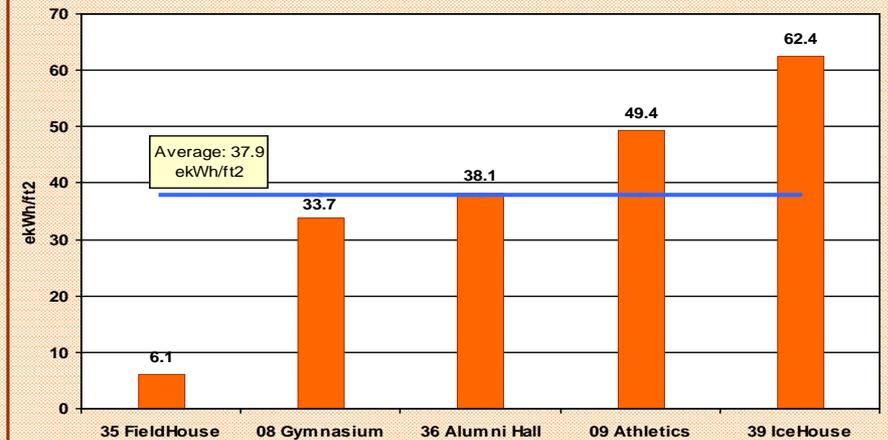
Energy Performance
Laboratory Buildings



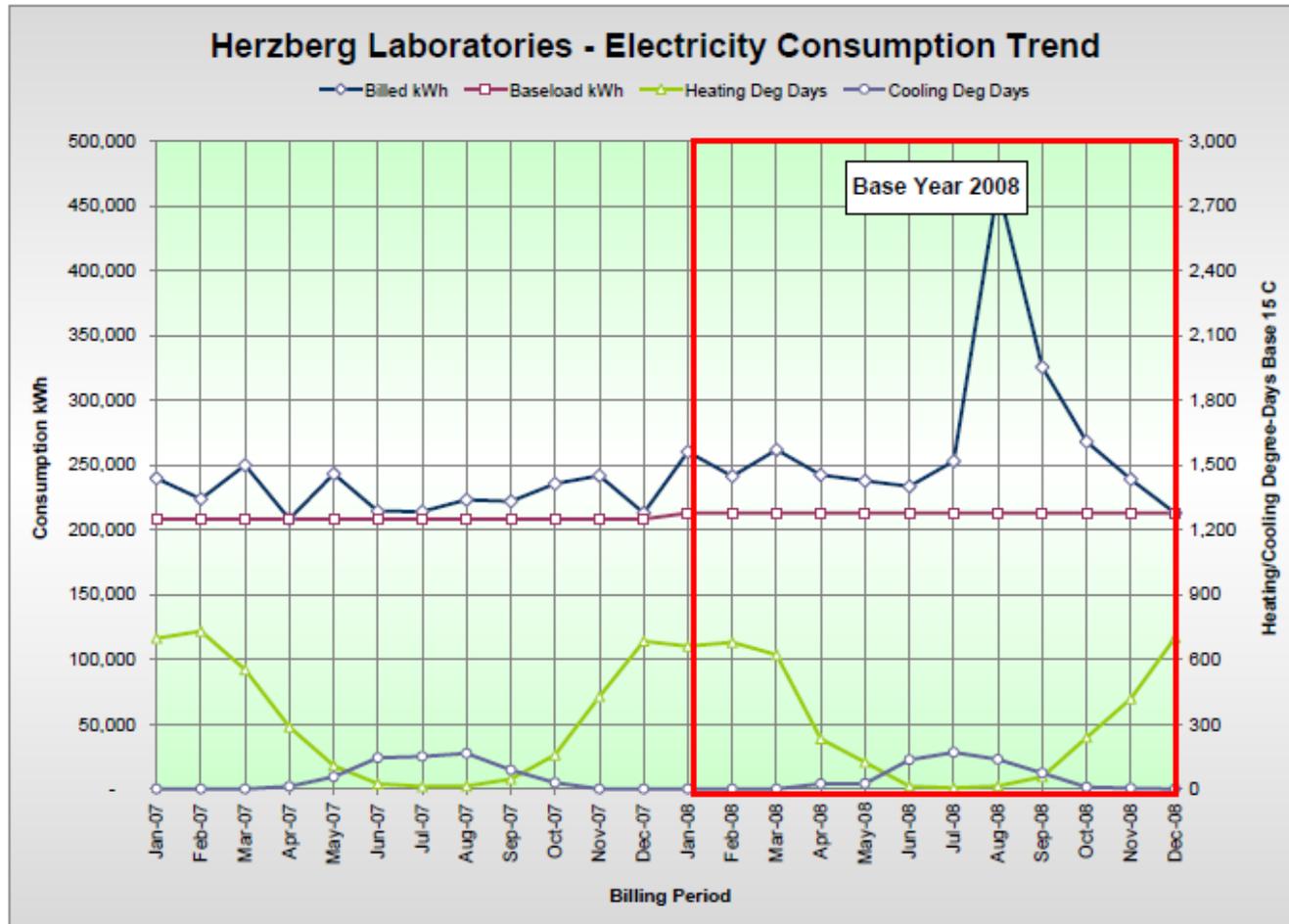
Energy Performance
Residential Buildings



