

Beaufort County's Sustainable Initiatives,

LEED, Rainwater Harvesting,

& much, much more!

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“You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.” R Buckminster Fuller

- Two biggest development policy debates of our generation - CLIMATE CHANGE & PETROLEUM have mysteriously ignored the idea of changes to the built environment, and instead seek out solutions that are easy to do now!
 - Technical fixes:
 - like light bulbs
 - energy rated appliances
 - rating buildings
 - better carsare essential but probably insufficient without major changes to land use and behavior.
 - Recent fuel cost increases have spurred talk of more drilling or the prospects of ethanol and hydrogen; yet, no mention of our sprawling landuse patterns and autocentric scale of development

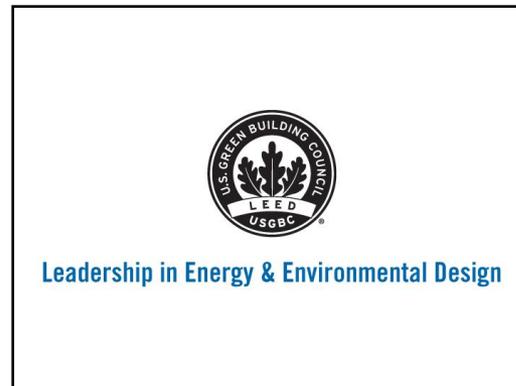
Area Planner's are doing their part to promote technical advances as well as local changes in landuse and behavior.

- BC is drafting 2 Comprehensive Plans...The 1st is a County-wide plan that will have an Energy Element
- The 2nd, The Daufuskie Island Community Plan is based entirely on the concept of Sustainable Urbanism (which links elements of Smart Growth, New Urbanism, and the US Green Building Council's LEED program together)
- Both Plans address global and regional sustainability by focusing on public and private sector development and behavior:
 - **Conservation**
 - Water use, energy use, stormwater management, density,
 - **Ecological Footprint**
 - LEED ND, New Urbanism, Smart Growth, parking, human ecology
 - **Transportation**
 - Transit Use, bicycle lanes & paths, vehicle ownership & sharing, car-free housing
 - **Economics**
 - Local economy, green jobs, food production, Incentives
 - **Alternatives**
 - Energy, design, etc.

And Much, Much More!

USGBC / LEED HISTORY

- 1970's & 80's certain Architects preach the benefits of energy efficiency and solar power.
- 1993 the AIA, inspired by recent RIO Earth Summit publishes *The Environmental Resource Guide*.



- 1993 - Inspired 3 development industry professionals to found USGBC. They expanded their membership beyond just architects and involved the private sector.
- 1995 – Drafted pioneering standards for green building
- 1996 – Re-named LEED (Leadership in Energy and Environmental Design)
- 1998 – Drafted a pilot system for public use
- 2000 – Released the first rating system in 2000
- 2001 – General Services Administration commit to have all buildings certified.

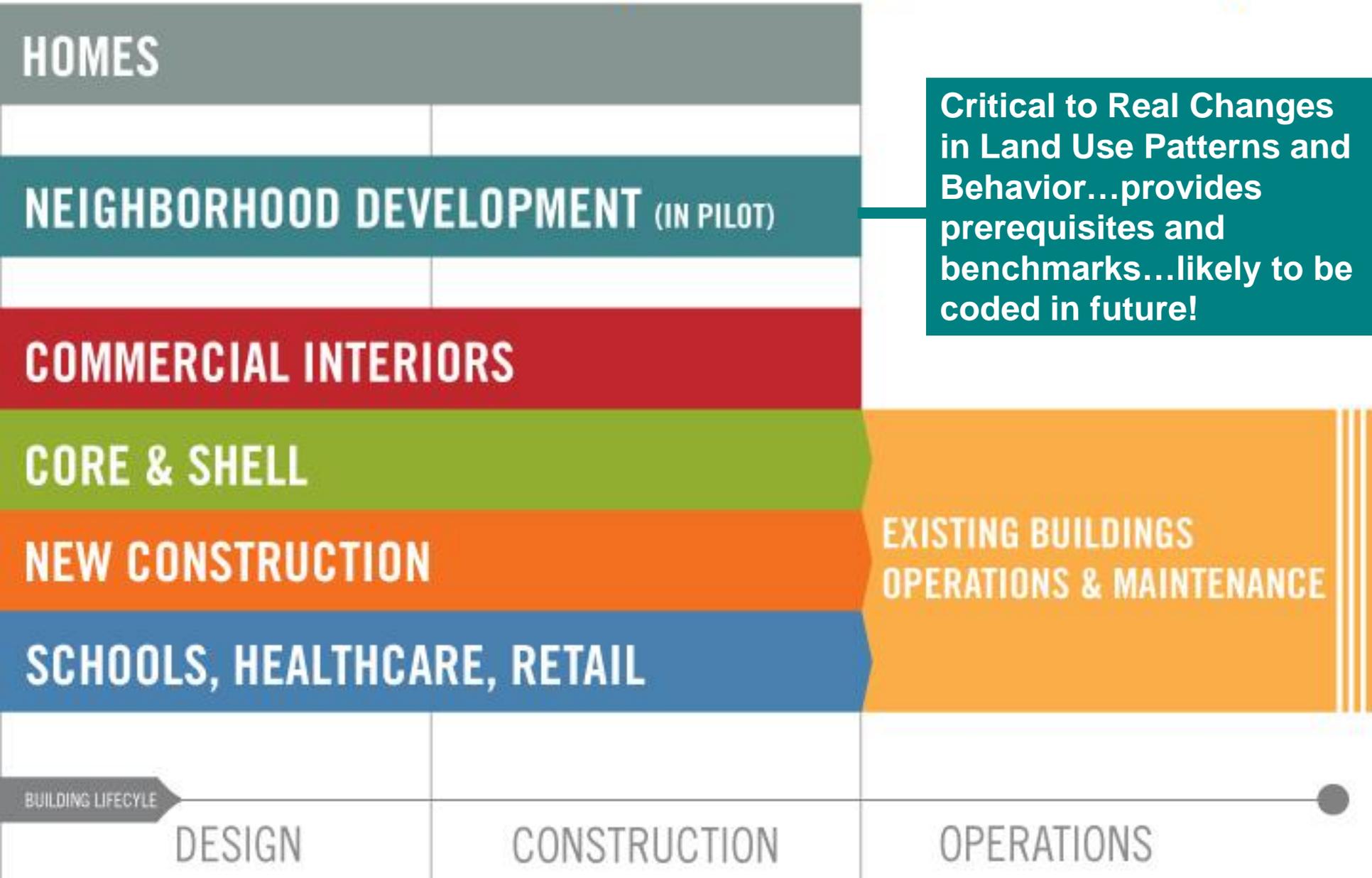
What Is Green Building?



