

THE LOWDOWN ON LEED

COMPARING & CONTRASTING
GREEN BUILDING RATING SYSTEMS



Passive House Institute US



The Passive House Institute US (PHIUS) is a 501c(3) nonprofit organization that provides training, education and research to promote implementation of Passive House Building Energy standard, as well as the design approach and techniques to accomplish that standard.

Passive House Institute US



- Originated in Germany
- Developed by the Physicist Dr. Wolfgang Feist
- Certification Process
- Passive House Planning Package Software
- Membership:
 - Student
 - Supporting/Associate
 - Professional - CPHC (Certified Passive House Consultant)
 - Professional – Non-CPHC

Passive House Institute US



Smith House residence built to Passive House standard in Urbana, Illinois

A Passive House is a very well-insulated, **virtually air-tight** building that is primarily heated by passive solar gain and by internal gains from people, electrical equipment, etc. Energy losses are minimized. Any remaining heat demand is provided by an extremely small source. **Avoidance of heat gain** through shading and window orientation also helps to limit any cooling load, which is similarly minimized. An energy recovery ventilator provides a constant, balanced fresh air supply. The result is an impressive system that not only saves up to 90% of space heating costs, but also provides a uniquely terrific indoor air quality.

Living Building Challenge



Mission Statement

To encourage the creation of Living Buildings, Sites and Communities in countries around the world while inspiring, educating and motivating a global audience about the need for fundamental and transformative change.

Living Building Challenge



- International Program non-profit organization
- Philosophy, Advocacy Platform & Certification
- Unified Tool Applicable at All Scales
- Performance based Standard - Not a Checklist
- Visionary Path to a Restorative Future
- Software
- Affiliation with the Cascadia Region Green Building Council. Although Cascadia is a chapter of both the USGBC and the Canada GBC.
- Both the USGBC and Canada GBC fully endorse Living Building Challenge and do not view it to be a competitor with the LEED Green Building Rating System.

Living Building Challenge

- a **PHILOSOPHY, ADVOCACY PLATFORM AND CERTIFICATION PROGRAM**. Because it defines priorities on both a technical level and as a set of core values, it is engaging the broader building industry in the deep conversations required to truly understand how to solve problems rather than shift them.
- an **EVOCATIVE GUIDE**. By identifying an ideal and positioning that ideal as the indicator of success, the Challenge inspires project teams to reach decisions based on restorative principles instead of searching for 'least common denominator' solutions. This approach brings project teams closer to the objectives we are collectively working to achieve.
- a **BEACON**. With a goal to increase awareness, it is tackling critical environmental, social and economic problems, such as: the rise of persistent toxic chemicals; climate change; habitat loss; the collapse of domestic manufacturing; global trade imbalances; urban sprawl; and the lack of community distinctiveness.
- a '**UNIFIED TOOL**'. Addressing development at all scales, it can be equally applied to landscape and infrastructure projects; partial renovations and complete building renewals; new building construction; and neighborhood, campus and community design.
- a **PERFORMANCE-BASED STANDARD**. Decidedly not a checklist of best practices, the Challenge leads teams to embrace regional solutions and respond to a number of variables, including climate factors and cultural characteristics.
- a **VISIONARY PATH TO A RESTORATIVE FUTURE**.

Energy Star Homes



ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through **energy efficient products and practices.**

Energy Star Homes

How New Homes Earn the ENERGY STAR

- To earn the ENERGY STAR, a home must meet strict guidelines for energy efficiency set by the **U.S. Environmental Protection Agency (EPA)**, making them **20–30% more efficient than standard homes**. Homes achieve this level of performance through a combination of energy-efficient improvements, including,
 - Effective Insulation Systems
 - High-Performance Windows
 - Tight Construction and Ducts
 - Efficient Heating and Cooling Equipment
 - **ENERGY STAR** Qualified Lighting and Appliances
- To ensure that a home meets ENERGY STAR guidelines, **third-party verification by a certified Home Energy Rater**

Energy Star Homes



Third Party certification process for builders:

100% Energy Star Builders; 1 in Louisiana
Energy Star Builder Partners; 20 in Louisiana

Program Indicators in Louisiana

10,027 ENERGY STAR qualified homes built to date
54 ENERGY STAR qualified homes built 2011 to date
94 ENERGY STAR qualified homes built in 2010

Enterprise Green Communities



Mission & Vision

Enterprise's vision through Green Communities is to fundamentally transform the way we think about, design and build affordable homes.

