

LEED Buildings: An Overview



U.S. GREEN BUILDING COUNCIL

**An Introduction to the
U.S. Green Building Council
and the
LEED Green Building
Rating System®**



USGBC's MISSION:

to promote the design and construction of buildings that are environmentally responsible, profitable, and healthy places to live and work.

The organization's activities...

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

USGBC is...

- A national nonprofit organization
- A diverse membership of organizations
- Consensus-driven
- Committee-based product development
- Developer and administrator of the LEED® Green Building Rating System

What is “Green” Design?

Design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and occupants in five broad areas:

- **Sustainable site planning**
- **Safeguarding water and water efficiency**
- **Energy efficiency and renewable energy**
- **Conservation of materials and resources**
- **Indoor environmental quality**

Environmental Impact of Buildings*

- 65.2% of total U.S. electricity consumption ¹
- > 36% of total U.S. primary energy use ²
- 30% of total U.S. greenhouse gas emissions ³
- 136 million tons of construction and demolition waste in the U.S. (approx. 2.8 lbs/person/day) ⁴
- 12% of potable water in the U.S. ⁵
- 40% (3 billion tons annually) of raw materials use globally ⁶

* Commercial and residential

Benefits of Green Building

Environmental benefits

- **Reduce the impacts of natural resource consumption**

Economic benefits

- **Improve the bottom line**

Health and safety benefits

- **Enhance occupant comfort and health**

Community benefits

- **Minimize strain on local infrastructures and improve quality of life**

Economic Benefits

Competitive first costs

- **Integrated design allows high benefit at low cost by achieving synergies between disciplines and between technologies**

Reduce operating costs

- **Lower utility costs significantly**

Optimize life-cycle economic performance

Economic Benefits

Increase building valuation and ROI

- **Using the income-capitalization method: asset value = net operating income (NOI) divided by the capitalization rate (return). If the cap rate is 7%, divide the reduction in annual operating costs by 7% to calculate the increase in the building's asset value**
- **Quantify financial benefit in terms of Return On Investment (ROI) instead of payback time.**

Decrease vacancy, improve retention

- **Marketing advantages**

Reduce liability

- **Improve risk management**

Productivity Benefits

Improve occupant performance

- **Estimated \$29 –168 billion in national productivity losses per year ¹**
- **Student performance is better in daylit schools. ^{2, 3}**

