



LEED-NC

FOR NEW CONSTRUCTION

REFERENCE GUIDE

Version 2.2

First Edition

October 2005



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LEED-NC ratings:

- ☐ Certified 26-32 points
- ☐ Silver 33-38 points
- ☐ Gold 39-51 points
- ☐ Platinum 52-69 points



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Foreword from the USGBC



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The built environment has a profound impact on our natural environment, economy, health and productivity. Breakthroughs in building science, technology and operations are now available to designers, builders, operators and owners who want to build green and maximize both economic and environmental performance.

The U.S. Green Building Council (USGBC) is coordinating the establishment and evolution of a national consensus effort to provide the industry with tools necessary to design, build and operate buildings that deliver high performance inside and out. Council members work together to develop industry standards, design and construction practices and guidelines, operating practices and guidelines, policy positions and educational tools that support the adoption of sustainable design and building practices. Members also forge strategic alliances with key industry and research organizations, federal government agencies and state and local governments to transform the built environment. As the leading organization that represents the entire building industry on environmental building matters, the Council's unique perspective and collective power provides our members with enormous opportunity to effect change in the way buildings are designed, built, operated and maintained.

USGBC Membership

The Council's greatest strength is the diversity of our membership. The USGBC is a balanced, consensus nonprofit representing the entire building industry, consisting of over 6,500 companies and organizations. Since its inception in 1993, the USGBC has played a vital role in providing a leadership forum and a unique, integrating force for the building industry. Council programs are—

❑ Committee-Based

The heart of this effective coalition is our committee structure in which volunteer members design strategies that are implemented by staff and expert consultants. Our committees provide a forum for members to resolve differences, build alliances and forge cooperative solutions for influencing change in all sectors of the building industry.

❑ Member-Driven

The Council's membership is open and balanced and provides a comprehensive platform for carrying out important programs and activities. We target the issues identified by our members as the highest priority. We conduct an annual review of achievements that allows us to set policy, revise strategies and devise work plans based on member needs.

❑ Consensus-Focused

We work together to promote green buildings and in doing so, we help foster greater economic vitality and environmental health at lower costs. The various industry segments bridge ideological gaps to develop balanced policies that benefit the entire industry.

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Introduction

I. Why Make Your Building Green?

The environmental impact of the building design, construction and operation industry is significant. Buildings annually consume more than 30% of the total energy and more than 60% of the electricity used in the U.S. Each day five billion gallons of potable water is used solely to flush toilets. A typical North American commercial construction project generates up to 2.5 pounds of solid waste per square foot of completed floor space. Development shifts land usage away from natural, biologically-diverse habitats to hardscape that is impervious and devoid of biodiversity. The far reaching influence of the built environment necessitates action to reduce its impact.

Green building practices can substantially reduce or eliminate negative environmental impacts and improve existing unsustainable design, construction and operational practices. As an added benefit, green design measures reduce operating costs, enhance building marketability, increase worker productivity, and reduce potential liability resulting from indoor air quality problems. For example, energy efficiency measures have reduced operating expenses of the Denver Dry Goods building by approximately \$75,000 per year. Students in day-lit schools in North Carolina consistently score higher on tests than students in schools using conventional lighting fixtures. Studies of workers in green buildings reported productivity gains of up to 16%, including reductions in absenteeism and improved work quality, based on “people-friendly” green design. At a grocery store in Spokane, Washington, waste management costs were reduced by 56% and 48 tons of waste was recycled during construc-

tion. In other words, green design has environmental, economic and social elements that benefit all building stakeholders, including owners, occupants and the general public.

II. LEED® Green Building Rating System

A. History of LEED®

Following the formation of the U.S. Green Building Council (USGBC) in 1993, the membership quickly realized that a priority for the sustainable building industry was to have a system to define and measure “green buildings.” The USGBC began to research existing green building metrics and rating systems. Less than a year after formation, the membership followed up on the initial findings with the establishment of a committee to focus solely on this topic. The diverse initial composition of the committee included architects, realtors, a building owner, a lawyer, an environmentalist and industry representatives. This cross section of people and professions added a richness and depth both to the process and to the ultimate product.

