



# COLORADO BUILDING GREEN

The official newsletter of the U.S. Green Building Council - Colorado Chapter

April 2007  
// CONTENTS

**Project Profile:** NREL Science and Technology Facility  
*pg. 1*

**LEED Update:** CU earns LEED-NC Gold for Wolf Law and ATLAS projects *pg. 4*

**Legislative Roundup:** New Energy Economy Achievements  
*pg. 6*

**Executive Director Corner:** April Energy, Spring Growth *pg. 7*

**Membership Update** *pg. 7*

**Colorado LEED Projects** *pg. 8*



Photo courtesy of John Fielder's Colorado

**Project Profile** // Exploring Highlights of Colorado's Latest Green Designs

## NREL Science and Technology Facility

Golden facility was recently awarded LEED Platinum



*by Dana Kose,  
LEED AP, M. A.  
Mortenson Company*

The National Renewable Energy Laboratory (NREL) in Golden, Colorado, is the nation's primary laboratory for renewable energy and energy efficiency research and development. NREL's mission is: to develop renewable energy and energy efficiency technologies and practices, advance related science and engineering, and transfer knowledge and innovations to address the nation's energy and environmental goals. NREL's existing campus contains nine major research facilities and in June 2006 tenth facility -the Science



*Green power is used to provide 100 percent of the NREL facility's electricity requirements.  
Photo copyright Bill Timmerman*

& Technology Facility (S&TF) – was completed. At the S&TF project's inception, NREL established a goal to achieve LEED-Gold certification.

The S&TF was recently awarded LEED Platinum, making it the second building in Colorado and 29th building in the world to achieve such

## NREL Science and Technology Facility *continued*

certification. This 71,000 square-foot, \$22.7 million project is also the first federal laboratory building to receive a platinum rating.

The two-story building was designed to fit into the gently sloping side of South Table Mountain. The natural terrain was conserved and water resources were conserved and managed. The design team, consisting of SmithGroup and its consultants, incorporated features such as daylighting, evaporative cooling and efficient fans, motors, windows and lighting to reduce the amount of energy the building uses. These features are predicted to save NREL 41 percent in energy costs. On-site renewable energy is used via biofuel powered boiler technology. This technology provides 17 percent of the building's energy. Green power is used to provide 100 percent of the building's electricity requirements.

The project team took special care to ensure that 11 percent of the building's materials were from recycled materials, 27 percent of its materials were manufactured within a 500 mile radius and 13 percent were extracted within the same radius. The general contractor, M. A. Mortenson Company diverted 80 percent of the construction waste from the landfill. Indoor environmental quality was a high priority



*Glare-free natural lighting was coupled with large window views to reduce eye strain and improve worker productivity.*

*Photo copyright Bill Timmerman*

for NREL. Glare-free natural lighting was coupled with large window views to reduce eye strain and improve worker productivity. In addition to low VOC materials, a carbon dioxide monitoring system was used to improve the indoor air quality. M. A. Mortenson Company developed and managed an extensive IAQ management plan to prohibit chemicals and pollutants from entering the building or adhering to the

building materials.

The completion of this state-of-the-art facility is a significant accomplishment for the U.S. Department of Energy, NREL, its operator Midwest Research Institute and Battelle and the project team. It shows their commitment to the 55 researchers and support staff who occupy the building, as well as those who will never step foot in the building.

### Sustainable Features

#### *Sustainable Sites*

##### **Alternative Transportation:**

- Easy access to bus lines and an NREL shuttle that connects their two campuses as well as the bus.
- Bicycle storage and showers are provided for building occupants to encourage commuting via bicycle.
- Alternative fuel shared vehicles are provided for 27% of the building occupants. Preferred parking is provided for these vehicles.
- New parking was not added for this project and two preferred parking spots were provided for carpool vehicles.

##### **Reduced Site Disturbance:**

- Site and erosion control policy
- 50% of project site was protected or restored with native vegetation.

##### **Stormwater Management:**

- The new discharge rate and quantity do not exceed the previous rate and quantity.
- Detention ponds reduce at least 80% of TS and 40% of TP.