Energy Performance
Sport Buildings

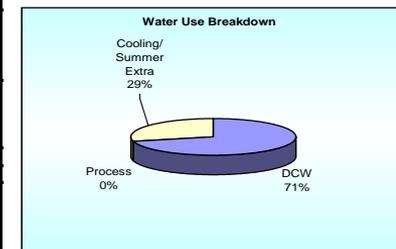
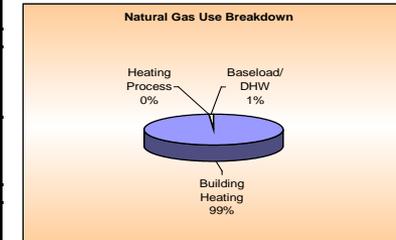
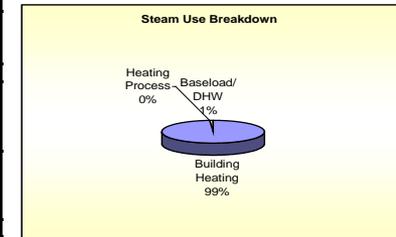
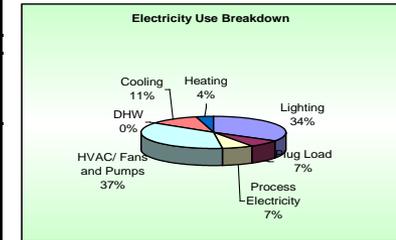


BEAT outputs – electricity consumption trend for the building, weather correlated for cooling



Building Energy Allocation Tool - BEAT

Building Energy Allocation and Projected Savings										
Tory Building	127,581	ft2								
Electricity	2008	Year								
Annual Energy	2,435,151	kWh	Sub Meter readings							
Total Utility Cost	\$ 213,076	\$	0.088	Unit cost	Reduction	11%	Projected			
Electricity	19.09	kWh/ft2	739.63	MJ/m2			16.99	kWh/ft2	658.27	MJ/m2
End Use	Calculated End Use Allocation	kWh/ft2	Annual Energy	Annual Cost \$	End Use Red'n Pot'l	Projected Annual Utility Use	Projected Utility Savings	Projected Annual Cost Saving	Overall Red'n	
Lighting	34%	6.49	827,951	\$ 72,446	15%	703,759	124,193	\$ 10,867	5%	
Plug Load	7%	1.34	170,461	\$ 14,915	10%	153,415	17,046	\$ 1,492	1%	
Process Electricity	7%	1.34	170,461	\$ 14,915	-	170,461	-	\$ -	0%	
HVAC/ Fans and Pumps	37%	7.06	901,006	\$ 78,838	10%	810,905	90,101	\$ 7,884	4%	
DHW	0%	-	-	\$ -	-	-	-	\$ -	0%	
Cooling	11%	2.10	267,867	\$ 23,438	10%	241,080	26,787	\$ 2,344	1%	
Heating	4%	0.76	97,406	\$ 8,523	10%	87,665	9,741	\$ 852	0%	
Totals	100%	19.09	2,435,151	\$ 213,076		2,167,284	267,867	\$ 23,438	11%	
							16.99	kWh/ft2	658.27	MJ/m2
Steam	2008	Year								
Annual Energy	2,027	Mlbs	Sub Meter readings							
Total Utility Cost	\$ 33,437	\$	16.500	Unit cost	Reduction	10%	Projected			
Heating Fuel	4.66	ekWh/ft2	180.39	MJ/m2			4.19	ekWh/ft2	162.53	MJ/m2
End Use	Calculated End Use Allocation	ekWh/ft2	Annual Energy	Annual Cost \$	End Use Red'n Pot'l	Projected Annual Utility Use	Projected Utility Savings	Projected Annual Cost Saving	Overall Red'n	
Building Heating	99%	4.61	2,006	\$ 33,103	10%	1,806	201	\$ 3,310	10%	
Heating Process	0%	-	-	\$ -	-	-	-	\$ -	0%	
Baseload/ DHW	1%	0.05	20	\$ 334	-	20	-	\$ -	0%	
Totals	100%	4.66	2,027	\$ 33,437		1,826	201	\$ 3,310	10%	
							4.19	ekWh/ft2	162.53	MJ/m2
Natural Gas	2008	Year								
Annual Energy	13,666	m3	Enbridge billings							
Total Utility Cost	\$ 6,211	\$	0.454	Unit cost	Reduction	10%	Projected			
Heating Fuel	1.12	ekWh/ft2	43.58	MJ/m2			1.01	ekWh/ft2	39.27	MJ/m2
End Use	Calculated End Use Allocation	ekWh/ft2	Annual Energy	Annual Cost \$	End Use Red'n Pot'l	Projected Annual Utility Use	Projected Utility Savings	Projected Annual Cost Saving	Overall Red'n	
Building Heating	99%	1.11	13,529	\$ 6,149	10%	12,176	1,353	\$ 615	10%	
Heating Process	0%	-	-	\$ -	-	-	-	\$ -	0%	
Baseload/ DHW	1%	0.01	137	\$ 62	-	137	-	\$ -	0%	
Totals	100%	1.12	13,666	\$ 6,211		12,313	1,353	\$ 615	10%	
							1.01	ekWh/ft2	39.27	MJ/m2
Water	2008	Year								
Annual Consumption	28,049	m3	Sub Meter readings							
Total Utility Cost	\$ 60,305	\$	2.150	Unit cost	Reduction	30%	Projected			
Water	219.85	Litres/ft2	20.43	L/m2			153.90	Litres/ft2	14.30	L/m2
End Use	Calculated End Use Allocation	Litres/ft2	Annual Energy	Annual Cost \$	End Use Red'n Pot'l	Projected Annual Utility Use	Projected Utility Savings	Projected Annual Cost Saving	Overall Red'n	
DCW	71%	156.10	19,915	\$ 42,817	30%	13,940	5,974	\$ 12,845	21%	
Process	0%	-	-	\$ -	-	-	-	\$ -	0%	
Cooling/ Summer Extra	29%	63.76	8,134	\$ 17,488	30%	5,694	2,440	\$ 5,247	9%	
Totals	100%	219.85	28,049	\$ 60,305		19,634	8,415	\$ 18,092	30%	
							153.90	Litres/ft2	14.30	L/m2
Building Total			Existing ekWh/ft2	Annual Energy ekWh	Annual Cost \$	Annual Cost \$/ft2	Projected ekWh/ft2	Projected Cost Savings	Overall Red'n	
			24.87	3,172,553	\$ 313,029	\$ 2.45	22.20	\$ 45,455	15%	
			963.60	MJ/m2			860.06	MJ/m2		



