



CASE STUDY: UNIVERSITY OF MINNESOTA, HOME OF THE GOLDEN GOPHERS

CAMPUS FACTS

LOCATION:

Minneapolis/St. Paul, Minnesota

FOUNDED:

1851

TYPE:

Public

TOTAL STUDENT POPULATION:

51,853 (30,375 undergraduates)

STAFF:

16,500

PRIMARY ATHLETICS CONFERENCE:

Big Ten

PRIMARY ATHLETICS DIVISION:

NCAA Division 1

NUMBER OF VARSITY TEAMS:

23 (13 women's, 12 men's)

NUMBER OF SPORTS FACILITIES:

26 (16 athletic, 10 recreational)

SUSTAINABILITY OFFICE FOUNDED:

2004

AASHE STARS RATING:

Silver, 2012

SPORTS GREENING WORK STARTED:

2007

SPORTS FACILITY LEED CERTIFICATIONS:

TCF Bank Stadium LEED Silver Certification for New Construction, 2009

“THE UNIVERSITY OF MINNESOTA’S ATHLETIC PROGRAMS ARE AN IMPORTANT WINDOW INTO THE INSTITUTION AND THE MEANS BY WHICH MANY STUDENTS GAIN ACCESS TO AN EXCEPTIONAL EDUCATION,” SAYS UM PRESIDENT ERIC KALER.

THE GOPHERS’ GREENING STORY: MOTIVATIONS, CHALLENGES, AND LESSONS

In 2009, the University of Minnesota’s (UM) TCF Bank Stadium became the first football venue in the United States to earn LEED certification for the New Construction standard. Since then, the LEED Silver stadium has become a catalyst for broader greening efforts across across UM’s athletic facilities, from green cleaning policies and a “zero waste” plan to a facility energy recommissioning that is saving more than \$412,000 annually. Now, UM’s athletics department is working toward a second LEED certification for its TCF Bank Stadium, this time for the Existing Buildings: Operations and Maintenance standard.

WHY IS UM GREENING SPORTS?

According to UM President Eric Kaler, Gopher Athletics is a critical part of the University of Minnesota’s sustainability efforts. “The University of Minnesota’s athletic programs are an important window into the institution and the means by which many students gain access to an exceptional education,” he says. In 2004, the University of Minnesota’s Board of Regents made sustainability a campus-wide strategic priority by adopting a sustainability and energy efficiency policy. The policy requires the institution to make a continuous effort to integrate sustainability into university teaching, research, outreach, and operations.

University of Minnesota Athletics is working to green its operations to benefit staff and students, while saving resources and money and reinforcing university commitments. “Gopher Athletics’ more sustainable practices reduce waste and pollution, minimize operating costs, and create healthier environments for fans, athletes, and employees,” says UM sustainability coordinator Shane Stennes. “Gopher Athletics communicates to thousands of fans the institution’s core value of sustainability and demonstrates how the institution is incorporating more sustainable practices into facility operations.”

WHERE DID UM START?

The UM athletics department began providing recycling bins in athletic venues and upgrading to more efficient equipment in 1998. Starting in 2003, the athletics department ratcheted up their sustainability efforts to address the design and construction of an on-campus football stadium, the first major athletics construction project in many years.

BUILDING THE FIRST LEED-CERTIFIED FOOTBALL STADIUM

TCF Bank Stadium, home to Gopher Football and the University of Minnesota’s Marching Band, was the first new stadium to be constructed in the Big Ten Conference since 1960. “This once-in-a-generation project presented a tremendous opportunity to advance sustainability within Gopher athletic facilities, with one of the largest construction projects in the history of the department, and to demonstrate the university’s commitment to sustainability,” says Stennes.

LEED SILVER TCF BANK STADIUM GREEN FEATURES

SUSTAINABLE SITE:

- The stadium site was a redeveloped brownfield.
- The stadium has access to public transportation.
- A stormwater management system allows rainwater to be directed into an underground filtering system outside the stadium, where it is filtered and drained into the Mississippi River. (The stadium's extensive, award-winning stormwater system manages the quality and the rate of discharge to the Mississippi River to a level that emulates conditions before human settlement of the area.)
- South facing windows reduce lighting demand through use of natural light for illumination.

