

Using LEED-NC® in Colorado: Tips, Resources and Examples

Helpful information for using the
LEED-NC® version 2.1 rating system
to build better buildings in Colorado



Colorado Governor's Office of Energy Management & Conservation
in collaboration with
U.S. Green Building Council, Colorado Chapter

June 2006

LEED® is a registered trademark of the U.S. Green Building Council



Funding and Project Management:

Colorado Governor's Office of Energy Management & Conservation (OEMC)
225 East 16th Avenue, Suite 650,
Denver, CO 80203
303-866-2100
Linda Smith, LEED AP, Sr. Program Manager
Edited by Joan Gregerson, LEED AP,
Consultant under contract to OEMC
E-mail: rebuildco@state.co.us
Website: www.colorado.gov/rebuildco

In Collaboration With:

U.S. Green Building Council, Colorado Chapter
Amy Jiron, Executive Director
303-229-9429
E-mail: amy@usgbccolorado.org
Website: www.usgbc.org/chapters/colorado

LEED and Leadership in Energy and Environmental Design are registered trademarks of the U.S. Green Building Council (USGBC).
Website: www.usgbc.org/leed

Written By:

Architectural Energy Corporation
2540 Frontier Avenue, Suite 201
Boulder, CO 80301
Website: www.archenergy.com
Authors: Amanda Portman, Caroline Clevenger and Courtney France

Acknowledgements:

Thank you to the authors, advisory committee, USGBC Colorado Chapter and project teams for contributing to this Guide.

Advisory Committee:

Lauren Yarmuth and Josie Plaut, DOMANI; Peter D'Antonio, PCD Engineering Services, Inc; Doug Hargrave, Long & Associates; Kristi Ennis, Boulder Associates, Inc.

Disclaimer:

The information herein is intended to aid in the use of the LEED-NC Rating System in Colorado. This information is provided only as a guide. The information reflects the authors and reviewers experience with LEED projects in Colorado, plus information from project teams and is not comprehensive. No guarantee of accuracy is implied. Refer to the USGBC for specific details of applying the LEED Rating System and to project teams for information about individual buildings. Also note that this Guide is geared toward the LEED-NC version 2.1. This version of the LEED Rating System applies to projects that registered before January 1, 2006. Projects registering after that date will use the LEED-NC version 2.2 Rating System. Look for updated versions of this Guide in the future.

Use of this Guide:

This document is intended to be used, free of charge, for all interested parties. No person or company may sell all or parts of this document in any form without prior written permission from the Colorado Governor's Office of Energy Management & Conservation. Available at www.colorado.gov/rebuildco.

Cover Photo:

Poudre School District's Fossil Ridge High School is the first LEED-NC Silver certified high school in Colorado. Photo courtesy: RB+B Architects.

Preface

Rebuild Colorado, a program of the **Governor's Office of Energy Management and Conservation**, offers technical assistance to help Colorado's state and local governments to help get better buildings through energy efficiency. Services include expertise and resources for every phase of a building's life including high performance design for new buildings, energy management for optimizing daily operations, and assistance identifying and implementing comprehensive energy-saving improvements in aging buildings. Visit the *Rebuild Colorado* website at www.colorado.gov/rebuildco to download this Guide, and for case studies and additional resources.