The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a voluntary, consensus-based national rating system for developing high-performance, sustainable buildings. LEED addresses all building types and emphasizes state-of-the-art strategies in five areas: sustainable site development, water savings, energy efficiency, materials and resources selection, and indoor environmental quality.

The U.S. Green Building Council (USGBC) is a 501(c)(3) non profit organization that certifies sustainable businesses, homes, hospitals, schools, and neighborhoods. USGBC is dedicated to expanding green building practices and education, and its LEED® (Leadership in Energy and Environmental Design) Green Building Rating System™.

LEED address the complete lifecycle of buildings:



Steps to LEED Certification

REGISTER YOUR PROJECT

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graph TD; A[REGISTER YOUR PROJECT] --> B[TRACK PROGRESS & DOCUMENT ACHIEVEMENT]; B --> C[APPLY FOR CERTIFICATION];
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**TRACK PROGRESS &
DOCUMENT ACHIEVEMENT**

APPLY FOR CERTIFICATION

USGBC has four levels of LEED:

A development gets Certified!



A professional gets Accredited!
(i.e. LEED AP)

Commercial LEED Registered Projects (per year) 13,468* Total Currently Registered

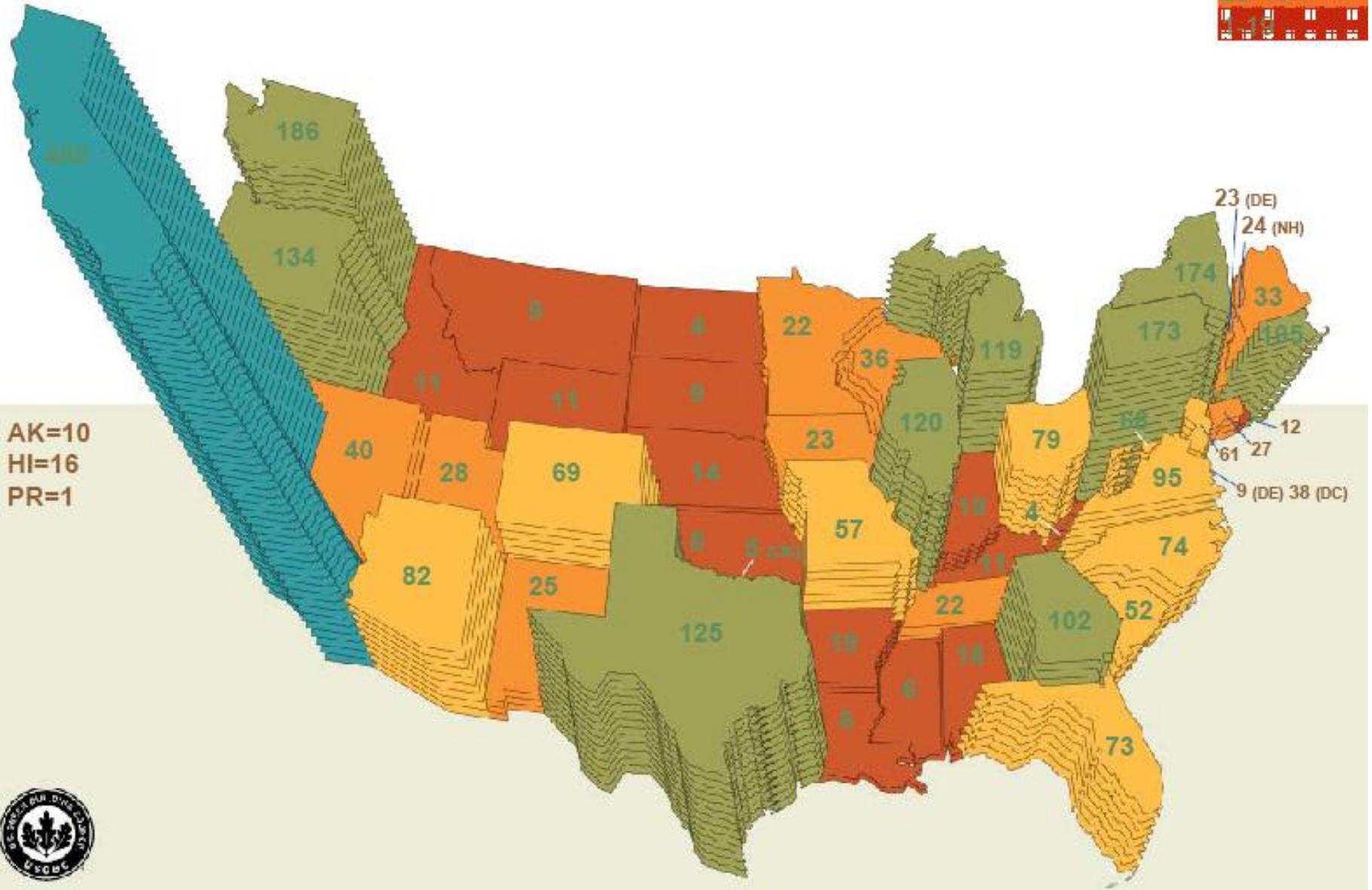
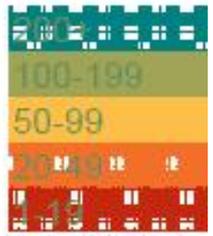
* As of May 2008