Reduce absenteeism and turnover

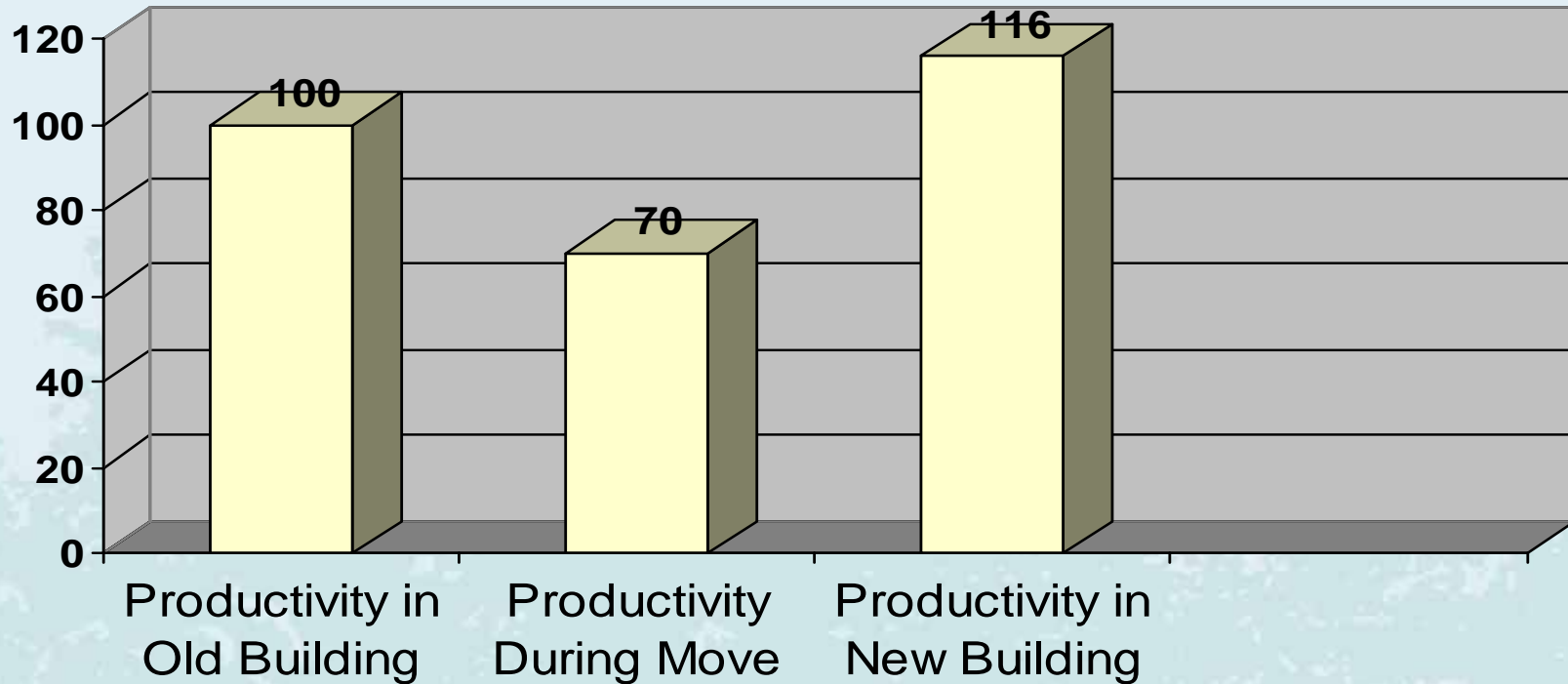
- **Providing a healthy workplace improves employee satisfaction**

Increase retail sales with daylighting

- **Studies have shown ~40% improvement ⁴**

West Bend Mutual Insurance Company

(West Bend, WI)



LEED

GREEN BUILDING RATING SYSTEM

Leadership in Energy & Environmental Design®

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



Why Was LEED[®] Created?

- Facilitate positive results for the environment, occupant health and financial return
- Define “green” by providing a standard for measurement
- Prevent “greenwashing” (false or exaggerated claims)
- Promote whole-building, integrated design processes

Why Was LEED® Created?

- Use as a design guideline
- Recognize leaders
- Stimulate green competition
- Establish market value with recognizable national “brand”
- Raise consumer awareness
- Transform the marketplace!

LEED® Products

LEED covers many different types of buildings and construction. These are covered under the following LEED products:

LEED-NC: LEED for New Construction and Major Renovations/Additions (for commercial and institutional buildings, released in 2000)

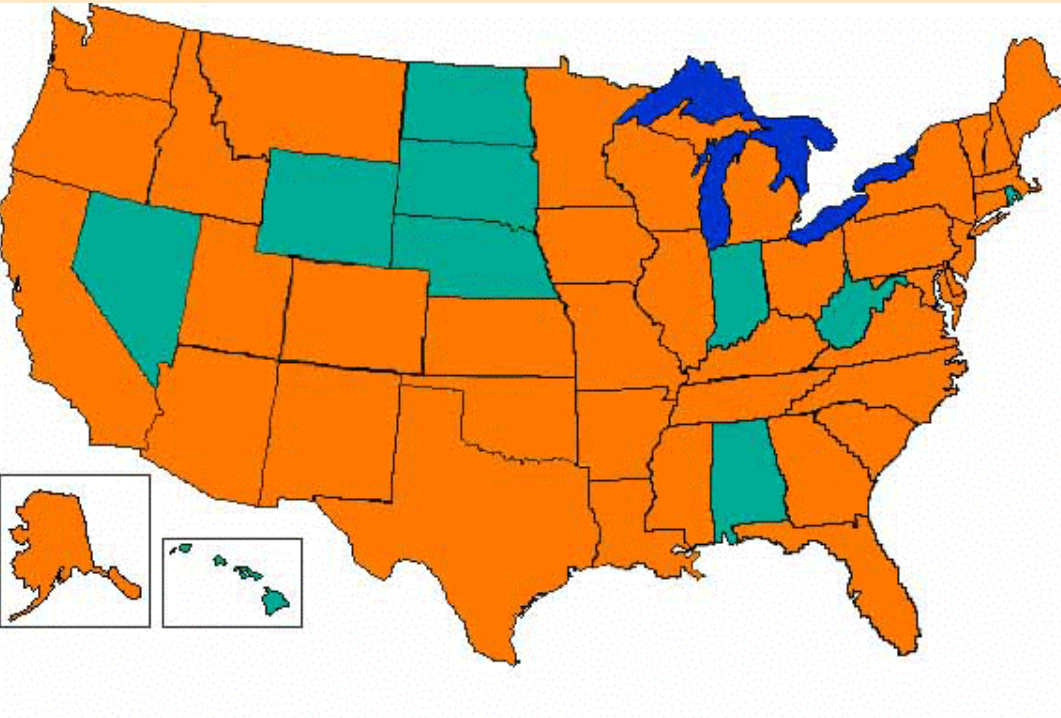
LEED-EB: LEED for Existing Buildings (public release: Winter 2004)

