Green Building Basics

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CT DEP Pollution Prevention
4/4/06

The Many Names of “Green”

- Sustainable Design
- Green Architecture
- Energy-Conscious Design
- Healthy Building
- High-Performance Building

Leadership in Energy & Environmental Design

A leading-edge system for designing, constructing, operating and certifying the world's greenest buildings.

U.S. Green Building Council

The nation's foremost coalition of leaders from across the building industry working to promote buildings that are environmentally responsible, profitable, and healthy places to live and work.

The organization’s purpose is to:

- *Integrate* building industry sectors
- *Lead* market transformation
- *Educate* owners and practitioners

Why Was LEED™ Created?

- To define “green” by providing a standard for measurement
- To act as a design guideline
- To promote a whole-building, integrated design processes
- To establish market value with recognizable national “brand”
- To transform the marketplace!

Achievements of LEED

1. Wide range of green building issues defined
2. Performance goals established
3. Industry standards cited (“best practice”)
4. Built-in flexibility

What does a

LEED
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

Building look like?

Clearview Elementary School, Hanover, PA

3rd Creek Elementary School, Statesville, NC

Blanchard Hall, Mount Holyoke College

Environmental Studies Center, Oberlin College

How does

work?

LEED System Basics

- Contains
  - 7 prerequisites
  - 69 possible points

Each Prerequisite or Point consists of a specific green building initiative.

- Gives the following ratings:
  - Certified 26 Points
  - Silver 33 Points
  - Gold 39 Points
  - Platinum 52 Points

LEED™ Categories

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation and Design Process

22	32	15	**Total Project Score**	Possible Points 69

Certified 26 to 32 points Silver 33 to 38 points Gold 39 to 51 points Platinum 52 or more points

Sustainable Sites — Possible Points 14

Y	?	N			
Y			Prereq 1	**Erosion & Sedimentation Control**	
	1		Credit 1	**Site Selection**	1
		1	Credit 2	**Urban Redevelopment**	1
		1	Credit 3	**Brownfield Redevelopment**	1
	1		Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
	1		Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
	1		Credit 4.3	**Alternative Transportation**, Alternative Fuel Refueling Stations	1
1			Credit 4.4	**Alternative Transportation**, Parking Capacity	1
	1		Credit 5.1	**Reduced Site Disturbance**, Protect or Restore Open Space	1
	1		Credit 5.2	**Reduced Site Disturbance**, Development Footprint	1
	1		Credit 6.1	**Stormwater Management**, Rate and Quantity	1
	1		Credit 6.2	**Stormwater Management**, Treatment	1
	1		Credit 7.1	**Landscape & Exterior Design to Reduce Heat Islands**, No	1
1			Credit 7.2	**Landscape & Exterior Design to Reduce Heat Islands**, Ro	1
1			Credit 8	**Light Pollution Reduction**	1

Water Efficiency — Possible Points 5

Y	?	N			
	1		Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
1			Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
		1	Credit 2	**Innovative Wastewater Technologies**	1
	1		Credit 3.1	**Water Use Reduction**, 20% Reduction	1
		1	Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Energy & Atmosphere — Possible Points 17

Y	?	N			
Y			Prereq 1	**Fundamental Building Systems Commissioning**	
Y			Prereq 2	**Minimum Energy Performance**	
Y			Prereq 3	**CFC Reduction in HVAC&R Equipment**	
2			Credit 1.1	**Optimize Energy Performance**, 20% New / 10% Existing	2
	2		Credit 1.2	**Optimize Energy Performance**, 30% New / 20% Existing	2
	2		Credit 1.3	**Optimize Energy Performance**, 40% New / 30% Existing	2
		2	Credit 1.4	**Optimize Energy Performance**, 50% New / 40% Existing	2
		2	Credit 1.5	**Optimize Energy Performance**, 60% New / 50% Existing	2
	1		Credit 2.1	**Renewable Energy**, 5%	1
		1	Credit 2.2	**Renewable Energy**, 10%	1
		1	Credit 2.3	**Renewable Energy**, 20%	1
1			Credit 3	**Additional Commissioning**	1
	1		Credit 4	**Ozone Depletion**	1
1			Credit 5	**Measurement & Verification**	1
	1		Credit 6	**Green Power**	1

