South Dakota Bureau of Administration
Office of the State Engineer

High-Performance Green Building Projects

CY2012 Annual Project Report

High Performance Green Buildings

State Building Projects Designed to Higher Standard

Background

Buildings consume a great deal of resources nationally and in South Dakota. According to the United States Green Building Council (USGBC), buildings account for:

- 72% of electricity consumption;
- up to 50% of energy use;
- 40% of raw material use;
- 30% of waste output; and
- 14% of potable water consumption.[i]

Designing buildings to be resource-efficient can save energy, water, reduce waste and pollution, thereby reducing operating costs, improving the indoor quality for occupants, and benefit the environment. A review of twelve of its "green" buildings by the U.S. General Services Administration found:

- 26% less energy use;
- 13% lower maintenance costs;
- 27% higher level of occupant satisfaction; and
- 33% lower CO_2 emissions.[ii]

Recognizing the opportunity to reduce costs, save resources, and make the indoor and outdoor environment better, the State of South Dakota began its green building initiative in 2008.

Green Building in State Law

Senate Bill 188 was introduced at the request of the Office of the Governor during the 2008 Legislative Session. As amended, the bill was passed overwhelmingly by the Legislature and signed into law by Governor Mike Rounds.

The new laws, codified as SDCL §§ 5-14-32 through 36, established requirements that any new construction or renovation of a state building with HVAC (heating, ventilation, and air conditioning systems) that has a cost of $500,000 or more or includes 5,000 square feet or more of space shall meet or exceed a high-performance green building standard.

The law also recognizes that meeting a high-performance green building standard may not always be feasible and allows the requirement to be waived by the Office of the State Engineer. The circumstances which allow a waiver are described in the Building Project Waivers section of this report.

The law provides the option to select from three rating systems to meet the high-performance green building requirement:

1) A silver standard rating under the USGBC's Leadership in Energy and Environmental Design (LEED) rating system; or

2) A two globe rating under the Green Building Initiative's Green Globes rating system; or

3) A comparable numeric rating under a certification program recognized by the American National Standards Institute.

After a review of the different rating systems, the Bureau of Administration determined the LEED rating system best meets South Dakota's needs and now pursues LEED silver rating or higher for state building projects.

Administrative rules detailing the steps necessary to certify a project as a high performance building are found in ARSD Chapter 10:09:02.

About LEED

LEED – Leadership in Energy and Environmental Design – is a voluntary rating system published by the non-profit organization United States Green Building Council (USGBC) that provides a framework for the design, construction and operation of green buildings.[iii]

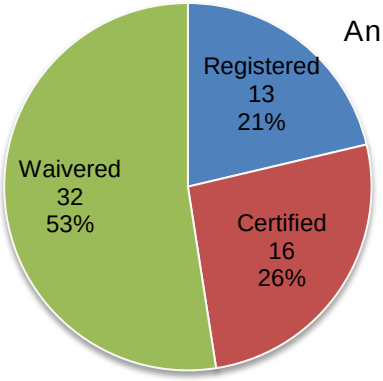
LEED is an internationally recognized certification system that provides third-party verification that a building uses strategies to improve performance in key categories of: site sustainability, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation in design.

Credits within each category are earned for each building project, and the amount of credit points earned defines the certification level achieved. A building project must satisfy all prerequisites and earn a minimum number of points to be certified. There are four levels of certification possible: Certified, Silver, Gold, and Platinum.

LEED-certified buildings are designed to:

- Lower operating costs and increase asset value;
- Conserve energy and water;
- Reduce waste sent to landfills; and
- Be healthier and safer for occupants;

Building Projects & LEED



Annual Report

SDCL § 5-14-37 requires this annual report to the Legislature, including a list of state building projects granted a waiver or that failed to achieve a high performance green building standard.