LEED-CI: LEED for Commercial Interiors (public release: Winter 2004)

LEED-CS: LEED for Core and Shell (public release: 2005)

LEED-H: LEED for Homes (public release: 2006)

LEED-NC[®] Market Transformation



■ 215 Certified Projects

■ 1921 Registered Projects

225 M gsf

50 States

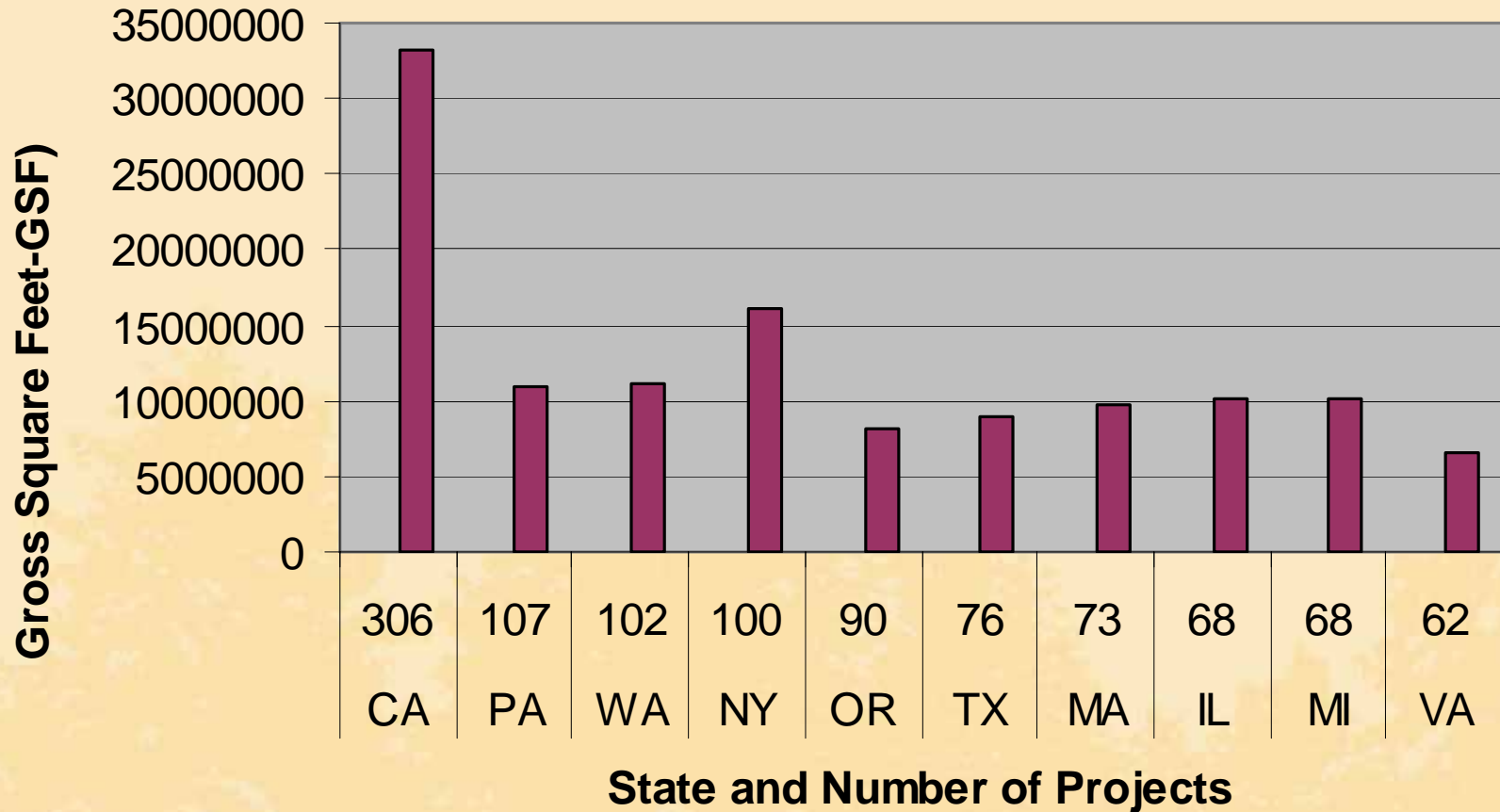
13 Countries

As of 05.02.05

All statistics exclude pilot projects

LEED-NC[®] Market Transformation

- Registered Projects by State - Top 10

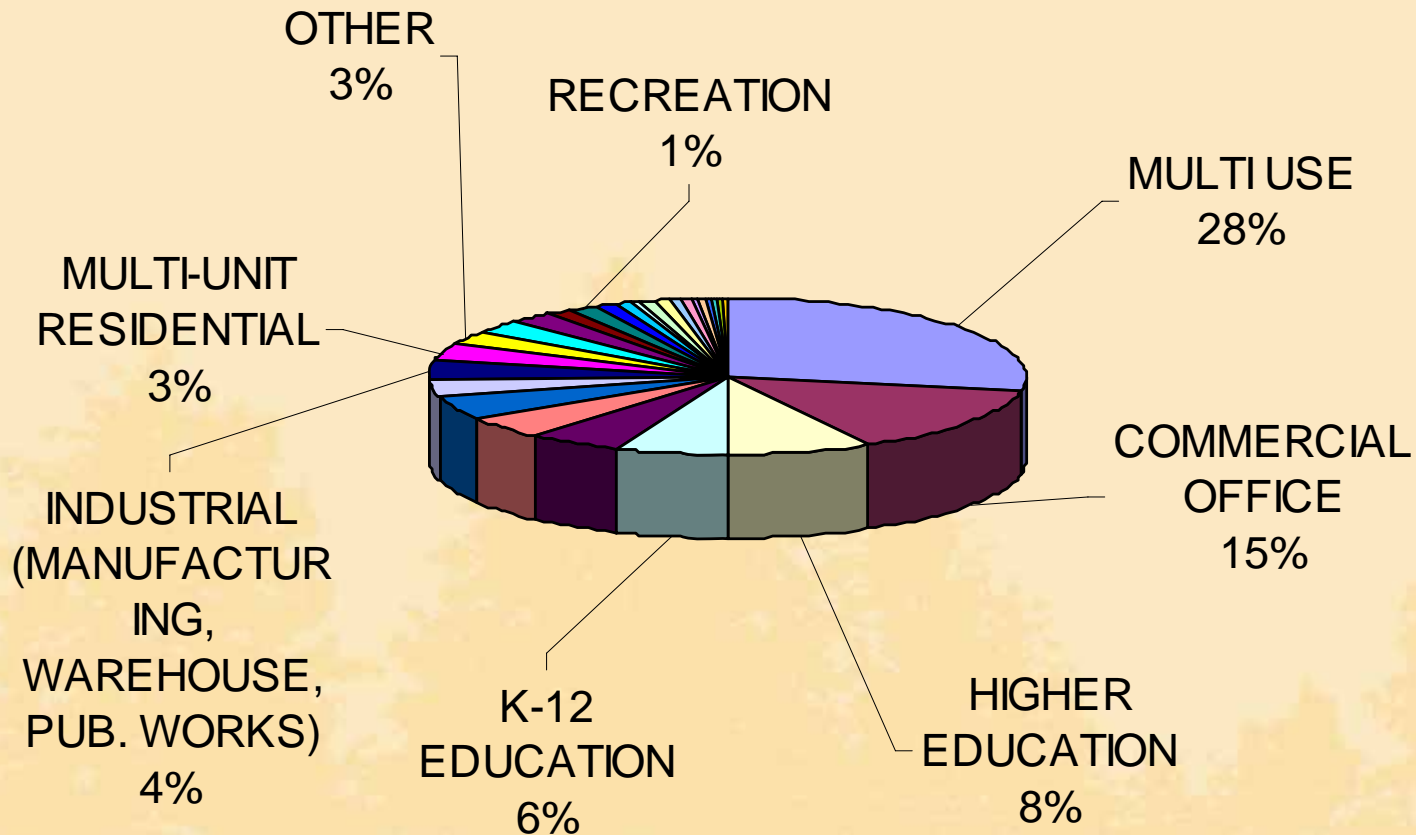


As of 05.02.05

All statistics exclude pilot projects

LEED-NC[®] Market Transformation

Registered Projects by Building Type

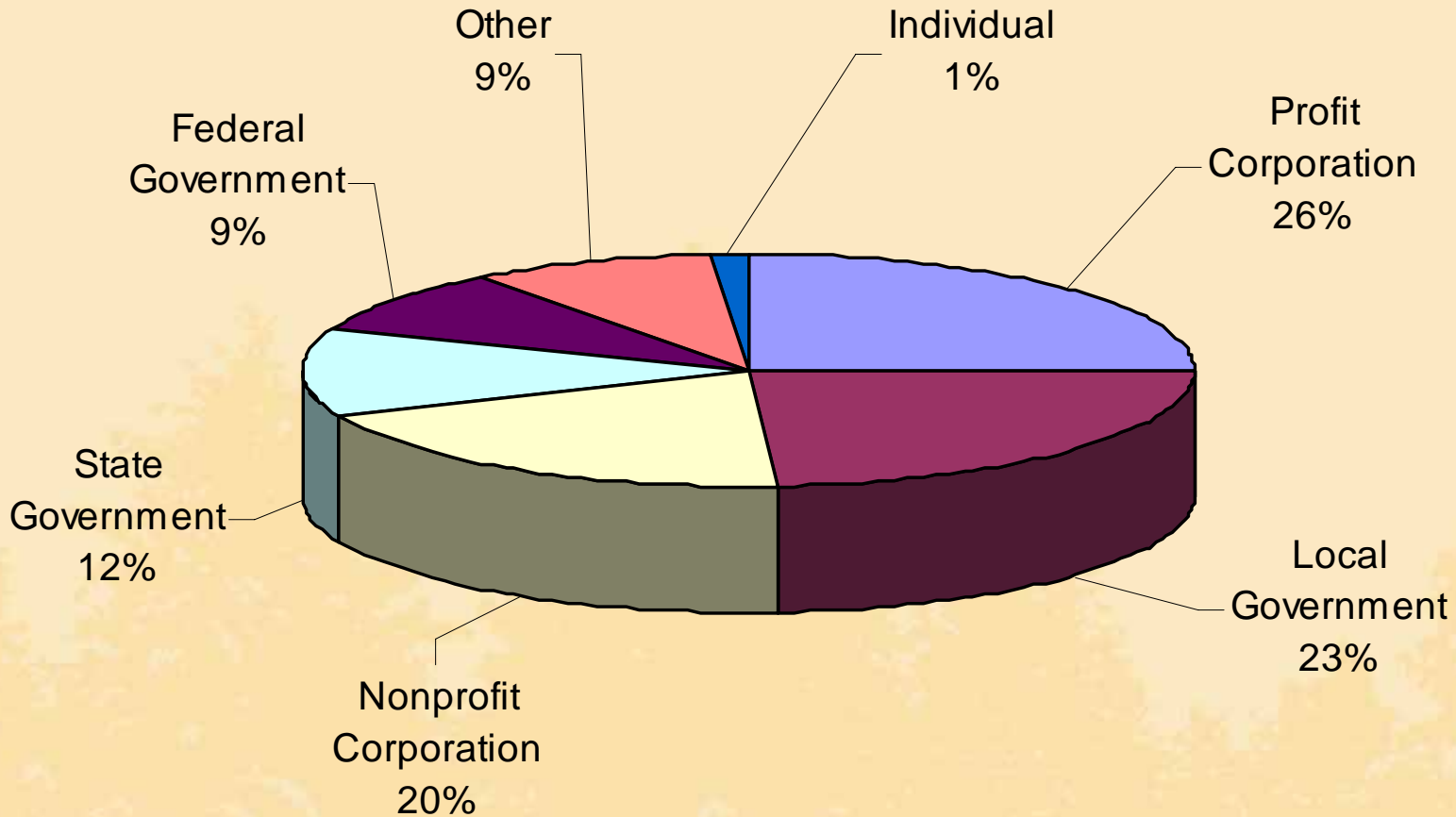


As of 05.02.05

All statistics exclude pilot projects

LEED-NC[®] Market Transformation

Registered Projects by Owner Type



As of 05.02.05

All statistics exclude pilot projects