LEED® for new construction buildings

as of 07/06

Distribution by geography

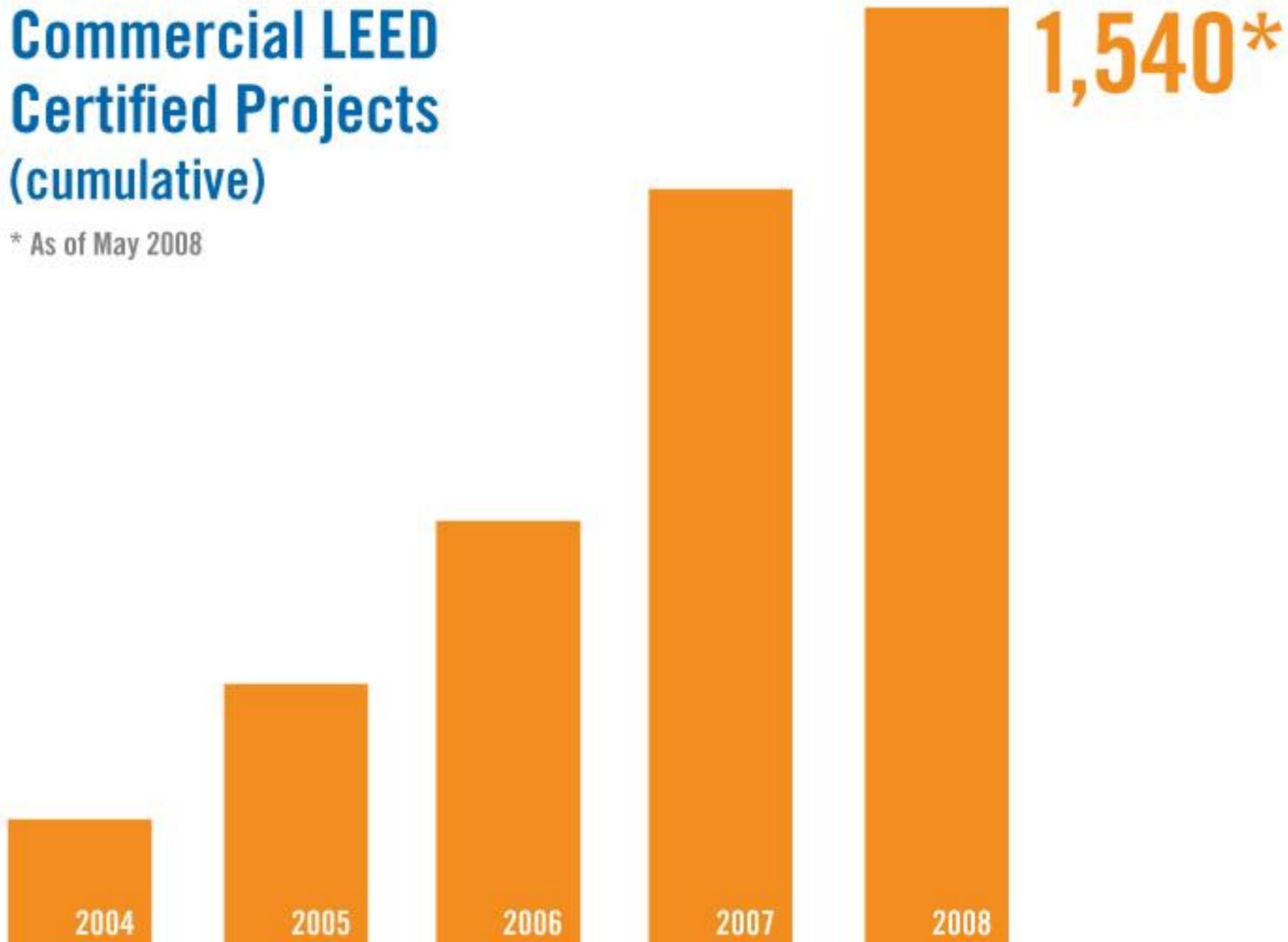


AK=10
HI=16
PR=1



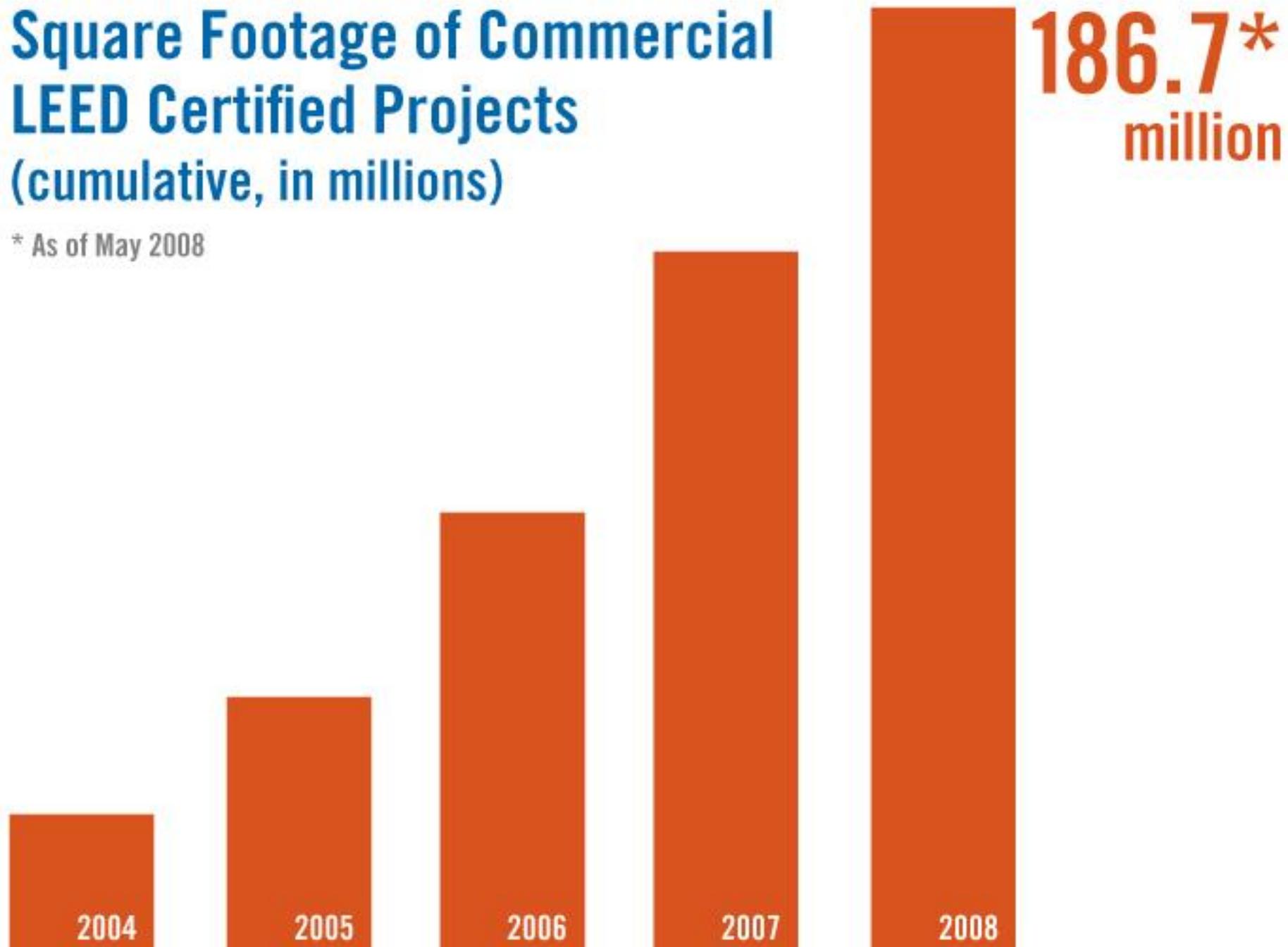
Commercial LEED Certified Projects (cumulative)

* As of May 2008



Square Footage of Commercial LEED Certified Projects (cumulative, in millions)

