

South Dakota Bureau of Administration
Office of the State Engineer

High-Performance Green Building Projects

CY2011 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 CO₂ 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.

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 areas 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.

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

There are a total of 25 state building projects that have been officially registered as LEED projects through CY2011. Fifteen of these projects are new buildings, ten are major renovations.

Applying principles of sustainable design incorporated in the LEED rating system will make the registered projects more energy efficient, lowering fuel and electricity costs. Water use costs will also be reduced indoors with low flow fixtures and outdoors with reduced landscaping irrigation. Materials are recycled and friendly to the indoor environment for a positive impact on occupants' health. These benefits will be realized over the lifespan of the building.

Administrative rules detailing the steps necessary to certify a project as a high performance building are found in ARSD Chapter 10:09:02. Nine state high performance green building projects have been completed and officially earned LEED certification to date.

The School of Medicine at the University of South Dakota was the first state building project to have achieved LEED certification, earning Certified status in 2009. The building project was underway before the new law took effect in 2008 requiring projects to meet or exceed a LEED Silver rating.

Four projects officially earned LEED Silver certification during CY2011: the MacKay state library building on the Capitol Complex in Pierre; the new science building at Black Hills State University in Spearfish; the Damm & Norgello building at the South Dakota Developmental Center in Redfield; and the Game, Fish, and Parks Fisheries building addition in Ft. Pierre.

Two more projects achieved LEED Gold Certification during CY2011: the Chemistry/Chemical Engineering building at the South Dakota School of Mines and Technology in Rapid City; and the Coyote Village Residence Hall at the University of South Dakota in Vermillion.

Previously Registered Projects

State building projects registered as LEED projects in 2008-2010.

Campus	Building	New Construction	Renovation	Certification Achieved
ACC	MacKay State Library		✓	Silver
ACC	Capitol Lake Plaza		✓	
BHSU	Student Union Building	✓		
BHSU	New Science Building	✓		Silver
BHSU	University Center (Rapid City)	✓		
DSU	Habeger Science Center		✓	
GFP	Outdoor Campus (Rapid City)	✓		
GFP	Fisheries Building (Ft. Pierre)	✓		Silver
SDDEV	Damm & Norgello		✓	Silver
SDSMT	Chemistry/Chemical Engineering	✓		Gold
SDSMT	Paleontology Building	✓		Gold
SDSMT	Connolly Palmerton Dormitory		✓	
SDSU	Dairy Microbiology Lab		✓	

SDSU	New Residence Hall	✓		
SDSU	New Dining Services	✓		
SDSU	Dykhouse Athletic Center	✓		Gold
SDSU	Agricultural Hall Lab		✓	
USD	School of Medicine	✓		Certified
USD	Churchill Haines Science Center		✓	
USD	Coyote Village Residence Hall	✓		Gold
USD	Wellness Center	✓		
PURC	Public University Research Center, 2	✓		
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 CY2011

Six buildings earned final LEED certification in 2011:

MacKay State Library, Capitol Complex

The MacKay building underwent complete renovation in 2009 and 2010 to accommodate its changed use to increase office space and modernize the building. The building project included efficient mechanical systems, lighting and lavatory fixtures; new windows and daylighting; and natural landscaping that doesn't use irrigation to achieve LEED Silver certification.

Life Sciences Laboratory, BHSU

The new science building was completed in 2010 and received LEED Silver certification in the fall of 2011. The building contains energy savings in the extensive laboratory mechanical and electrical systems and incorporates daylighting to improve student study areas.

GFP Fisheries Building, Ft. Pierre

Construction of the new addition to the Fisheries building was completed in 2010 with LEED Silver certification achieved in 2011. The building is noteworthy for incorporating an underground geothermal heating system to reduce energy consumption by more than 50%.

Damm & Norgello, SDDC

The Damm and Norgello buildings had obsolete heating and cooling systems and were originally built without a ventilation system but have achieved LEED Silver certification. The renovations include modern energy efficient mechanical and electrical systems, and windows. Extra effort was taken to salvage existing materials and to maintain as many original building characteristics as possible. A unique feature of the renovation included the creation of a tempered attic space with the addition of a sloped roof constructed with structural insulated panels made in Watertown. This improved energy efficiency and points were gained for using local building materials.