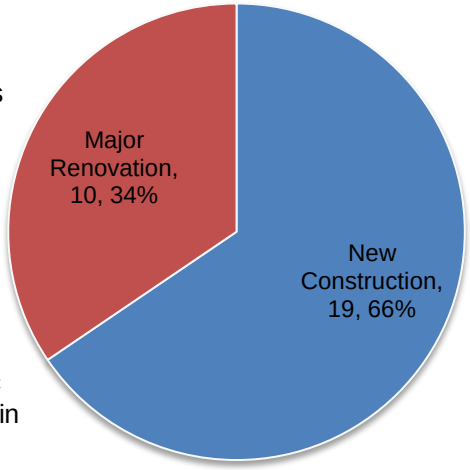
High Performance Green Building Projects

Project Summary

A total of 29 state building projects have been registered as LEED projects through CY2012. Nineteen of the projects are new buildings; ten are major renovations. Sixteen state high performance green building projects have been completed and officially earned LEED certification to date.

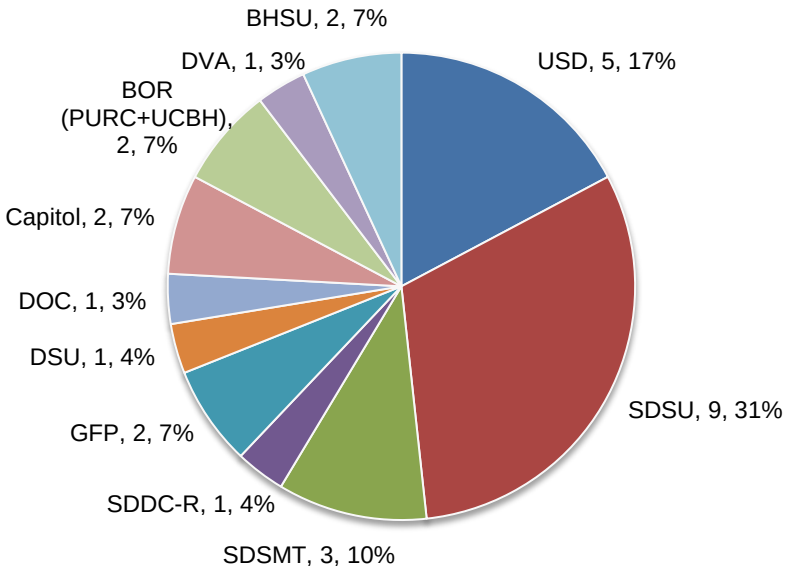
Four projects earned LEED Silver certification during CY2012: the Dairy Microbiology Laboratory Renovation and Jackrabbit Village Complex, both on the SDSU campus; the Wellness Center at the University of South Dakota; and the Public University Research Center North 2 building in Sioux Falls.

LEED Projects by Project Type



Three more projects achieved LEED Gold Certification during CY2012: the Student Union Addition at Black Hills State University in Spearfish; the Game, Fish, and Parks Outdoor Campus in Rapid City; and the Connolly Palmerton renovations at South Dakota School of Mines and Technology in Rapid City.

LEED Projects by Campus



LEED Registered Projects

State building projects registered as LEED projects through CY2012:

Campus	Building	New Construction	Renovation	Certification Achieved
ACC	MacKay State Library		✓	Silver
ACC	Capitol Lake Plaza		✓	
BHSU	Student Union Building	✓		Gold
BHSU	New Science Building	✓		Silver
BHSU	University Center (Rapid City)	✓		
DSU	Habeger Science Center		✓	
DVA	Veterans Home	✓		
GFP	Outdoor Campus (Rapid City)	✓		Gold
GFP	Fisheries Building (Ft. Pierre)	✓		Silver
SDDEV	Damm & Norgello		✓	Silver
SDSMT	Chemistry/Chemical Engineering	✓		Gold
SDSMT	Paleontology Building	✓		Gold
SDSMT	Connolly Palmerton Dormitory		✓	Gold
SDSU	McCrory Gardens Building	✓		
SDSU	Electrical Engineering & Computer Science Addition	✓		
SDSU	Architecture, Math & Engineering Building	✓		
SDSU	Dairy Microbiology Lab		✓	Silver
SDSU	Jackrabbit Village Residence Halls	✓		Silver
SDSU	New Dining Services	✓		Not Achieved
SDSU	Dykhouse Athletic Center	✓		Gold
SDSU	Agricultural Hall Lab		✓	
SDSU	Jackrabbit Grove Residence Halls	✓		
USD	School of Medicine	✓		Certified
USD	Churchill Haines Science Center		✓	
USD	Coyote Village Residence Hall	✓		Gold
USD	Wellness Center	✓		Silver
PURC	Public University Research Center, 2	✓		Silver
DOC	Minimum Security Prison, Rapid City		✓	
USD	Akeley Science Center		✓	