* As of May 2008



LEED Is Consensus-Based

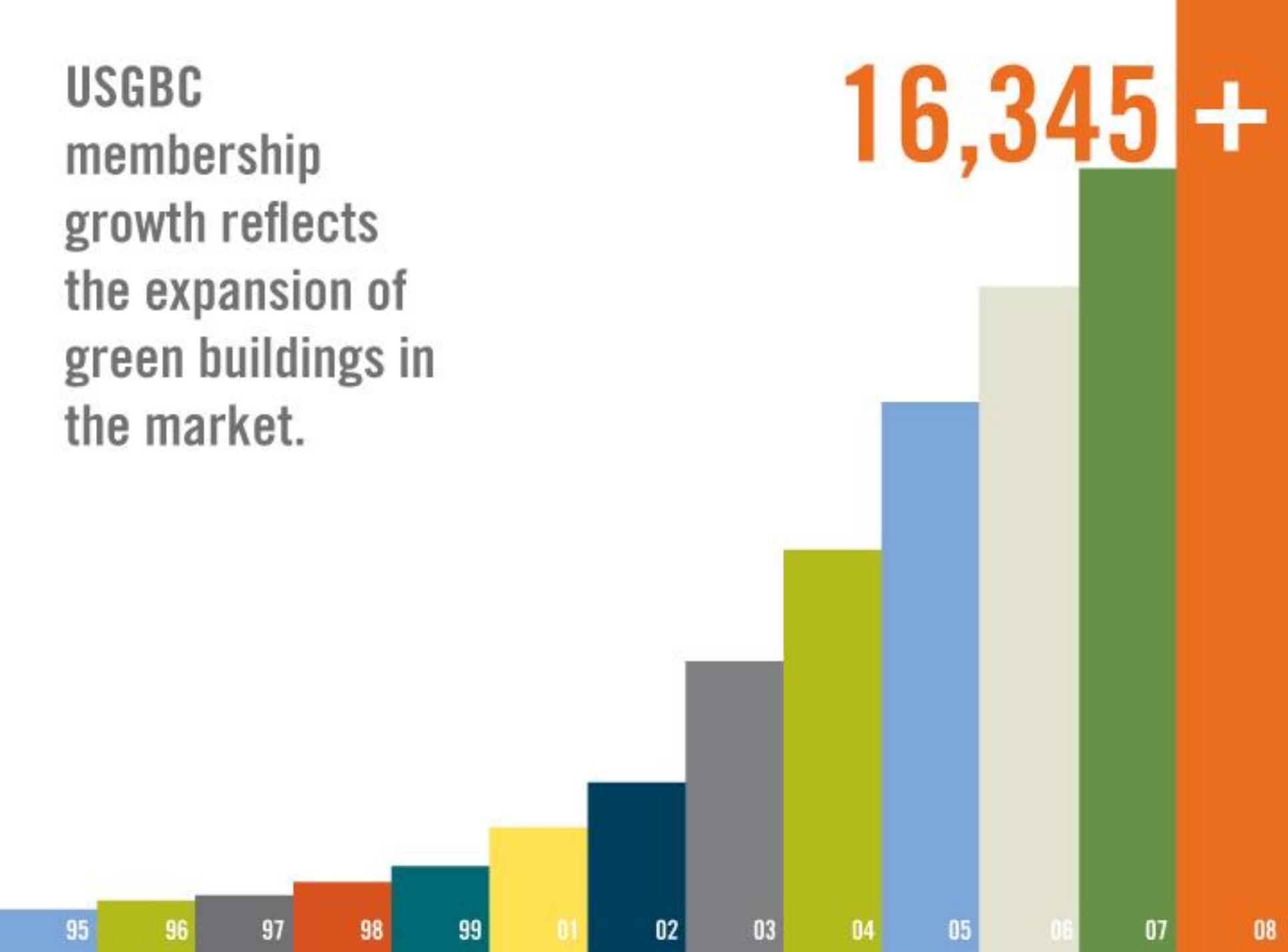


Cross-Functional Team

ENGINEERS OPERATIONS AND MAINTENANCE TEAMS
BUILDING OCCUPANTS BUILDING MANAGERS BU
FACULTY ENVIRONMENTAL HEALTH AND SAFETY STAFF
GROUNDSKEEPERS CAPITAL PLANNING STAFF GR
UTILITY MANAGERS INTERIOR DESIGNERS UTILITY MANA
CUSTODIAL TEAM PROPERTY MANAGERS CUSTODI
HUMAN RESOURCES BUILDING OWNERS HUMAN
PURCHASING STAFF ENVIRONMENTAL GROUPS
