CASE STUDY:

UNIVERSITY OF NORTH TEXAS, HOME OF THE MEAN GREEN

CAMPUS FACTS

LOCATION:
Denton, Texas

FOUNDED:
1890

TYPE:
Public

TOTAL STUDENT POPULATION:
35,778 (28,911 undergraduates)

STAFF:
8,494

PRIMARY ATHLETICS CONFERENCE:
Conference USA

PRIMARY ATHLETICS DIVISION:
NCAA Division 1

NUMBER OF VARSITY TEAMS:
16 (10 women's, 6 men's)

NUMBER OF SPORTS FACILITIES:
29 (19 athletic, 10 recreational)

UNT SUSTAINABILITY FOUNDED:
2009

AASHE STARS RATING:
Silver, 2012

SPORTS GREENING WORK STARTED:
2005

SPORTS FACILITY LEED CERTIFICATIONS:
Apogee Stadium LEED Platinum Certification for New Construction, 2011

THE EAGLES' GREENING STORY: MOTIVATIONS, CHALLENGES, AND LESSONS

The University of North Texas's Apogee Stadium was the first sports venue in the United States to be awarded LEED Platinum certification. The stadium is powered by wind energy and designed to optimize resource efficiency while minimizing environmental impact. As one of the first, largest, and most visible LEED Platinum venues in the state, the stadium is a model green building in Texas. Its green building accomplishments have paved the way for greener facilities and operations throughout the UNT campus.

WHY IS UNT GREENING SPORTS?

The university's athletics department values leading by example. UNT Athletics sees its sports greening initiatives as an opportunity to "take some of things we preach on campus and put them into practice," explains athletics director Rick Villarreal. "We have a very strong environmental commitment on campus," he adds. "It's important to ensure that athletic operations are in line with the university's sustainability efforts and implement as many green initiatives as possible."

According to Villarreal, there were two other motivations for greening the athletics department. First, sports greening helps protect the natural environment. "As cliché as it sounds, in the last few years I was blessed with three young grandchildren and I very quickly went from being disengaged to being an environmental enthusiast," he says. "It helped open my eyes about the urgency of the environmental challenges we face and the value of greener operations."

Second, a greening project can provide students with a stronger and lasting connection to UNT. "With a program as simple as tree planting around our softball field, we can give our student-athletes a sense of ownership, pride, and responsibility," explains Villarreal. "From the perspective of the athletics department, that's a great way to make sure students invest in and will stay part of the Mean Green community, to ensure they feel connected to the university years after graduating. That alumni connection is vital, and sports greening efforts help strengthen it."

"WE CAN GIVE OUR STUDENT-ATHLETES A SENSE OF OWNERSHIP, PRIDE, AND RESPONSIBILITY," EXPLAINS ATHLETICS DIRECTOR RICK VILLARREAL. "THAT'S A GREAT WAY TO MAKE SURE STUDENTS INVEST IN AND WILL STAY PART OF THE MEAN GREEN COMMUNITY, TO ENSURE THEY FEEL CONNECTED TO THE UNIVERSITY YEARS AFTER GRADUATING. THAT ALUMNI CONNECTION IS VITAL, AND SPORTS GREENING EFFORTS HELP STRENGTHEN IT."

UNT had four goals when it developed Apogee Stadium: to build a facility that was the epitome of sustainable design, to elevate the visibility of North Texas Athletics, to enhance community engagement, and to showcase UNT's commitment to sustainability. "In 2008, UNT signed the American College and University Presidents' Climate Commitment [ACUPCC] and outlined several initiatives for strengthening sustainability at the university and elevating the visibility of North Texas Athletics," says Lauren Helixon, assistant director of UNT Sustainability. "These combined efforts led to the development of one of the finest and most environmentally friendly athletic villages in the nation, located at UNT's Eagle Point Campus."