##### **Reduce Heat Island Effect:**

- 30% of the project's non-roof surfaces are shaded or are constructed of high reflectivity paving materials.
- 99% of roofing materials are highly emissive and reflective.

##### **Light Pollution Reduction:**

- The project's exterior lighting reduces light pollution.



## NREL Science and Technology Facility *continued*

### *Water Efficiency*

#### **Water Use Reduction in Irrigation:**

- Native plantings were used, therefore no irrigation system was installed.

#### **Water Use Reduction in Plumbing**

##### **Fixtures:**

- Water use was reduced by 26% by using low flow water closets, urinals and lavatories and sinks.

### *Energy and Atmosphere*

#### **Optimizing Energy Performance:**

- There will be a 41% energy savings. The following features were used to accomplish this savings:
  - Daylighting
  - Evaporative cooling
  - Efficient motors and fans
  - Efficient windows
  - Efficient lighting.

#### **Commissioning and Measurement/Verification**

- Additional commissioning was used.
- Metering equipment was installed to provide ongoing accountability and optimization of building energy and water consumption.

#### **Ozone Protection**

- HCFC's were eliminated from HVAC, refrigeration and fire protection systems.

#### **Renewable Energy and Green Power**

- 17% of the building's energy is pro-

vided with on-site renewable energy via the use of biofuel powered boiler technology.

- 50% of the building's regulated electric usage is supplied by renewable power.

### *Materials and Resources*

- 11% of the building materials were from recycled materials
- 27% of the construction materials were manufactured within 500 miles of the building site.
- 13% of the construction materials were extracted within 500 miles of the building site.
- 80% of the construction waste was diverted from landfills.

### *Indoor Environmental Quality*

#### **Improved Air Quality**

- A carbon dioxide monitoring system was installed.
- Low VOC adhesives, sealants, paints, carpet and wood were used.

#### **Improve Environmental Quality**

- 77% of critical visual task areas use daylighting.
- 100% of critical visual task areas have direct access to views of the outside
- Glare-free, natural lighting coupled with large window views decreases eye strain, improves 'see-ability' and has been shown to increase productivity.

### **Ventilation and Thermal Comfort**

- The building's design allows effective delivery and mixing of air to support the safety, comfort and well-being of the building occupants.
- Non-perimeter spaces have adequate control over airflow, ventilation and lighting.

### **Construction IAQ Management**

- During construction an IAQ management plan was implemented and followed.
- A two week building flush-out was conducted with 100% outside air.

### *Design Innovations*

- Green Building Education  
A vision document was created as a direct result of the project's LEED charrette and will guide the development of the campus master plan. The vision was then implemented as a case study and tour.
- Minimizing Effluents  
The building's exhaust system effluents were minimized
- Fume Hood Efficiency  
Efficient fume hoods were used and they were commissioned.
- Green Power  
100% of the building's electricity requirements are provided by green power.



## Project Data

#### **Project Name**

NREL Science & Technology Facility

#### **Building Type**

Laboratory

#### **Project Location**

Golden, Colorado

#### **Construction Completion Date**

June 2006

#### **Project Size**

71,000 square feet

#### **Project Cost**

\$22.7 million

#### **Owner**

National Renewable Energy Laboratory

#### **Design Team**

Smith Group *Architect*

Martin and Martin *Civil*

Martin and Martin *Structural*

Smith Group *Mechanical*

Smith Group *Electrical*

Wenk & Associates *Landscape*

Architectural Energy Corporation

*Daylighting and Energy Analysis*

M. A. Mortenson Company *Contractor*

# Not One, but Two!

Colorado University earns LEED-NC Gold for Wolf Law and ATLAS projects



by Courtney France,  
President France  
Sustainable Solutions

When a building owner or developer achieves LEED certification for one project, you know they are *on board*. But when they achieve LEED certifications for several different buildings, you know they are *leading the way*.

