

The logo features the words "GREEN DESIGN" in a bold, sans-serif font. "GREEN" is in a dark green color, while "DESIGN" is in white. A green leaf icon replaces the letter "I" in "DESIGN". The text is set against a light green background with a halftone dot pattern. Stylized green and white floral sprigs with leaves are positioned on either side of the text.

GREEN DESIGN

Wows and Woes

Caroline Lobo, Orcutt I Winslow

A horizontal decorative band in a light green color, featuring stylized floral and leaf patterns on the left and right sides. The text is centered within this band.

Wows: Importance of the Green Built Environment



Ecological???

Environmentally friendly???

Energy conscious ???

Sustainable ???

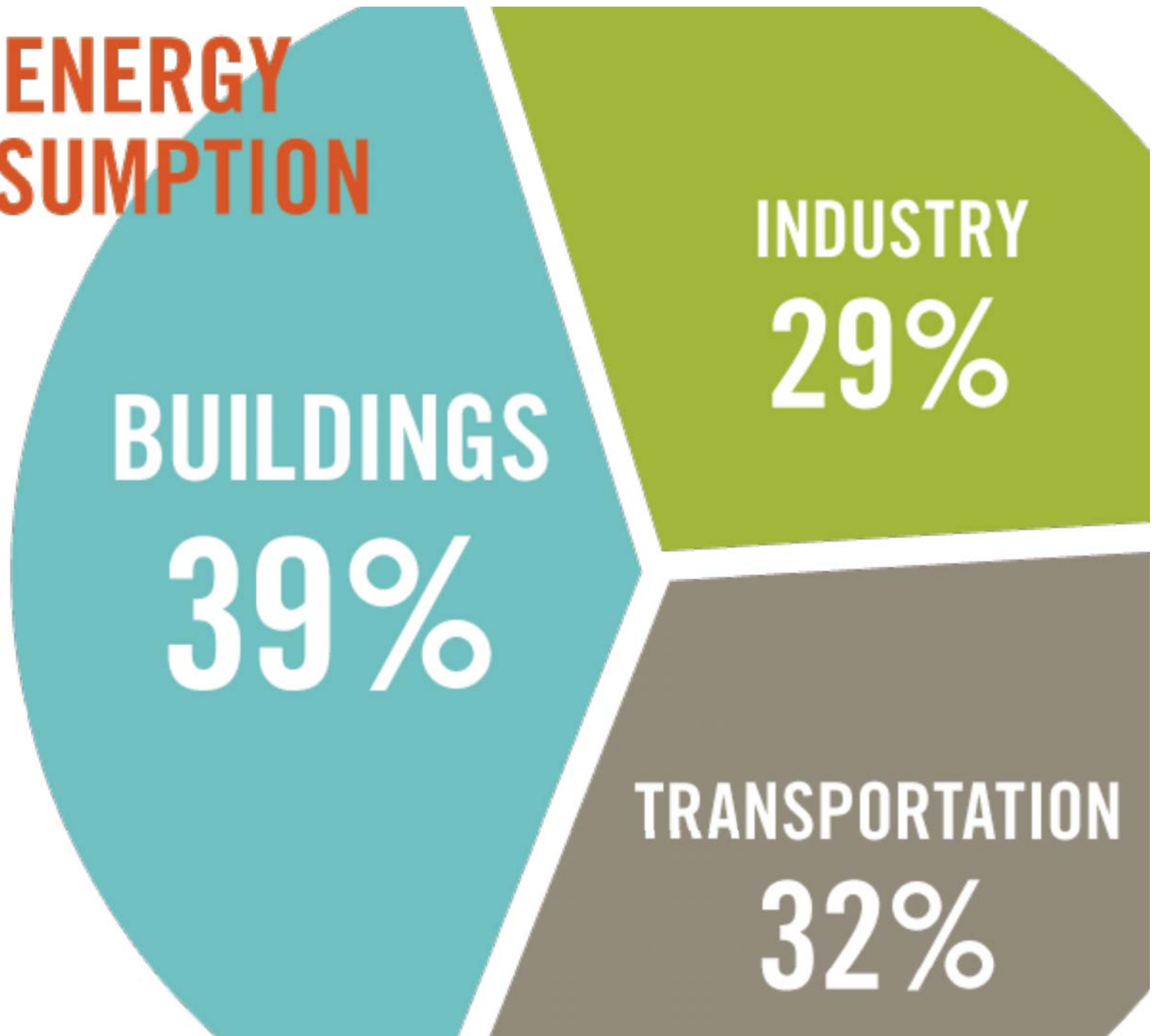
GREEN ???

U.S. ENERGY CONSUMPTION

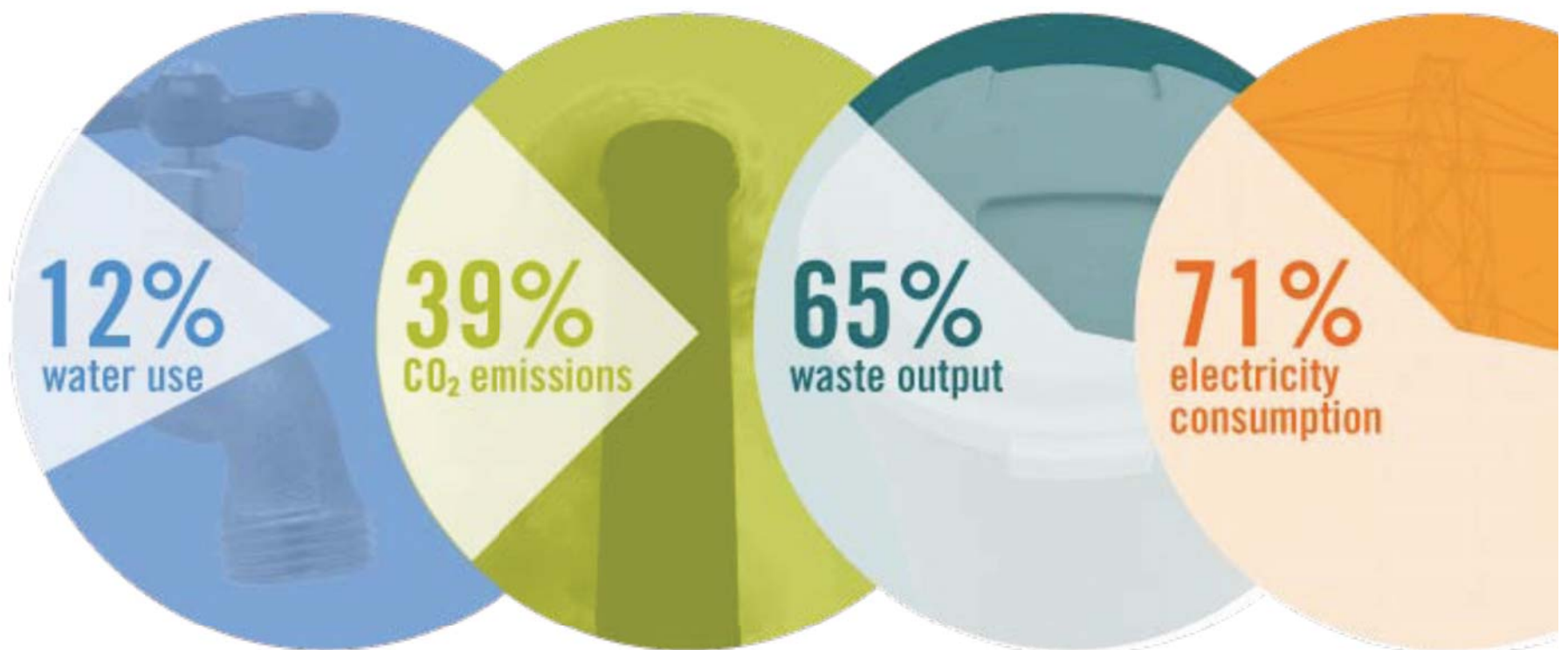
**BUILDINGS
39%**

**INDUSTRY
29%**

**TRANSPORTATION
32%**



U.S. Building Impacts:



- **Earth Day – June 1970**
- **Oil Crisis in US – mid 1970's**
- **Brandt Commission – 1980**
- **Brundtland Commission – 1987**
- **The Earth Summit - Agenda 21 Held in Brazil in 1992 (not attended by US)**
- **AIA Environmental Resource Guide - Initiated by EPA in 1992**
- **United States Green Building Council (USGBC) DOE/EPA initiative in 1993**
- **Green Building Challenge – 1998**
- **USGBC LEED 1.0 - 2000**



Overview of the emergence of 'Green'