LEED-NC[®] in the USA

Federal Government Use:

- **General Services Administration (GSA)**
 - LEED Certified projects beginning in 2003
- **U.S. Air Force**
 - LEED Application Guide for Lodging
- **U.S. Army Corps of Engineers**
 - Adaptation of LEED: SPiRiT
- **Department of State**
- **Department of Energy (DOE)**
- **Environmental Protection Agency (EPA)**
 - Grant for LEED Existing Buildings
- **U.S. Navy**
 - Grant for LEED Residential

LEED-NC[®] in the USA

State Government Use*:

- California
- Maryland
- Massachusetts
- New Jersey
- New York
- Oregon
- Pennsylvania
- Washington

Local Government Use*:

- Austin, TX
- Arlington, VA
- Boulder, CO
- Chicago and Cook County, IL
- Los Angeles, CA
- Portland, OR
- San Jose, CA
- San Francisco, CA
- Seattle, WA

*Not limited to these examples

Michigan LEED Certified Projects

1. Bunker Interpretive Center, Calvin College, Grand Rapids [Gold](#)
2. Interurban Transit Partnership ITP, Grand Rapids [Certified](#)
3. Keystone Community Church, Grand Rapids [Certified](#)
4. Michigan Alternative and Renewable Energy Center, Muskegon [Certified](#)
5. Water/Environmental Services Facility Water Systems Dept., Grand Rapids [Certified](#)
6. [Bazzani Associates Headquarters](#), Grand Rapids [Silver](#)
7. Detroit Lions HQ & Training Facility, Allen Park [Certified](#)
8. First National Bank in Howell - Green Oak Township Office, Whitmore Lake [Certified](#)
9. Ford Rouge Visitor Center, Dearborn [Gold](#)
10. Goodwillie Environmental School, Forest Hills Public Schools, Grand Rapids [Certified](#)
11. [Herman Miller C1 Main Site](#), Herman Miller, Inc, Zeeland [Gold](#)
12. Ice Mountain Bottling Plant, Stanwood [Certified](#)
13. S.T. Dana Building, University of Michigan, Ann Arbor [Gold](#)
14. [The Herman Miller MarketPlace](#), Zeeland Township [Gold](#)
15. Herman Miller BG Main Site, .Zeeland [Certified](#)
16. Steelcase Wood Furniture Manufacturing Plant, Caledonia [Silver](#)

Global Interest in LEED®

- Australia
- Canada**
- China*
- France
- India **
- Japan*
- Spain*
- Mexico**
- Italy*
- Côte d'Ivoire*
- Guatemala*

*Certified Projects

*Registered Projects

Premier Automotive Group North American Headquarters Ford Motor Company Irvine, California

Project Highlights:

Sustainable Sites

- Alternative Transportation: Three bus routes are located within ¼ mile; bicycle racks and showers provided; 30 electric vehicle recharging stations provided.

Water Efficiency

- Innovative Wastewater Technologies: All toilets use reclaimed water, accounting for more than 50% of total sewage conveyance.