Table of Contents

| | |
|---|-----------|
| 1. Introduction | 1 |
| Getting Started: USGBC & LEED | 2 |
| About this Guide | 3 |
| LEED Certified Projects in Colorado | 3 |
| Historical Data for LEED-NC Certified Projects in Colorado | 6 |
| 2. Sustainable Sites | 9 |
| Prerequisite 1 Erosion & Sedimentation Control | 10 |
| Credit 1 Site Selection | 11 |
| Credit 2 Development Density | 12 |
| Credit 3 Brownfield Redevelopment | 14 |
| Credit 4.1 Alternative Transportation: Public Transportation Access | 15 |
| Credit 4.2 Alternative Transportation: Bicycle Storage & Changing Rooms | 16 |
| Credit 4.3 Alternative Transportation: Alternative Fuel Vehicles | 17 |
| Credit 4.4 Alternative Transportation: Parking Capacity | 18 |
| Credit 5.1 Reduced Site Disturbance: Protect or Restore Open Space | 19 |
| Credit 5.2 Reduced Site Disturbance: Development Footprint | 20 |
| Credit 6.1 Stormwater Management: Rate & Quantity | 21 |
| Credit 6.2 Stormwater Management: Treatment | 23 |
| Credit 7.1 Heat Island Effect: Non-Roof | 25 |
| Credit 7.2 Heat Island Effect: Roof | 26 |
| Credit 8 Light Pollution Reduction | 28 |
| 3. Water Efficiency | 29 |
| Credit 1.1 Water Efficient Landscaping: 50% Reduction | 30 |
| Credit 1.2 No Potable Use or No Irrigation | 33 |
| Credit 2 Innovative Wastewater Technologies | 35 |
| Credit 3 Water Use Reduction | 37 |
| 4. Energy and Atmosphere | 39 |
| Prerequisite 1 Fundamental Building Systems Commissioning | 40 |
| Prerequisite 2 Minimum Energy Performance | 42 |
| Prerequisite 3 CFC Reduction in HVAC&R Equipment | 44 |
| Credit 1 Optimize Energy Performance | 45 |
| Credit 2 Renewable Energy | 48 |
| Credit 3 Additional Commissioning | 50 |
| Credit 4 Ozone Protection | 51 |
| Credit 5 Measurement & Verification | 52 |
| Credit 6 Green Power | 54 |

| | |
|--|-----------|
| 5. Materials and Resources | 57 |
| Prerequisite 1 Storage and Collection of Recyclables | 58 |
| Credit 1 Building Reuse | 60 |
| Credit 2 Construction Waste Management | 61 |
| Credit 3 Resource Reuse | 63 |
| Credit 4 Recycled Content | 64 |
| Credit 5 Regional Materials | 66 |
| Credit 6 Rapidly Renewable Materials | 68 |
| Credit 7 Certified Wood | 69 |
| | |
| 6. Indoor Environmental Quality | 71 |
| Prerequisite 1 Minimum IAQ Performance | 72 |
| Prerequisite 2 Environmental Tobacco Smoke (ETS) Control | 73 |
| Credit 1 Carbon Dioxide (CO ₂) Monitoring | 74 |
| Credit 2 Ventilation Effectiveness | 75 |
| Credit 3.1 Construction IAQ Management Plan: During Construction | 77 |
| Credit 3.2 Construction IAQ Management Plan: After Construction/Before Occupancy | 79 |
| Credit 4 Low-Emitting Materials (General Overview) | 80 |
| Credit 4.1 Low-Emitting Materials: Adhesives & Sealants | 81 |
| Credit 4.2 Low-Emitting Materials: Paints & Coatings | 82 |
| Credit 4.3 Low-Emitting Materials: Carpet | 83 |
| Credit 4.4 Low-Emitting Materials: Composite Wood | 84 |
| Credit 5 Indoor Chemical & Pollutant Source Control | 85 |
| Credit 6.1 Controllability of Systems: Perimeter Spaces | 86 |
| Credit 6.2 Controllability of Systems: Non-Perimeter Spaces | 88 |
| Credit 7.1 Thermal Comfort: Compliance with ASHRAE-55 1992 | 89 |
| Credit 7.2 Thermal Comfort: Permanent Monitoring System | 91 |
| Credit 8.1 Daylight & Views: Daylight 75% of Spaces | 92 |
| Credit 8.2 Daylight & Views: Views for 90% of Spaces | 94 |
| | |
| 7. Innovation and Design Process | 95 |
| Credit 1 Innovation in Design | 96 |
| Credit 2 LEED Accredited Professional | 98 |
| | |
| Appendices | 99 |
| A: Credits Achieved for Colorado LEED-NC Version 2 Certified Projects | 100 |
| B. Colorado LEED Certified Projects at a Glance | 103 |
| C: What's New in 2.2? | 104 |
| D: Cost and Benefits of Green Building | 109 |
| E: Sources for Case Studies | 111 |
| F: Local Green Building & High Performance Design Associations | 112 |
| G: Funding Sources for Green Building | 113 |
| H: General Green Building Resources | 115 |