Wows: Impact of the Green Movement



**PERCEIVED
ADVANTAGES OF
BUILDING GREEN**

8-9% decrease in operating costs

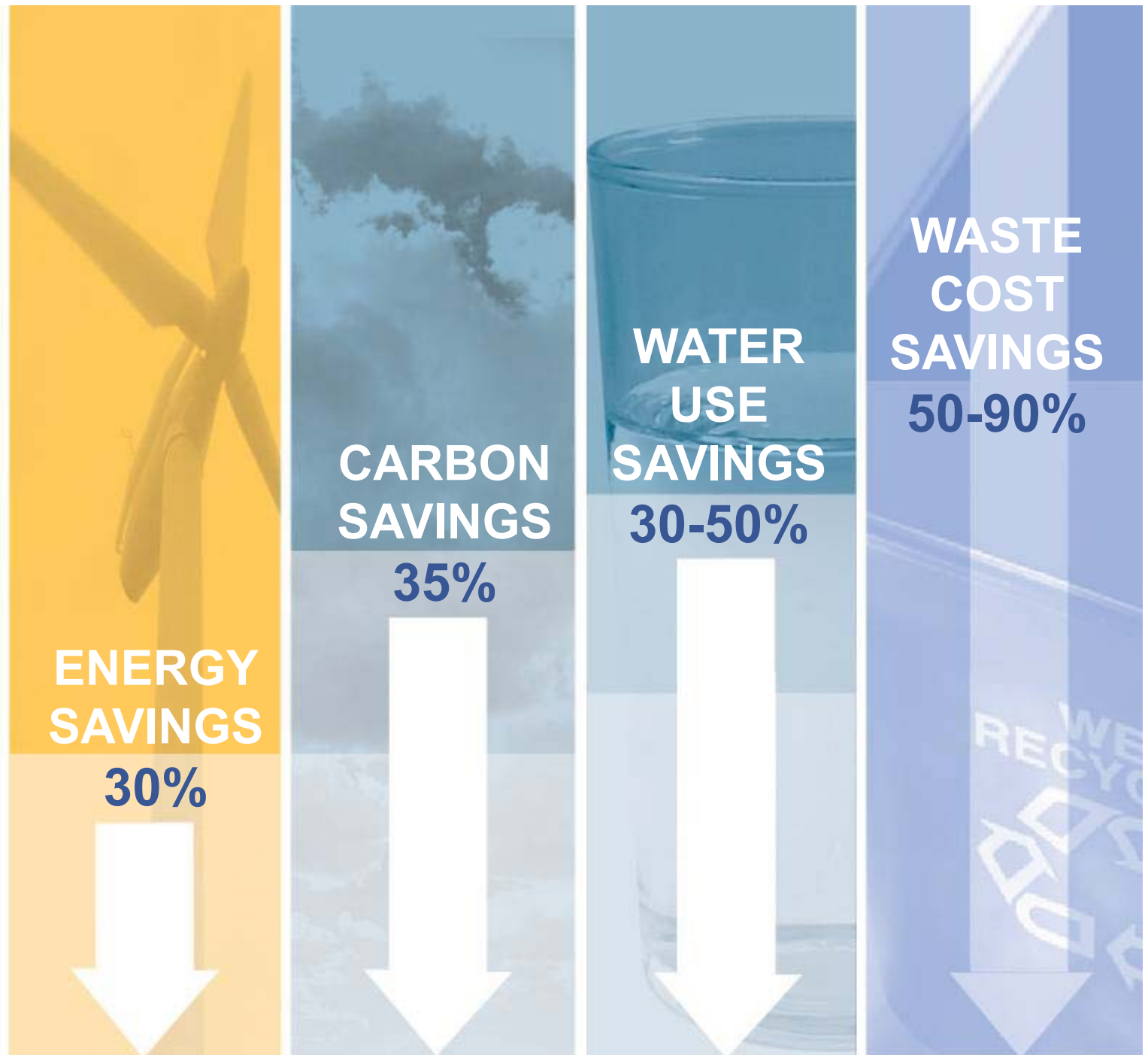
7.5% increase in building values

6.6% improvement in ROI

3.5% increase in occupancy

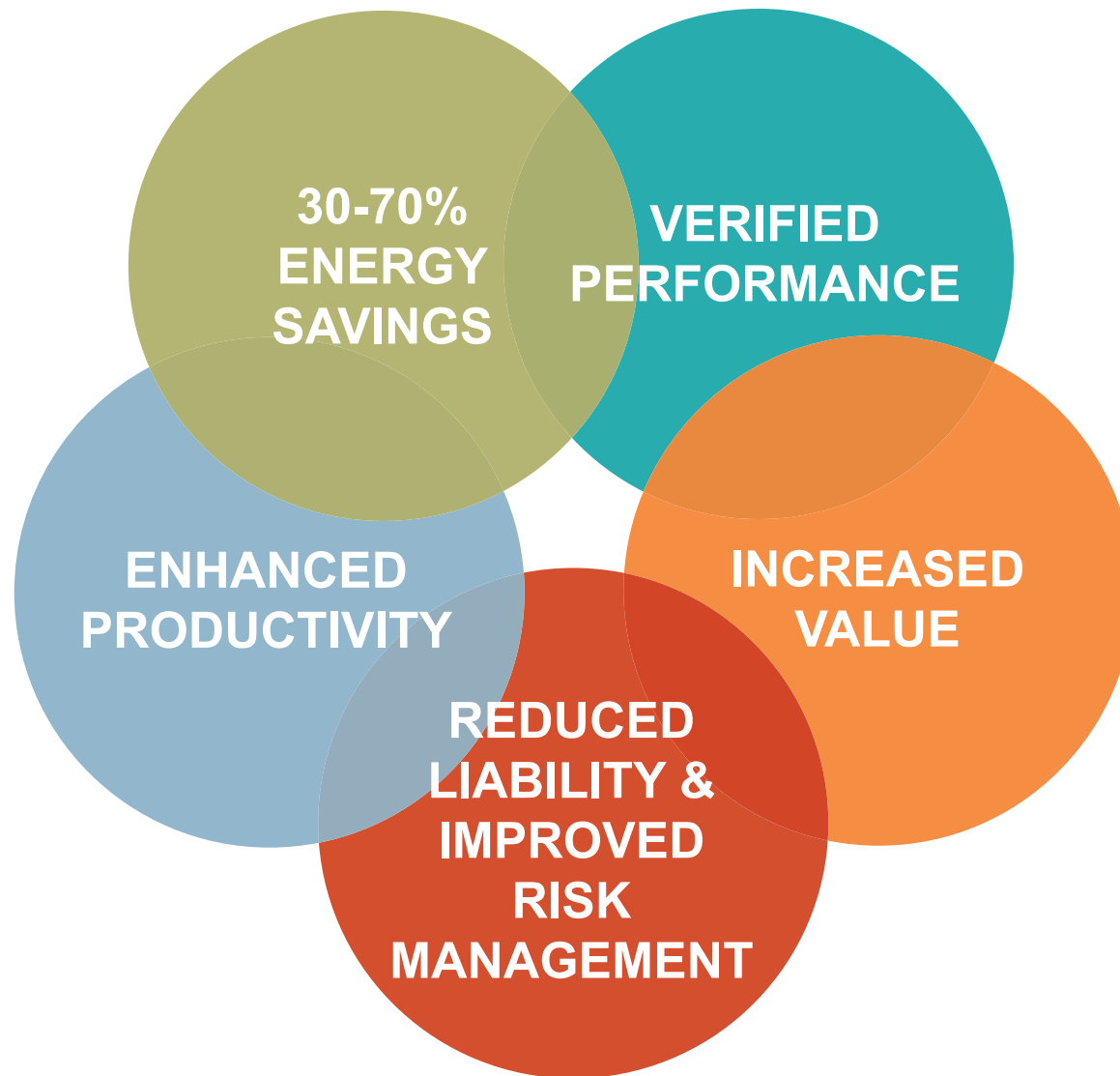
3% rent increase

Average Savings of Green Buildings

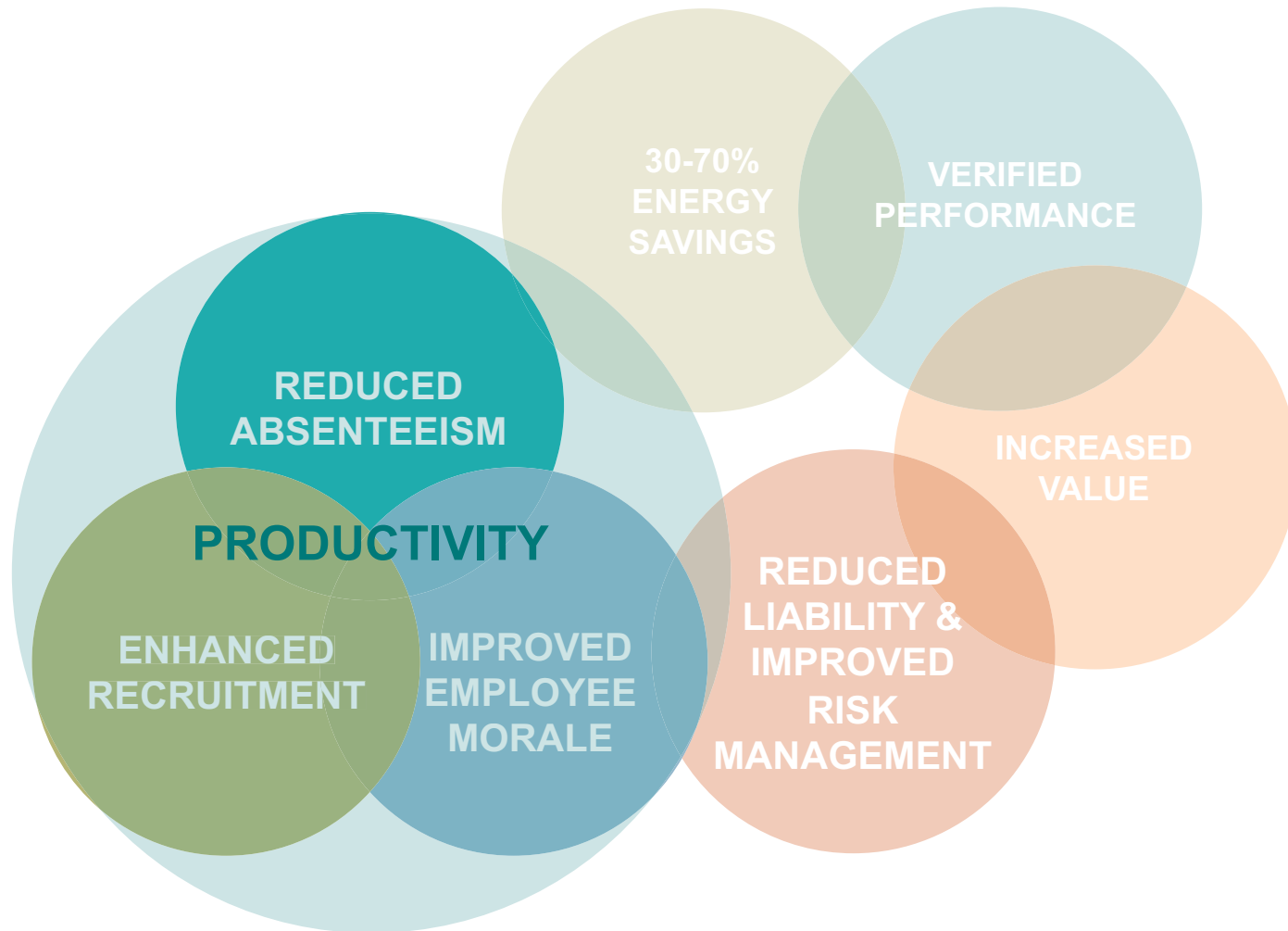


Source:
Capital E

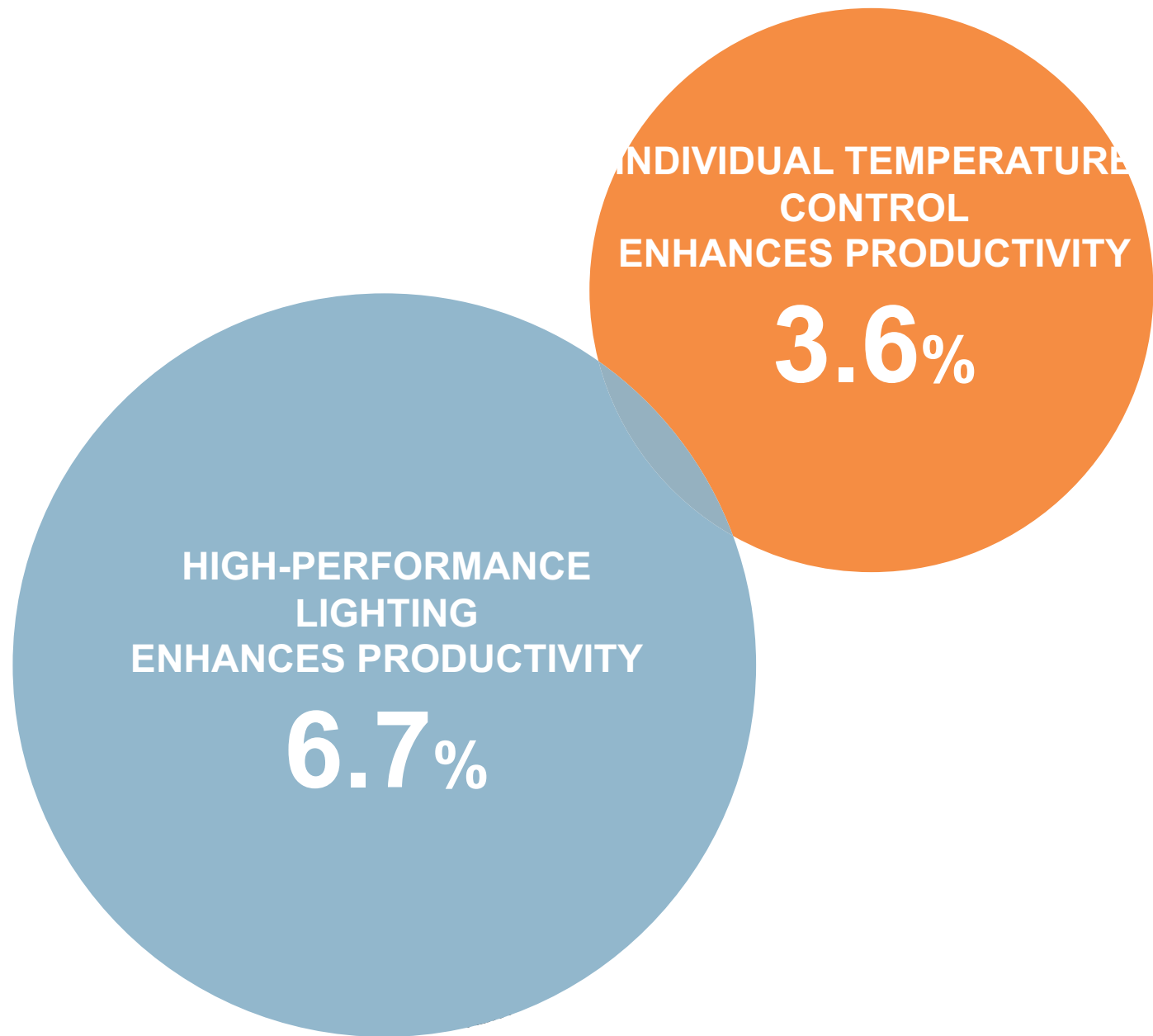
**Improved
Bottom
Line.**



Improved Bottom Line.



**Average
Productivity
Gains**



Increased Productivity.

SCHOOLS

20%
BETTER TEST
PERFORMANCE

HOSPITALS

EARLIER
DISCHARGE

RETAIL

INCREASE
IN SALES PER
SQUARE FOOT

FACTORIES

INCREASED
PRODUCTION

OFFICES

2-16%
PRODUCTIVITY
INCREASE



Review of Changes in the Building Industry



Nutrition Facts

Serving Size 8 crackers (28g)
Servings Per Container About 2

Amount Per Serving

Calories 120 Calories From Fat 30

% Daily Value*

Total Fat 3.5g 5%

Saturated Fat 1g 5%

Trans Fat 0g

Polyunsaturated Fat 1.5g

Monounsaturated Fat 0.5g

Cholesterol 0mg 0%

Sodium 140mg 6%

Total Carbohydrate 22g 7%

Dietary Fiber Less than 1g 3%

Sugars 7g

Protein 2g