Chemical and Biological Engineering and Chemistry (CEBEC) Building, SDSMT

The CEBEC building is part of the Board of Regent's 2007 state-wide bonding initiative to enhance higher education's science and laboratory capabilities. This building recently achieved Gold certification. The design and construction incorporated several environmentally friendly and energy efficient measures including maximizing exterior open spaces, reducing water consumption by 42.8% of normal laboratory usage, and increasing the energy efficiency of laboratory fume hoods. In addition to these, 88% of construction waste was diverted from the landfill and 93% of the students and faculty see sunlight while working in the building.

Coyote Village Residence Hall, USD

The Coyote Village is a new 500 bed residence hall that achieved LEED Gold certification by maximizing student comfort while reducing energy and water consumption compared to non-LEED student halls. Occupant comfort and energy efficiency were achieved by installing individual hot water boilers in each room and allowing students to control the temperature in each room. Water consumption was also reduced by installing energy efficient washing machines in the building. Sustainable building materials were also used throughout the 4-winged complex.

Projects Registered in CY2011

One building project was registered as a LEED project in 2011.

New Residence Village, SDSU

South Dakota State University is currently in the design phase to construct a new 802 bed residence hall complex similar to Jackrabbit Village. The building project will incorporate numerous energy saving measures and water reduction measures while optimizing student comfort.

Building Project Waivers

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

There are a total of 28 state building projects that have been granted waivers through CY2011. Most commonly, these projects were: underway in 2008, but before the high performance green building requirement became law in July, 2008; because the project is less than 50% of the total building square footage; or the scope of the project makes LEED certification unattainable.

Seven state building projects were granted waivers in CY2011. Two of the projects were on the South Dakota State University campus in Brookings, one each on the campuses of Northern State University in Aberdeen, the School of Mines and Technology in Rapid City, the University of South Dakota in Vermillion. The other two waivers were granted for Sioux Falls projects located at the GFP/DOT building and the new Public University Research Center.

A waiver, however, 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. In some cases, waived project may miss only a single prerequisite or credit point to be eligible for certification had it been a LEED registered project.

Previously Granted Waivers

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
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
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
SDSMT	Surbeck Center	Project in design development before July 1, 2008
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
USD	Slagle Hall Renovation	Project in design development before July 1, 2008

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

Waivers Granted by the State Engineer in CY2011

Seven state building projects were granted waivers from the high performance green building requirement by the State Engineer in CY2011.

Game, Fish, and Parks / Department of Transportation Building Addition, Sioux Falls

This construction project is a 6,222 square foot addition to the existing GFP / DOT maintenance shop. The expansion includes maintenance and welding shop improvements and minimal office space. The addition was granted a waiver on April 6, 2011 because the building will be occupied by fewer than 20 persons in any 24 hour period.

Student Center Addition and Renovation, NSU

This expansion and renovation project was granted a waiver on November 16, 2011 because two of the mandatory LEED points could not be achieved. First, to achieve the water efficiency credit, the majority of the plumbing fixtures would need to be replaced, which was cost prohibitive. Second, LEED requires that all major HVAC equipment use non-CFC refrigerants. Because the existing chiller was purchased less than 10 years ago, the university should expect another 15 years of useful life from the existing chiller. However, several energy conservation measures remained in the project, including occupancy sensors for lighting, well insulated walls and roof, and high performance windows.

Classroom Renovation, Public University Research Center, Sioux Falls

The classroom renovation was granted a waiver on March 17, 2011 because the total 5,481 square feet of space was less than 10% of the building's total square feet.

Electrical Engineering / Physics Building Renovation, SDSMT

The renovation project was a relatively small area of 5,961 square feet relative to the 59,003 total square feet of the existing building. The project was granted a waiver on March 14, 2011.

Student Union, SDSU

The expansion and renovation work at the Student Union only affected 24% of the facility square footage. A waiver was granted on November 14, 2011.

Young Hall, SDSU

The Young Hall renovation included bathroom finish improvements to the residence hall. Because the project affected 5,216 square feet relative to Young Hall's total square feet of 78,978 a waiver was granted on January 13, 2011.

North Commons Renovation, USD

The North Commons renovation project was granted a waiver on April 18, 2011. The scope of the project did not include major mechanical and electrical improvements and a simple payback to achieve certification could not be achieved within 15 years.

More Information

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

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<http://www.state.sd.us/boa/ose/>

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
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