Few Colorado building owners can claim the distinction of achieving more than one LEED certified project. CH2M Hill, Continuum Partners LLC and the State of Colorado occupy the pantheon of environmental stewards that have achieved LEED certification on more than one project. Recently the pantheon was expanded to welcome the University of Colorado at Boulder for two LEED NC Gold certifications - one for the Wolf Law Building and one

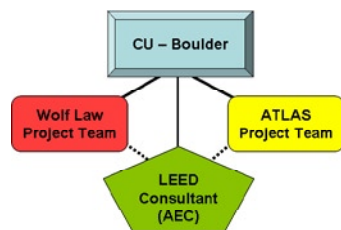
for the Alliance for Teaching, Learning and Society (ATLAS) building. To add icing on the cake, the University recently registered the Leed's Business School building under the LEED NC system.

Rather than examine CU's LEED Gold achievements as individual building awards, I would like to focus this month's LEED discussion on synergies - and stumbling blocks - of applying sustainable measures to campus-wide or multi-building, design and construction projects.

## Cost Savings from the Start

The Wolf Law building and the ATLAS building were drastically different in end-use and design. However, both had to meet the same sustainable thresholds listed in the LEED-NC version 2 Silver performance metrics.

The University contracted with separate design firms for each project. However, given the desire to achieve LEED NC Gold certification for both projects, the University decided to hire an independent LEED consultant to coordinate the sustainable aspects of both



The CU Alliance for Teaching, Learning and Society (ATLAS) building.

projects and manage the certification process. This strategy paid double dividends: sustainable design coordination and management efficiencies; and reduced fees by eliminating the need for separate consultant sub-contracting costs.

## Sustainability Drives Standards

Roofing - CU-Boulder's campus roofing standards include a terra cotta tile design of various mixed earthy tones and sandstone colors. Even after applying a highly reflective, energy-star rated EPDM roof product to the flat surfaces of the roof, the sloped mixed tile portion had to meet reflectivity requirements in order to achieve

the Reduced Heat Island Effect-Roofs credit (SSc7.2). The University asked the tile manufacturer to obtain the necessary ASTM testing results in order to qualify the product -or at least specific tile colors - to meet the energy criteria outlined in the LEED credit. The final roofing design mix for both buildings minimized the number of tiles not meeting the LEED performance criteria.

## Commissioning and Measurement & Verification

Compliments go to the Facilities Engineering Department for its progressive approach to maintaining an energy efficient, environmentally



## Not One, but Two! *continued*

responsible campus. Although very capable of meeting the LEED requirements under the Commissioning and Measurement & Verification credits – indeed in many cases the existing facilities management procedures complied with the requirements – the Department was not prepared for the LEED documentation and submission process. With assistance from LEED consultant Architectural Energy Corporation's Commissioning and Building Energy Evaluation teams, the University succeeded in formalizing field standards, documenting compliance and submitting supporting qualifications, prerequisites and protocols.

### Integrated Pest Management Innovation and Design Credit

The Wolf Law and ATLAS projects both achieved Innovation & Design Process points by eliminating the need for synthetic pesticides. Instead, the project used structural controls, design/maintenance standards, and non-toxic pest controls.

The list of positive environmental benefits associated with these projects could go on, and on...

- Both projects achieved 40%+ Water Use Reduction (WEc3 + ID pt) – water saving flow and flush fixtures become campus design standard
- Both projects achieved 20%+



*The CU Wolf Law building, Boulder.*

*Image courtesy of Davis Partnership Architects*

Recycled Content (MRc4 + ID pt) – talented design teams worked hard to modify specifications where possible, and the construction team included availability of recycled content information as a basis for submittal approval

However, LEED can't just be that easy for campuses, can it? Certainly not. Applying LEED to multiple same-owner projects, also present challenges:

- **Paints:** Low-VOC (Volatile Organic Compounds) paint design standards did not initially appear to pose a problem. However, CU's facilities maintenance department had questions about the durability and permanence of these low-emitting paint products. Also, the ATLAS building's 'black-box' theatres presented a challenge when trying to identify available low-VOC black paints

- (color typically adds VOC content).
- **Daylight & Views:** Although daylight and views for a classroom filled with students studying litigation and case proceedings sounds like an appealing concept, dark rooms and film-screenings work better in basement-like settings with no windows. As the ATLAS Building's end uses tend more towards the latter, Daylight and Views credits (IEQc8.1 & 8.2) were not appropriate. However, they were very applicable to the Wolf Law building.