- A key for the campus and agency abbreviations is included in the endnotes[iv].

Certifications Earned in CY2012

Seven buildings earned LEED certification in CY2012:

Student Union Addition, BHSU

Energy efficient kitchen equipment was installed that utilizes heat recovery technologies. 85% of on-site generated construction waste was diverted from the landfill, saving the university significant landfill fees. An important part of achieving Gold certification was demonstrating 45.3% of the total building materials content by value were manufactured using recycled materials.

GFP Outdoor Campus, Rapid City

Gold certification was achieved by maximizing energy efficiency with a geothermal well system, installing individual lighting controls, and designing an environmentally friendly landscape. The geothermal system provides an approximate 38.5% reduction in energy consumption compared to a non-LEED building.

Connolly Palmerton Dormitory Renovations, SDSMT

This renovation of existing dormitory buildings achieved Gold certification by increasing the overall energy efficiency of the buildings while providing comfortable spaces for the students. An estimated 20% reduction in energy consumption is expected. The use of environmental friendly finish materials and providing daylighting for 90% of the spaces added to the overall occupant satisfaction.

Dairy Microbiology Laboratory Renovation, SDSU

The Dairy Microbiology Lab renovation achieved Silver certification by reducing water consumption by more than 30%, diverting more than 75% of construction waste from the landfill, improving indoor air quality, and reducing energy consumption of the 1960s era building. Extra efforts in enhanced building commissioning were implemented to ensure the most efficient operation of the mechanical and electrical systems.

Jackrabbit Village Residence Hall Complex, SDSU

Silver certification was achieved by reducing irrigation by more than 50% and reducing water consumption by more than 30% by using low-flow fixtures. More than 20% of the construction materials used were provided regionally, in large part by designing and constructing the building exterior using pre-cast panels manufactured in Sioux Falls. Building systems were commissioned to ensure optimal energy efficiency.

Wellness Center, USD

The Wellness Center includes exercise equipment, a running/walking track, classroom space, and a climbing wall. Silver certification for the multi-use recreational facility was achieved by focusing on energy efficiencies, water use reductions, occupancy comfort, large windows for daylighting, and using natural grasses that eliminated the need for landscape irrigation. The energy saving building systems are expected to reduce consumption by at least 26% over baseline.

Public University Research Center, North 2 Building, Sioux Falls

The use of regional materials, recycled content, optimizing energy efficiency and water reduction techniques, and providing student comfort secured a Silver rating from the USGBC. The low-flow water fixtures will reduce water use in the building by 30% and the heating and cooling systems are expected to save 34% on energy bills.

Projects Registered in CY2012

Four building projects were newly registered as LEED projects in 2012:

McCrory Gardens, SDSU

The new McCrory Garden building provides conference and visitor space for the surrounding McCrory Gardens. The building will be energy efficient, provide natural lighting, and will incorporate innovative landscaping techniques.

Electrical Engineering and Computer Science Addition, SDSU

This addition to the recently completed EECS (Daktronics) building on the SDSU campus will include modern and energy efficient laboratory space while providing for occupant comfort.

Architecture, Math, and Engineering Building, SDSU

This new building will provide program space to three departments. The design will include energy efficient lab space, classrooms, as well as an architectural workshop space that must include an abundance of natural lighting.