WATER:

- Potable water use for landscape irrigation was reduced by 50 percent relative to a standard building of the same size and type.
- Indoor potable water use was reduced by 30 percent relative to a standard stadium of the same size.

ENERGY:

- The building meets energy efficiency requirements of the ASHRAE 90.1 standard.
- A reflective roof was installed to reduce cooling needs and the heat island effect.

MATERIALS AND RESOURCES:

- 98 percent of the construction waste from the site was recycled.
- Steel for the stadium included 90 percent recycled content and was fabricated primarily in Minneapolis. (More than 10 percent of materials used in construction were extracted and produced regionally.)
- More than 10 percent of construction materials were required to contain recycled content.
- Builders selected paint, carpet, sealants, and adhesives that were low in volatile organic compounds.

TCF BANK STADIUM WINS PUBLIC RAIN GARDEN AWARD

Metro Blooms awarded UM with its annual "Best Public Rain Garden" award in 2009. As part of the TCF Bank Stadium site refurbishment, Gopher Athletics planted an entire city block's worth of bioswales (rain gardens) using only native plants that require less water, including wildflowers and grasses. Porous pavement and roof rainwater catchment infrastructure help capture and direct the water to the plants. An underground system collects any excess water in a holding pond where it is stored temporarily, treated, and released to the city's storm sewer system at a controlled rate to help prevent overflow. UM has 22 full-time landscaping gardeners and 100 employees to help manage the site, replanting areas and composting any debris as needed.

Construction of the 50,805-seat TCF Bank Stadium on the East Bank of the Twin Cities campus began in July 2007 and was completed in July 2009. The Minnesota Athletics Department collaborated with other university departments, Populous (the stadium architect), and Mortenson Construction (the general contractor) to establish sustainability as a guiding principle early in the project's design. This allowed the team to restore the project site, formerly a contaminated brownfield, and minimize the environmental impact of the construction and operations.

"There's no better experience than seeing 50,000 Gopher fans coming back to campus to celebrate Minnesota football. To play in a stadium that's respectful of the environment was paramount for us from day one," said Scott Radevic, senior principal of Populous, upon completion of the project.¹

According to Ken Sorensen, vice president and general manager of Mortenson's Minneapolis office, the success of TCF Bank Stadium resulted from sustainability objectives set by the project team. "Mortenson is honored to have worked with an outstanding team to build the first football stadium, collegiate or professional, to become LEED certified," said Sorensen. "This is a testament to the university's commitment to sustainability within our community."²

When the stadium's LEED Silver certification was announced, UM President Emeritus Robert Bruininks said, "TCF Bank Stadium is an historic project for the university, and it was important to us to do it right. The LEED designation, in particular, underscores the commitment of the Board of Regents and the leadership of the university to principles of sustainability, energy conservation, and responsible stewardship of our environment and our resources."³

Rick Fedrizzi, the president, CEO, and founding chair of the U.S. Green Building Council, said TCF Bank Stadium paves the way for more advanced, greener stadium design nationwide. "The green building movement offers an unprecedented opportunity to respond to the most important challenges of our time, including global climate change, dependence on non-sustainable and expensive sources of energy, and threats to human health," said Fedrizzi. "The work of innovative building projects such as TCF Bank Stadium is a fundamental driving force in the green building movement."⁴

ENERGY EFFICIENCY AND RECOMMISSIONING

In 2010, Minnesota Athletics staff with UM's energy management department to complete an energy recommissioning study of eight existing athletic facilities. The study revealed so much energy-saving potential that energy conservation measures were implemented in all eight athletic facilities, yielding more than \$412,000 in avoided utility costs annually for Minnesota Athletics. "Energy conservation opportunities have become a priority in our annual budget process and we have worked well with our campus constituents to achieve significant results," notes Jeff Seifriz, director of athletic facilities. Many of the upgrades had payback periods of less than one year. Below are highlights from this work.

TCF Bank Stadium

Though TCF Bank Stadium was the newest building on campus in 2010, it still benefited from recommissioning. "Some of the original controls' programming and design used more outside air on non-event days, thus increasing our steam consumption. We took a detailed look at our sequencing and partnered with the energy management's team to identify those variations and modify mechanical automation controls accordingly, resulting in savings for the facility of \$131,000 in energy costs each year," says Derek Hillestad, director of operations at TCF Bank Stadium.