Vitamin A 0% • Vitamin C 0%

Calcium 10% • Iron 4%

* Percent Daily Values are based on a 2,000

calorie diet.

CONTINUED ON OTHER SIDE

“As of 2006, **50% of builders** are focusing their attention on green building issues.”

National Association of Home Builders (NAHB)
March, 2006

“Between **40% and 50% of the homes** built in 2010 are expected to be green.”

National Association of Home Builders (NAHB)
March, 2007

**THE NEXT
GENERATION'S
PERSPECTIVE
WILL INCREASE
GREEN BUILDING**

89% choose brands aligned
with social cause

74% listen to brands aligned
with social cause

69% shop for brands aligned
with social cause

66% recommend brands aligned
with social cause

Changes to the practice of architecture, engineering & construction



BIM

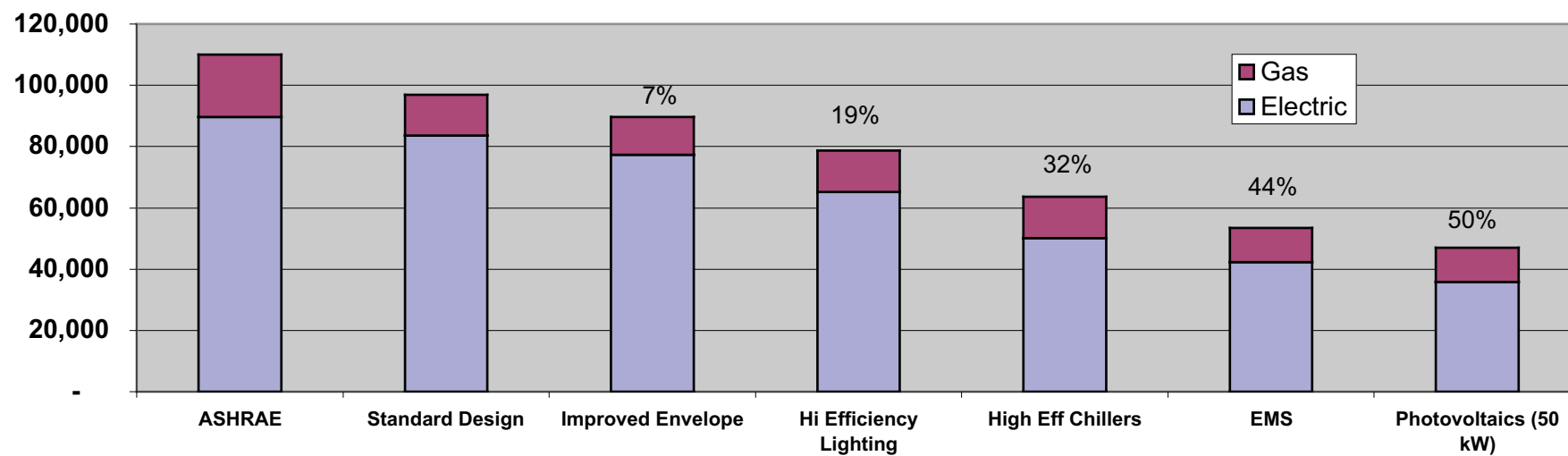


COLLABORATION



COMMISSIONING

ENERGY ANALYSIS



- **US – LEED (Leadership in Energy & Environmental Design)**
- **US – Energy Star**
- **US – Green Globes**
- **UK – BREEAM (Building Research Establishment Environmental Assessment Method)**
- **Canada - BREEAM**

Wows: Green Building Assessment Tools



Importance of benchmarking





PROVE IT.