Energy and Atmosphere

- Optimize Energy Performance: Exceeds ASHRAE 90.1-1999 by 40% using a high efficiency glazing system, high efficiency lighting with T5 lamps, an underfloor air distribution system in office tower, increased chiller efficiency and a variable speed drive on one chiller.

Materials and Resources

- Construction Waste Management: 57% of all construction waste was recycled including concrete, asphalt, paper, metal and cardboard.

Indoor Environmental Quality

- Construction IAQ Management Plan: All ducts and permeable materials were protected against contamination during construction; all construction filtration media was replaced before occupancy.



LEED® v2 Certified 2001

Building Statistics

Completion Date:	<i>November 2001</i>
Cost:	<i>\$60 Million</i> <i>(construction contract only)</i>
Size:	<i>253,000 gross square feet</i>
Footprint:	<i>74,000 square feet</i>
Construction Type:	<i>Commercial/Industrial</i>
Use Group:	<i>Office and Design Center</i>
Lot Size:	<i>11.5 acres</i>
Annual Energy Use:	<i>24,356,010 kBtu/h</i>
Occupancy:	<i>700</i>

New York State Department of Environmental Conservation Office Complex at 625 Broadway Avenue

Albany, New York

Project Highlights:

Sustainable Sites

- Urban Redevelopment: Urban infill site was previously a gravel parking lot.
- Alternative Transportation: Located 80 yards from 4 bus lines; bicycle racks and showers; 15 electric vehicle charging stations; priority carpool parking.

Energy and Atmosphere

- Optimize Energy Performance: Exceeds ASHRAE/IESNA 90.1-1999 by 23.7%.
- Additional Commissioning: Verified that the building is designed, constructed and calibrated to operate as intended.

Materials and Resources

- Construction Waste Management: 51% of construction waste was recycled.

Indoor Environmental Quality

- CO₂ Monitoring: CO₂ monitoring system has 83 sensors integrated with the building's building management system.
- Low-Emitting Materials: All adhesives, sealants, paints, coatings, carpeting, composite wood emit low or no volatile organic compounds.



LEED® v2 Silver 2002

Owner:	Picotte Companies
Building Statistics	
Completion Date:	<i>September 2002</i>
Size:	<i>471,000 gross square feet</i>
Footprint:	<i>45,600 square feet</i>
Construction Type:	<i>Commercial</i>
Use Group:	<i>Office</i>
Lot Size:	<i>2.18 acres</i>
Annual Energy Use:	<i>22,232,209 kBtu/year</i>
Occupancy:	<i>1700 Staff</i>

Issaquah Highlands Fire Station #73

City of Issaquah

Issaquah, Washington

LEED® v2 Silver 2003



On October 30, 2003, Issaquah Highlands Fire Station #73 in Issaquah, Washington, was awarded LEED® v2 Silver and became the first LEED certified fire station. This 2 story 3 bay fire station incorporates many water efficient technologies for both the building and landscaping to maximize efficiency. Within the building, the project achieves 55% potable water use reduction for waste conveyance and 36% water use reduction for flush and flow fixtures. In addition, the landscape design does not require a permanent irrigation system, further reducing the need for potable water on site. During construction, a waste management plan was implemented to divert 76% of materials from the landfill. Fire Station #73 supports the regional economy as 44% of building materials are locally manufactured, and of those, 55% are locally harvested, demonstrating exemplary performance. For the interior, the project includes several indoor environmental quality strategies, such as carbon dioxide monitoring systems and the use of low-emitting materials. Furthermore, a construction IAQ management plan was implemented during construction as well as before occupancy to help sustain the comfort and well-being of the fire fighters. A biodiesel fuel storage tank supplies the building's emergency generator and also has the capability to provide fuel for the fire service vehicles based at the station. To further demonstrate innovative performance, a rain water catchment system and underground cistern provide non-potable water for truck washing, conserving 4,500 gallons of water annually.