Materials & Resources — Possible Points 13

Y	?	N			
Y			Prereq 1	**Storage & Collection of Recyclables**	
		1	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Shell	1
		1	Credit 1.2	**Building Reuse**, Maintain 100% of Existing Shell	1
		1	Credit 1.3	**Building Reuse**, Maintain 100% Shell & 50% Non-Shell	1
1			Credit 2.1	**Construction Waste Management**, Divert 50%	1
	1		Credit 2.2	**Construction Waste Management**, Divert 75%	1
		1	Credit 3.1	**Resource Reuse**, Specify 5%	1
		1	Credit 3.2	**Resource Reuse**, Specify 10%	1
1			Credit 4.1	**Recycled Content**, Specify 25%	1
	1		Credit 4.2	**Recycled Content**, Specify 50%	1
1			Credit 5.1	**Local/Regional Materials**, 20% Manufactured Locally	1
1			Credit 5.2	**Local/Regional Materials**, of 20% Above, 50% Harvested Locally	1
	1		Credit 6	**Rapidly Renewable Materials**	1
	1		Credit 7	**Certified Wood**	1

Indoor Environmental Quality — Possible Points 15

Y	?	N			
Y			Prereq 1	**Minimum IAQ Performance**	
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	
	1		Credit 1	**Carbon Dioxide** (CO_2) **Monitoring**	1
	1		Credit 2	**Increase Ventilation Effectiveness**	1
1			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
	1		Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
1			Credit 4.2	**Low-Emitting Materials**, Paints	1
1			Credit 4.3	**Low-Emitting Materials**, Carpet	1
	1		Credit 4.4	**Low-Emitting Materials**, Composite Wood	1
1			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
1			Credit 6.1	**Controllability of Systems**, Perimeter	1
	1		Credit 6.2	**Controllability of Systems**, Non-Perimeter	1
	1		Credit 7.1	**Thermal Comfort**, Comply with ASHRAE 55-1992	1
	1		Credit 7.2	**Thermal Comfort**, Permanent Monitoring System	1
	1		Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
1			Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Innovation & Design Process — Possible Points 5

Y	?	N			
1			Credit 1.1	**Innovation in Design**: Specific Title	1
1			Credit 1.2	**Innovation in Design**: Specific Title	1
	1		Credit 1.3	**Innovation in Design**: Specific Title	1
	1		Credit 1.4	**Innovation in Design**: Specific Title	1
1			Credit 2	**LEED™ Accredited Professional**	1

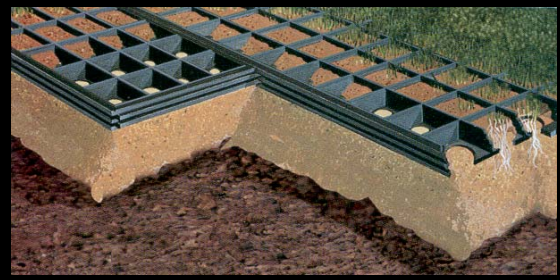
What are typical

Strategies and Technologies?