CASE STUDY
30 Schools
Studied

33.4%

Average direct
energy savings

50%

Average indirect
energy savings

32.1%

Average water
savings



**DIRECT SAVINGS
FOR AN AVERAGE
GREEN SCHOOL**

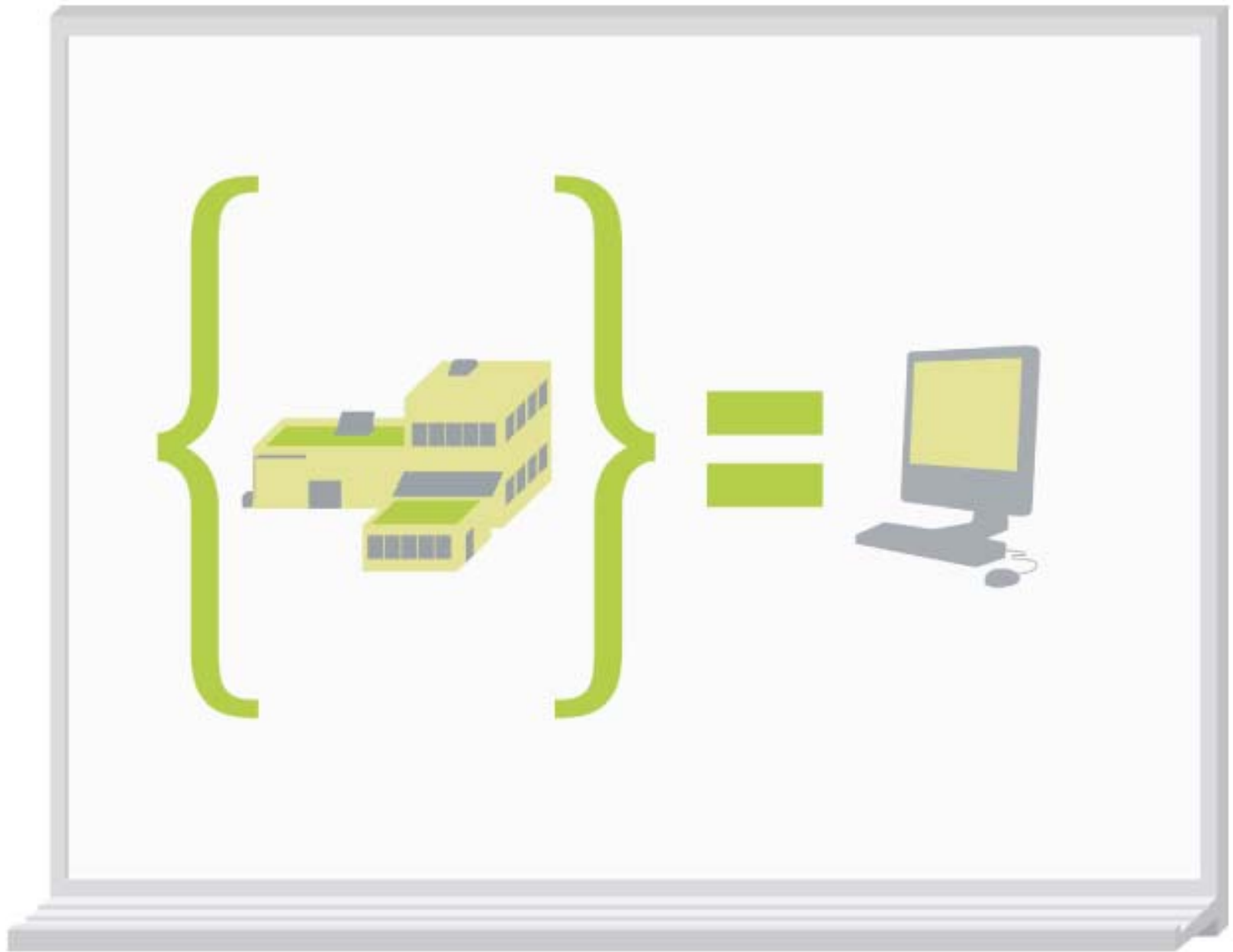
\$47,880

Annual Direct Energy Savings Per School

\$95,760

Annual Total Direct Savings Per School





**LEARNING
BENEFITS
OF GREEN
SCHOOLS**

=

+3%

INCREASE IN PRODUCTIVITY,
LEARNING, & PERFORMANCE

AND

-3%

DECREASE IN
TEACHER TURNOVER





Overview of LEED, Green Globes



USGBC's mission

To transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy and prosperous environment that improves the quality of life.

LEED Is Consensus-Based





What is the LEED System?

LEADERSHIP in ENERGY and ENVIRONMENTAL DESIGN

A leading-edge system
for certifying
DESIGN, CONSTRUCTION, & OPERATIONS
of the greenest
buildings in the world

Scores are tallied for
different aspects of
efficiency and design
in appropriate
categories.

For instance, LEED
assesses in detail:

1. Site Planning
2. Water Management
3. Energy Management
4. Material Use
5. Indoor
Environmental
Air Quality
6. Innovation &
Design Process

Green Facts

John M. Langston High School
Continuation & Langston-Brown
Community Center
Arlington, Virginia

LEED-NC rating out of 69

Silver 35

Sustainable Site 8

Water Efficiency 3

Energy & Atmosphere 4

Materials & Resources 6

Indoor Environmental
Quality 11

Innovation & Design 3

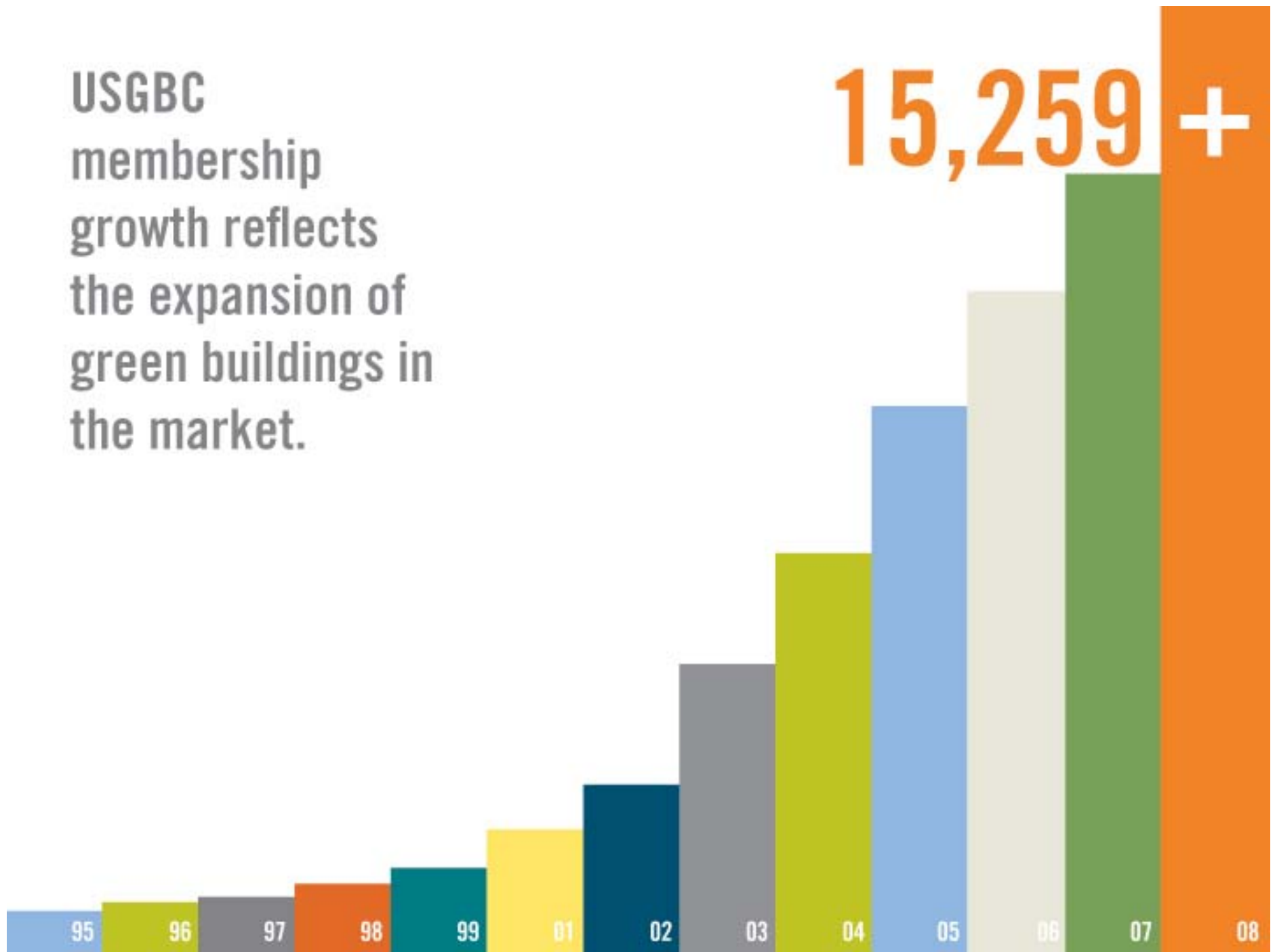
USGBC LEED-NC rated Sept. 3, 2003.





USGBC
membership
growth reflects
the expansion of
green buildings in
the market.

15,259 +





GREEN BUILDING CERTIFICATION INSTITUTE

HEREBY CERTIFIES THAT

51,452

HAS ACHIEVED THE DESIGNATION OF

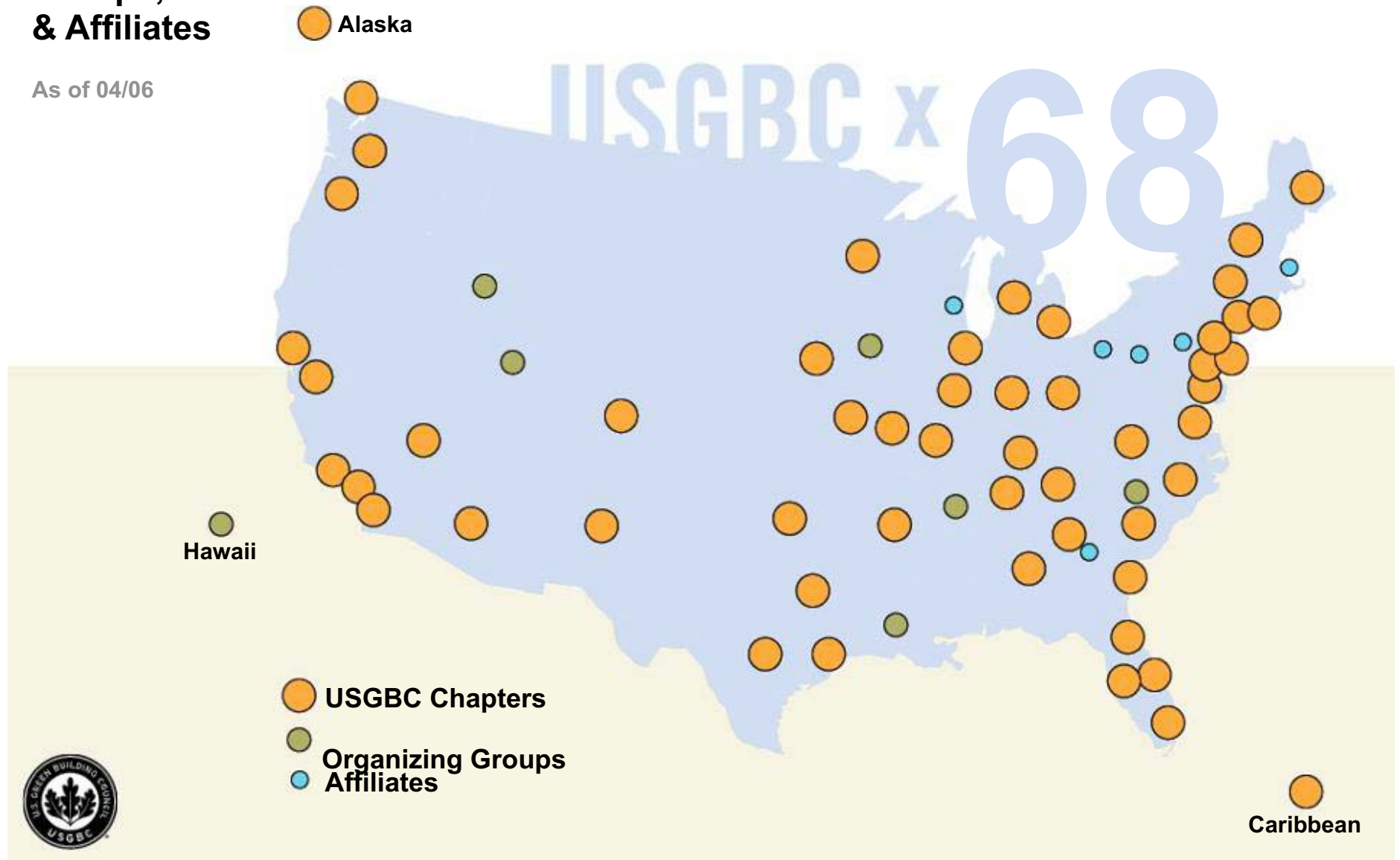
LEED® ACCREDITED PROFESSIONAL

BY DEMONSTRATING THE KNOWLEDGE OF GREEN BUILDING PRACTICE
REQUIRED FOR SUCCESSFUL IMPLEMENTATION OF THE LEADERSHIP IN ENERGY
AND ENVIRONMENTAL DESIGN (LEED®) GREEN BUILDING RATING SYSTEM™.