West Coast & Alaska Tsunami Warning Center

National Oceanic and Atmospheric Administration/
National Weather Service

Palmer, Alaska

LEED v2 Certified 2004



The West Coast and Alaska Tsunami Warning Center in Palmer, Alaska, achieved LEED® v2 Certified on December 23, 2003. As the first LEED certified building for Alaska, this one story 6,690 sf building monitors potential tsunamigenic earthquakes occurring in the coastal areas of California, Oregon, Washington, Alaska, and British Columbia. The project reused an existing site, relocating the old warning center building and storage facility for reuse at another site. By planting adaptive vegetation which does not require irrigation, more than half of the site was restored, and within the building, water usage is reduced by more than 30%. Additional commissioning helps the building to achieve 28% energy efficiency over ASHRAE 90.1-1999. Through the implementation of a construction waste management plan, 82% of materials were diverted from the landfill. To improve indoor air quality, the project includes carbon dioxide monitoring, a construction IAQ management plan during construction and before occupancy, and installation of low-emitting adhesives, sealants, and paints. To connect staff to the beautiful Palmer scenery, the building is designed with views from 90% of spaces.

Technical Overview of LEED®

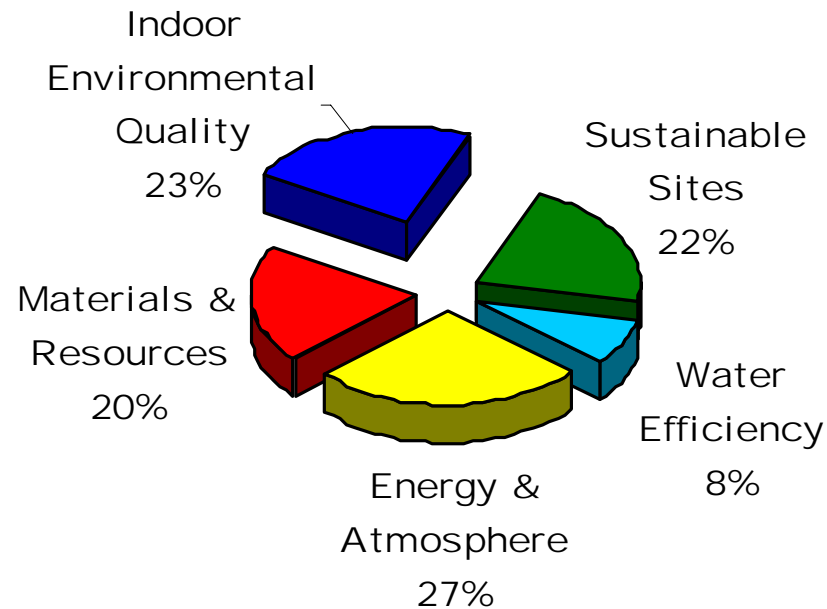
- Green building rating system, currently for commercial and institutional new construction and major renovation.
- Existing, proven technologies
- Evaluates and recognizes performance in accepted green design categories
- LEED product development includes existing buildings, commercial interiors, multiple buildings, core & shell, and homes

Technical Overview of LEED®

- Whole-building approach encourages and guides a collaborative, integrated design and construction process
- Optimizes environmental and economic factors
- Four levels of LEED-NC certification:
 - Certified Level 26 - 32 points
 - Silver Level 33 - 38 points
 - Gold Level 39 - 51 points
 - Platinum Level 52+ points (69 possible)

LEED-NC[®] Point Distribution

Five LEED credit categories



LEED-NC[®] Certification Process

A three step process:

- Step 1: Project Registration
 - LEED Letter Templates, CIR access, and on-line project listing
- Step 2: Technical Support
 - Reference Package
 - Credit Inquiries and Rulings (CIR)
- Step 3: Building Certification
 - Upon documentation submittal and USGBC review

LEED® Certification Benefits

Recognition of Quality Buildings and Environmental Stewardship

- Third party validation of achievement
- Qualify for growing array of state and local government incentives
- Contribute to growing knowledge base
- LEED certification plaque to mount on building
- Official certificate
- Receive marketing exposure through USGBC Web site, case studies, media announcements

Resources

- LEED Green Building Rating System
- Training Workshop
- Reference Package
- Professional Accreditation
- Welcome Packet
- Credit Rulings
- Website (www.leadbuilding.org)
- Email (leedinfo@usgbc.org)

**For more information
please visit
www.usgbc.org**