LEED™ Sustainable Sites

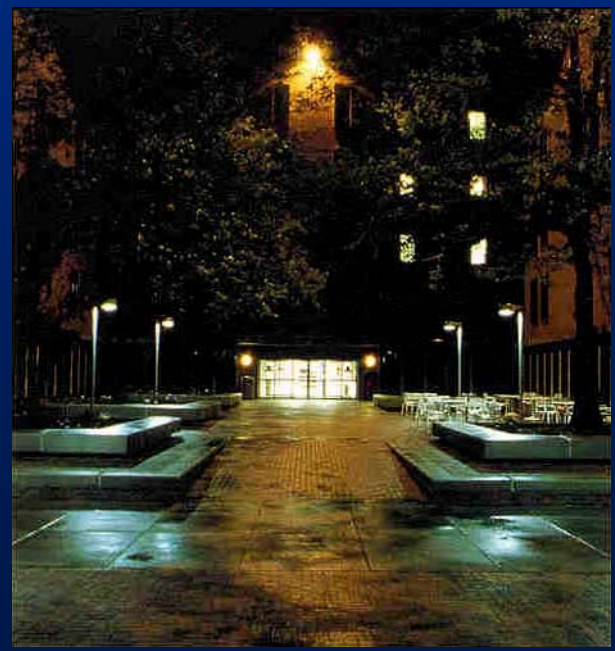
Credit 4: Alternate Transportation

Credit 6: Stormwater Management



LEED™ Sustainable Sites

- Credit 7: Landscape and Exterior Design to Reduce Heat Islands



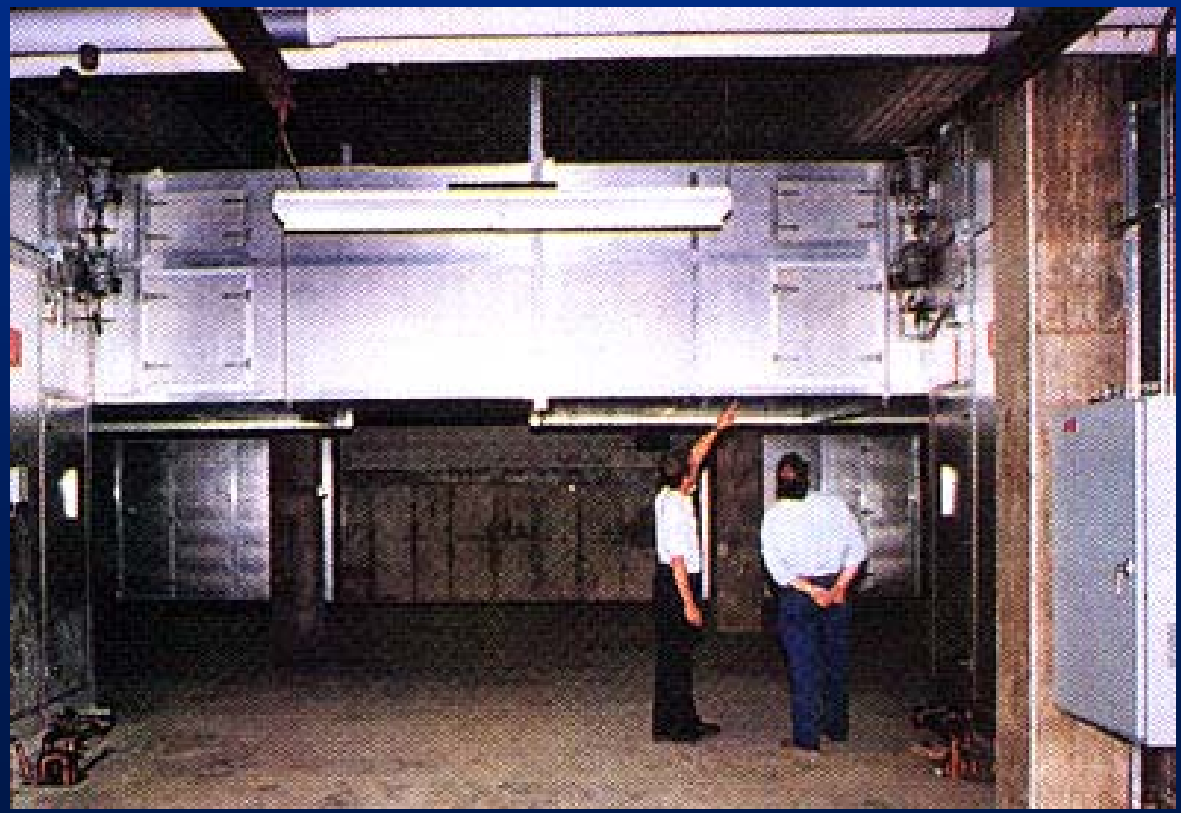
- Credit 8: Light Pollution Reduction

LEED™ Water Efficiency

- Credit 1: Water Efficient Landscaping
- Credit 2: Innovative Wastewater Technologies
- Credit 3: Water Use Reduction