The first LEED Pilot Project Program, also referred to as LEED Version 1.0, was launched at the USGBC Membership Summit in August 1998. After extensive modifications, the LEED Green Building Rating System Version 2.0 was released in March 2000. This rating system is now called the LEED Green Building Rating System for New Commercial Construction and Major Renovations, or LEED-NC.

As LEED has evolved and matured, the program has undertaken new initiatives. In addition to a rating system specifically devoted to building operational and

maintenance issues, LEED addresses the different project development/delivery processes that exist in the U.S. building design and construction market. Currently, the LEED product portfolio is being expanded to the following areas:

LEED for New Commercial Construction (LEED-NC) is part of the growing portfolio of rating system products serving specific market sectors.



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** under development
as of October 2005*

B. Features of LEED®

The LEED Green Building Rating System is a voluntary, consensus-based, market-driven building rating system based on existing proven technology. It evaluates environmental performance from a whole building perspective over a building's life cycle, providing a definitive standard for what constitutes a "green building." The development of the LEED Green Building Rating System was initiated by the USGBC Membership, representing all segments of the building industry and has been open to public scrutiny.

The rating system is organized into five environmental categories: Sustainable Sites, Water Efficiency, Energy & Atmo-

sphere, Materials & Resources, and Indoor Environmental Quality. An additional category, Innovation & Design Process, addresses sustainable building expertise as well as design measures not covered under the five environmental categories.

LEED is a measurement system designed for rating new and existing commercial, institutional and residential buildings. It is based on accepted energy and environmental principles and strikes a balance between known established practices and emerging concepts.

It is a performance-oriented system where credits are earned for satisfying criterion designed to address specific environmental impacts inherent in the design, construc-



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tion and O&M of buildings. Different levels of green building certification are awarded based on the total credits earned. The system is designed to be comprehensive in scope, yet simple in operation.

C. The Future of LEED

The green design field is growing and changing daily. New technologies and products are coming into the marketplace and innovative designs are proving their effectiveness. Therefore, the Rating System and the Reference Guide will evolve as well. Teams wishing to certify with LEED should note that they will need to comply with the version of the rating system that is current at the time of their registration.

The USGBC will highlight new developments on its website on a continuous basis at www.usgbc.org.

III. LEED-NC Overview and Process

The LEED Green Building Rating System for New Commercial Construction and Major Renovation (LEED-NC) provides a set of performance standards for certifying the design and construction phases of commercial, institutional buildings, and high-rise residential buildings. The specific credits in the rating system provide guidelines for the design and construction of buildings of all sizes in both the public and private sectors. The intent of LEED-NC is to assist in the creation of high performance, healthful, durable, affordable and environmentally sound commercial and institutional buildings.

LEED-NC addresses:

- ☐ Sustainable Sites
- ☐ Water Efficiency
- ☐ Energy & Atmosphere
- ☐ Materials & Resources
- ☐ Indoor Environmental Quality
- ☐ Innovation in Design

A. When to Use LEED-NC

LEED-NC was designed primarily for new commercial office buildings, but it has been applied to many other building types by LEED practitioners. All commercial buildings, as defined by standard building codes, are eligible for certification as a LEED-NC building. Commercial occupancies include (but are not limited to) offices, retail and service establishments, institutional buildings (libraries, schools, museums, churches, etc.), hotels and residential buildings of four or more habitable stories.

LEED-NC addresses design and construction activities for both new buildings and major renovations of existing buildings. The LEED Green Building Rating System for Existing Buildings (LEED-EB) is designed to address operational and maintenance issues of working buildings. Therefore, if you are performing a major renovation on an existing building, LEED-NC is the most appropriate rating system for your project. If however, your project scope does not involve significant design and construction activities and focuses more on O&M activities, LEED-EB is the most appropriate tool for your project. As a general rule-of-thumb, a major renovation involves elements of major HVAC renovation, significant envelope modifications and major interior rehabilitation.

Many projects will cleanly and clearly fit the defined scope of only one LEED Rating System product. Other projects may be applicable to two or more LEED Rating System product scopes. USGBC encourages the project team to tally a potential point total using the Rating System checklists for all possibilities. The project is a viable candidate for LEED certification if it can meet all prerequisites and achieve the minimum points required in a given Rating System. If more than one Rating System applies, then it is up to the project team to decide which one to pursue. For assistance in choosing the

most appropriate LEED Rating System, please e-mail leedinfo@usgbc.org.