As the original Architectural Energy Corporation LEED Coordinator for these two projects when initiated back in the Fall of 2004, this author gives tremendous applause to the Project Teams that completed them. The following architects took great efforts to incorporate the required LEED criteria into a finalized building (and

budget!) in order to see the projects successfully completed:

- **Wolf Law Building:** Davis Partnership Architects and Centerbrook Architects and Planners design team, led by Curtis Cox
- **ATLAS Building:** DTJ Design and Communications Arts design team, led by Len Segel

With a great start from design, and a solid finish with the diligent efforts of,

- **Wolf Law Building:** Saunders Construction, led by Connie Harris
- **ATLAS Building:** PCL Construction, led by Brendan Bartolo

Of course, much of the success of these two LEED NCv2 Gold certified projects is due to the incredible efforts of Moe Tabrizi, Energy Conservation Officer for the University of Colorado at Boulder. Moe's tireless campaign to improve the environmental responsiveness of the CU-Boulder campus is bearing fruit, achieving national recognition for attaining high levels of sustainable design and construction standards. And as Moe knows, rewards come to those that work hard. He notes, "Once you decide to do LEED, the second, third, fourth buildings, and so on...these are the projects that become the beneficiaries." The University of Colorado at Boulder has a rewarding future of projects and benefits as the campus-wide sustainable approach grows.

## New Energy Economy Achievements



by **Daniele Loffreda**,  
LEED AP, Plateau Enviro  
Associates

Throughout the 2006 Governor's race, then-candidate Bill Ritter focused his campaign on the 'Colorado Promise' – including the "promise to our children and grandchildren that we would leave them a better Colorado."

If his first 100 days in office are any indication, the future for our succeeding generations is promising indeed.

April 18th marked Governor Ritter's 100th day since being sworn in. In that short period of time his New Energy Economy initiative has doubled the State's renewable energy portfolio, made it easier for electric utilities to build transmission lines for wind power turbines, enticed the world's leading wind turbine manufacturer to build a blade factory in Windsor, quadrupled the number of E-85 ethanol pumps throughout the State, and kick-started the Colorado Renewable Energy Collaboratory.

The Governor punctuated his 100 day anniversary by issuing two 'Greening of State Government' executive orders, introduced new



Signing of the Colorado Renewable Energy Collaboratory agreement.

climate change adviser Heidi VanGenderen, signed legislation that supports the New Energy Economy, and announced a name change for the Office of Energy Management and Conservation.

The "Greening of State Government" executive orders deliver a combination 'one-two' punch, providing clear green guidance and directive to state agencies and offices, while appointing a Greening Government Manager to implement, assist, track and report.

"I want to make sure all state agencies are doing everything possible to reduce consumption as we ask the people of the state to do the same"

### New Energy Economy Legislation

With a swirl of the pen Governor Ritter signed several Bills into law that

will have positive impacts on Colorado's green building community:

- Senate Bill 126 authorizes the appropriation of funds for distribution to the Colorado Renewable Energy Authority for the Collaboratory
- Senate Bill 51 requires all new state buildings and major renovations to be constructed in accordance with a 'high performance standard certification program.' Although originally drafted to specify achievement of LEED Gold, the final version establishes 'high performance building' criteria rather than referencing LEED. The Bill directs the State Architect to select which independent third-party certification program to use. The Bill also allows a 15 year period to recoup high performance sustainable design costs, based upon operational efficiencies.

### Greening of State Government 2012 Goals

- Reduce energy consumption by 20% for all state facilities
- Cut use of paper products by 20%
- Reduce water consumption by 10%
- Purchase more environmentally friendly products
- Cut use of petroleum products in state vehicles by 25%

- Senate Bill 145 allows cities, towns and counties to offer tax credits or rebates to property owners who install on-site renewable energy-producing fixtures, such as solar panels or wind turbines.
- House Bill 1087 establishes a "Wind for Schools" grant program – may be a boon to our Chapter's 'Green Schools' program.