ENGINEERS OPERATIONS AND MAINTENANCE TEAMS
BUILDING OCCUPANTS BUILDING MANAGERS BU

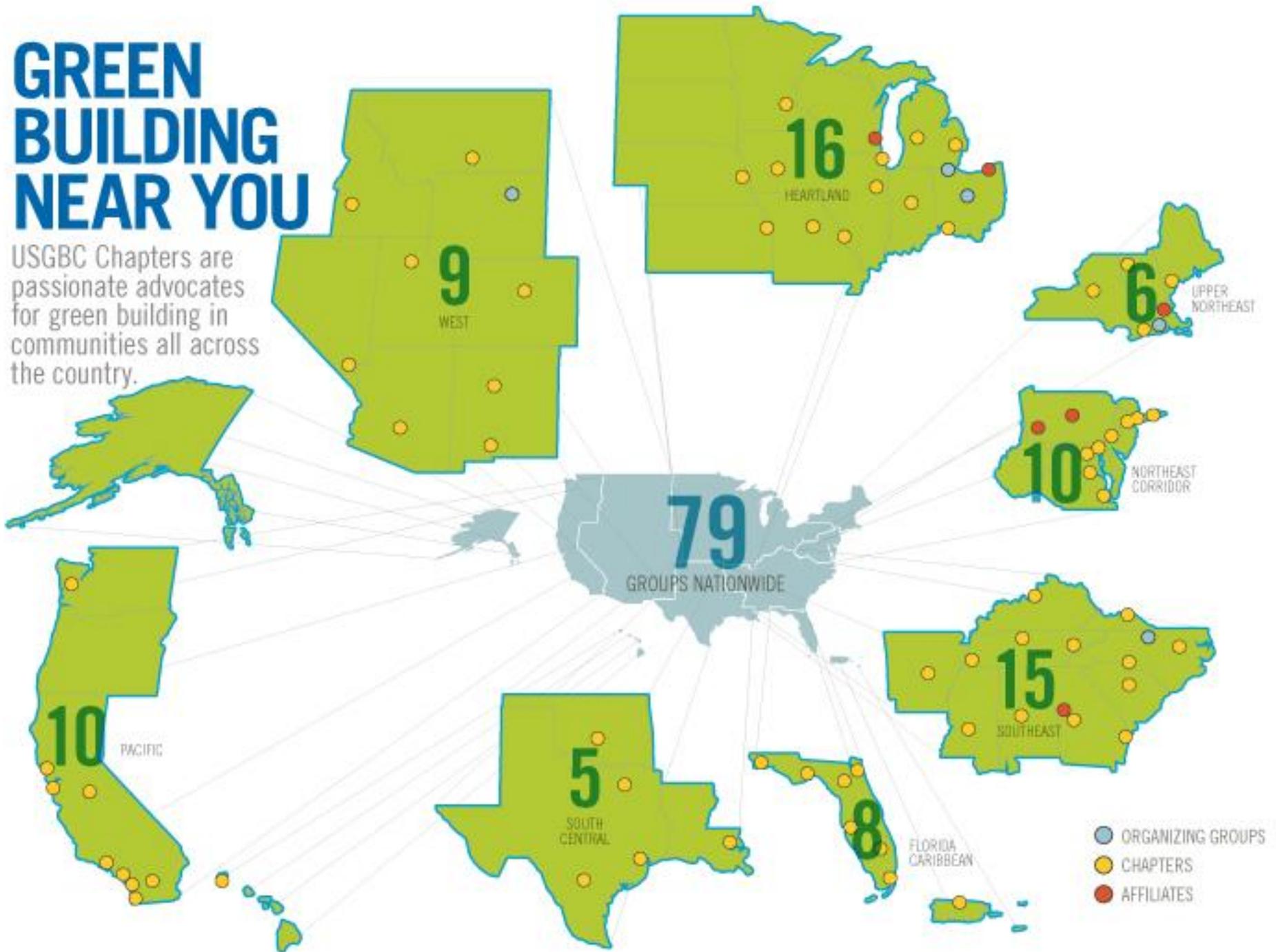
USGBC
membership
growth reflects
the expansion of
green buildings in
the market.

16,345 +



GREEN BUILDING NEAR YOU

USGBC Chapters are passionate advocates for green building in communities all across the country.



Green Building Trends in SC...

As with many components of Sustainable Urbanism SC is behind much of the USA!

