

Trends in Green

SUSTAINABLE INNOVATIONS ON CAMPUS

Defeating the Carbon Footprint

At The University of Toledo, geothermal saves costs.

BY JOE KUNKLE, AIA, PE, LEED-AP, AND BILL BEAUREGARD

ANATIONAL LEADER IN SOLAR ENERGY RESEARCH, The University of Toledo, Ohio, has dedicated an entire satellite campus near its main campus to advancing renewable, alternative, and sustainable energies. The Scott Park Campus of Energy and Innovation is the University's home of solar research with eight acres of solar panels producing 1.12 MW of electricity. With the goal of neutralizing the University's overall carbon footprint, energy consumption is reduced wherever possible on all campuses and green building practices are followed throughout, but not without significant challenges.

Recently completed on its main campus, the 92,896-sq.-ft. Fetterman Training Center, shown to the right, connected to the LEED Gold-certified Savage Arena, includes a 71,000-sq.-ft. open practice field complete with an artificial turf playing field and a six-lane synthetic sprint track with long jump pit. The remaining 22,000 sq. ft. include a regulation basketball/volleyball court, golf practice area, and locker and toilet rooms.

To produce the energy required for the building's multisport function, the Training Center partially relies on 42 geothermal wells. To support the University's sustainable design mission and to accomplish the necessary technical completion, in-depth expertise and focused knowledge in sustainability for higher education were critical. By maximizing the facility's function of serving multiple sports and minimizing its cost through the design team's various sustainable selections, the long-term operating cost of the building was significantly reduced.

Serving as a practice area for 12 varsity sports, the University's preference for using geothermal wells was facilitated by the Training Center's multifunctional purpose, which allowed for its different areas to have different energy systems.

The project was bid by the design team for both a standard mechanical system and for geothermal. The three-year payback of using geothermal for the practice field proved the most cost-effective choice because the temperature range provided for such a large volume space would be sufficiently comfortable for vigorous exercise, such as football and soccer practice.

The designers were able to utilize a proprietary geothermal system that minimized the number of wells by using a high-efficiency pipe. At 300 ft. deep, each of the 42 wells was drilled directly under the practice field. The geothermal closed-loop system is tied to an energy recovery ventilator at each end of the practice field that circulates the air throughout the space, maintaining an ideal temperature range while eliminating the need for ductwork in the practice field.



IMAGE COURTESY OF TOLEDO ATHLETICS

For example, if the outdoor temperature is 30°F, indoors it is 55°F; if 95°F outdoors, the indoor temperature is about 80°F.

Drilling the wells within the building's footprint, directly underneath the turf practice field, presented designers with their biggest challenge to the schedule. The owner's nine-month construction schedule was met by simultaneously drilling geothermal wells while pouring foundations and setting the pre-engineered building's structural steel.

Due to strict humidity and temperature control requirements, a traditional heating and cooling system was installed to independently support the Training Center's basketball/volleyball practice court and golf area, both relatively smaller spaces requiring less energy.

In keeping with the adjacent Savage Arena's sustainability requirements, the Fetterman Training Center incorporated low-flow plumbing fixtures, translucent wall panels, and a "cool color" metal roof, all of which led to significantly lower energy costs. Other sustainable features include the reuse of Savage Arena's original basketball court and sizing roof steel for future solar panels.

On every college campus, there is a range of facilities with many purposes and distinctly different requirements. Early assessment of the Fetterman Training Center helped determine air temperature levels needed for the various sporting activities, which ultimately maximized energy cost savings. The end result is a worthy addition to The University of Toledo's deep commitment to comprehensive and innovative sustainability, both in the University's research and throughout everyday campus life. **CPM**

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