APOGEE STADIUM PROJECT PARTNERS

- North Texas Athletics Department
- UNT System Facilities
- UNT Administration
- UNT Sustainability
- UNT Dining (initial input)
- UNT Division of Student Affairs & Students (initial input)
- Manhattan Construction Company (construction manager)
- HKS (design and LEED consultant)
- Smith Seckman Reid (mechanical engineer)
- Aguirre Roden (electrical engineer)
- Jaster-Quintanilla (civil engineer)
- Rogers Moore Engineering/Walter P. Moore (structural engineer)
- Cascade Renewable Energy (turbine supply and installation)
- Caye Cook & Associates (landscape architect)
- Henneman Engineering (commissioning agent)

Photo courtesy of University of North Texas.

APOGEE STADIUM TURBINES

In mid-2011 UNT installed three wind turbines, manufactured by Northern Power Systems, to accompany Apogee Stadium. With a hub height of 121 feet and a blade length of 30 feet, these horizontal-axis wind turbines are specifically designed for implementation in the urban environment and are perfectly suited for the Class II wind conditions that exist in the North Texas region. The three turbines produce approximately 500,000 kilowatt-hours of electricity annually to the UNT Eagle Point power grid, enough to provide 30 percent of the stadium's energy consumption and, when the stadium is not in use, approximately 6 percent of the energy needs of the entire Eagle Point campus. The turbines effectively eliminate the emission of 323 metric tons of carbon dioxide each year.

The North Texas athletics department and UNT Sustainability recognize that sports provide an important platform for environmental education and communicating the university's commitment to sustainability. "Apogee Stadium, given its visibility, showcases UNT's commitment to sustainability like no other campus effort can," says Helixon. "It helps UNT become recognized as a leader in sustainability."

WHERE DID UNT START?

In 2008, UNT recognized the need to replace outdated Fouts Field stadium, which could no longer hold the university's growing population. When the 20,000-seat Fouts Field was constructed in 1952, UNT's student enrollment was under 5,000. In 2008, the university's student population was close to 35,000. The students agreed with the administration, and voted in favor of allocating a $10 fee per class credit (capped at 15 credits per semester) to build the new stadium.

Building Apogee Stadium was one of the most ambitious initiatives in the history of UNT. The effort, from concept to completion, took approximately three years. The project design started in January 2009 with a kick-off meeting focused on sustainability and brought together on- and off-campus stakeholders. "This accomplishment could not have been achieved without a dedicated team effort including UNT System Facilities, UNT Sustainability, North Texas Athletics, the students, HKS Architects, and the Manhattan Construction Company," says Raynard Kearbey, associate vice chancellor for System Facilities at UNT.

The stadium project used an integrated design process that involved regular meetings of all project partners (listed in the adjacent sidebar) to create, plan, track, and implement the sustainability goals for the project. The team began by mapping out an initial LEED scorecard, which initially indicated the potential for Silver certification. However, as construction got underway in April 2010, the team realized the project had the potential to achieve LEED Gold or Platinum as numerous upgrades began to appear more achievable.

"During the 14-month design and planning process, it was a constantly changing landscape of what was possible," explains Villarreal. "It was never about buying points or just adding extra features for the sake of a higher [LEED] certification; it was about exploring the improved technology that we could effectively integrate into our operations."

One project addition was the installation of three wind turbines to provide power for Apogee Stadium and the surrounding Eagle Point campus. The turbines were fully funded by a $2 million grant from the Texas State Energy Conservation Office (SECO) awarded to UNT Sustainability. The team completed a feasibility study on the environmental impacts of the proposed turbines in October 2010, and by March 2011 work on the wind turbines began.

"Replacing unsustainable energy sources with wind technology reduces UNT's carbon emissions and reduces UNT's energy costs. The turbines contribute to UNT's sustainability by producing renewable electricity for the Eagle Point campus," says Helixon. "The stadium's position within the campus provides a unique opportunity to harvest the site's wind resources and become a visible symbol of environmental responsibility as well as an educational tool for students, patrons, and the broader community."