LEED™ Energy and Atmosphere

- Prereq 1:
  Fundamental Building Systems Commissioning

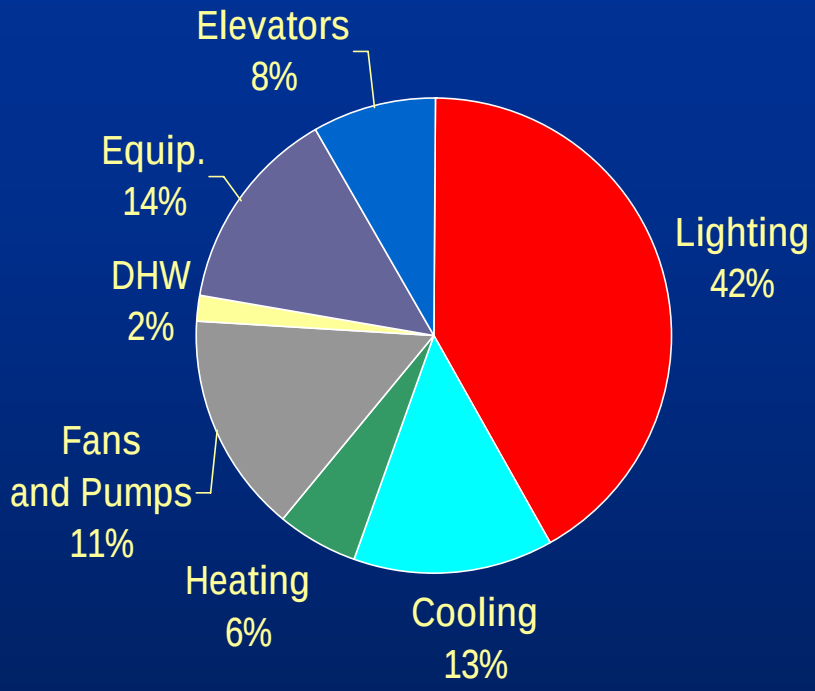


LEED™ Energy and Atmosphere

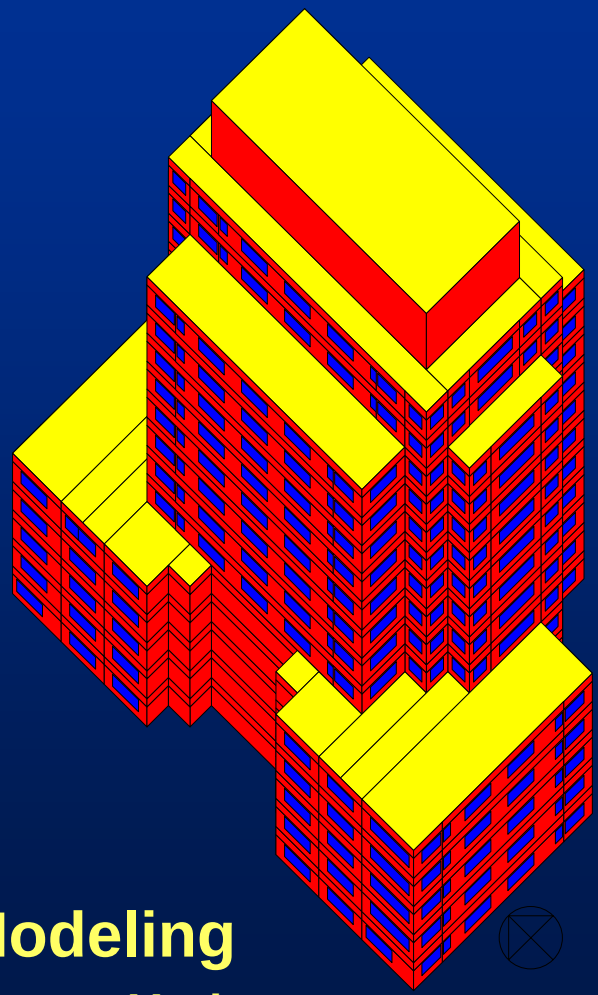
- Credit 1: Optimize Energy Performance
  - Credits Based on Performance above ASHRAE 90.1-1999

New Buildings	Existing Buildings	Points
20%	10%	2
30%	20%	4
40%	30%	6
50%	40%	8
60%	50%	10