### New Name for OEM

In line with his objective of establishing Colorado as a national leader in a New Energy Economy, the Governor broadened the Office of Energy Management and Conservation's mission. He also changed its name. In addition to its traditional energy conservation and efficiency focus, the newly-christened Governor's Energy Office is charged with "expanding renewable energy resources and opportunities for Colorado's economy, for Colorado's environment, and for Colorado's energy independence".

Here's hoping the Governor's next 100 days in office are just as productive.

# April Energy, Spring Growth



by Amy Jiron,  
USGBC, Colorado

Finally! The snow has melted, the tulips have bloomed and green is abundant here in much of Colorado! This spring month we can involve ourselves in the many educational, collaborative, networking and fun activities for the Green Building Community. On April 2nd we kicked off the month with a program on how to landscape with all native plants and without water! (Not to mention how to grow pumpkins on your roof!)? The Governor announced numerous earth-friendly State initiatives and re-named the former Office of Energy Management and Conservation, the new Governor's Energy Office. Our first Learn LEED® Hands On monthly tour and credit-by-credit overview packed Boulder Associates offices and received only positive feedback.

Earth Day turned into Earth Week with events before, after and during the workday all over the state. On Arbor Day, USGBC-Colorado with the AIA Committee on the Environment and American Society of Land-



On Arbor Day, USGBC-Colorado with the AIA Committee on the Environment and American Society of Landscape Architects participated in the City of Denver's initiative to plant 7,000 trees in 7 days.

scape Architects participated in the City of Denver's initiative to plant 7,000 trees in 7 days.

And, the Chapter approved its first discretionary spending budget, announced more benefits for its 100 Friends and welcomed Brett Bagwell as the Chapter's second paid employee! Brett is an undergraduate student of Construction Management at the University of Denver, drives his own biodiesel automobile and is passionate about green building. Please introduce yourself at the next Green Building Community Gathering. We are looking forward to the USGBC-Colorado Spring Social which will be held on the summer solstice on the deck at the Denver Athletic Club. Other initiatives-in-the-works include making the chap-

ter carbon-negative, providing new and better networking opportunities and membership benefits, quarterly technical roundtable sessions, the launch of our new website, and, among many others, the Emerging Green Builders 2006 Natural Talent Design Competition.

Through all of this activity, energy and excitement, I hope that we can collectively take a step back from greening ourselves and the world to enjoy the beautiful spring growth and remember the big picture: why we are doing this! And, with the same strength that we see from the students at Virginia Tech, with whom who we can all identify, let us reach out and show the compassion, caring and support that will sustain our own humanity as well as the green Earth.

## Membership Update

### Welcome New USGBC Colorado Chapter Members!

#### February-April

Weston Burrel	Sarah Small
Penny Johnson	Christopher Tyler
Cliff Lind	Adam Wright
Lorrie McAllister	Benton Bates
Mike Diess	Robert Grady
Kevin Brandon	Mark Henderson
Jeremy Babilonia	Sarah Rege
Jennifer Eden	Marla Shapiro
Joe Steffens	Chad Mapp
Ian Anderson	Juliana Ruffalo
Alyson Sothoron	Bob Johnsen
Patrick Braun	Amy Johnston
Kathrine Graham	Elaine Harkins
Denise Jacoby	Eric Bivens
Douglas Dahlstrom	Gregg Cassarini
Robin Woelfel	
Jason Coker	
ml Robles	
Sean Garrett	
Mike Doody	
Joseph Bogetich	
Erin Sharp	
Stephen Cole	
Marjory O'Brien	
Sam Kessel	
Charles Beresford	
Karen Jacobsen	
Andrew Trapanese	
Mark Grundmann	