USGBC Chapters, Organizing Groups, & Affiliates

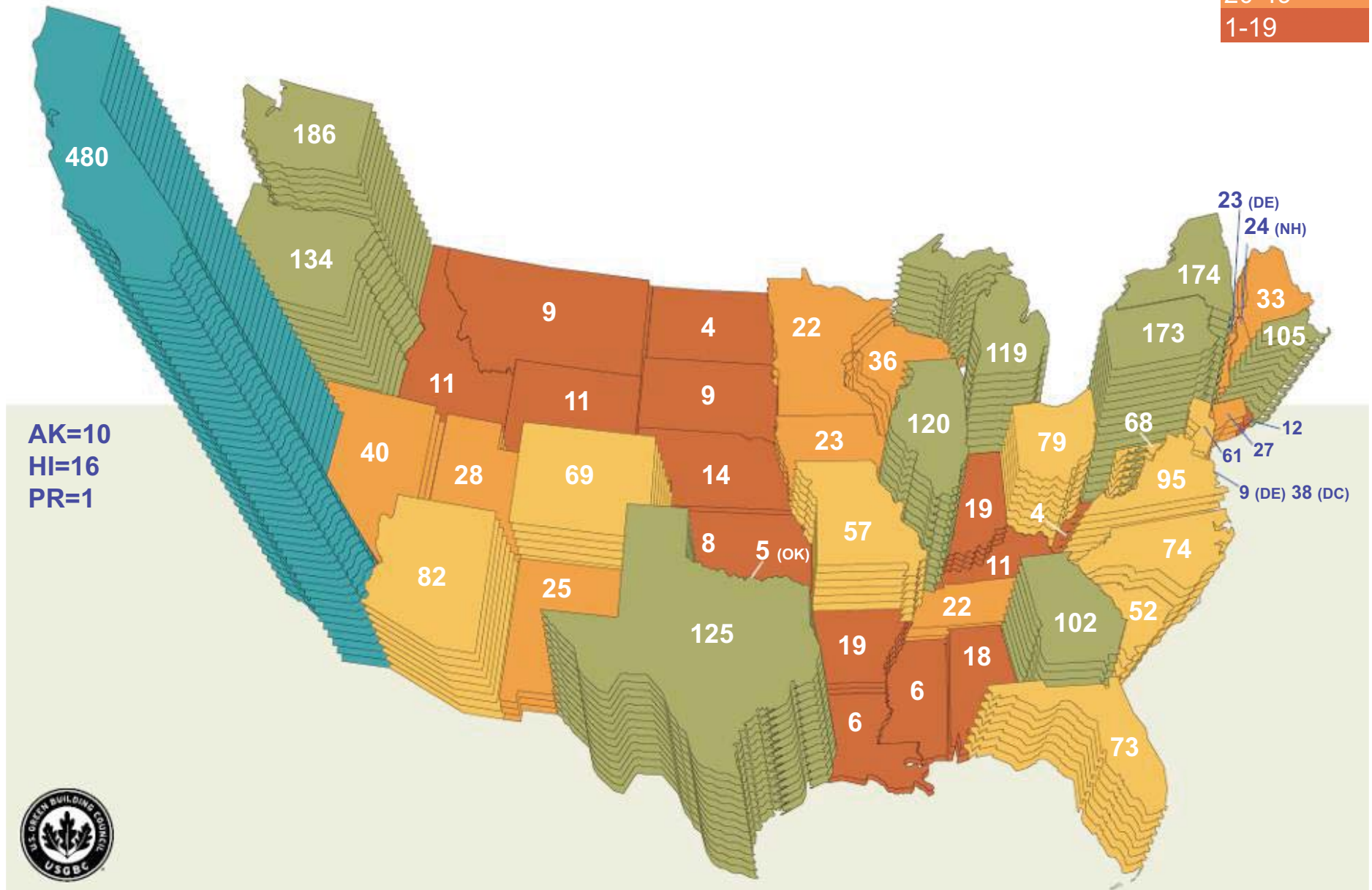
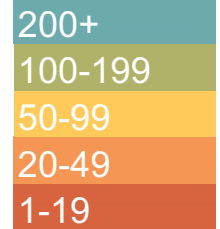
As of 04/06



LEED for new construction buildings

as of 07/06

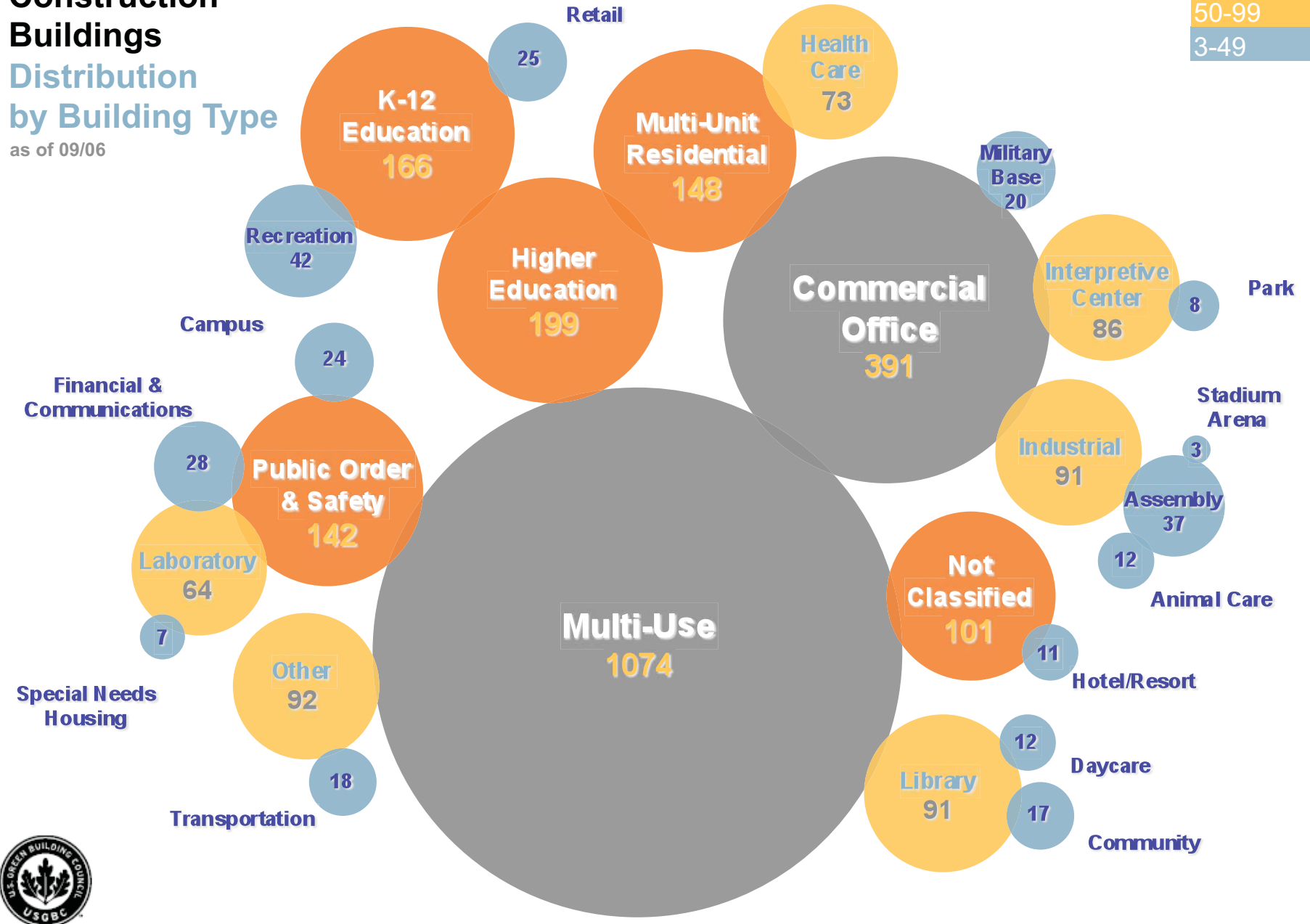
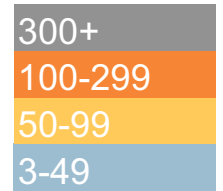
Distribution
by geography