These benefits are in line with North Texas Athletics' mission statement, which includes a goal of "benefiting the community through public service, education, and outreach activities that reflect positively on the university and promote good will in the community." The athletics department has a variety of annual environmental programs that engage student-athletes in landscape restoration, tree planting, and waste diversion projects around the campus and community. Apogee Stadium and its wind turbines provide the athletics department and UNT with a valuable asset.

Photo courtesy of University of North Texas.

The athletics department and UNT Sustainability give regular tours of the environmental features of the stadium to demonstrate the value of green innovation. Some tours are targeted to middle school and high school students.

"We built the stadium in a way that allows us to provide educational walking tours and show visitors that a green building doesn't necessarily look different from any other building," says Villarreal. "We explain that we're using recycled materials, nontoxic paints, and responsibly harvested wood. We demonstrate that these environmentally preferable practices are safe, and many times not even noticeable. They are simply acquired and constructed in ways that have less environmental impact."

Beyond the weekly tours, Apogee Stadium's green features are promoted at every UNT Mean Green football home game and at other events on non-game days, including UNT banquets, staff appreciation parties, and at student orientation. Apogee also serves the greater North Texas region as a venue for concerts, community events, high school football games, and band competitions. In fact, the stadium and wind turbines are located at one of the busiest intersections in the country. The stadium's prominent LEED Platinum plaque and turbines are visible to an estimated 24,000 drivers daily. "New people see the green features and stop in all the time to find out about them," says Villarreal.

"We are encouraging more people in this part of the country to start thinking about sustainability when they embark on new building projects or renovations, or even just when visiting existing buildings," says Villarreal. "By buying locally and providing a model for green building, we are also supporting the market for greener products and encouraging others to do the same."

Tailgating is held in the vast green space adjacent to the stadium immediately before each home game. UNT Sustainability works to promote "Mean Green pride" in conjunction with the UNT recycling department with a "Recycling at Tailgating" program that collects as many recyclables as possible during pregame celebrations. The program is staffed by student volunteers who set up recycling bins and direct fans to recycle their bottles and cans.

"This is a great accomplishment for UNT and strongly underscores our commitment to sustainability," says UNT's president, V. Lane Rawlins. "UNT is a leader in environmental research and sustainability, and the fact that we have the first LEED Platinum football stadium is an example of our commitment and our plans for the future."

STANDOUT GREEN FEATURES OF APOGEE STADIUM

REDUCING WATER AND ENERGY CONSUMPTION

- The stadium uses energy-efficient heating, ventilation, air conditioning, and lighting equipment, reducing energy consumption by 25 percent in comparison with a typical building of the same type.
- Low-flow plumbing fixtures—sinks, toilets, urinals, and showers—reduce water consumption by more than 52 percent in comparison with a typical building of the same type.
- The three on-site wind turbines will provide approximately 500,000 kilowatt-hours of energy annually for the UNT Eagle Point power grid, effectively eliminating 323 metric tons of CO_2 from being emitted each year into the atmosphere.
- A web-based monitoring system provides details on the turbines' energy production, carbon reduction statistics, and data that can be used for both educational and research purposes at UNT.

USING MORE SUSTAINABLE AND RECYCLED MATERIALS

- 83 percent of construction waste materials (including 6,373 tons of concrete, 188 tons of metal, 4 tons of wood, and 3 tons of cardboard) were diverted from landfills through recycling.
- 20 percent of the products and materials used in the construction of the stadium were made with recycled content.
- More than 47 percent of the products and materials used in the construction of the stadium were manufactured locally.

