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

October 2005
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)

![Graph showing productivity comparison between old and new buildings during and after a move.](image-url)
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 (released 2004)
- **LEED-CI**: LEED for Commercial Interiors (released 2004)
- **LEED-CS**: LEED for Core and Shell (public release: 2005)
- **LEED-H**: LEED for Homes (public release: 2006)
- **LEED-ND**: LEED for Neighborhood Developments (public release: 2006)
LEED-NC® Market Transformation

289 Certified Projects
2,069 Registered Projects

235 M gsf 50 States 13 Countries

As of 10.19.05

All statistics exclude pilot projects
LEED-NC® Market Transformation

- Registered Projects by State - Top 10

As of 10.19.05

All statistics exclude pilot projects
LEED-NC® Market Transformation

- Registered Projects by Building Type

As of 10.19.05 All statistics exclude pilot projects

- MULTI-UNIT RESIDENTIAL 3%
- LIBRARY 3%
- K-12 EDUCATION 6%
- HIGHER EDUCATION 7%
- OTHER 3%
- MULTI USE 32%
- COMMERCIAL OFFICE 14%

All statistics exclude pilot projects
LEED-NC® Market Transformation

- Registered Projects by Owner Type

As of 10.19.05 All statistics exclude pilot projects

- Individual: 2%
- Corporation: 28%
- Local Government: 22%
- Nonprofit Corporation: 20%
- State Government: 12%
- Federal Government: 8%
- Other Government: 8%
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

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*Not limited to these examples
Global Interest in LEED®

- Australia
- Canada**
- China**
- France
- India **
- Brazil*
- Curaçao*

- Japan*
- Spain*
- Mexico**
- Italy*
- Côte d'Ivoire*
- Guatemala*
- Chile

*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.
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.
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.
We are not just building a shelter: we are creating a teaching tool and a model for others who want to make environmentally sound choices. Using the U.S. Green Building Council's LEED rating system as a guideline, we are designing a collegiate learning center that is as environmentally sensitive and energy efficient as possible. Choosing the site for the collegiate facility was a long and careful process. Its current location gives the building occupants a convenient entrance from a county road and easy access to a prime outdoor classroom—the Kesling wetlands. Locating the building on the perimeter of Merry Lea’s 1,150 acres near land that is already developed allows the nature center’s more remote areas to remain undisturbed. Slope, elevation and southern exposure were also important factors. When the site was purchased in 1969, it was badly eroded farmland that had lost its upper layer of topsoil. Today, invasive, non-native species such as autumn olive and multiflora rose still dominate this area. Ten years from now, when the landscaping surrounding the collegiate facility is well established, we expect this patch of earth to be a healthier, more biologically diverse ecosystem than it was when it was an empty field. After site development, the landscape will include prairie dropseed, big blue stem, coneflowers, compass plants, blue phlox and many other plants which provide a home for native species and preserve the character and uniqueness of northern Indiana.
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

Indoor Environmental Quality 23%
Materials & Resources 20%
Energy & Atmosphere 27%
Sustainable Sites 22%
Water Efficiency 8%
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
Green Design Benefits

- Lower operating costs (life cycle costs)
- Employee retention (improved productivity)
- Increased sales
- Marketing opportunities
- Leading by example in local community
- Make a difference for future generations
Implementation Techniques for Parks Projects

- **Site:**
  - Limit soil compaction
  - Limit site disturbance
  - Use of recycled materials
  - Improved erosion control

- **Water:**
  - Innovative stormwater management
  - Onsite sewage treatment
  - Collect rainwater for reuse (grey water or irrigation)

- **Energy:**
  - Closed loop ground source heat pumps
  - Solar water heaters
  - Wind/solar energy collection
Resources

- **USGBC**
  - [www.usgbc.org](http://www.usgbc.org) or call 202-828-7422

- **LEED**
  - [www.usgbc.org/leed](http://www.usgbc.org/leed)

- **Whole Building Design Guide**
  - [www.wbdg.org](http://www.wbdg.org)

- **EPA**
  - [http://www.epa.gov/greenbuilding](http://www.epa.gov/greenbuilding)

- **Greener Buildings**
  - [http://www.greenerbuildings.com/](http://www.greenerbuildings.com/)