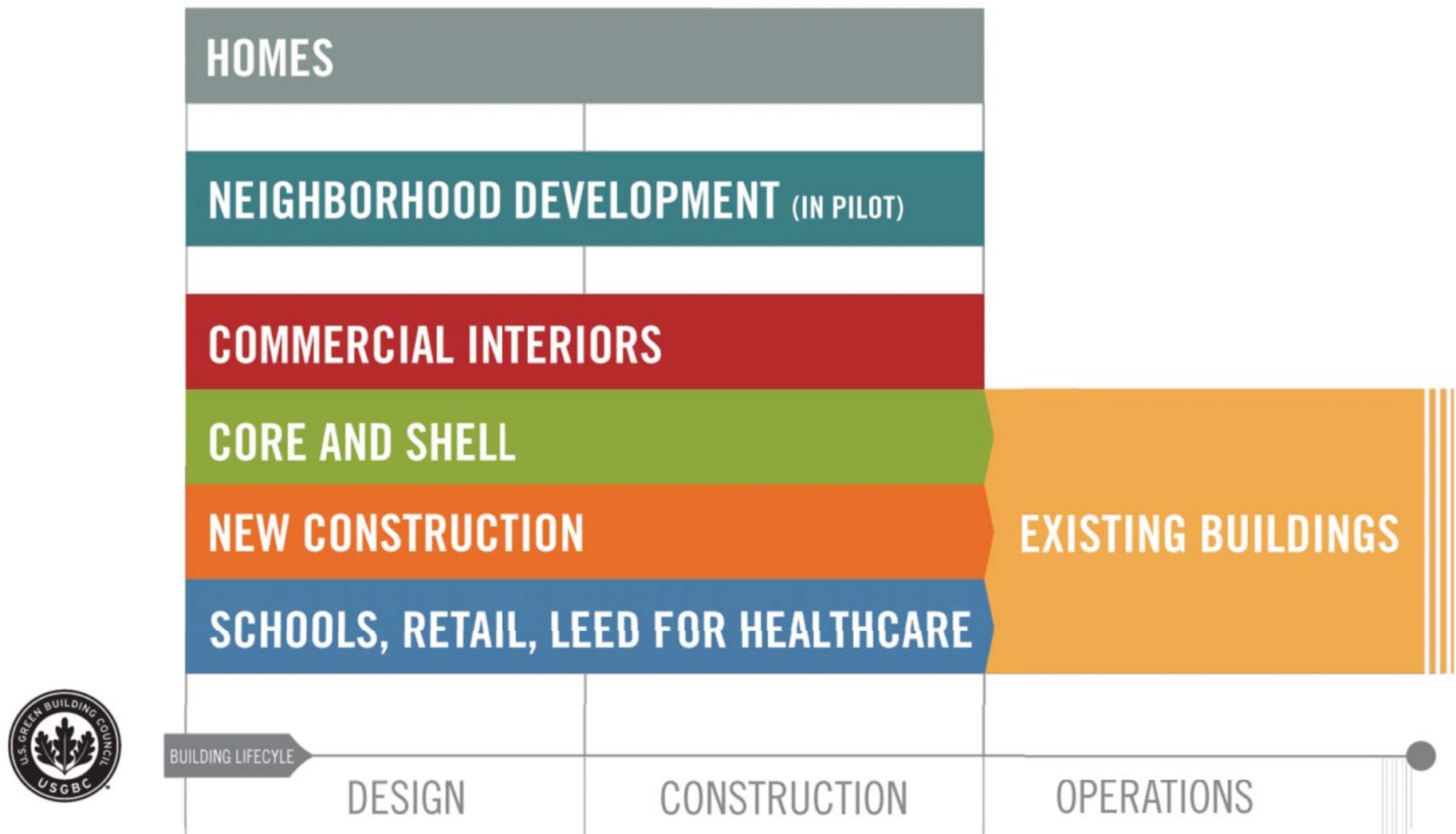
LEED for New Construction Buildings

Distribution by Building Type

as of 09/06



**LEED addresses the
complete lifecycle
of buildings:**





LEED for Schools Credit Modifications to NC v2.2

Updated on 7/20/2015

35 6 14 9

Possible Points 77

7 1 6 3 Sustainable Sites Possible Points 16

MC	Cr	Mod	Rev	Prereq	Cr	Mod	Rev	Points
				Prereq 1	Erosion & Sedimentation Control			
					Environmental Contamination Free Site			
				Cr 1	Site Selection			1
				Cr 2	Development Density and Community Connectivity			1
				Cr 3	Brownfield Redevelopment			1
				Cr 4.1	Alternative Transportation, Public Transportation Access			1
				Cr 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms			1
				Cr 4.3	Alternative Transportation, Low-Emitting/Fuel Efficient Vehicles			1
				Cr 4.4	Alternative Transportation, Parking Capacity			1
				Cr 5.1	Site Development, Protect or Restore Habitat			1
				Cr 5.2	Site Development, Maximize Open Space			1
				Cr 6.1	Stormwater Design, Quantity Control			1
				Cr 6.2	Stormwater Design, Quality Control			1
				Cr 7.1	Heat Island Effect, Non-Roof			1
				Cr 7.2	Heat Island Effect, Roof			1
				Cr 8	Light Pollution Reduction			1
					Future Expansion Within Master Plan			1
					Joint Use of Facilities			1

5 1 1 Water Efficiency Possible Points 6

MC	Cr	Mod	Rev	Cr	Mod	Rev	Points
				Cr 1.1	Water Efficient Landscaping, Reduce by 50%		1
				Cr 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation		1
				Cr 2	Innovative Wastewater Technologies		1
				Cr 3.1	Water Use Reduction, 20% Reduction		1
				Cr 3.2	Water Use Reduction, 30% Reduction		1
				Cr 4	Process Water Use Reduction, 20% Reduction		1

3 2 1 Energy & Atmosphere Possible Points 17

MC	Cr	Mod	Rev	Prereq	Cr	Mod	Rev	Points
				Prereq 1	Fundamental Building Systems Commissioning			
				Prereq 2	Minimum Energy Performance			
				Prereq 3	Fundamental Refrigerant Management			
				Cr 1.1	Optimize Energy Performance			10
				Cr 2.1	On-Site Renewable Energy			3
				Cr 3	Enhanced Commissioning			1
				Cr 4	Enhanced Refrigerant Management			1
				Cr 5	Measurement & Verification			1
				Cr 6	Green Power			1

Table Key:

	No change from NC
	Clarification on requirements
	Modification, deletion or addition to requirements
	New credit or prerequisite

13 13 Materials & Resources Possible Points 13

MC	Cr	Mod	Rev	Prereq	Cr	Mod	Rev	Points
				Prereq 1	Storage & Collection of Recyclables			
				Cr 1.1	Building Reuse, Maintain 75% of Existing Walls, Floors & Roof			1
				Cr 1.2	Building Reuse, Maintain 100% of Existing Walls, Floors & Roof			1
				Cr 1.3	Building Reuse, Maintain 50% of Interior Non-Structural Elements			1
				Cr 2.1	Construction Waste Management, Divert 50%			1
				Cr 2.2	Construction Waste Management, Divert 75%			1
				Cr 3.1	Resource Reuse, Specify 5%			1
				Cr 3.2	Resource Reuse, Specify 10%			1
				Cr 4.1	Recycled Content, Specify 10% PC + R			1
				Cr 4.2	Recycled Content, Specify 20% PC + R			1
				Cr 5.1	Regional Materials, 20% Manufactured Locally			1
				Cr 5.2	Regional Materials, of 20% Above, 50% Harvested Locally			1
				Cr 6	Rapidly Renewable Materials			1
				Cr 7	Certified Wood			1

6 2 7 4 Indoor Environmental Quality Possible Points 19

MC	Cr	Mod	Rev	Prereq	Cr	Mod	Rev	Points
				Prereq 1	Minimum IAQ Performance			
				Prereq 2	Environmental Tobacco Smoke (ETS) Control			
				Prereq 3	Minimum Acoustical Performance			
				Cr 1	Outdoor Air Delivery Monitoring			1
				Cr 2	Increased Ventilation			1
				Cr 3.1	Construction IAQ Management Plan, During Construction			1
				Cr 3.2	Construction IAQ Management Plan, Before Occupancy			1
				Cr 4.1	Low-Emitting Materials, Adhesives & Sealants			1
				Cr 4.2	Low-Emitting Materials, Paints & Coatings			1
				Cr 4.3	Low-Emitting Materials, Flooring Systems			1
				Cr 4.4	Low-Emitting Materials, Composite Wood & AgriFiber Products			1
				Cr 5.1	Indoor Chemical & Pollutant Source Control			1
				Cr 5.2	Lighting System Design & Controllability			1
				Cr 5.3	Thermal Comfort Controllability			1
				Cr 7.1	Indoor Environmental Comfort, Design			1
				Cr 7.2	Indoor Environmental Comfort, Verification			1
				Cr 8.1	Daylight & Views, Daylight 75% of Spaces			1
				Cr 8.2	Daylight & Views, Views for 90% of Spaces			1
					Enhanced Acoustical Performance			2
					Mold Prevention			1
					Low Impact Cleaning and Maintenance Equipment Policy			1

1 1 1 Innovation & Design Possible Points 3

MC	Cr	Mod	Rev	Cr	Mod	Rev	Points
				Cr 1.1	Innovation in Design		4
				Cr 2	LEED Accredited Professional		1
				Cr 3	The School As A Teaching Tool		1