Green Communities is the first national green building program developed for **affordable housing**.

Enterprise Green Communities



- Building Program for Affordable Housing
- Grants, Loans Tax-credit Equity, Training for Developers & Builders
- Green Community Criteria:
 - Integrative Design
 - Location & Neighborhood Fabric
 - Site Improvements
 - Water Conservation
 - Energy Efficiency

Enterprise Green Communities



Lafitte Redevelopment Phase I New Orleans, Louisiana

When complete, this new mixed-income community on and around the 27-acre site of the former Lafitte public housing complex will feature 1,500 homes and apartments, representing a one-for-one replacement of all 900 subsidized apartments, and the development of an additional 600 homes for sale to working families and first-time homeowners.

Enterprise Green Communities

- **Funding**

Enterprise offers a comprehensive array of funding options for interested developers. Explore the funding options below.

- **Grants**

Enterprise offers [Charrette and Sustainability](#) grants to help cover the costs of planning and implementing green components of affordable housing developments, as well as tracking their costs and benefits.

- **Loans**

We offer [Predevelopment, and Acquisition Loans](#) to support the development of affordable rental and homeownership housing that adheres to Green Communities Criteria.

- **Low-Income Housing Tax Credit Equity**

Competitively priced [Low-Income Housing Tax Credit \(LIHTC\) equity](#) to nonprofit and for-profit developers for new construction and/or rehabilitation of affordable rental housing that generally adheres to the Green Communities Criteria.

- **Green Mini Loans**

[A new lending program from Enterprise and the National Housing Trust Community Development Fund](#) provides nonprofit owners and developers capital to jump start green retrofits of older affordable rental communities.

Green Globes, Green Building Initiative



The Green Building Initiative (GBI) is a non-profit organization whose mission is to accelerate the adoption of building practices that result in energy-efficient, healthier and environmentally sustainable buildings by promoting credible and practical green building approaches for residential and commercial construction.

Green Globes, Green Building Initiative



- Originated in Canada in 1996
- Modeled after the **National Association of Home Builder's** "Model Green Home Building Guidelines"
- Assessment Method: BREEAM
Building Research Establishment Assessment Method
- Personal Accreditation:
Assessor
Professional
- Rating System: Performance Driven by ANSI Standards
American National Standard Institute
- Assessment Software & Certification through Subscription
- Correlates with Energy Star

Green Globes, Green Building Initiative



Artist's concept of VA's New Orleans hospital

The VA hospital and a planned state hospital will create a \$2 billion development on 25 city blocks in lower Mid-City.

Leadership in Energy & Environmental Design



Mission Statement

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.

Leadership in Energy & Environmental Design



LEED is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO₂ emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts”