B. LEED-NC Registration

Project teams interested in obtaining LEED-NC Certification for their project must first register this intent with the USGBC. Projects can be registered on the USGBC website (www.usgbc.org) in the LEED section, under Register Your Project. The website includes information on registration costs for USGBC member companies as well as non-members. Registration is an important step that establishes contact with the USGBC and provides access to software tools, errata, critical communications and other essential information.

C. Credit Interpretation Rulings

In some cases, the design team may encounter challenges in applying a LEED-NC prerequisite or credit to their particular project. These difficulties arise from instances where the Reference Guide does not sufficiently address a specific issue or there is a special conflict that requires resolution. To address such issues, the USGBC has established the LEED-NC Version 2.2 Credit Interpretation Ruling (CIR) process (separate from the CIR page for version 2.0 and 2.1 CIRs). See the LEED-NC section of the USGBC website for more information at www.usgbc.org.

The Credit Interpretation process is summarized as follows:

1. Project teams should review the CIR webpage to read previously posted credit interpretation requests and USGBC responses. Many questions can be resolved by reviewing existing CIRs and the LEED-NC v2.2 Reference Guide. Note that CIRs for other rating systems (LEED-EB, LEED-CI and past versions of LEED-NC) are not necessarily applicable.
2. If no existing Credit Interpretation Rulings are relevant to the project, the

LEED project team should submit an on-line credit interpretation request. The description of the challenge encountered by the project team should be brief but explicit; should be based on prerequisite or credit information found in the Rating System and Reference Guide; and should place a special emphasis on the Intent of the prerequisite or credit. If possible, the project team should offer potential solutions to the problem and solicit approval or rejection of their proposed interpretation. Follow the detailed instructions in the “CIR Guidelines” document available on the CIR webpage in the LEED section of the USGBC website.

3. USGBC will rule on your request electronically according to the posted schedule, either through a posting on the CIR Page or via e-mail correspondence.

D. LEED-NC Application

Once a project is registered, the project design team begins to collect information and perform calculations to satisfy the prerequisite and credit submittal requirements. Since submittal documentation should be gathered throughout design and construction, it is helpful to designate a LEED team leader who is responsible for managing the compilation of this information by the LEED-NC project team. Use the Letter Templates that are provided through the LEED project resources webpage located in the LEED section of the USGBC website. These templates contain embedded calculators, and are instrumental in documenting fulfillment of credit requirements and prompting for correct and complete supporting information.

Two-Phase Application

A new feature of LEED-NC v2.2 is the option of splitting a LEED-NC certification application into two phases. Rather than submitting all documentation for



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a project at the end of the construction phase, project teams will be able to submit designated “design phase credits” at the end of the design phase for review by USGBC. Design phase credits are those credits that USGBC can reasonably adjudicate based on design phase documentation. For example, if a project site meets the LEED-NC Sustainable Sites Credit 3: Brownfield Redevelopment Requirements, USGBC can assess the likelihood of the project achieving this credit prior to the completion of construction. It is important to remember that LEED credit is not awarded at the design review stage. Project teams are notified of the likelihood of their project to achieve a LEED credit if construction is executed in accordance with design phase plans. Projects must submit verification that design elements were implemented as planned after completion of construction. A list of the potential design phase credits can be found in the LEED section of the USGBC website. Project Teams are allotted one design phase review. At the completion of construction, the balance of attempted credits, verification of design phase credits, and additional documentation for any design phase credits that has changed since the design phase review are documented and submitted for USGBC review. See below for more details regarding the two-phase review.

E. Review and Certification

To earn LEED-NC certification, the applicant project must satisfy all of the prerequisites and a minimum number of points to attain the established LEED-NC project ratings as listed below. Having satisfied the basic prerequisites of the program, applicant projects are then rated according to their degree of compliance within the rating system. All LEED-NC projects will need to comply with the version of LEED-NC that is current at the time of project registration.