- Use of LEED® Rating System is Growing
- 915 Certified projects (cert, silver, gold, plat) in USA
- 19 Certified Projects in SC – BJWSA will be 1st Project Certified in BC (LEED® Gold) using New Construction & Major Renovation 2.2.
(Spartenburg-4, Greenville-3, Columbia-3, N. Charleston-2)
- 115 are REGISTERED for Certification in SC – 5 in BC
(Beaufort Town Cntr, Enlisted Dining Center, Pickle Factory Lofts, Celia Dunns Sotheby's, Newalk Inc.).
- >450 LEED® Accredited Professionals in SC (<5 Planners in SC), Over 55,000 worldwide (>350 Planners nationwide)



Bronx Library Center New York, NY

90% of demolition
debris recycled

20% energy cost
savings

80% of wood is FSC
certified



**Boulder Associates,
Inc. Office
Boulder, CO**

39%

of materials and
furniture have
recycled content

43%

less water use

55%

of demolition/
construction
waste diverted
from landfill

Photography courtesy of Ed LaCasse



Sidwell Friends Middle School Washington, DC

90% reduced municipal
water use

60% less energy
demand than a
conventional school

80% native plant species
planted on site



Photograph Courtesy of Peter Aaron/ESTO



Tepeyac Haven
Pasco, WA

15 units per acre

29% improvement of
attic insulation heat
resistance over
state code energy

44 homes available for
low-income families





Orchard Garden Hotel San Francisco, CA

22% of building materials
manufactured
within 500 miles

77% of construction
waste diverted from
the landfill

100% of interior
spaces
designated
tobacco-free

Photograph Courtesy of
Orchard Garden

LEED ND (Neighborhood Development) Requirements

Smart Location & Linkage

30 Points

Prereq 1	Smart Location	Required
Prereq 2	Proximity to Water and Wastewater Infrastructure	Required
Prereq 3	Imperiled Species and Ecological Communities	Required
Prereq 4	Wetland and Water Body Conservation	Required
Prereq 5	Farmland Conservation	Required
Prereq 6	Floodplain Avoidance	Required
Credit 1	Brownfield Redevelopment	2
Credit 2	High Priority Brownfields Redevelopment	1
Credit 3	Preferred Location	10
Credit 4	Reduced Automobile Dependence	8
Credit 5	Bicycle Network	1
Credit 6	Housing and Jobs Proximity	3
Credit 7	School Proximity	1
Credit 8	Steep Slope Protection	1
Credit 9	Site Design for Habitat or Wetlands Conservation	1
Credit 10	Restoration of Habitat or Wetlands	1
Credit 11	Conservation Management of Habitat or Wetlands	1

LEED ND (Neighborhood Development) Requirements

Neighborhood Pattern & Design

39 Points

Prereq 1	Open Community	Required
Prereq 2	Compact Development	Required
Credit 1	Compact Development	7
Credit 2	Diversity of Uses	4
Credit 3	Diversity of Housing Types	3
Credit 4	Affordable Rental Housing	2
Credit 5	Affordable For-Sale Housing	2
Credit 6	Reduced Parking Footprint	2
Credit 7	Walkable Streets	8
Credit 8	Street Network	2
Credit 9	Transit Facilities	1
Credit 10	Transportation Demand Management	2
Credit 11	Access to Surrounding Vicinity	1
Credit 12	Access to Public Spaces	1
Credit 13	Access to Active Public Spaces	1
Credit 14	Universal Accessibility	1
Credit 15	Community Outreach and Involvement	1
Credit 16	Local Food Production	1

Prereq 1	Construction Activity Pollution Prevention	Required
Credit 1	LEED Certified Green Buildings	3
Credit 2	Energy Efficiency in Buildings	3
Credit 3	Reduced Water Use	3
Credit 4	Building Reuse and Adaptive Reuse	2
Credit 5	Reuse of Historic Buildings	1
Credit 6	Minimize Site Disturbance through Site Design	1
Credit 7	Minimize Site Disturbance during Construction	1
Credit 8	Contaminant Reduction in Brownfields Remediation	1
Credit 9	Stormwater Management	5
Credit 10	Heat Island Reduction	1
Credit 11	Solar Orientation	1
Credit 12	On-Site Energy Generation	1
Credit 13	On-Site Renewable Energy Sources	1
Credit 14	District Heating & Cooling	1
Credit 15	Infrastructure Energy Efficiency	1
Credit 16	Wastewater Management	1
Credit 17	Recycled Content for Infrastructure	1
Credit 18	Construction Waste Management	1
Credit 19	Comprehensive Waste Management	1
Credit 20	Light Pollution Reduction	1

LEED ND (Neighborhood Development) Requirements

Innovation & Design Process

5 Points

Credit 1.1	Innovation in Design: Provide Specific Title	1
Credit 1.2	Innovation in Design: Provide Specific Title	1
Credit 1.3	Innovation in Design: Provide Specific Title	1
Credit 1.4	Innovation in Design: Provide Specific Title	1
Credit 1.5	Innovation in Design: Provide Specific Title	1
Credit 2	LEED® Accredited Professional	1

Rainwater Harvesting in LEED ND

Green Construction & Technology

GCT Credit 9: Stormwater Management

1 to 5 Points

Note: Projects can use this version or the February 2007 version found in Appendix B.

Intent

Reduce adverse impacts on water resources by mimicking the natural hydrology of the region on the project site, including groundwater recharge. Reduce pollutant loadings from stormwater discharges, reduce peak flow rates to minimize stream channel erosion, and maintain or restore chemical, physical, and biological integrity of downstream waterways.

Requirements

OPTION 1 – FOR PREVIOUSLY DEVELOPED SITES

Implement a comprehensive stormwater management plan for the **project** that infiltrates, reuses, or evapotranspirates the below-specified amount of rainfall from the project's **development footprint** and other areas that have been graded so as to be effectively impervious.