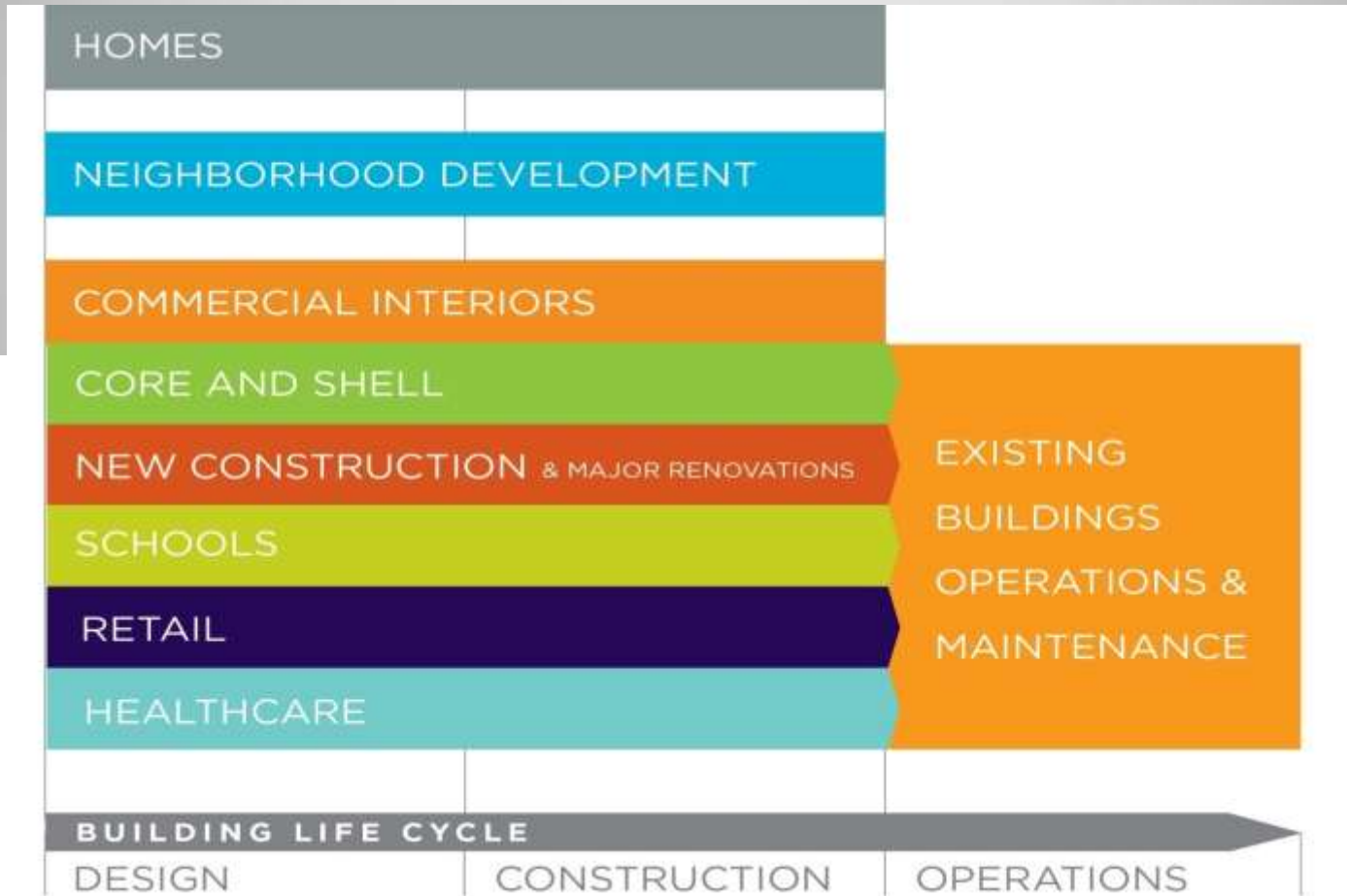
Leadership in Energy & Environmental Design



- Originated in the US in 1996
- Rating System based on 7 components:
 - Sustainable Sites
 - Water Efficiency
 - Energy & Atmosphere
 - Indoor Environmental Air Quality
 - Innovation and Design Process
 - Regional Credits
- Rating System by Building Type
- Third Party Verification
- Personal Accreditation

Leadership in Energy & Environmental Design

CATEGORIES OF RATING SYSTEMS



Leadership in Energy & Environmental Design

USGBC has four levels of LEED:



Certified

= 40-49 pts.

Silver

= 50-59 pts.

Gold

= 60-79 pts.

Platinum

= 80-110 pts.

LEED Credits, Points & Prerequisites

Sustainable Sites (26 possible points)

Prerequisite 1- Construction Activity Pollution Prevention

Water Efficiency (10 possible points)

Prerequisite 1- Water Use Reduction

Energy and Atmosphere (35 possible points)

Prerequisite 1- Fundamental Commissioning of Building Energy System

Prerequisite 2- Minimum Energy Performance

Prerequisite 3- Fundamental Refrigerant Management

Materials and Resources (14 possible points)

Prerequisite 1- Storage and Collection of Recyclables

Indoor Environmental Quality (15 possible points)

Prerequisite 1- Minimum Indoor Air Quality

Prerequisite 2- Environmental Tobacco Smoke (ETS) Control

Innovation in Design (6 possible points)

Regional Priority – NEW CATEGORY (4 possible points)

LEED Checklist

LEED-NC v3.0 Preliminary Project Checklist
Design-Build for the New USCG Station Houston
Houston, TEXAS 77029