Consensus-Based Standards

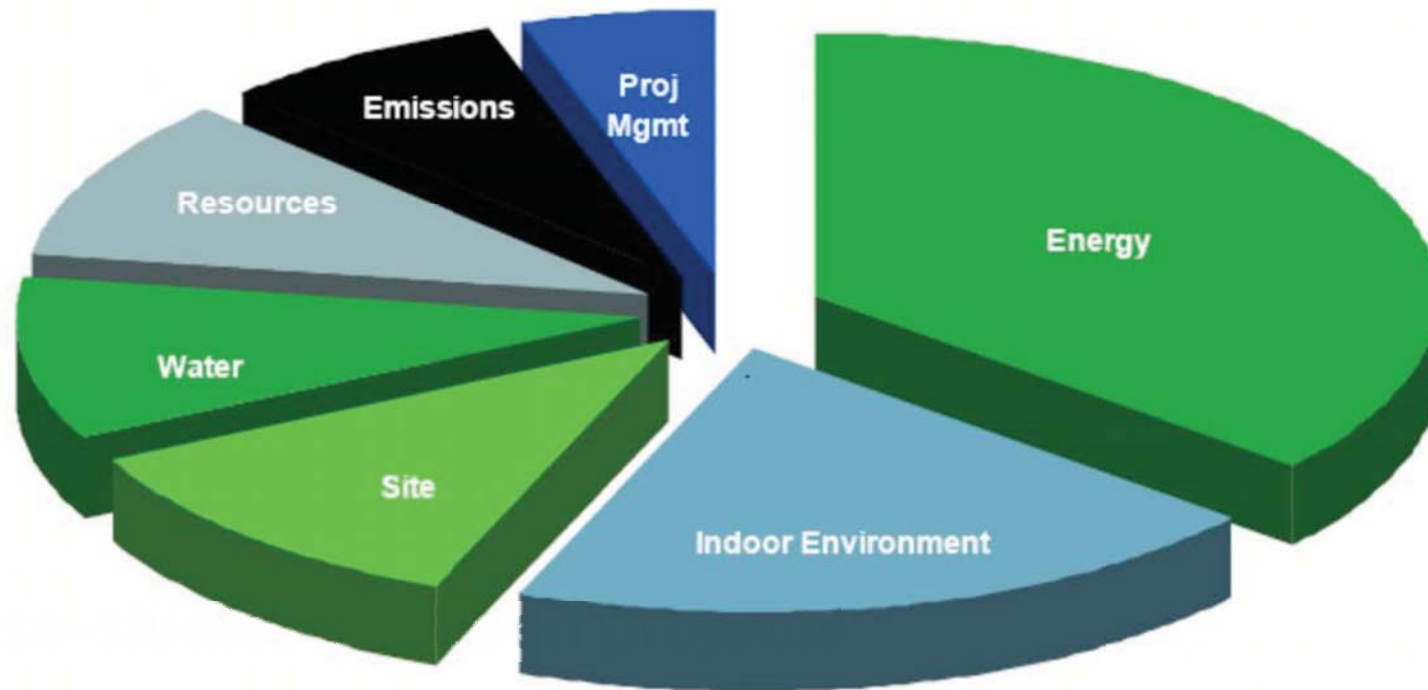
USGBC has four levels of LEED:





Green Globes – Green Building Initiative (GBI)

Seven Areas of Assessment



Seven Areas of Assessment

1 Project Management (50 pts.)

- ✓ **Integrated design process**
- ✓ **Environmental purchasing**
- ✓ **Commissioning (plans for systems testing after construction)**
- ✓ **Emergency response plan**



Seven Areas of Assessment

2 Site (115 pts.)

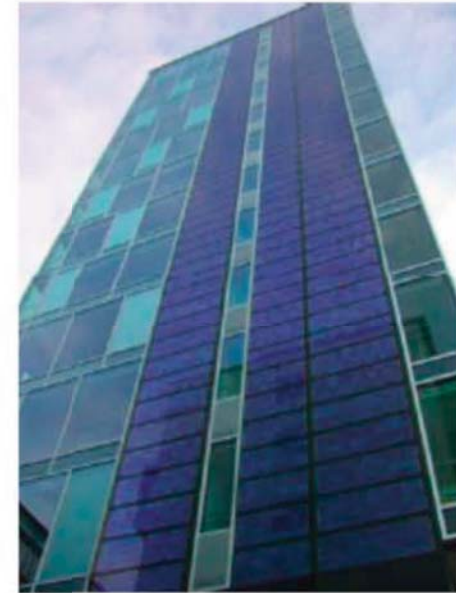
- ✓ **Development area**
- ✓ **Ecological impacts**
(erosion, heat island, light pollution)
- ✓ **Watershed features**
- ✓ **Site ecology enhancement**



Seven Areas of Assessment

3 Energy (360 pts.)

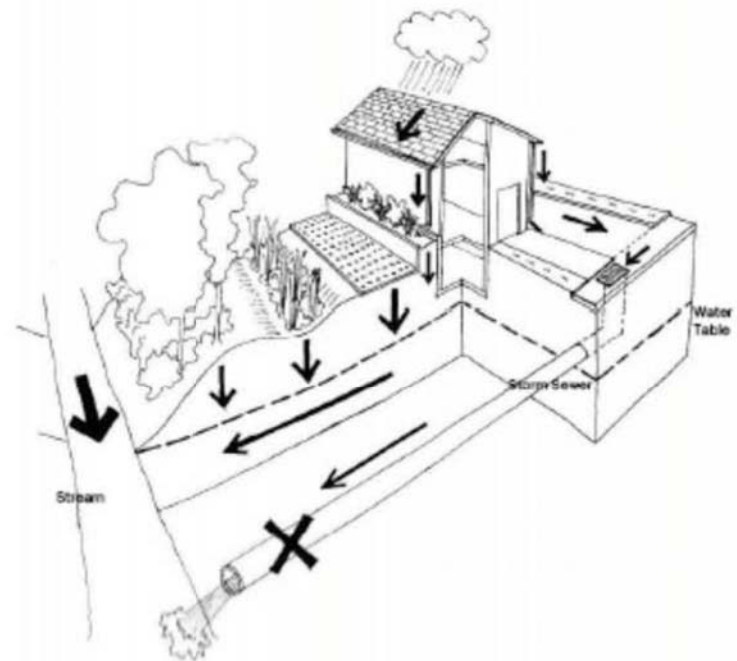
- ✓ **Energy performance**
- ✓ **Reduced demand (space optimization, microclimatic design, daylighting, envelope design, metering)**
- ✓ **Energy efficiency features (lighting, heating & cooling equipment).**
- ✓ **Renewable energy (solar, wind, biomass, etc)**
- ✓ **Transportation**



Seven Areas of Assessment

4 Water (100 pts.)

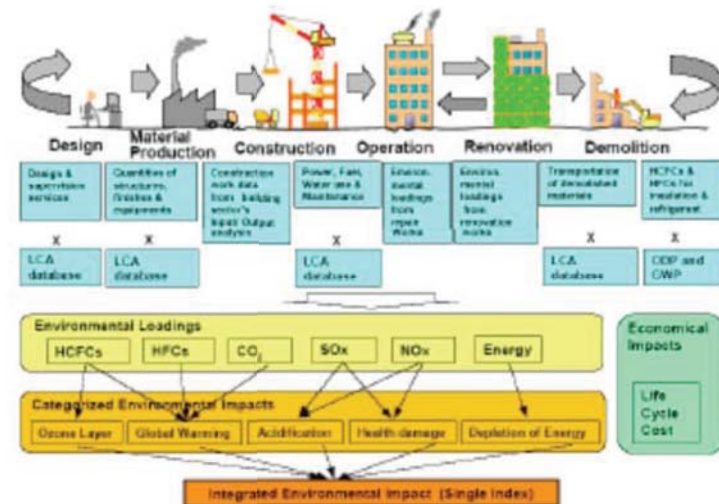
- ✓ **Water performance**
- ✓ **Water conserving features (equipment, meters, irrigation systems)**
- ✓ **On-site treatment (stormwater, greywater, blackwater)**



Seven Areas of Assessment

5 Resources (100 pts.)

- ✓ **Low-impact systems and materials (LCA)**
- ✓ **Minimal use of non-renewables**
- ✓ **Reuse of existing buildings**
- ✓ **Durability, adaptability and disassembly**
- ✓ **Demolition waste (reduce, reuse, recycle)**
- ✓ **Recycling & composting facilities**



Seven Areas of Assessment

6 Emissions, Effluents & Other Impacts (75 pts.)

- ✓ **Air emissions (boilers)**
- ✓ **Ozone depletion**
- ✓ **Sewer & waterway protection**
- ✓ **Pollution control (procedures, compliance with standards)**



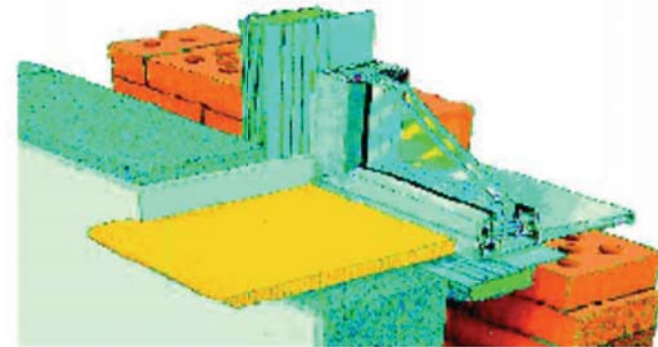
Recuperative boiler



Seven Areas of Assessment

7 Indoor Environment (200 pts.)

- ✓ Ventilation system
- ✓ Indoor pollution control
- ✓ Lighting (daylighting & electric)
- ✓ Thermal comfort
- ✓ Acoustic comfort



Project List sortable by any field

[HOME](#) | [WHAT BUILD GREEN](#) | [GREEN RESOURCES](#) | [ABOUT GBI](#) | [COMMERCIAL](#) | [RESIDENTIAL](#) | [JOIN](#) | [HELP](#)



Environmental Assessment for
New Commercial Buildings

[YOUR PROJECT LIST](#) | [INSTRUCTIONS](#) | [DEMONSTRATION](#) | [USER FORUM](#) | [MANAGE MY ACCOUNT](#) | [LOGOUT](#)

[SELECT ADD PROJECT](#)

[SELECT STAGE](#)

[SELECT SECTION](#)

[COMPLETE GUES DONOR NAME](#)

[VIEW REPORT](#)

User: [ustest1@greenglobes.com](#)

[Need Help?](#)
[Read Instructions >](#)
[Enter the User Forum >](#)
[View Demo >](#)

Your Project List

Select a column header to sort

 Project	Proj. leader	Address	City	St.	Proj. client
Alberici HQ		8800 Page Ave.	Overland	MO	Alberici Redevelopment Corporation
Downtown Condominium		123 Numbered Street	New York	NY	The Client
Family Centre		Green Lane	New York	NY	Family Group
Gateway Project		Washington DC	Washington DC	DC	n/a
Headquarters		1111 10th Street	n/a	WI	n/a
Immigrant Women's Centre		1096 Genard Street East	n/a	IL	n/a
Learning Center		1096 Genard Street East	Little Rock	AR	Immigration US
Test - Baker's Hall 1		2550 NE Park Drive 1	Issaquah 1	WA	n/a
US Bad Project		123 Bad St.	Albany	NY	Acme Realty
US Good Building		123 Good St.	Little Rock	AR	Acme Realty
Womens Centre		1000 Progress St	New York	NY	Immigrant Womens Centre





You are currently approved to use the system for 11 projects, and have 11 projects entered.