Williams Arena

Prior to the recommissioning study, Williams Arena consumed approximately \$287,000 worth of energy per year. The recommissioning team saved the most energy by running fans only when the building is occupied. The operations staff also installed a new direct digital control system and variable frequency drives.



Implementation costs totaled \$1,700 and had a payback period of less than one month. The total annual energy savings for Williams Arena is nearly \$61,000, which is more than 21 percent of the building’s original annual energy costs.

Bierman Building

Before recommissioning, the Bierman Field Athletic Building racked up approximately \$284,000 in energy costs each year. The greatest energy-saving opportunity at this facility was reducing the airflow to the perimeter offices on the second floor. Engineers tested the airflow in the offices and realized they were receiving about 45 to 50 air changes per hour when they needed only 3 or 4. The team saved \$15,000 annually by setting the fan to operate only when the offices are occupied, approximately 16 hours per day, while still meeting ASHRAE 62 guidelines. Overall, energy savings in the Bierman Building totaled \$67,000, more than 24 percent of annual energy costs.

Ridder Arena and Baseline Tennis Center

Until 2010, Ridder Arena and Baseline Tennis Center consumed approximately \$284,000 worth of energy annually. The recommissioning team recognized that reducing the airflow supply to the main arena when events weren’t taking place would save a significant amount of energy. Consequently, they installed variable frequency drives (VFDs) and programmed the control sequences to slow the two main fans when the arena was not in use, thereby saving about \$14,000 annually. Total energy-saving projects saved \$48,000, or close to 17 percent of the annual energy costs at the arena. Recommissioning costs totaled \$49,000, which was recouped in slightly more than a year.

Gibson-Nagurski Football Complex

The Gibson-Nagurski Football Complex used approximately \$152,000 worth of energy annually before recommissioning. The energy team saved \$5,000 by reducing the airflow to the Football Hall of Fame room, which was receiving nearly twice as much air as it needed. The complex now saves more than \$8,000 in energy costs annually, thanks to the recommissioning work. Implementation costs totaled \$5,000, with a payback period of approximately seven months.

CHALLENGES: OVERCOME AND ONGOING

TCF Bank Stadium’s green building success and the energy recommissioning of the athletics department’s numerous facilities became a catalyst for additional greening work across Gopher Athletics. Motivated by the positive feedback prompted by the LEED accomplishment, stadium staff members have become advocates for new sustainability initiatives. These include:

- implementing green cleaning procurement policies;
- working with the Minneapolis-based Tennant Company Group to pilot a “blue” cleaning technology, which minimizes chemical use by applying a low-level electrical charge to tap water, transforming it into a cleaning solution that breaks apart and lifts dirt from surfaces like a magnet;
- developing a plan to make TCF Bank Stadium a “zero waste” venue;
- joining the Green Sports Alliance and participating in its forums for sharing better practices in sports greening;
- applying for a second LEED certification for TCF Bank Stadium under the Existing Buildings: Operations and Maintenance standard.

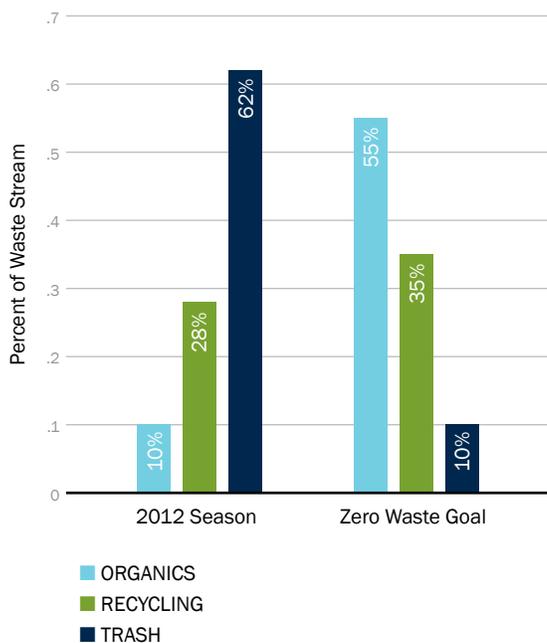
SAVINGS FROM ENERGY EFFICIENCY AND RECOMMISSIONING

GOPHER ATHLETIC FACILITY	ANNUAL SAVINGS FROM ENERGY CONSERVATION	ANNUAL POUNDS CO ₂ REDUCED
TCF Bank Stadium	\$131,000	786,000
Williams Arena	\$61,000	1,302,000
Bierman Building	\$67,000	1,190,000
Gibson-Nagurski Football Complex	\$8,000	164,000
Fieldhouse	\$7,000	178,000
Mariucci Arena	\$15,000	244,000
Ridder Arena and Baseline Tennis Center	\$48,000	1,124,000
Aquatic Center	\$75,000	678,000
Total	\$412,000	5,666,000