Reporting energy efficiency features for the university portfolio

Energy Efficient Features	Laboratory Buildings						Sport Buildings					
	12/SC	13/HP	16/NB	22/AA	25/LS	33/NW	8/GY	9/AC	35/FH	36/AH	39/IH	40/TC
Lighting												
Percentages of compact fluorescents light	70% <=	70% <=	70% <=	70% <=	70% <=	70% <=	NO	NO	NO	NO	NO	NO
Percentages of T8 or T5 fluorescent lights in the building area	70% <=	70% <=	70% <=	70% <=	70% <=	70% <=	NO	NO	N/A	70% <=	N/A	70% <=
Percentages of light emitting diodes (LEDs) exit signs are	40-70% <=	40-70% <=	40-70% <=	40-70% <=	40-70% <=	40-70% <=	NO	NO	NO	NO	NO	NO
Other types of LED lighting	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
High-intensity fluorescent fixtures in large areas that require high lighting levels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Task lighting provided in office spaces along with reduced ambient lighting levels	40-70% <=	40-70% <=	40-70% <=	40-70% <=	40-70% <=	<40% <=	N/A	40-70% <=	N/A	N/A	N/A	N/A
Automated lighting controls	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	NO
Percentage of high efficiency lighting	80% <=	80% <=	80% <=	80% <=	80% <=	80% <=	60-80% <=	80% <=	80% <=	80% <=	80% <=	80% <=
Controls												
Temperature setback and weather compensation implemented	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Building automation systems (BAS)	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Hot Water												
High efficiency water heating equipment	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Percentage of hot water faucets saving devices	<.25% <=	<.25% <=	<.25% <=	<.25% <=	<.25% <=	<.25% <=	25-49% <=	25-49% <=	50% <=	50% <=	50% <=	<.25% <=
DHW temperatures maintained between 50° and 55° C	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Envelope												
Building envelope condition and performance report												
• → Water infiltration and condensation	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	NO
• → Moist air transfer	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	NO
• → Air flow	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	NO
• → Heat transfer	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	NO

Legend: YES NO N/A Not Applicable

BEAT outputs

End use
e.g. Lighting

Energy saving measures
e.g. Complete upgrade to high efficiency lamps.
Upgrade/replace lighting controls