10-Jan-11

Preparatory Review Only - Subject to Change

Code	Requirement	Points	Notes
42 1 15 Sustainable Sites 25 Points			
SS100	Construction Activity Pollution Prevention	Required	
SS101	Site Selection	Required	
SS102	Development Density & Community Connectivity	1	Site plan shows 200 ft. from density & community connectivity.
SS103	Brownfield Redevelopment	1	Not available.
SS104	Alternative Transportation, Public Transportation Access	1	Public Bus Route 240 & Station 100 ft. to site.
SS105	Alternative Transportation, Bicycle Storage & Changing Room	1	Provided in building plan only.
SS106	Alternative Transportation, Low-Emitting and Fuel Efficient Vehicles	1	Permitting process has to be provided.
SS107	Alternative Transportation, Parking Capacity	1	Site scoring parking space related to 11/11/10.
SS108	Site Development, Protect or Restore Habitat	1	Preservation of native soil water table.
SS109	Site Development, Maintain Open Space	1	
SS110	Stormwater Design, Quality Control	1	
SS111	Stormwater Design, Quality Control	1	
SS112	Heat Island Effect, Non-Roof	1	
SS113	Heat Island Effect, Roof	1	20% TIR only, white high reflectance roof.
SS114	Light Pollution Reduction	1	Prohibit use of 200K or greater lighting.
43 1 3 Water Efficiency 10 Points			
WE100	Water Use Reduction, 20% Reduction	Required	
WE101	Water Efficient Landscaping	2/2	Use practice water-saving using an on-site waterwise system. 20% reduction target.
WE102	Innovative Wastewater Technologies	1/1	
WE103	Water Use Reduction	1/1	
44 1 19 Energy & Atmosphere 18 Points			
EA100	Fundamental Commissioning of the Building Energy Systems	Required	
EA101	Minimum Energy Performance	Required	
EA102	Fundamental Refrigerant Management	Required	
EA103	Optimize Energy Performance	1/1/1	
EA104	On-Site Renewable Energy	1/1	
EA105	Enhanced Commissioning	1	Required a RFP.
EA106	Enhanced Refrigerant Management	1	
EA107	Measurement & Verification	1	
EA108	Green Power	1	
45 1 7 Materials & Resources 14 Points			
MR100	Storage & Collection of Recyclables	Required	
MR101	Building Reuse, Maintain Existing Walls, Floors & Roof	1/1/1	
MR102	Building Reuse, Maintain 50% of Interior Non-Structural Elements	1	
MR103	Construction Waste Management	1/1/1	
MR104	Materials Reuse	1/1/1	
MR105	Recycled Content	1/1/1	
MR106	Regional Materials	1/1/1	
MR107	Rapidly Renewable Materials	1	2.5% of total value of all building materials.
MR108	Certified Wood	1	
46 1 2 Indoor Environmental Quality 10 Points			
IEQ100	Minimum IAQ Performance	Required	
IEQ101	Environmental Tobacco Smoke (ETS) Control	Required	
IEQ102	Outdoor Air Delivery Monitoring	1	
IEQ103	Increased Ventilation	1	
IEQ104	Construction IAQ Management Plan, During Construction	1	
IEQ105	Construction IAQ Management Plan, Before Occupancy	1	
IEQ106	Low-Emitting Materials, Adhesives & Sealants	1	
IEQ107	Low-Emitting Materials, Paints & Coatings	1	
IEQ108	Low-Emitting Materials, Flooring Systems	1	
IEQ109	Low-Emitting Materials, Composite Wood & Particle Products	1	
IEQ110	Indoor Chemical & Pollutant Source Control	1	
IEQ111	Controllability of Systems, Lighting	1	Task lighting LED with non-fluorescent systems.
IEQ112	Controllability of Systems, Thermal Comfort	1	
IEQ113	Thermal Comfort, Design	1	
IEQ114	Thermal Comfort, Ventilation	1	
IEQ115	Daylight & Views, Daylight 70% of Spaces	1	Integrable into low-wall partitions - min. of 100sq.
IEQ116	Daylight & Views, Views for 80% of Spaces	1	
47 1 4 Innovation & Design Process 6 Points			
ID100	Innovation in Design, Low Mercury Lighting	1	Quantity lighting.
ID101	Innovation in Design, LED Lighting	1	Use LED lighting for non-emergency lighting.
ID102	Innovation in Design, Flooring & Finishes	1	Flooring that is durable systems.
ID103	Innovation in Design, Equipment	1	Design for application.
ID104	Innovation in Design, Provide Specific Title	1	From Part 6 - Checklist Below.
ID105	LEED Accredited Professional	1	
48 1 4 Regional Priority 4 Points			
RP100	Regional Priority SDC 1 Stormwater Design - Quality Control	1	
RP101	Regional Priority SDC 2 Stormwater Design - Quality Control	1	
RP102	Regional Priority SDC 3.1 Site Development - Protect & restore habitat	1	
RP103	Regional Priority - Provide Specific Title	1	
49 1 14 Project Totals (pre-certification estimated) 110 Points			