ENHANCING THE SITE AND ITS SURROUNDINGS

- More than 50 percent of the stadium site was landscaped with plantings that are native to the North Texas climate.
- Permeable ground, combined with the native landscaping, reduces stormwater runoff and minimizes the heat island effect.
- Campus bus stops, secured bicycle storage, and preferred parking spaces for carpoolers are provided to promote use of environmentally preferable transportation.
- Walkways and bike paths connect to the main campus, encouraging fans to walk or bike to stadium events.

IMPROVING INDOOR ENVIRONMENTAL QUALITY

- Materials emitting low levels of volatile organic compounds, such as low-VOC adhesives, sealants, paints, coatings, and flooring, were used to improve the indoor air quality for building occupants.
- 90 percent of regularly occupied indoor spaces provide occupants with natural daylight and views of the outdoors.
- UNT has implemented green policies and procedures for stadium operations and maintenance.

Photos courtesy of University of North Texas.

FINANCING APOGEE STADIUM

FUNDING

- $39 million (estimate) was raised via a student fee ($10 fee per credit, capped at 15 credits per semester). The fee was not implemented until the stadium was completed in fall 2011. The fee accounts for 50 percent of the cost, which is the limit for student fees funding under Texas law.
- $20 million came from Apogee, which entered into a 20-year agreement for naming rights to the new stadium.
- $29 million (estimate) was given by private donors.
- $2 million came in the form of a Texas State Energy Conservation Office (SECO) grant.

Note: Texas law does not permit state funds to be used for construction related to athletics.

APPROXIMATE COSTS

Total project cost: $78 million
(including but not limited to the following items)

- Construction: $62.8 million
- Wind turbines: $2 million
- LEED Platinum certification: $858,000 (1.1 percent of project cost)
  - LEED hard costs (infrastructure upgrades): $594,750
  - LEED soft costs (registration and staff time): $263,250

SAVINGS

- $402,000 in annual recoverable operational savings from LEED upgrades (e.g. energy and water efficiency).
- Approximately $40,000 to $50,000 expected annually.

CHALLENGES: OVERCOME AND ONGOING

PROJECT SIZE

The greatest challenge for the North Texas athletics department was envisioning an advanced green building project the size of Apogee Stadium. According to Villarreal, one barrier was the lack of comparable projects (such as LEED Platinum sports venues) to use as models for Apogee. “Our first challenge was keeping an open mind,” he says. “Our team and staff initially had reservations about the possibility of achieving a LEED Platinum stadium, given the size and layout of stadiums.”

To help address the complexity of the project, UNT determined early on that an interdisciplinary team and broad stakeholder engagement were critical for success. Beginning with the design phase of the project, a variety of representatives from across the campus were invited to offer perspectives and expertise on the stadium. These included UNT System Facilities, UNT Facilities, UNT Administration, UNT Sustainability, UNT Dining, the Division of Student Affairs, and others. Students, the principal users of the building, were also included in preliminary design discussions. Alumni were approached to provide feedback, and many alumni were asked to help fund the capital project.

PROJECT FINANCING

The total project cost of the stadium for construction and LEED expenses was approximately $78 million, of which about $62.8 million was directly associated with construction costs. The additional costs for a LEED Platinum stadium equaled only 1.1 percent of the total project cost (not including the $2 million grant for wind turbines). Of these additional costs, $263,250 represented LEED soft costs that were not recoverable, such as certification registration fees and staff time. However, the other $594,750 represented LEED hard costs for more efficient infrastructure upgrades, which will result in $402,000 in annual recoverable operational savings. The wind turbine energy generation is also expected to provide energy savings of $40,000 to $50,000 each year.

“Our staff originally thought that building more sustainably would be very expensive,” says Villarreal, “We were pleased to find that in practice that wasn’t the case. It was contrary to what the public expectation is around building green.” The project was financed through student fees, with some private donations from the UNT community. In addition, the electronics company Apogee entered into a 20-year, $20 million stadium naming agreement.

Because UNT hopes to use this stadium for up to 75 years, incorporating greener building features was not only good for the environment but a good financial decision, according to President Rawlins. “By building in this manner, the sustainable features pay for themselves through their efficiencies within eight years. Plus, environmentally responsible buildings mean healthier buildings with better air quality.”