Veteran's Home, Hot Springs

The new Veteran's Home will be constructed with a focus on energy efficiency and human comfort. A biomass boiler system is planned to utilize a low cost local fuel source located in the Black Hills.

Building Project Waivers

Waiver Summary

SDCL § 5-14-34 allows waivers from the high performance green building standard to be granted by the Office of the State Engineer for state building projects if:

1) The building will have minimal human occupancy;
2) The increased costs of achieving a high-performance green building standard cannot be recouped from decreased operational costs within fifteen years;
3) A building is on the national register of historic places and achieving a high-performance green building standard would result in noncompliance with standards for historic preservation as set forth in the secretary of the interior's Standards for the Treatment of Historic Properties in effect as of January 1, 2008;
4) The square footage of the renovation project is less than fifty percent of the total square footage of the building being renovated. If the renovation project is being done in phases, the total square footage of all intended phases combined shall be used in making this calculation; or
5) The Bureau of Administration determines that extenuating circumstances exist to make impractical high-performance green building standard certification.

The conditions and procedures for granting waivers are detailed in ARSD Chapter 10:09:03.

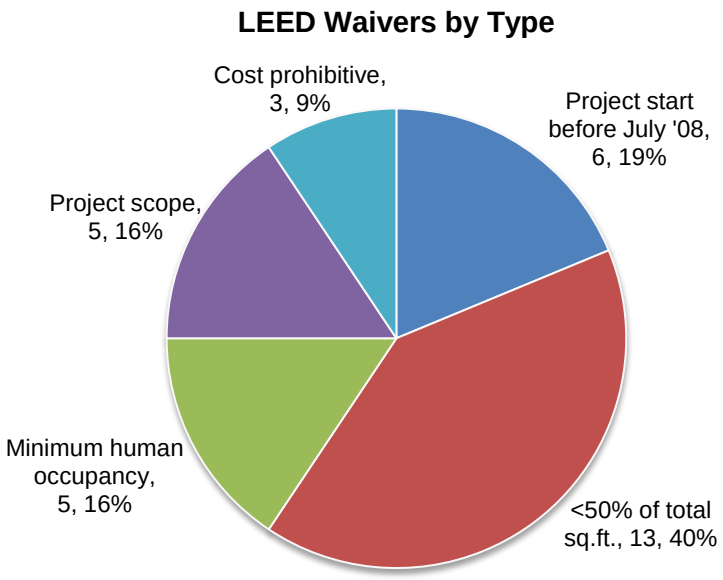
Four building projects were granted waivers in CY2012. Three of the projects were Dept. of Transportation maintenance shops, and one was a small renovation project on the USD campus. There are a total of 32 state building projects granted waivers through CY2012.

A waiver does not mean that principles of sustainable design are ignored. State building projects are designed and constructed to be as energy and water efficient as feasible even though the project is not a LEED registered project.