USCG Station
Houston

LEED Silver Highlights

Solar Tubes and Skylights

High reflective Energy Star rated roof to reduce "Heat Island"

Solar Water Heater

Use of Native Habitat plantings

Preferred parking for Van Pools and fuel efficient vehicles

Sunshade devices at Building Perimeter

Recycle concrete substrate ~ Walkways and roadway

Pervious paving around Heritage Oak

Pervious Asphalt paving with recycled content

USCG Station Houston



LEED Checklist Analysis

- 14 Projects (8 new buildings., 6 renovations)
 - 11 NC 2.2(new construction)
 - 3 CI 2.0(commercial interiors)
 - 7 Silver
 - 7 Gold
 - 5 achieved certification
 - 9 registered
 - Mix of project uses and sizes
 - PA, OH, CA, FL, MD, VA, IN



LEED 2009 for New Construction and Major Renovations

Project Checklist

Project Name

Date

Sustainable Sites Possible Points: 26

Y	P	N	Prereq	Description	Points
Y			Prereq 1	Construction Activity Pollution Prevention	
F			Credit 1	Site Selection	1
M			Credit 2	Development Density and Community Connectivity	5
	L		Credit 3	Brownfield Redevelopment	1
F			Credit 4.1	Alternative Transportation—Public Transportation Access	6
F			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
F			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
F			Credit 4.4	Alternative Transportation—Parking Capacity	2
	L		Credit 5.1	Site Development—Protect or Restore Habitat	1
	L		Credit 5.2	Site Development—Maximize Open Space	1
M			Credit 6.1	Stormwater Design—Quantity Control	1
M			Credit 6.2	Stormwater Design—Quality Control	1
	L		Credit 7.1	Heat Island Effect—Non-roof	1
F			Credit 7.2	Heat Island Effect—Roof	1
	L		Credit 8	Light Pollution Reduction	1

Water Efficiency Possible Points: 10

Y	P	N	Prereq	Description	Points
Y			Prereq 1	Water Use Reduction—20% Reduction	
F			Credit 1	Water Efficient Landscaping	2 to 4
	L		Credit 2	Innovative Wastewater Technologies	2
F			Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere Possible Points: 35

Y	P	N	Prereq	Description	Points
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
F			Credit 1	Optimize Energy Performance *	1 to 19
	L		Credit 2	On-Site Renewable Energy	1 to 7
	L		Credit 3	Enhanced Commissioning	2
F			Credit 4	Enhanced Refrigerant Management	2
M			Credit 5	Measurement and Verification	3
	L		Credit 6	Green Power	2

Materials and Resources Possible Points: 14

Y	P	N	Prereq	Description	Points
Y			Prereq 1	Storage and Collection of Recyclables	
	L		Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
	L		Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
F			Credit 2	Construction Waste Management	1 to 2
	L		Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	P	N	Prereq	Description	Points
F			Credit 4	Recycled Content	1 to 2
F			Credit 5	Regional Materials	1 to 2
F			Credit 6	Rapidly Renewable Materials	1
F			Credit 7	Certified Wood	1

Indoor Environmental Quality Possible Points: 15

Y	P	N	Prereq	Description	Points
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
F			Credit 1	Outdoor Air Delivery Monitoring	1
	L		Credit 2	Increased Ventilation	1
F			Credit 3.1	Construction IAQ Management Plan—During Construction	1
F			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
F			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
F			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
F			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
	L		Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
F			Credit 5	Indoor Chemical and Pollutant Source Control	1
F			Credit 6.1	Controllability of Systems—Lighting	1
F			Credit 6.2	Controllability of Systems—Thermal Comfort	1
F			Credit 7.1	Thermal Comfort—Design	1
F			Credit 7.2	Thermal Comfort—Verification	1
F			Credit 8.1	Daylight and Views—Daylight	1
F			Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process Possible Points: 6