Design Phase Review

Once USGBC has received your complete design phase application and the design phase fee (which is a portion of the total certification fee), the USGBC will formally rule on your application by designating each attempted credit as either Anticipated or Denied. No certification award will be given at this time, nor will any credits be awarded. This process serves to allow project teams the opportunity to assess the likelihood of credit achievement, and requires follow through to ensure the design is executed in the construction phase according to design specifications.

Construction Phase Review

At the completion of construction, the project team will submit all attempted credits for review. If the project team had elected to have a design phase review and any of the design phase Anticipated credits have changed, additional documentation must be submitted to substantiate continued compliance with credit requirements. For design phase Anticipated credits that have not substantively changed, the project team must submit a verification that the design has been executed per requirements in the construction phase. Once USGBC has received the complete application and fee (the remainder of the total certification fee, if a design review has been conducted), the USGBC will formally rule on your full application. All applicant-verified design phase credits that were designated as Anticipated and have not changed since the design phase review will be declared as Achieved. All other credits will be designated as either Achieved or Denied.

Appeals

Appeals may be filed either after the design phase review or the final review. Please see the LEED-NC section of the USGBC website for more information on appeals.

Fees

Certification fee information can be found in the LEED-NC section of the USGBC website. The USGBC will acknowledge receipt of your application and proceed with application review when all project documentation has been submitted.

The LEED-NC ratings are awarded according to the following scale—

- ❑ Certified 26-32 points
- ❑ Silver 33-38 points
- ❑ Gold 39-51 points
- ❑ Platinum 52-69 points

The USGBC will recognize buildings that achieve one of these rating levels with a formal letter of certification and a mountable plaque.

F. Updates & Addenda

This is the first edition of the LEED-NC Version 2.2 Reference Guide, dated October 2005. As LEED-NC continues to improve and evolve, updates and addenda will be made available to substitute and augment the current material. The USGBC cannot be held liable for any criteria set forth herein, which may not be applicable to later versions of LEED-NC. Updates and addenda will be accumulated between revisions and will be formally incorporated in major revisions. In the interim between major revisions, the USGBC may use its consensus process to clarify criteria.

When a project registers for certification, the prerequisites, credits, and credit rulings current at the time of project registration will continue to guide the project throughout its certification process.

IV. LEED-NC Version 2.2 Reference Guide

The LEED-NC v2.2 Reference Guide is a supporting document to the LEED-NC Green Building Rating System. The

Guide is intended to assist project teams in understanding LEED-NC criteria and the benefits of complying with each criterion. The Guide includes examples of strategies that can be used in each category, case studies of buildings that have implemented these strategies successfully, and additional resources that will provide more information. The guide does not provide an exhaustive list of strategies for meeting the criteria as subsequent strategies will be developed and employed by designers that satisfy the Intent of each credit. Nor does it provide all of the information that design teams need to determine the applicability of a credit to their project.

Prerequisite and Credit Format

Each prerequisite and credit is organized in a standardized format for simplicity and quick reference. The first section summarizes the key points regarding the measure and includes the Intent, Requirements, and some Potential Technologies & Strategies for achieving the credit. The subsequent sections provide supportive information to help interpret the measure, examples, and links to various resources.

If your project team encounters an out-of-date web link in the Reference Guide, please go to the root website, which should take the form of www.organization.com with no additional text following. Then you may be able to navigate through the website to find the referenced document. Please contact the USGBC at (202) 828-7422 if you are unable to locate a resource.

Design with EB in Mind Icons

Throughout this Reference Guide, you will see this icon:



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This icon will assist projects that are proceeding with the intention of certifying with LEED-EB, following their LEED-NC certification. It identifies credits that involve measures that are significantly more cost-effective and convenient to implement during design and construction than they are during the operation of the building. These credits are—

- SSc 2: Development Density & Community Connectivity
- SSc 4.1: Alternative Transportation: Public Transportation Access
- EAc 1: Optimize Energy Performance
- EAc 3: Enhanced Commissioning
- EAc 5: Measurement & Verification
- MRc 4: Recycled Content
- MRc 5: Regional Materials
- MRc 6: Rapidly Renewable Materials
- MRc 7: Certified Wood
- EQc 1: Outdoor Air Delivery Monitoring
- EQc 6.2: Controllability of Systems: Thermal Comfort
- EQc 7: Thermal Comfort
- EQc 8: Daylight and Views