Rainwater Harvesting in LEED ND

Points achievable	Arid Watersheds (less than 20" of rain/year)	Semi-arid Watersheds (between 20"-40" rain/year)	Humid Watersheds (at least 40" rain/year)
1 point	0.15"	0.225"	0.3"
2 points	0.3"	0.45"	0.6"
3 points	0.45"	0.675"	0.9"
4 points	0.6"	0.9"	1.2"
5 points	0.75"	1.125"	1.5"

OPTION 2 – FOR ALL OTHER SITES

Implement a comprehensive stormwater management plan for the project that infiltrates, reuses, or evapotranspirates the below-specified amount of rainfall from the project's **development footprint** and other areas that have been graded so as to be effectively impervious.

Points achievable	Arid Watersheds (less than 20" of rain/year)	Semi-arid Watersheds (between 20"-40" rain/year)	Humid Watersheds (at least 40" rain/year)
1 point	0.3"	0.45"	0.6"
2 points	0.6"	0.9"	1.2"
3 points	0.9"	1.35"	1.8"

Rainwater Harvesting in LEED ND

4 points	1.2"	1.8"	2.4"
5 points	1.5"	2.25"	3.0"

Notes: a) The stormwater management plan should identify practices to be employed, such as permeable pavements, [rainwater harvesting systems](#) or green roofs.
b) For the purposes of the calculations in this credit, the development footprint will include typically impervious surfaces included in the definition of “development footprint,” such as roofs and pavements, even though the surfaces may be made pervious as part of the stormwater management plan.

Submittals

During the pilot program, project teams are encouraged to suggest replacement documentation that may be easier to access or produce than the items listed below, but still clearly verifies that the requirements have been met. The certification reviewers will evaluate the adequacy of the potential replacement documentation on a case-by-case basis.

Provide the LEED submittal template, signed by the responsible party, declaring that the requirements have been met, and the following:

For STAGE 1 Submissions (Pre-review)

Submitting for Stage 1 is optional. If it is skipped, these items will be required at Stage 2.

Rainwater Harvesting in LEED ND

All Options

- A site plan indicating the project's development footprint, and the location of any planned stormwater management technologies or BMPs.
- A written commitment to develop and implement a comprehensive stormwater management plan to meet the requirements if the project is built.
- Confirmation of type of watershed.

Option 1

- A site plan indicating previously developed areas (this can be done as part of the site plan listed above).

For STAGE 2 Submissions (Certification of Approved Plan)

Stage 2 must be completed. If a project is already built, Stage 2 and 3 documentation may be submitted simultaneously.

Case 2A: No change since Stage 1

If the project submitted at Stage 1, and project conditions remain unchanged with respect to credit requirements, indicate "No change since Stage 1" on project checklist, and submit the following additional documentation:

All Options

- A summary of the stormwater management plan, highlighting the technologies or BMPs used on the site.

Case 3B: Change since Stage 2

If project conditions have changed with respect to credit requirements:

- Submit updated versions of the relevant documentation submitted at Stage 2 and the additional item(s) listed above in Case 3A.

Rainwater Harvesting in LEED ND

- A statement of the project team's capacity and/or qualifications to implement the plan, and/or a description of the services that will be contracted to do so.

Case 2B: Change since Stage 1

If the project submitted at Stage 1, and project conditions have changed with respect to prerequisite requirements:

- Submit updated versions of the relevant documentation required at Stage 1 and the additional item(s) listed above in Case 2A.

Case 2C: Did not submit at Stage 1

- Submit the documentation required at Stage 1 and the additional item(s) listed above in Case 2A.

For STAGE 3 Submissions (Certification of Completed Neighborhood Development)

Stage 3 must be completed. If a project is already built, Stage 2 and 3 documentation may be submitted simultaneously.

Case 3A: No change since Stage 2

If project conditions remain unchanged with respect to credit requirements, indicate "No change since Stage 2" on project checklist, and submit the following additional post-construction documentation:

- A calculation of either 90% of the average annual rainfall or 1" of rainfall that occurs on the project's development footprint and other effectively impervious areas.
- A calculation of the percentage of the development footprint for which runoff will be

LEED ND

(Neighborhood Development)

Pilot Projects Currently Under Construction in our Area

Georgia

- Sustainable Fellwood, Savannah GA, 24.72 acres
- Weatherford Place, Roswell GA, 1.60 acres
- West Town, Atlanta GA, 45.00 acres

South Carolina

- Magnolia, Charleston SC, 218.00 acres
- The Navy Yard At Noisette, North Charleston SC, 340.00 acres

LEED (NC) New Construction & Major Renovation

SS	WE	EA	MR	EQ	ID
Credit 6.1					

Stormwater Management: Rate and Quantity

1 Point

Intent

Limit disruption and pollution of natural water flows by managing stormwater runoff.

Requirements

If existing imperviousness is less than or equal to 50%, implement a stormwater management plan that prevents the post-development 1.5 year, 24 hour peak discharge rate from exceeding the pre-development 1.5 year, 24 hour peak discharge rate.

OR

If existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff.

Submittals

- Provide the LEED Letter Template, signed by the civil engineer or responsible party, declaring that the post-development 1.5 year, 24 hour peak discharge rate does not exceed the pre-development 1.5 year 24 hour peak discharge rate. Include calculations demonstrating that existing site imperviousness is less than or equal to 50%.

OR

- Provide the LEED Letter Template, signed by the civil engineer or responsible party, declaring and demonstrating that the stormwater management strategies result in at least a 25% decrease in the rate and quantity of stormwater runoff. Include calculations demonstrating that existing site imperviousness exceeds 50%.

Potential Technologies & Strategies

Design the project site to maintain natural stormwater flows by promoting infiltration. Specify garden roofs and pervious paving to minimize impervious surfaces. Reuse stormwater volumes generated for non-potable uses such as landscape irrigation, toilet and urinal flushing and custodial uses.

1 Point

Stormwater Management: Treatment

Intent

Limit disruption of natural water flows by eliminating stormwater runoff, increasing on-site infiltration and eliminating contaminants.