Waivers Granted to Building Projects

Campus	Building	Waiver Reason
BHSU	Woodburn Hall Renovation	Project Scope
DHS	HSC Admissions Office (Yankton)	Less than 50% of total building square footage
DOT	Pierre Regional Office	Less than 50% of total building square footage
DOT	Maintenance Shop, Clear Lake	Minimum Human Occupancy
DOT	Maintenance Shop, Martin	Minimum Human Occupancy
DOT	Maintenance Shop, Mobridge	Minimum Human Occupancy
DSU	Zimmerman/Emery Residence Halls	Project in design development before July 1, 2008
GFP	State Game Lodge (CSP)	Project in design development before July 1, 2008
GFP	Fisheries Storage Bldg. (Ft. Pierre)	Minimum human occupancy
GFP/DOT	Building Addition (Sioux Falls)	Minimum human occupancy
NSU	Kramer Hall	Project in design development before July 1, 2008
NSU	MeWaldt-Jensen Science	Less than 50% of total building square footage
NSU	Kirkac	Less than 50% of total building square footage
NSU	Lincoln & Graham Halls Renovations	Project Scope
NSU	Barnett Center Addition	Less than 50% of total building square footage
NSU	Student Center Addition/Renovation	Cost Prohibitive to Meet Prerequisites
SDSMT	Surbeck Center	Project in design development before July 1, 2008
SDSMT	EE/Physics Bldg. Renovation	Less than 50% of total building square footage
SDSU	NFA Bldg; Various Rooms	Less than 50% of total building square footage
SDSU	Administration	Project Scope
SDSU	Northern Plains Biostress Lab	Less than 50% of total building square footage
SDSU	Larson Commons	Less than 50% of total building square footage
SDSU	Binnewies Hall Bathroom	Less than 50% of total building square footage
SDSU	Seed Technology	Project in design development before July 1, 2008
SDSU	Briggs Library Renovation	Project Scope
SDSU	Dairy Manufacturing Addition	Specialty requirements for project precluded LEED certification
SDSU	Student Union Dining Addition	Less than 50% of total building square footage
SDSU	Young Hall bathroom Renovation	Less than 50% of total building square footage
USD	Slagle Hall Renovation	Project in design development before July 1, 2008
USD	Delzell Renovation	Project Scope
USD	North Commons Renovation	Cost Prohibitive to include mechanical system
PURC	Classroom Renovation	Less than 50% of total building square footage

- A key for the campus and agency abbreviations is included in the endnotes.



Waivers Granted by the State Engineer in CY2012

Four state building projects were granted waivers from the high performance green building requirement by the State Engineer in CY2012.

Department of Transportation Maintenance Shop, Clear Lake

The construction of a new DOT maintenance shop in Clear Lake was granted a waiver on February 7, 2012 because of minimal human occupancy and construction type precludes achieving a LEED certification.

Department of Transportation Maintenance Shop, Martin

The construction of a new DOT maintenance shop in Martin was granted a waiver on February 7, 2012 because of minimal human occupancy and construction type precludes achieving a LEED certification.

Department of Transportation Maintenance Shop, Mobridge

The construction of a new DOT maintenance shop in Mobridge was granted a waiver on February 7, 2012 because of minimal human occupancy and construction type precludes achieving a LEED certification.

Delzell Renovation, USD

The Delzell renovation project was granted a waiver on February 29, 2012. The scope of the project only included some mechanical and electrical upgrades and LEED could not be achieved without increasing the project scope to include a major finishes work.

Projects Not Achieving LEED

To date, only one project has not achieved LEED Silver certification when a waiver was not granted by the State Engineer. The project was SDSU's Dining Hall expansion begun in 2009. While LEED was initially attempted, the energy reduction required for Silver certification would have required the existing cooling system be replaced. Because the existing chiller was less than 15 years old , in good working order, and is expected to last another 15 years LEED certification was aborted for being cost prohibitive. However, energy efficiency measures were still taken to the extent practicable. The issue also prompted the waiver of the latest dining service project at the SDSU campus.

More Information

Information about the State's high performance green building projects is available from:

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523 E. Capitol Ave.
Pierre, SD 57501
P : 605-773-3466
F : 605-773-5980
http://www.state.sd.us/boa/ose/

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[i] United States Green Building Council. First Edition. Green Building and LEED Core Concepts Guide.

[ii] General Services Administration. Public Buildings Service. 2008. Assessing Green Building Performance: A Post Occupancy Evaluation of 12 GSA Buildings.

[iii] Information about the USGBC and the LEED rating system is available at www.usgbc.org

[iv] Campus and Agency Abbreviation Key:
ACC: Bureau of Administration/Capitol Complex (Pierre)
BHSU: Black Hills State University
DHS: Dept. of human Services
DOC: Dept. of Corrections
DOT: Dept. of Transportation
DSU: Dakota State University
DVA: Dept. of Veterans Affairs
GFP: Dept. of Game, Fish & Parks
NSU: Northern State University
PURC: Public University Research Center (Board of Regents, Sioux Falls)
SDDEV: South Dakota Developmental Center (Redfield)
SDSMT: School of Mines & Technology
SDSU: South Dakota State University
USD: University of South Dakota