Cost to implement
e.g. \$25K

Potential savings
e.g. \$59,389

Payback (years)
e.g. 0.4

Energy end use	Y/N	Energy-saving measures	Cost per sf	Cost	Savings	Payback
Lighting and Lighting Control	-	High Efficiency Lamps	-			
	x	Lighting Controls/ Optimize Schedules	\$ 0.05	\$ 25,000		
	-	Replace Incandescent lamps with CFL	-			
	-	Lighting Controls/ Optimize Schedules	-			
Total				\$ 25,000	\$ 59,389	0.4
Lighting Exterior	x	Major Retrofit - HE Lamps	\$ 0.00	\$ 2,000		
	-	Lighting Controls/ Optimize Schedules	-			
Total				\$ 2,000	\$ 2,200	0.9
Plug Load	x	High Efficiency Appliances	\$ 0.19	\$ 100,000		
	-	Remove Unnecessary Loads	\$ 0.00	\$ 0		
	x	Circuit Control	\$ 0.19	\$ 100,000		
Total				\$ 200,000	\$ 87,983	2.3
HVAC Systems	-	Major Equipment Replacement	-			
	-	HVAC Systems Overhaul/Upgrade	-			
	x	Replace/Upgrade Building Automation System	\$ 0.06	\$ 30,000		
	-	Fan/Pump VFD Control	-			
	x	Recommissioning/Air Balancing	\$ 1.15	\$ 600,000		
	-	Exhaust Air Heat Recovery	-			
Total				\$ 630,000	\$ 281,546	2.2
HVAC Pump Systems	-	Major Equipment Replacement	-			
	-	Pump Systems Overhaul/Upgrade	-			
	-	Upgrade/Optimize Pump Control	-			
	-	Recommissioning/Water Balancing	-			
Total				\$ -	\$ -	-
Domestic Hot Water	-	Boiler Upgrade/Replacement	-			
	-	Optimize Control/Delivery Temperature	-			
	-	Low Flow Fixtures Replacement	-			
Total				\$ -	\$ -	-
Cooling Plant	-	Replace/Upgrade Existing Cooling Plant	-			
	-	Retrofit/Overhaul Existing Chillers	-			
	x	Chiller Maintenance/Controls Optimization	\$ 0.06	\$ 30,000		
	-	Cooling Tower Control - VFD/Winterize	-			
	-	Building Envelope/Solar Film/Shading	-			
Total				\$ 30,000	\$ 74,786	0.4
Electricity Total				\$ 885,000	\$ 503,704	1.8
Heating Fuel End Use	Y/N	Energy Savings Opportunities	Implementation Cost \$/ft2	Implementation Cost \$	Potential Cost Savings \$	Simple Payback Years
Heating Plant	-	Boiler Upgrade/Replacement	-			
	-	Retrofit/Overhaul Boilers	-			
	-	DHW Boiler Replacement	-			
	x	Upgrade/Replace Boiler Controls	\$ 0.10	\$ 50,000		
	x	Summer DHW/Reheat Boiler	\$ 0.57	\$ 300,000		
	-	Kitchen Equipment Upgrade/Replace	-			
	x	Optimize Ventilation Rate	\$ 0.29	\$ 150,000		
	x	Optimize Humidification	\$ 0.06	\$ 30,000		
	-	Building Envelope/Infiltration/Pressurization	-			
Heating Fuel Total				\$ 530,000	\$ 155,834	3.4
Water End Use	Y/N	Energy Savings Opportunities	Implementation Cost \$/ft2	Implementation Cost \$	Potential Cost Savings \$	Simple Payback Years
Domestic Cold Water	-	Low Flow Fixtures Upgrade	-			
	x	Cooling Optimization	\$ 0.02	\$ 10,000		
	-	Landscape/Maintenance Optimization	-			
Water Total				\$ 10,000	\$ 9,963	1.0
				Implementation Cost \$	Potential Cost Savings \$	Simple Payback Years
Grand Total				\$1,425,000	\$ 669,507	2.1

Case Study- Drexel

Drexel is the first university in the U.S. to commit to using Green Globes comprehensively through university policy for all new and existing campus buildings.

Drexel is using Green Globes as a tool to help identify potentially effective design elements that contribute to the improvement of a building's performance.



Case Study- Drexel University

Construction projects registered with the Green Globes® system:

Project	Registration	Self assessment - Anticipated Globes	Stage 1 Assessment - Review of CD's	Stage 2 Assessment - Site Review	Status Report	Achieved Rating	Final Results
Recreation Center Completion date: February 2010	9/5/08	2 Globes					
Papadakis Integrated Sciences Building Completion date: Winter 2011 LEED Progress Report as of June 17, 2010	1/20/09	4 Globes			 [Green Globes Summary]  [Site Report]		
Millennium Residence Hall Completion date: September 2009	1/20/09	2 Globes					
Northside Dining Terrace Completion date: January 2010	1/26/09	2 Globes					
Queen Lane Addition Completion date: October 2009	1/20/09	1 Globes	in progress				
URBN Center Completion Date: September 2011	8/28/09	4 Globes					
URBN Center Annex Completion Date: September 2011	4/12/10	4 Globes					
LeBow College of Business	4/12/10	4 Globes					