> “THIS IS A GREAT ACCOMPLISHMENT FOR UNT AND STRONGLY UNDERSCORES OUR COMMITMENT TO SUSTAINABILITY,” SAYS UNT’S PRESIDENT, V. LANE RAWLINS. “UNT IS A LEADER IN ENVIRONMENTAL RESEARCH AND SUSTAINABILITY, AND THE FACT THAT WE HAVE THE FIRST LEED PLATINUM FOOTBALL STADIUM IS AN EXAMPLE OF OUR COMMITMENT AND OUR PLANS FOR THE FUTURE.”

LESSONS FROM THE FIELD

PUBLICIZE BENEFITS

"Having the first LEED Platinum collegiate athletic stadium in the world and the first stadium powered with wind turbines greatly strengthens the sustainability identity and visibility of UNT," says Helixon.

USE CAMPUS EXPERTS

The LEED design process helped the athletics department establish strong contacts across campus. "You become aware of the knowledgeable staff and sustainability resources around the campus," says Villarreal. "Now when we build a new facility or revise operations, our staff can pick up the telephone and get helpful advice from these contacts. We can ask questions and get the support we need quickly. This project helped us discover many readily available and helpful experts."

EDUCATE AND INVOLVE STUDENTS

UNT has used the stadium in a variety of ways to educate students, from engaging them in the stadium design process to including them in facility tours. With some of the grant funds received to install the turbines, UNT was able to purchase a "Wind for Schools Package," a set of data monitoring tools that provide real-time information to educate students about wind turbines. Wind for Schools also includes a "PublicView" component accessible to the general public that allows UNT to share its success with the local community or other schools. "The installation of wind turbines on the UNT campus influences potential research in sustainability and renewable energy technology," says Helixon. "Numerous students and departments have already used turbines for research, with more projects on the horizon."

USE A SUCCESSFUL PROJECT TO BUILD MOMENTUM FOR OTHER GREENING EFFORTS

"Once we accomplished the stadium, it made it seem like anything was possible," says Villarreal. "Thanks to this great success, we've become aware of the opportunities in other parts of campus as well as our athletic facilities. It started permeating in the athletics department and on campus in places that it hadn't before." Next for North Texas Athletics is LEED certification for its new baseball stadium, slated for the near future.

BUILD A DIVERSE PROJECT TEAM

At UNT, gathering opinions from a diverse team increased the likelihood that the project would meet the varied interests of all stakeholders, including the surrounding community. "This inclusive approach was even more important after the project was completed and events were developed to highlight the stadium," explains Helixon. "Thus far, conferences, banquets, and specialized tours have been hosted in the stadium. The success of these events has hinged on the adaptability of the space and the constant coordination among various units at the UNT campus. This helps the stadium achieve its maximum potential as an outreach tool."

USE GREEN ATHLETIC FACILITIES AS THE BASIS FOR A NEW CAMPUS BUILDING STANDARD

"The green features of the stadium provide a model for both existing and future projects," says Helixon. "The use of renewable energy and water-conserving features offers practical models to follow, especially considering that the North Texas region is infamous for droughts during the summer. The stadium serves as an example for future construction projects on campus. In addition, as the first university with a certified LEED Platinum collegiate football stadium, UNT has set the bar high for other universities."

"OUR STAFF ORIGINALLY THOUGHT THAT BUILDING MORE SUSTAINABLY WOULD BE VERY EXPENSIVE," SAYS ATHLETIC DIRECTOR VILLARREAL. "WE WERE PLEASED TO FIND THAT IN PRACTICE THAT WASN'T THE CASE. IT WAS CONTRARY TO WHAT THE PUBLIC EXPECTATION IS AROUND BUILDING GREEN."

Photos courtesy of University of North Texas.