Energy Analysis



Energy Cost Breakdown by End Use



DOE-2 Computer Energy Modeling

Example: Office Tower - Albany, New York

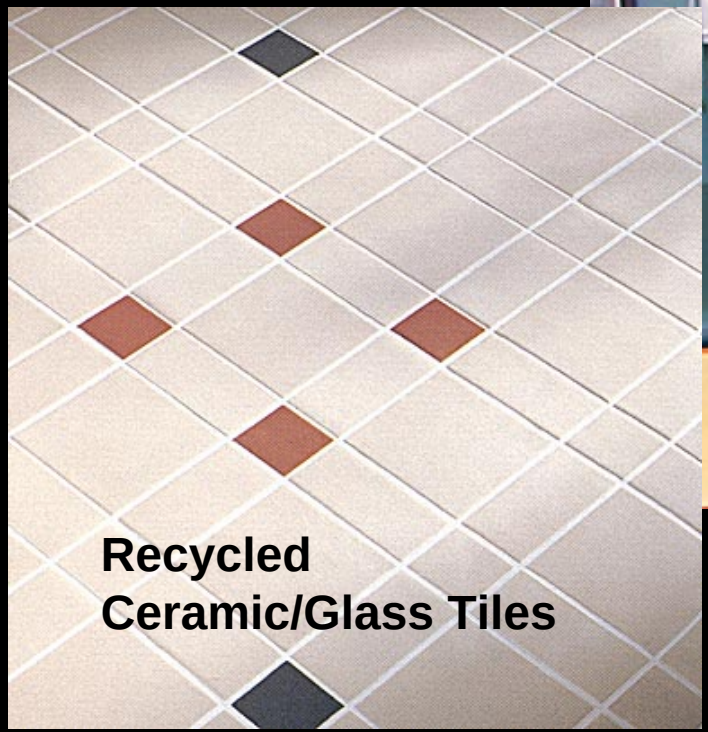
LEED™ Materials and Resources

- Credit 2: Construction Waste Management

LEED™ Materials and Resources

Credit 4:

Recycled Content

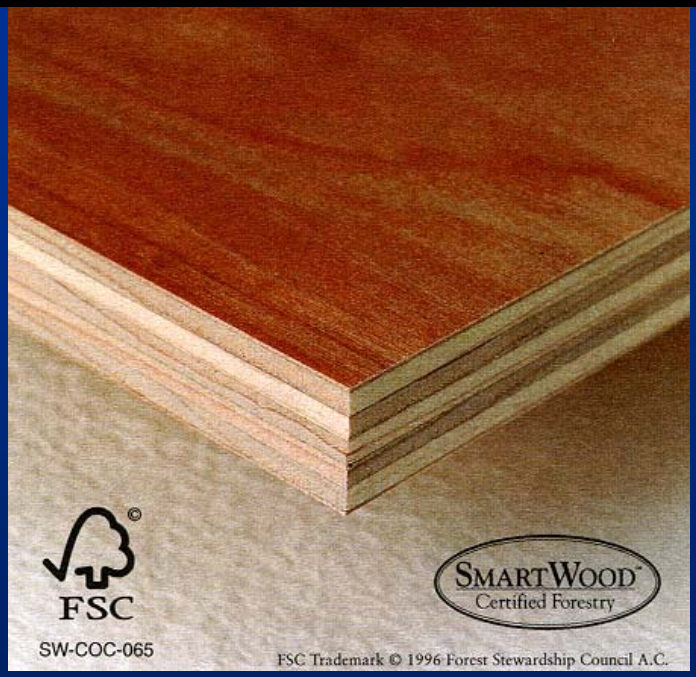


LEED™ Materials and Resources

Credit 5:

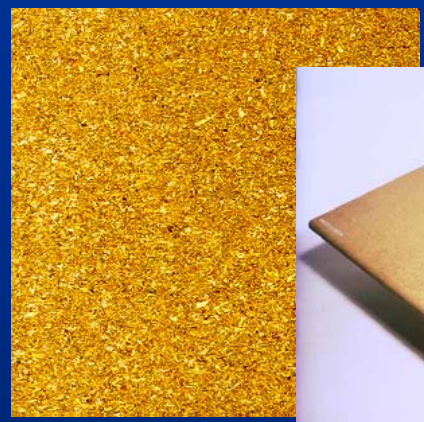
Local/Regional Materials

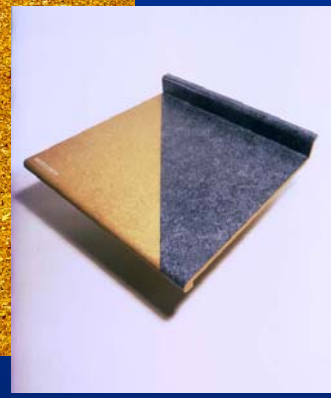
LEED™ Materials and Resources

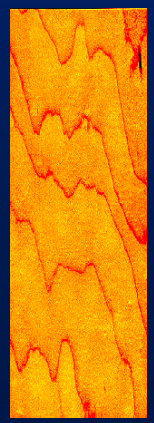


Credit 6:

Renewable Materials (natural linoleum, cork, straw board)





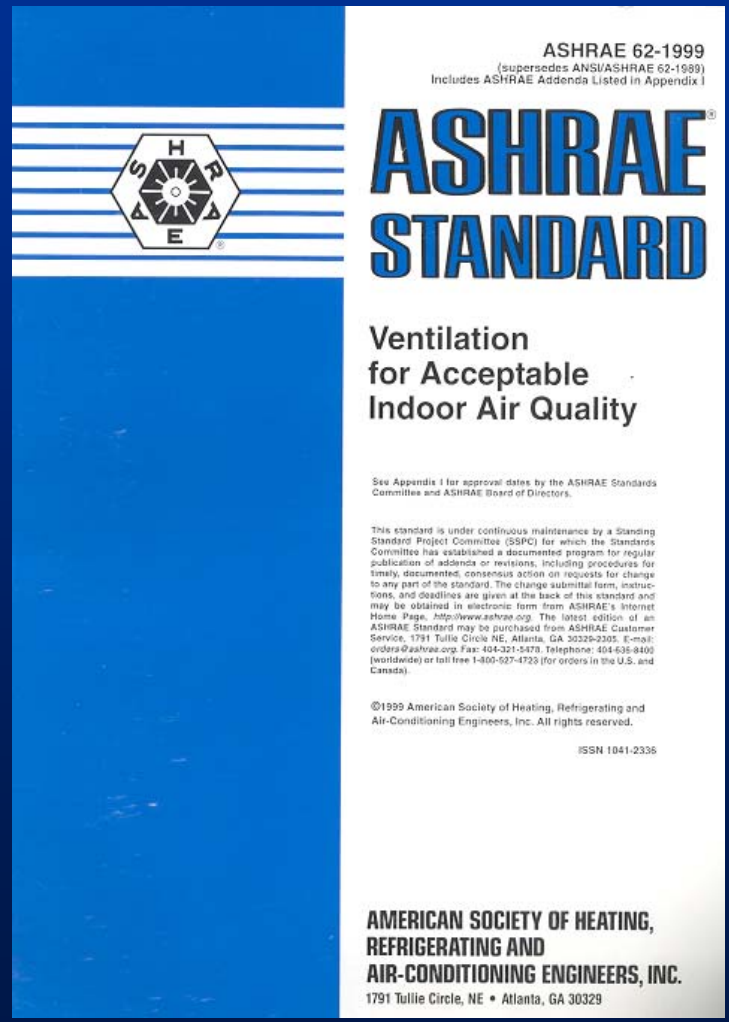


Credit 7:

Certified Wood Products

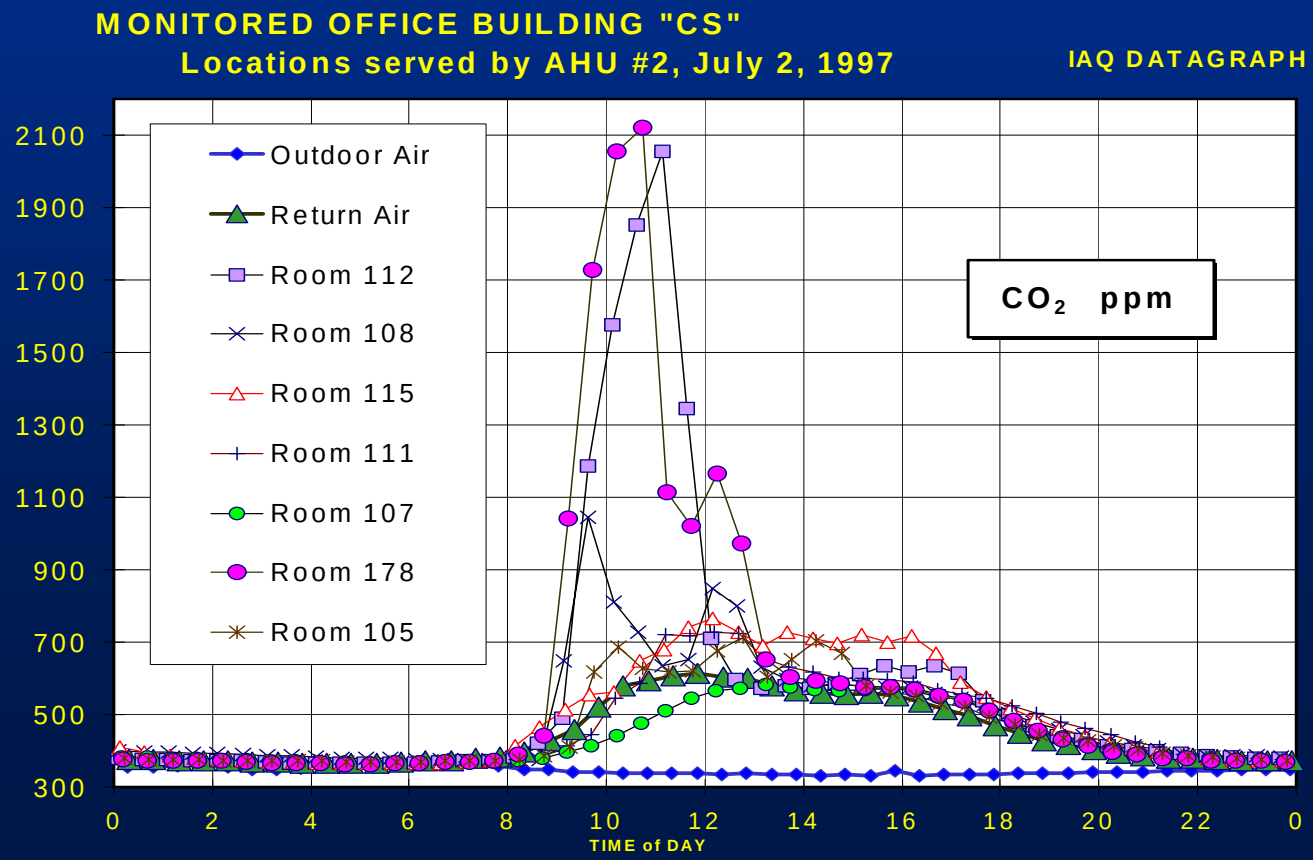
LEED™ Indoor Environmental Quality

- Prerequisite 1: Minimum IAQ Performance



LEED™ Indoor Environmental Quality

» Credit 1: Carbon Dioxide (CO_2) Monitoring



LEED™ Indoor Environmental Quality

- Credit 4:
  Low-Emitting Materials
  - Adhesives / Sealants
  - Paints
  - Carpet Systems
  - Composite wood / agrifiber products

CRI

LEED™ Indoor Environmental Quality

» Credit 8: Daylight and Views

Benefits of Green Building

Environmental

- Reduce natural resource consumption

Economic

- Reduce operating costs, Improve bottom line

Health and Safety

- Enhance occupant comfort and health

Community

- Minimize strain on local infrastructures, improve quality of life

Working with LEED

- Can be used as a guideline only, OR…
  Projects can register with the USGBC
- Requires close integration of the entire project team
- Training and Accreditation available

LEED™ in the USA

Federal Government Use

- General Services Administration (GSA)
- U.S. Army Corps of Engineers
- Department of State

State Government Use

- New Jersey
- New York
- Massachusetts

Local Government

- Arlington, VA
- Los Angeles, CA
- Seattle, WA

CT DPW LEED/Green Projects

- Dinosaur State Park Visitor's Center
- WCSU Science Building
- ECSU Science Building
- Residence Halls at WCSU, ECSU, SCSU

FOR MORE INFORMATION...

The **US Green Building Council**

Web site: www.usgbc.org
Email: info@usgbc.org

The CT Green Building Council
www.CTGBC.org

Questions??

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