BOMA BEST 1,500 certified buildings

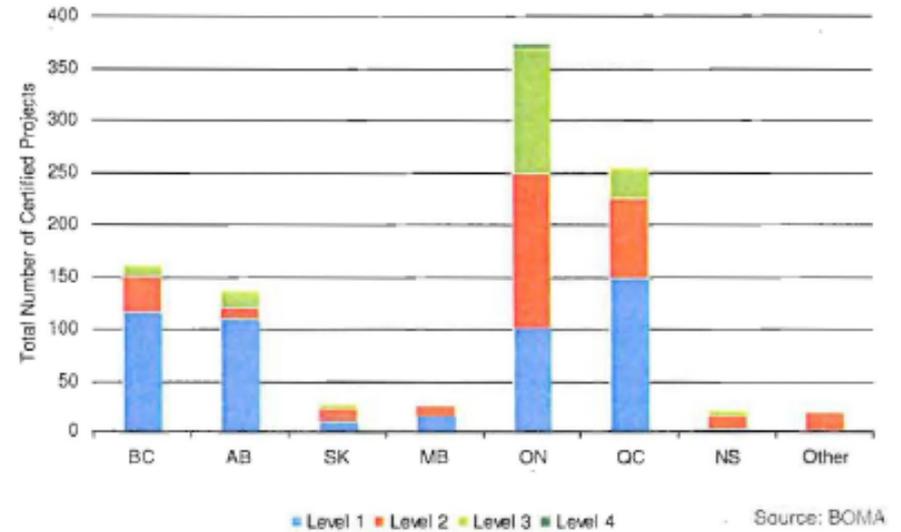


BOMA BEST Energy and Environmental Report

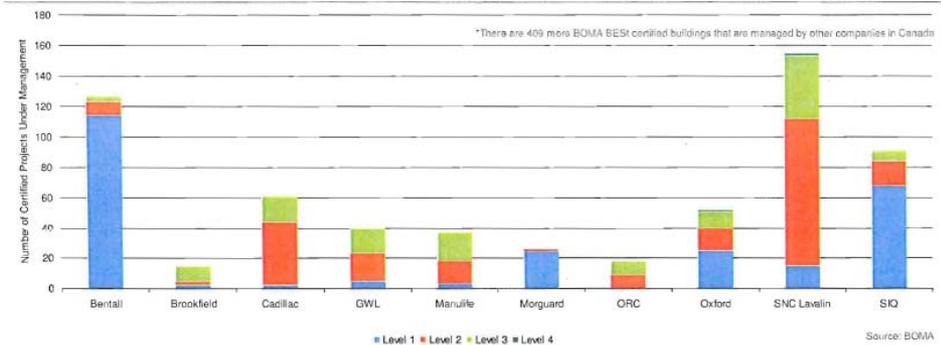
2009 The first comprehensive national report on the energy and environmental performance of BOMA BEST certified office buildings in Canada