[Add a new project](#)



Green Globes™ Ratings

Once an assessment is verified by a third party, properties achieving a score of 35% or more receive a Green Globes rating based on the percentage of total points (up to 1000) achieved.

85-100%		Reserved for select building designs which serve as national or world leaders in energy and environmental performance. The project introduces design practices that can be adopted and implemented by others.
70-84%		Demonstrates leadership in energy and environmental design practices and a commitment to continuous improvement and industry leadership.
55-69%		Demonstrates excellent progress in achieving eco-efficiency results through current best practices in energy and environmental design.
35-54%		Demonstrates movement beyond awareness and commitment to sound energy and environmental design practices by demonstrating good progress in reducing environmental impacts.



Verification Choices

1. **Third Party Verification** (required to receive a rating from Green Globes)
\$4,000 - \$6,000 per building, depending on complexity, size and distance travel costs for verifier
2. **Self Assessment** for those who don't need or want to promote their building as having a rating from Green Globes.

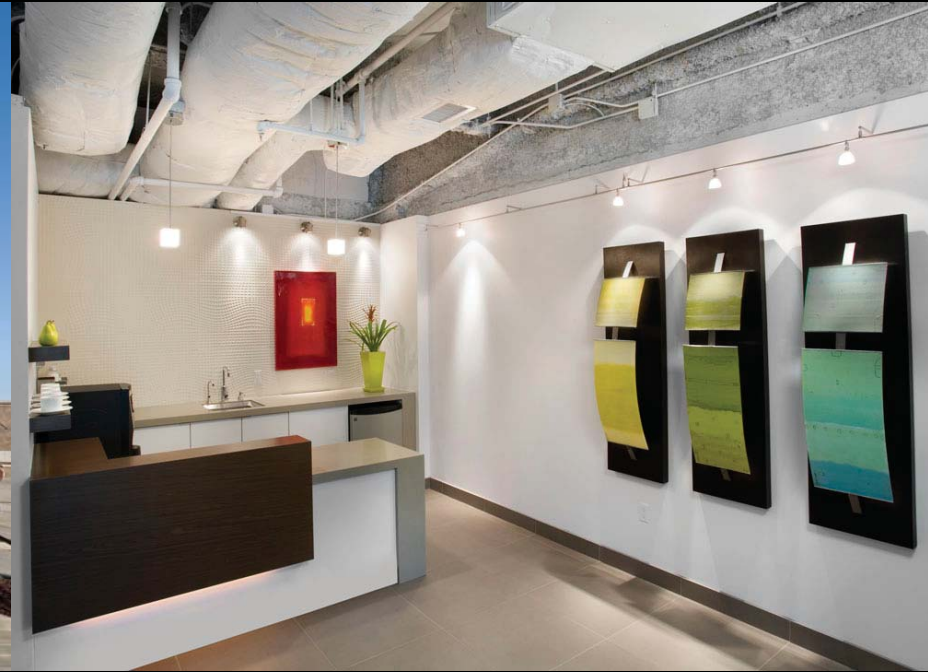
Flexible Membership Options

Use of the Green Globes New Construction module is a benefit of Affiliation with GBI as a Professional Associate
(only one membership needed per firm)



Third Party Verification costs \$4-6,000 per building





Case-studies of Green projects

Being committed to Green – does not mean you are

- green claims based on the purchase of "renewable energy credits." RECs are a type of financial arrangement that companies increasingly use to justify assertions that they have reduced their net contribution to global warming. But the most commonly used RECs, which are supposed to result in a third party's developing pollution-free power, turn out to be highly dubious

- Ecoimagination (marketing)

Woes: Understanding the Green Building Industry



Greenwashing



Green·wash
(grēn'wōsh',
-wôsh')

"verb: the act of misleading consumers regarding practices of a company or the environmental benefits of a product or service."

What's the risk?

Communication people are no ecologists

*Communication people are trained to
develop ideal pictures. The line between
'telling the truth in the best way' and
'greenwashing' is small...*

The sin of the hidden trade off:

Suggestion of being Green, based on a single environmental attribute, while blurring all other parameters which are maybe more important

Example:

Lexus SUV claiming to be sustainable because of their new hybrid technology, however emission can be the same (or even more) as regular cars

The sin of no proof:

An environmental claim that cannot be substantiated by easily accessible supporting information, or by reliable third-party certification, commits the Sin of No Proof.

Examples:

- Household lamps and lights that promote their energy efficiency without any supporting evidence or certification.
- Personal care products (such as shampoos and conditioners) that claim not to have been tested on animals, but offer no evidence or certification of this claim.

The sin of vagueness:

The sin of vagueness is committed by every claim that is so poorly defined or broad that its real meaning is likely to be misunderstood by the intended client.

Examples:

- “Chemical-free”. In fact, nothing is free of chemicals. Water is a chemical. All plants, animals, and humans are made of chemicals as are all of our products
- VISA Green Card: it is vague to the customer how using their GreenCard contributes to a better environment: We contribute to ‘Green Projects’ (what? How much? How?)

The sin of irrelevance:

The sin of irrelevance is committed by making an environmental claim that may be truthful, but is unimportant and unhelpful for customers seeking environmentally preferable products. It is irrelevant and therefore distracts the consumer from finding a truly greener option.

Examples:

- The mention of Unleaded: Hardly all fuel in Europe is unleaded.
- CFC-free shaving gels, CFC-free oven cleaners, >>>CFK-free fridges, ..

The sin of lesser of two evils:

These are “green” claims that may be true within the product category, but that risk distracting the consumer from the greater environmental impacts of the category as a whole.

Examples:

- Green pesticides, organic cigarettes
- The suggestion of “green cars”. Green cars do not exist. In the best case, today some manufacturers offer “less pollution cars”.
- Shell claiming eco-friendliness due to one activity (capturing CO₂ for agriculture), while others still are very polluting.

The sin fibbing:

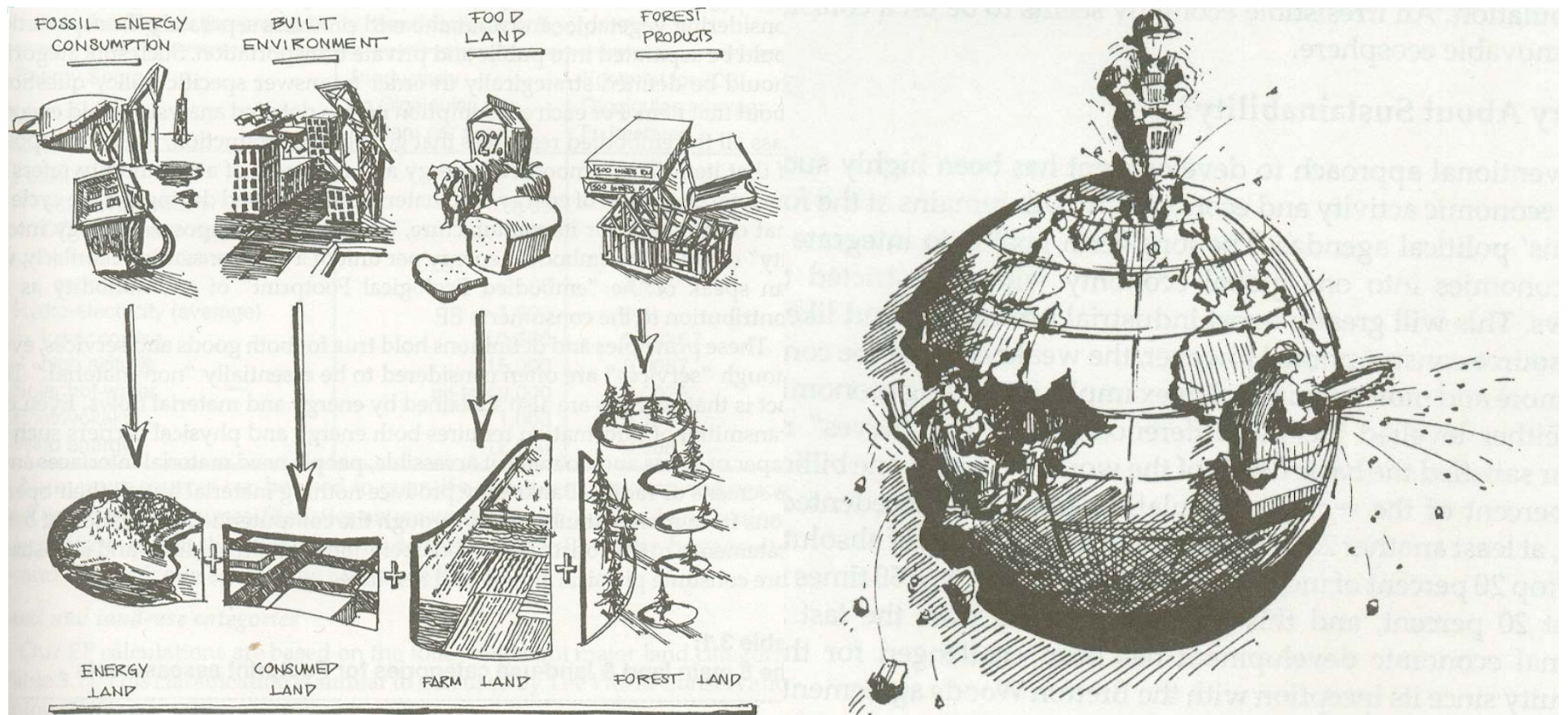
The sin of fibbing is committed by making environmental claims that are simply false

Examples:

- Exxon Mobile reporting to have reduced its emissions while their emissions have been raised.
- “With Daihatsu, you drive climate-neutral” is not true they only offset your driving in the very first year. On top of that the eco-footprint of manufacturing is not included.

- Its all about the points
- Performance claims
- Green (energy simulation) and BIM – higher standard of care
- Contractual Language
- Net-zero, carbon-neutral, 20-30 challenge
- Ecological Footprint
- Benchmarking

Pitfalls of the Green Building Industry, Being aware!



Slide credits:

www.usgbc.org

www.greenglobes.com

<http://www.terrachoice.com/Home/Six%20Sins%20of%20Greenwashing/The%20Six%20Sins>

"Our Ecological Footprint: Reducing Human Impact on the Earth", [Williams E. Rees](#) and [Mathis Wackernagel](#)