Y	P	N	Prereq	Description	Points
F			Credit 1.1	Innovation in Design: Specific Title	1
F			Credit 1.2	Innovation in Design: Specific Title	1
F			Credit 1.3	Innovation in Design: Specific Title	1
F			Credit 1.4	Innovation in Design: Specific Title	1
F			Credit 1.5	Innovation in Design: Specific Title	1
F			Credit 2	LEED Accredited Professional	1

Regional Priority Credits Possible Points: 4

Y	P	N	Prereq	Description	Points
F			Credit 1.1	Regional Priority: Specific Credit	1
F			Credit 1.2	Regional Priority: Specific Credit	1
M			Credit 1.3	Regional Priority: Specific Credit	1
M			Credit 1.4	Regional Priority: Specific Credit	1

Total Possible Points: 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Frequent (F) 80%

Moderate (M) 50%

Low (L) 30%

Frequency of Points by Category

	SS	WE	EA	MR	IAQ	ID	REG	Total
Frequent	14	8	21	8	13	6	2	72
Moderate	7	0	3	0	0	0	2	12
Low	5	2	11	6	2	0	0	26
Total	26	10	35	14	15	6	4	110

Certification Strategy

- 45 points + Energy & Atmosphere: Optimized Energy Performance = certified
- Get every Innovation in Design and Regional credit you can FIRST
- Energy Modeling/Simulation is key to higher certification levels but also greatest cost
 - Architectural, Mechanical and Electrical Collaboration
 - #1 Envelope shape, orientation, % glass, glass type, thermal performance, daylight strategies, watts/sf
 - #2 Add mechanical system enhancements to get more

Regional Credits

Zip Code 70801

Baton Rouge, LA

- 1.EAc1.1: Optimized Energy performance:
*LPP Reduction 15%
(Commercial Interior)*
2. EAc2: Onsite Renewable Energy -
1%
3. EAc4:Enhances Refrigerant Management :*3%
On/25% off (Existing Buildings)*
- 4.MRc2: Construction Waste Management:
Recycle/Salvage 75%

Zip Code 32803

Orlando, FL

1. SSc2: Development Density and Community Connectivity
2. SSc4.1: Alternative Transportation- Public Transportation Access
3. WEc2: Innovative Wastewater Technologies
4. EAc1: Optimize Energy Performance- *28%*
5. EAc2: Onsite Renewable Energy- *13%*
6. MRc5: Regional Materials
20%

Example

Water Efficiency & Regional Priority Credits

- Restore Natural Habitat
- Native plantings will enhance facility environment
 - Indian Blanket
 - Texas Cone Flower
 - Swamp Sunflower
 - Bullrush
 - Juncus Effusus



Indian Blanket



Bullrush



Juncus
Effusus



Swamp
Sunflower



Texas Cone
Flower

- **Benefits:**
 - Low maintenance
 - Tolerant of:
 - Foot Traffic
 - Flood/drought
 - Sun/Shade
 - Salt Water Tolerant

USCG Station
Houston
Houston, Texas
CDM Dallas/New Orleans

Example

Innovation in Design Credit

- Environmental Education

The entire facility is dedicated to the environmental education of the water and wastewater management of the Los Angeles area for students.



- **Benefits:**

- Green Roof
- Photo-voltaics
- Windmill
- Exhibition space
- Learning Lab
- Auditorium for environmental learning