BOMA BEST Certified Buildings in Canada

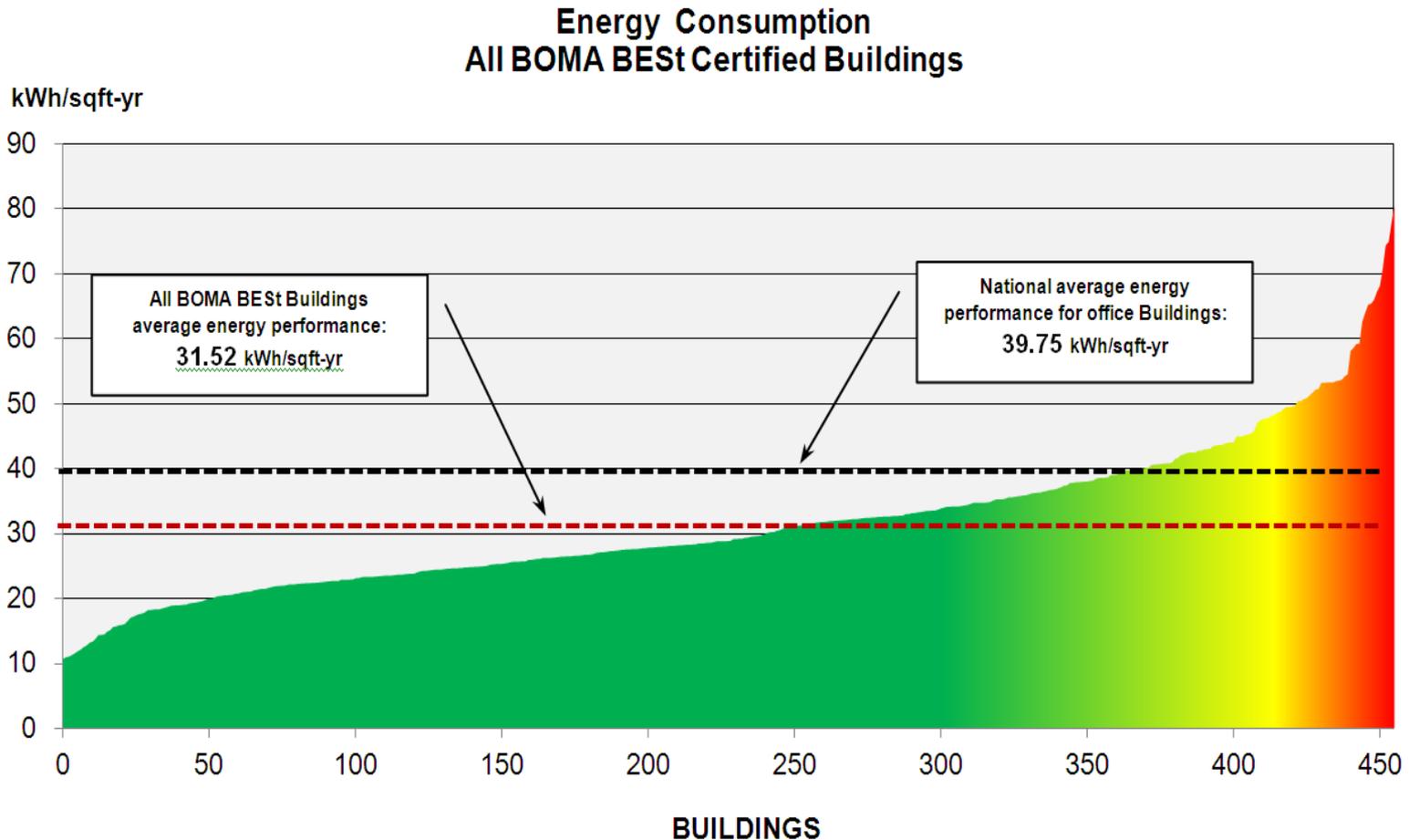


BOMA BEST Certified Buildings by Management Company



Industry performance benchmarks

- BOMA BEST buildings consume 14% less energy than the Canadian average
- CO2 reductions up to 0.79 tons/1,000sf through HVAC, controls and lighting



Conservation Demand Management Incentive Programs



"Energy conservation is OUR business"



Contact Us

HOME

CDM PROGRAM

TIP

ECAP

HOW TO APPLY TO CDM | DOCUMENT CENTRE | CDM FAQ | USER SPOTLIGHT

The CDM Program At a Glance

The BOMA Toronto CDM Program will reduce the capital cost of your retrofit by up to 40%. \$800 per kilowatt of on-peak demand savings or \$0.10 per kilowatt-hour annual consumption savings for non-lighting projects; \$400 per kilowatt of on-peak demand savings or \$0.05 per kilowatt-hour annual consumption savings for lighting projects; \$250 per cooling ton (for ground source cooling projects).

Energy retrofits can be pricey. You may be eager to help the environment and cut your energy bills, but the initial capital costs and long payback period for a retrofit can mean that your project may not get approved. Let the BOMA CDM Program help you.



Program Highlights

Purpose

The Program will direct incentive funds to eligible Participants, towards the capital cost of initiatives that provide sustainable electricity demand and energy reductions in commercial buildings. The program offers incentives for annual energy savings, in kilowatt hours (kWh), peak summer demand reductions, in kilowatts (kW), and reducing tons of cooling (for geothermal projects).

Target

Large commercial buildings with 25,000 square feet or greater.

Duration

4 years, ending December 31, 2010

Program Objectives

To reduce the City's on-peak electricity demand by 150 Megawatts (MW) and a commensurate amount of electrical energy over 3 years.

Incentive Level

\$800 per kilowatt of on-peak demand savings or \$0.10 per kilowatt-hour annual consumption savings for non-lighting projects; \$400 per kilowatt of on-peak demand savings or \$0.05 per kilowatt-hour annual consumption savings for lighting projects; \$250 per cooling ton (for ground source cooling projects).

Incentive Cap

Incentive payment limited to 40% of total Eligible Costs.

Payment Timing

Once our Project Completion Report is finalized you will receive your incentive payment within 30 business days.

Go Green Plus/BOMA BEST

Go Green Plus/ BOMA BEST Assessment Tool questionnaire must be completed for the Program, but building certification is NOT required.