Photos courtesy of University of Minnesota.



TCF BANK STADIUM GAME-DAY WASTE



“TCF BANK STADIUM IS AN HISTORIC PROJECT FOR THE UNIVERSITY, AND IT WAS IMPORTANT TO US TO DO IT RIGHT,” SAID UM PRESIDENT EMERITUS ROBERT BRUININKS. “THE LEED DESIGNATION, IN PARTICULAR, UNDERSCORES THE COMMITMENT OF THE BOARD OF REGENTS AND THE LEADERSHIP OF THE UNIVERSITY TO PRINCIPLES OF SUSTAINABILITY, ENERGY CONSERVATION, AND RESPONSIBLE STEWARDSHIP OF OUR ENVIRONMENT AND OUR RESOURCES.”

“Among these initiatives, developing a plan to achieve ‘zero waste’ is perhaps the biggest undertaking,” says Stennes. Once fully implemented, the program aims to divert 90 percent or more of all waste generated in the facility to recycling, composting, or reuse. “Fortunately, the Gopher Athletics project team has been able to draw on the experience of other universities pursuing ‘zero waste’ in their athletic venues, including Ohio State University and the University of Colorado at Boulder,” says Stennes.

Developing the waste diversion program has taken several months of planning in collaboration with a diverse group of stakeholders, including TCF Bank Stadium Operations staff, contracted vendors like ARAMARK (the food service concessionaire) and Marsden (the game-day housekeeping), and the university’s sustainability office and recycling program. The work involves changes to infrastructure, operations, serveware, and outreach, leading to some increased costs and time.

To date, Gopher Athletics’ greening initiatives, which have focused on more efficient building practices and upgrades, have not included robust student engagement, as the success of building retrofits did not rely on student or fan participation. “Engaging fans and sponsors in a ‘zero waste’ effort will bring a new set of challenges and opportunities,” explains UM director of athletics Norwood Teague, “particularly because fans will be a big part of helping the Gophers divert an estimated 76,000 pounds of trash annually, just over 90 percent of all waste.”

LESSONS FROM THE FIELD

USE LOCAL EXPERTS

“Some sports greening opportunities are relatively easy to implement if you can access experts like those who work for your local utility, or faculty on campus, or, in our case, the university’s energy management staff,” says Stennes.

“There are 20+ Fortune 500 companies within the Minneapolis-St.Paul metro area and many of them have sustainable platforms that connect to managing athletic facilities,” Hillestad says. “We have found great success in partnering with these companies and sharing our vision of sustainability, furthering innovation.”

TARGET ENERGY CONSERVATION

“Energy-related projects can involve a great return on investment and have immediate benefits for both the environment and the organization’s bottom line,” says Stennes. “The benefits of other projects might require more work to quantify in order to justify investment in capital, materials, and perhaps additional labor.”

USE GREENING EFFORTS TO BUILD MOMENTUM FOR FUTURE PROJECTS

UM takes pride in being the first campus to be awarded LEED certification for its football stadium. Stadium staff members now have the credibility to initiate new greening efforts and build on their accomplishments.

LOOK TO YOUR PEERS FOR GUIDANCE

As the Gopher athletics department works toward its “zero waste” goals for TCF Bank Stadium, it is learning from other campuses, like Ohio State University and the University of Colorado at Boulder, that have implemented successful programs at their stadiums.

- 1 “University of Minnesota TCF Bank Stadium Achieves LEED Silver Certification,” University of Minnesota news release, September 17, 2009, www1.umn.edu/news/news-releases/2009/UR_CONTENT_131347.html.
- 2 Ibid.
- 3 Ibid.
- 4 Ibid.