Requirements

Construct site stormwater treatment systems designed to remove 80% of the average annual post-development total suspended solids (TSS) and 40% of the average annual post-development total phosphorous (TP) based on the average annual loadings from all storms less than or equal to the 2-year/24-hour storm. Do so by implementing Best Management Practices (BMPs) outlined in Chapter 4, Part 2 (Urban Runoff), of the United States Environmental Protection Agency's (EPA's) *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, January 1993 (Document No. EPA-840-B-92-002) or the local government's BMP document (whichever is more stringent).

Submittals

- Provide the LEED Letter Template, signed by the civil engineer or responsible party, declaring that the design complies with or exceeds EPA or local government Best Management Practices (whichever set is more stringent) for removal of total suspended solids and total phosphorous.

Potential Technologies & Strategies

Design mechanical or natural treatment systems such as constructed wetlands, vegetated filter strips and bioswales to treat the site's stormwater.

Water Efficiency

1 Point

Water Efficient Landscaping: Reduce by 50%

Intent

Limit or eliminate the use of potable water for landscape irrigation.

Requirements

Use high-efficiency irrigation technology OR use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means.

Submittals

- Provide the LEED Letter Template, signed by the architect, engineer or responsible party, declaring that potable water consumption for site irrigation has been reduced by 50%. Include a brief narrative of the equipment used and/or the use of drought-tolerant or native plants.

Potential Technologies & Strategies

Perform a soil/climate analysis to determine appropriate landscape types and design the landscape with indigenous plants to reduce or eliminate irrigation requirements. Use high-efficiency irrigation systems and consider using stormwater and/or greywater for irrigation.

LEED (NC) New Construction & Major Renovation

Water Efficient Landscaping: No Potable Use or No Irrigation

1 Point
in addition to
WE 1.1

Intent

Limit or eliminate the use of potable water for landscape irrigation.

Requirements

Use only captured rain or recycled site water to eliminate all potable water use for site irrigation (except for initial watering to establish plants), OR do not install permanent landscape irrigation systems.

Submittals

Provide the LEED Letter Template, signed by the responsible architect and/or engineer, declaring that the project site will not use potable water for irrigation. Include a narrative describing the captured rain system, the recycled site water system, and their holding capacity. List all the plant species used. Include calculations demonstrating that irrigation requirements can be met from captured rain or recycled site water.

OR

Provide the LEED Letter Template, signed by the landscape architect or responsible party, declaring that the project site does not have a permanent landscape irrigation system. Include a narrative describing how the landscape design allows for this.

Potential Technologies & Strategies

Perform a soil/climate analysis to determine appropriate landscape types and design the landscape with indigenous plants to reduce or eliminate irrigation requirements. Consider using stormwater and/or greywater for irrigation.

1 Point

Innovative Wastewater Technologies

Intent

Reduce generation of wastewater and potable water demand, while increasing the local aquifer recharge.

Requirements

Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR treat 100% of wastewater on site to tertiary standards.

Submittals

Provide the LEED Letter Template, signed by the architect, MEP engineer or responsible party, declaring that water for building sewage conveyance will be reduced by at least 50%. Include the spreadsheet calculation and a narrative demonstrating the measures used to reduce wastewater by at least 50% from baseline conditions.

OR

Provide the LEED Letter Template, signed by the civil engineer or responsible party, declaring that 100% of wastewater will be treated to tertiary standards on site. Include a narrative describing the on-site wastewater treatment system.

Potential Technologies & Strategies

Specify high-efficiency fixtures and dry fixtures such as composting toilets and waterless urinals to reduce wastewater volumes. Consider reusing stormwater or greywater for sewage conveyance or on-site wastewater treatment systems (mechanical and/or natural).

LEED (NC) New Construction & Major Renovation

Water Use Reduction: 20% Reduction

1 Point

Intent

Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirements

Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting the Energy Policy Act of 1992 fixture performance requirements.

Submittals

- Provide the LEED Letter Template, signed by the MEP engineer or responsible party, declaring that the project uses 20% less water than the baseline fixture performance requirements of the Energy Policy Act of 1992.
- Provide the spreadsheet calculation demonstrating that water-consuming fixtures specified for the stated occupancy and use of the building reduce occupancy-based potable water consumption by 20% compared to baseline conditions.

Potential Technologies & Strategies

Estimate the potable and non-potable water needs for the building. Use high-efficiency fixtures, dry fixtures such as composting toilets and waterless urinals, and occupant sensors to reduce the potable water demand. Consider reuse of stormwater and greywater for non-potable applications such as toilet and urinal flushing, mechanical systems and custodial uses.

Credit 3.2

1 Point
in addition to
WE 3.1

Water Use Reduction: 30% Reduction

Intent

Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirements

Employ strategies that in aggregate use 30% less water than the water use baseline calculated for the building (not including irrigation) after meeting the Energy Policy Act of 1992 fixture performance requirements.

Submittals

- Provide the LEED Letter Template, signed by the MEP engineer or responsible party, declaring that the project uses 30% less water than the baseline fixture performance requirements of the Energy Policy Act of 1992.
- Provide the spreadsheet calculation demonstrating that water-consuming fixtures specified for the stated occupancy and use of the building reduce occupancy-based potable water consumption by 30% compared to baseline conditions.

Potential Technologies & Strategies

Estimate the potable and non-potable water needs for the building. Use high-efficiency fixtures, dry fixtures such as composting toilets and waterless urinals, and occupant sensors to reduce the potable water demand. Consider reuse of stormwater and greywater for non-potable applications such as toilet and urinal flushing, mechanical systems and custodial uses.

...The end!

Sources...

- Farr, Douglas, Sustainable Urbanism - Urban Design with Nature: 2007.
- USGBC Website:
<http://www.usgbc.org/Default.aspx>. Power Point presentations & LEED ND Pilot Draft.
- USGBC SC Website:
<http://chapters.usgbc.org/southcarolina/>.
- Beaufort County Comprehensive Plan, Energy Element: 2008.
- Daufuskie Island Community Preservation Plan, Introduction: 2008.