Program Benefits

- Improve the pay back of your energy savings projects
- Reduce your property operating costs
- Help the environment by reducing the emissions from electricity generation

Your Program Partners

- The [Building Owners and Managers Association of the Greater Toronto Area \(BOMA Toronto\)](#) helps members ensure tenant satisfaction, maximize profits, and enhance asset values for building owners and investors through market intelligence, education, networking, and government advocacy.
- The [Ontario Power Authority](#) contributes to the development of a reliable and sustainable electricity system for the benefit of Ontario customers. In doing



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CDM PROGRAM

TIP

ECAP

HOW TO APPLY TO ECAP | DOCUMENT CENTRE | ECAP FAQ | READY TO USE BEAT

The ECAP At a Glance

The Energy Conservation Assessment Program or ECAP is a significant capability building tool for the BOMA Toronto Conservation and Demand Management (CDM) Program. It is designed to further promote electricity conservation in commercial real estate by involving our *Channel Partners** and thereby enhancing the quality and the depth of conservation measures applied for incentive through the CDM Program.

ECAP is delivered in two phases:

Phase I: Scoping Study

An incentive of \$3,000 is available to 'channel partners' to promote, and conduct, full building energy 'scoping studies' for property owners/tenants.

Phase II: Project Submission Support

An additional \$2,500 of incentive available to property owners/tenants to have their CDM Application (resulting from the Phase I - Scoping Study) facilitated by a channel partner.



Program Highlights

Objectives

- To increase the number and depth of building assessments undertaken.
- To increase the Participant's knowledge of energy components and reduction opportunities.
- To increase the number of participating channel partners.
- To increase the electricity conservation in commercial/industrial properties.

Eligible Applicants (Channel Partners*)

- Engineering firms
- Energy service companies
- Energy management consultants
- Original equipment manufacturers/providers and their authorized agents

***Channel Partners** must have a Certificate of Authorization or be a professional engineer, certified engineering technologist, or accredited by the Association of Energy Engineers as a Certified Energy Manager or Certified Measurement and Verification Professional.

I have ECAP Login Name and a Password, and I would like to use the Building Energy Assessment Tool (BEAT)
(click to continue)



GovEnergy 2010

Used in Industry led Energy Improvement Programs

The BOMA Toronto CDM Program will reduce the capital cost of your retrofit by up to 40%. The Program will pay either \$400 per kilowatt (kW) on-peak demand reduction or \$0.05 per kilowatt hour (kWh) of annual consumption reduction or \$250 per cooling ton reduction (for geothermal projects).



[Meet Chuck Stradling](#)

Executive Vice President
BOMA Toronto



[Meet R. Wayne Proulx](#)

Program Director
BOMA Toronto CDM Program



[Meet Paul Godfrey](#)

Former President
Toronto Blue Jays



[Meet Peter Love](#)

Chief Energy
Conservation Officer
for OPA



[Meet Keith Major](#)

Senior Vice President,
Property Management
Bentall Real Estate Services



[Meet Eric Sellors](#)

Canadian Tire
Associate Dealer



[Meet Gord Hicks](#)

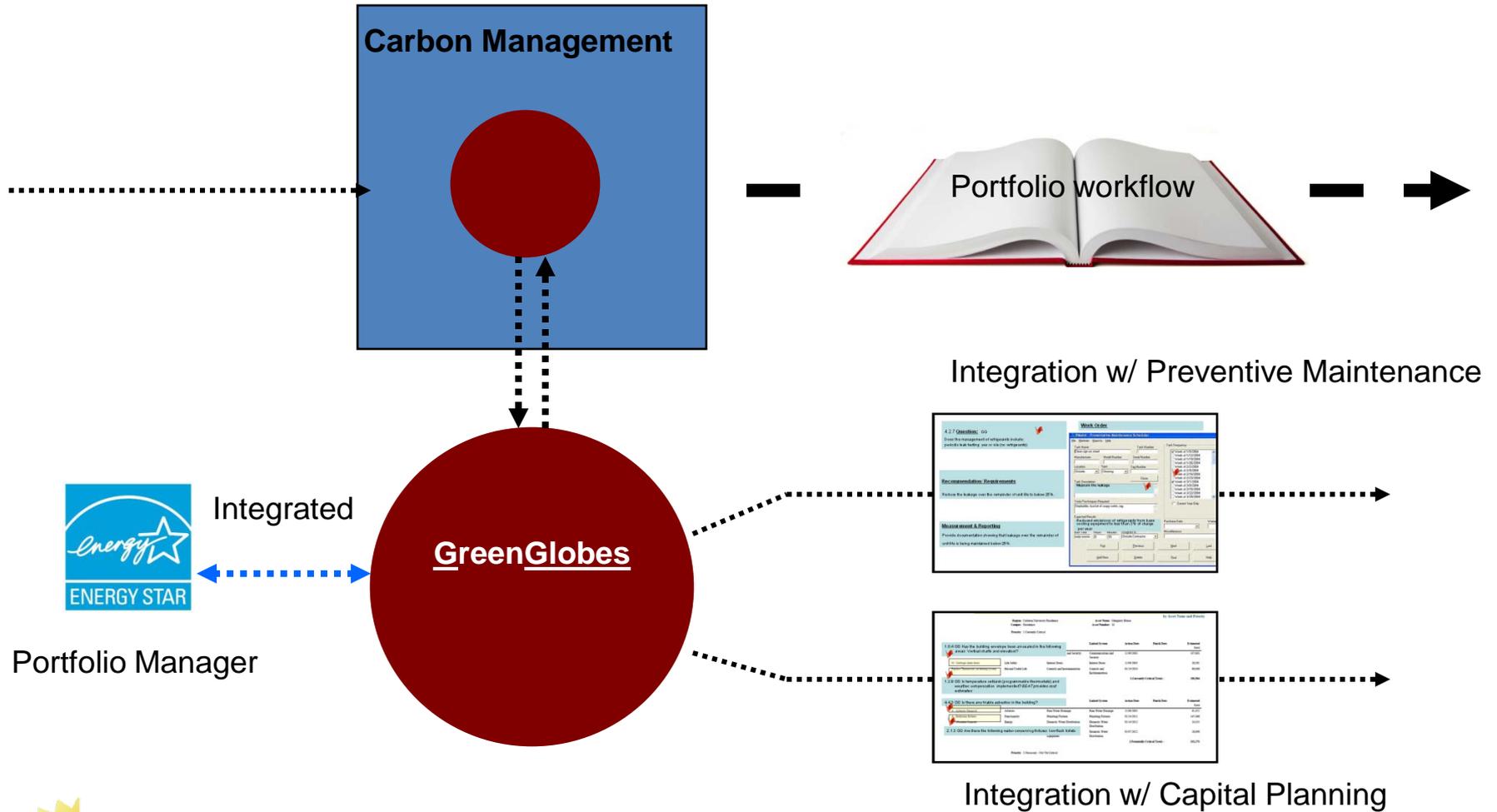
President
Brookfield Le Page Johnson
Controls (BLJC)