# Colorado LEED Projects

## Certified Projects

BUILDING	CITY
Sundeck Restaurant (NC 1.0 Bronze)	Aspen
CH2M Hill South Building (NC Certified)	Englewood
CH2M Hill West Building (NC Certified)	Englewood
CH2M Hill North Building (NC Certified)	Englewood
North Boulder Recreation Center (NC Silver)	Boulder
Boulder Community Hospital (NC Silver)	Boulder
U.S. Department of Transportation (NC Silver)	Lakewood
Denver Place (EB 1.0 Gold)	Denver
Russell T. Tutt Science Center (NC Certified)	Colorado Springs
Snowmass Golf Clubhouse (NC Silver)	Aspen
Colorado Springs Utilities Laboratory (NC Silver)	Colorado Springs
Fossil Ridge High School (NC Silver)	Fort Collins
University of Denver, College of Law (NC Gold)	Denver
Belmar 2M3 (NC Silver)	Lakewood
State of CO Dept. of Labor and Empl. (NC Cert)	Denver
Boulder Associates, Inc. (CI Gold)	Boulder
Pikes Peak Regional Development Center (NC Silver)	Colorado Springs
ProLogis (NC Cert)	Denver
Univ. of Colorado Memorial Center (EB Silver)	Boulder
Classrooms of Guggenheim Hall (CI 1.0 Silver)	Fort Collins
Alliance Center (EB Gold)	Denver
Porter Industries Building (EB Gold)	Loveland
City of Fort Collins Vehicle Storage Building (NC Silver)	Fort Collins
DTJ Design Office Expansion (CI Gold)	Boulder
RMI Offices (CI Platinum)	Boulder
Byron G. Rogers U.S. Courthouse (EB 1.0 Gold)	Denver
Main Street @ NorthField Stapleton (CS 1.0 Silver)	Denver
Alliance for Sustainable Colorado (CI 2.0 Silver)	Denver
Alliance for Tech, Learning and Society (ATLAS) (NC 2.0 Gold)	Boulder
NREL Science & Technology Facility (NC 2.0 Platinum)	Golden
Wolf Law Building, University of Colorado (NC 2.0 Gold)	Boulder

## Certified LEED H Projects

BUILDING	CITY
Harvard Communities	Denver
McStain Neighborhoods	Denver
New Town Builders	Denver



*Harvard Communities, Denver*



*McStain Neighborhoods, Denver*



## VISION

Promote responsibility for Colorado's environmental legacy.

## MISSION

Advance and promote sustainable planning, design, construction and operation of the built environment through education, improving industry guidelines, policy advocacy, and information and resource sharing.

## BOARD OF DIRECTORS

**Tom Hootman**, President

RNL Design

**Tim Carey**

Johns Manville

**Dana Kose**

M.A. Mortenson

**Jeff Pring**

Aardex

**Jay Griffin**

Norris Design

**Rick Gulick**

Rockey Mountain Foam

**Michael Haughey**

Silvertip Integrated Engineering Consultants

**Peter D'Antonio**

PCD Engineering

**Greg Borst**

Swinerton Builders

**Christy Woodward**

Tetra Tech EM, Inc.

**Conor Merrigan**

**Daniele Loffreda**

Palteau Enviro

**Amy Jiron**

Executive Director

Colorado Building Green is the official newsletter of the U.S. Green Building Council – Colorado Chapter, and is published monthly. The newsletter is distributed electronically via e-mail. To add or remove your name from the mailing list, or to submit story ideas and other information for publication, please contact the editor at [tom.hootman@rnldesign.com](mailto:tom.hootman@rnldesign.com).

# 100 Friends of Colorado

## Platinum \$5000

**MORTENSON**

**JOHN FIELDER'S  
COLORADO**  
johnfielder.com



East West Partners  
A FAMILY OF RELATED COMPANIES



STRUCTURAL ASSOCIATES



**CONSTRUCTION LEADERS**



Joint Platinum Supporter



Joint Platinum Supporter



## Gold \$2500

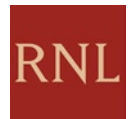


## Silver \$1000

**Gensler**



Joint Silver Supporter



Join the 100 Friends of Colorado. For more information please contact Amy Jiron at (303) 229-9424 or [amy@usgbccolorado.org](mailto:amy@usgbccolorado.org).