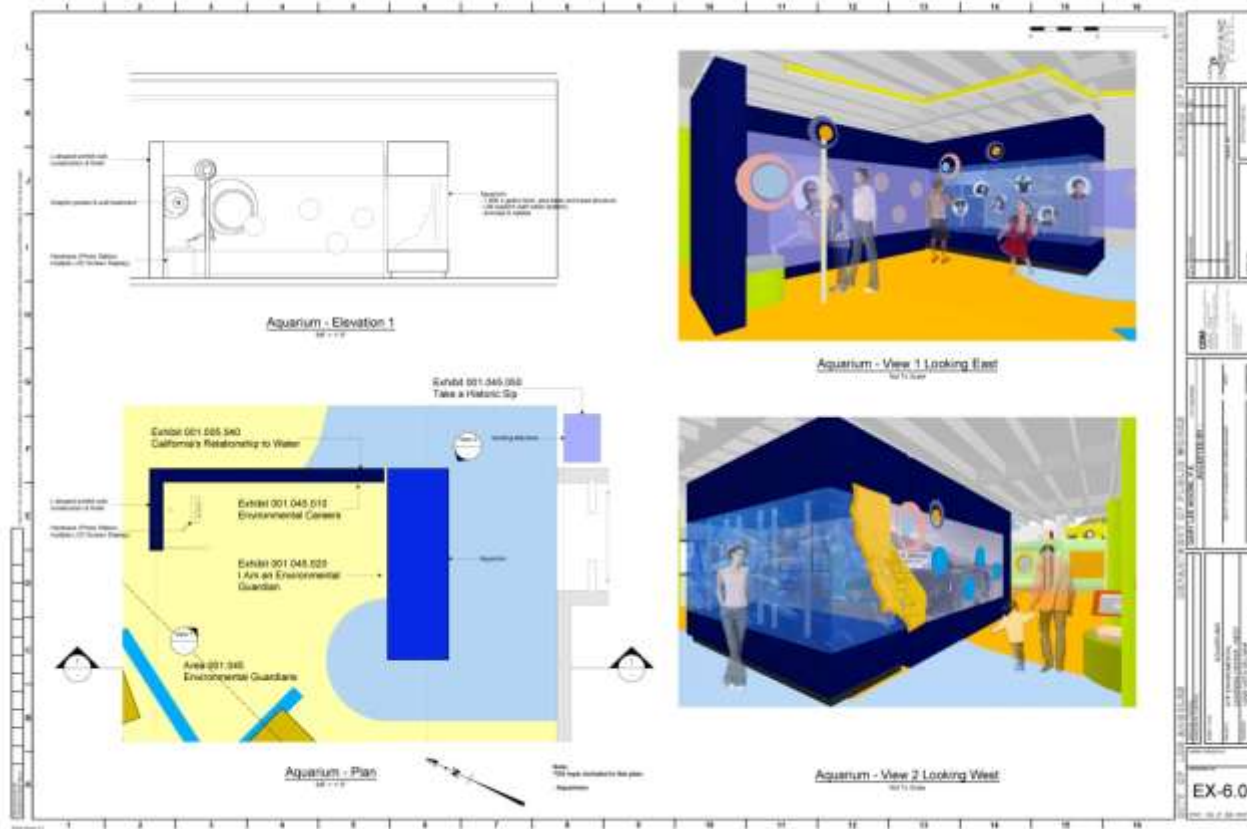
Hyperion -
Environmental
Learning Center
West

Los Angeles, CA

CDM Pittsburgh

Example

Innovation in Design Credit



- **Benefits:**
 - Green Roof
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Hyperion -
Environmental
Learning Center
West

Los Angeles, CA
CDM Pittsburgh

Comparison of LEED & Green Globe

	LEED	Green Globes
Organization	US Green Building Council (USGBC)	Green Building Initiative (GBI)
Levels	Credits in many categories add to ~110 point score, with thresholds for 'Certified', 'Silver', 'Gold', and 'Platinum'	Overall point score (max 1000 points) converts to 1, 2, 3, or 4 'Globes'
Process	Web-based templates	Web based self-assessment
Phasing	Assessment at end of Design and Construction phases	Assessment at every phase of design
Pre-requisites	Minimum levels in each category	None
Certification cost	Depends on project size; \$2,250 for 50,000 SF building \$22,500 for 500,000 SF building	Depends on project size, \$3000 - \$6,000 typical
Perceived difficulty	Rigorous, 3 rd party verification	Less strenuous, self-assessment 3 rd party verification available for an additional cost
Market adoption	Over 22,000 projects certified Over 1,500,000,000 SF commercial	Over 100 projects certified

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www.usgbc.com



www.greencommunitiesonline.org



www.energystar.gov



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www.thegbi.org



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