[Meet Pierre Bergevin](#)

President and CEO
Cushman & Wakefield LePage

Integration of Carbon Management and Green Globes (including Preventive Maintenance and Capital Planning)



Integration with Operational Procedures

Sustainable Management

<i>Project Area*</i>	<i>Project Name</i>	<i>Description</i>
Plumbing	M001R - Install water efficient fixtures	Replace existing water-consuming fixtures with more water efficient
Building Envelope/ Windows	A001 - Rehabilitate windows	Rehabilitate windows off-site, finding balance between heritage conservation, energy efficiency, and function within overall buiding envelope

Integration with Operational Procedures

Sustainable Management

<i>Scenarios</i>	<i>Possible Program(s)</i>	<i>Result</i>
Status Quo	N/A	No change in building water consumption
Minor improvement	Change to infrared (IR) controls, upgrade tap aerators to 0.5 GPM (2.2 L/min)	Will depend on baseline, but estimate of 10-20% water savings over EPA
Mid improvement	Change to waterless urinals, lower flush conventional toilets (4.4 LPF), IR controls and 0.5 GPM (2.2 L/min) aerators	Will depend on baseline, but estimate of 21-40%
Aggressive	Change to low flow/aerator taps (0.5 GPM), waterless urinals and dual flush (3L/6L)/composting toilets	Will depend on baseline, but estimate of 40+%
Status Quo	N/A	Continued deterioration, energy loss, air infiltration (thermal comfort), potential water infiltration issues
Minor improvement	N/A	N/A
Mid improvement	Rehabilitate to reglaze and reseal to preserve heritage value and reduce air infiltration.	energy efficiency, preservation of heritage features
Aggressive	N/A - there should be no interventions that do not conserve heritage value.	N/A

Green Globes.....comprehensive sustainability

GG New construction



Guides design and construction of new buildings (ANSI Standard)

GG Existing buildings



Assess and improve existing base buildings

Fit-up (CI)



Guides design of interior spaces.

Tenants



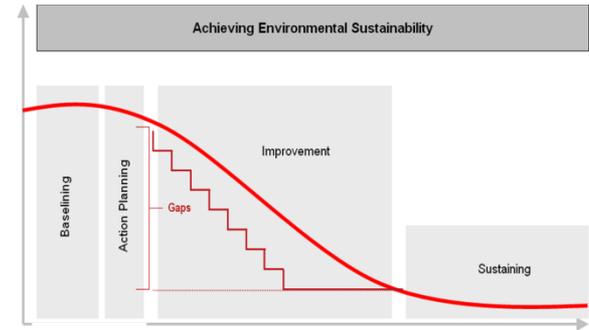
Assess and improve occupant behaviors

Building Emergency Management



Green Purchasing

Monitor and improve



Aggregate data for CSR reporting including carbon footprint





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Real value in a changing world

Thank you



GovEnergy 2010