

Poudre School District Fossil Ridge High School

Fort Collins, Colorado

Building Type:	Academic
Recognition Status:	LEED for New Construction v2.0/2.1 Silver
Gross Square Footage:	296,375 sq. ft. (27,534 sq. m.)
Completion Date:	2004
Total Project Cost:	US\$38.5 million
Energy Cost Savings:	US\$60,000/yr projected; US\$271,800 actual over 3 years
Site Energy Use:	39.5 kBtu/sq. ft./yr (125 kWh/sq. m./yr) projected 41.6 kBtu/sq. ft./yr (131 kWh/sq. m./yr) actual
Source Energy Use:	88.6 kBtu/sq. ft./yr (279 kWh/sq.m./yr) actual
Water Cost Savings:	US\$11,500/yr projected; US\$27,852 actual over 3 years
Indoor Potable Water Use:	957,000 gallons/yr (3,622,600 liters/yr) projected
Outdoor Potable Water Use:	0 gallons/yr projected
Occupancy:	1,800 staff, faculty, and students
DOE Climate Zone:	Zone 2 (6400 HDD, 500 CDD)

PROJECT OVERVIEW

Fossil Ridge High School, a state-of-the-art secondary school in Fort Collins, Colorado, was the first secondary education school in Colorado to achieve a Leadership in Energy and Environmental Design (LEED) Silver rating. During design, the Poudre School district emphasized energy

efficiency with strict attention to siting, orientation, construction details, and proper equipment sizing. This focus, combined with creative methods for student engagement, helped create a school that not only saves taxpayers money, but also actively teaches students the advantages of high-performance buildings.

THE BOTTOM LINE

Fossil Ridge High School is part of the Poudre School District's overall effort to embed sustainability in the educational building stock in and around Fort Collins. The experiences gained from the design, construction, and operation of Fossil Ridge have allowed the district to push the envelope even further on more recent construction projects in the area. Careful design through the LEED process enabled the school district to build Fossil Ridge at no added cost. In the school's three years of operation it has realized cumulative energy savings of US\$271,791 and cumulative water savings of US\$27,852. These cost reductions have allowed the school district to redirect district funds from maintenance costs to classroom spending, allowing the Poudre School District to continue enhancing its award-winning educational system. Fossil Ridge High School is an excellent example of how integrated design can help to meet building program needs, cost constraints, and sustainability standards.

Exterior photovoltaic system also provides shade / © David Patterson



Poudre School District Fossil Ridge High School

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Students enjoy open, daylight spaces / © David Patterson

GREEN FEATURES EDUCATE BOTH STUDENTS AND STAFF

Green features are highlighted in the Fossil Ridge High School design to teach students, staff, and visitors how sustainable design systems have been integrated into their built environment. Ice storage tanks were left exposed and photovoltaic panels are showcased near head height to maximize exposure to students and visitors. Building materials at the high school were selected in order to enhance the learning environment while simultaneously reduce the building's impact on natural resources. By focusing on energy and resource efficiency, the Poudre School district and its team of designers were able to create a building where students and teach-

ers can engage more effectively with each other and their environment.

INTEGRATED DESIGN RESULTS IN NO ADDED COSTS

Fossil Ridge High School was designed through a collaborative integrated design process. The district started the design process by forming a "Green Team" that included architects, engineers, teachers, maintenance staff, and other key stakeholders. The design team began with strategies developed during previous elementary school design sessions to reduce design fees. Engaging Poudre School District Operations and Maintenance staff from the beginning further reduced upfront fees. In addition, funding for operations and mainte-

nance staff training was reduced since the intent and design of the building systems was already clearly understood.

Efficiency was paramount to the design of all systems throughout the facility. Energy-efficient mechanical systems, including an off-peak ice thermal storage system, combine with passive design features to save on heating and cooling costs. Daylight and motion sensors limit the use of artificial lights. A 5.2-kilowatt photovoltaic system provides clean energy while shading windows from unwanted heat gain.

The project team also sought to connect the school to other school facilities in the area through shared infrastructure; for example, the team wanted the school's grounds to serve an environmental function. A raw water pond on the high school site collects and stores stormwater, providing water for Fossil Ridge's irrigation needs as well those of nearby Zach Elementary. This water source is also shared with the Parks and Recreation Department and will serve as a water source for a 50-acre (20-hectare) park slated for future completion. The City of Fort Collins Parks and Recreation Department also uses baseball and softball fields, tennis courts, and other athletic fields at the school.

"We're saving money, [and] these buildings are healthy for people. I wouldn't build buildings any other way. We really can't afford not to build buildings like this."

— Mike Spearnak
AIA, Director of Planning
Design, & Construction
Poudre School District

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LEARNING COMMUNITIES HELP EMPHASIZE SUSTAINABILITY

The school is designed to accommodate 1,800 students within its three Learning Communities. Each Learning Community contains separate accommodations for administrative offices, student work areas, computer labs, and student lockers. Core subjects such as mathematics, social studies, language arts, and special education are taught within each community's academic facilities. Special subjects such as science, business, language, music, and culinary arts, along with the athletic and performing arts facilities, are housed separately from the Learning Communities.

The Learning Community approach, along with thoughtful building details that draw attention to sustainability, has provided a highly interesting, healthy, and effective learning environment. Indoor air quality and its relationship to student and staff health at Fossil Ridge High School was an important consideration for the project team. All paints contain few, if any, volatile organic compounds (VOCs). The concrete and porcelain tiles used in the building do not require the use of chemicals for their maintenance, thus avoiding toxic chemical exposure for maintenance staff,

“We have a moral imperative to be fiscally responsible, to educate the children for an ever-changing global economy, and look beyond the future.”

— Jana Ley, President, Board of Education,
Poudre School District



Fossil Ridge High School library / © David Patterson

students, and faculty. Operable windows increase natural ventilation and provide thermal comfort for building occupants. Window size, placement, and shades allow for extensive daylighting and control the entry of useful light while minimizing glare to create an optimal learning and working environment.

The school has conducted several studies to measure the impact that high-performance buildings have on student and teacher satisfaction and performance. Student and teacher satisfaction levels at Fossil Ridge High School are very high and building occupants seem to genuinely appreciate their environment. Attention to indoor air quality, daylighting, and light controls have been shown to enhance student and instructor comfort and performance.

PROJECT TEAM

Owner:

Poudre School District

Architect:

RB+B Architects

Mechanical Engineer:

MKK Consulting Engineers, Inc.

LEED Consultants:

Institute for the Built Environment

Energy Modeling:

EMC Engineers, Inc.

Daylighting Consultant:

Rocky Mountain Institute

Civil Engineer:

Nolte Associates

Structural Engineer:

JVA, Inc.

Commissioning Agent:

Architectural Energy Corporation

Contractor:

Haselden Construction, Inc.

SOURCES

Mike Spearak, AIA, Director of
Planning, Design, & Construction,
Poudre School District

Stu Reeve, Energy Manager,
Poudre School District