

The Case for Green Collegiate Sports Venues

Campus Athletics Catch On to Sustainability's Benefits

Photo Credit (all): Images courtesy of USGBC; Photographer: Rebecca Bishop, Bentley University.



The LEED Platinum Bentley Arena was designed by Architectural Resources Cambridge and built by Suffolk Construction.

Installation of efficient gas water heaters helped the project meet building standards and contributed toward the arena's overall LEED certification.

By Jaime Van Mourik

Across the U.S., collegiate athletic departments are showing increasing interest in developing green facilities — both new and existing — mirroring a widespread commitment to sustainability within the higher education sector at large.

Colleges and universities are leveraging athletic events to communicate their sustainability values and to demonstrate responsible land and building ownership. Sustainable sports facilities can have a huge impact through reduced operating costs, improved building performance, reduced carbon and waste footprints, and healthier occupant experience.

Green building strategies, like those outlined in LEED (or Leadership in Energy and Environmental Design), help institutions keep pace with a sector that sees sustainability as a priority in the mission to deliver education excellence. According to a McGraw-Hill SmartMarket Research Study, 86 percent of higher education institutions in the U.S. have constructed green buildings, with nearly the same percentage making green retrofits, and 90 percent of respondents say green buildings have a positive impact on student health. Nationwide there are currently more than 8,300 higher education projects participating in LEED, and more than 60 collegiate sports venues and athletic training facilities are LEED-certified.

An Inefficient Space-type No More

Although sports venues differ in use, they all share common characteristics like fluctuating occupation, high resource-intensity and size. Practical strategies in LEED help address these challenges.

Accounting for surge occupancy: Sports facilities typically have limited full-time staff and a high volume of visitors. In LEED, the definition of regularly occupied space takes into consideration variables such as how occupants use the space and differentiates between stadium seating and staff workspaces. For some credits, LEED also accounts for the peak transient population, which may be equal to the sold-out capacity.

Energy efficiency: LEED v4 allocates 30 percent of all possible points to energy efficiency. It rewards projects that pursue efficient lighting strategies, such as the installation of light-emitting diodes

(LEDs), and those that meet minimum energy performance standards. Installation of renewable energy systems is a common strategy as owners and operators begin to understand the cost-saving opportunities. Efficient HVAC technologies can also dramatically reduce energy demand while maintaining chilled-water air conditioning performance.

Waste diversion: Waste diversion and recycling are key areas where athletic departments can educate fans and community stakeholders about the benefits of environmental stewardship. LEED credits ensure that visitors have access to signage that provides simple explanations and encourages options for proper recycling and diversion.

Water conservation: Some of the biggest opportunities to lower utility bills come in the form of water-use reduction measures. LEED rewards projects that implement rainwater collection strategies, water efficient plumbing fixtures, and water bottle filling stations, among other strategies.

Occupant experience: Air quality and thermal comfort are critical to athlete performance and fan experience, and LEED credits seek to optimize the indoor environment.

While many higher-education institutions have initiatives to lower consumption, the cost of running a campus remains exponential. Consider that small colleges spend about \$4.2 million annually on utilities, with mid-size schools spending about \$11 million, and large universities spending upwards of \$22 million. Any facility addressing just one of these focus areas makes a measurable impact and increases the institution's ability to provide an efficient and healthy space for its students, athletes and community.

The Bentley Arena

Bentley University, located in Waltham, Mass., is



home to one of the top business schools in the nation — and one of the latest examples of best-in-class green building design. The 76,000-square-foot, LEED Platinum Bentley Arena is the first certified building on campus and has become a symbol of the University's sustainability ambitions, which include a 2030 carbon neutrality goal.

Bentley Arena is among the first collegiate ice arenas in the U.S. to achieve LEED certification. Ice arenas are generally extremely inefficient, consuming large amounts of energy to meet the demands of ice making, dehumidifying and heating for occupant comfort.

The new home of the NCAA Division I Bentley Falcons is a state-of-the-art multipurpose space that includes a 500-kilowatt rooftop solar array that satisfies almost half of the building's annual electricity needs. An entire "sustainability wall" in the main lobby has been dedicated to educating the hundreds of fans that pass through the arena's doors, during both the on- and off-season, about the building's sustainable design. Other strategically placed signs offer a self-guided tour of specific LEED features and their impacts.

One of the most challenging aspects of the project was to reduce overall energy demand from the resource-intensive process of making ice. The arena's ice sheet consists of a large concrete slab with five miles of underground pipe. When ice is installed at the

See **Green Scene**, page 22 ➔

Green Scene, from page 17

beginning of the season, highly efficient chillers pump ice-cold antifreeze (glycol) through the pipes for three days to cool the slab. Water is then hand-sprayed over the slab to create ice. The ice sheet is maintained for approximately eight months out of the year. During that time an insulated floor can be placed over the ice, transforming the venue to host a multitude of events such as concerts, career fairs, lectures and alumni gatherings.

When challenged with designing a highly efficient ice plant, the project team's mechanical engineers developed a state-of-the-art heat reclamation loop which absorbs excess heat generated by fans and motors within the plant. The reclaimed heat is then used to pre-heat the building's domestic hot water system as well as to provide space heating (including radiant floor heating systems in the second floor lobbies). The heat reclamation loop reduces the building's need for natural gas, thereby reducing energy demand and saving the University valuable operating dollars.

"Thanks to the combination of the rooftop solar technology and energy-efficient mechanical design, the overall grid energy required to power the arena is less than half of what it would take to power a building of a similar size," said

Amanda King, executive director of Bentley's Office of Sustainability. "These technologies also cut the building's carbon footprint in half."

Another unexpected building feature: windows. Typical ice arenas are windowless to prohibit heat intrusion and diminish the glare on the ice. Windows at Bentley Arena were positioned to reduce glare during the season and are also highly insulated, allowing for plenty of natural light to fill the arena during the day while preventing heat gain.

At night, occupancy sensors ensure LED lights are turned off in areas with intermittent traffic. As an added benefit, the installation of LED lights resulted in reduced thermal emittance in the space — meaning that a simple 1- to 2-degree difference from cooler lighting saves energy and labor from trying to keep the ice cold.

Making the Case

In an increasingly competitive environment, sustainability — like athletics — is tied to institutions' reputation and student recruitment efforts. Research shows that students want green campuses and they seek schools that will support their interest in and commitment to the environment. In



Sustainable features at Bentley Arena include 1,400 roof solar panels that provide 40 percent of the building's annual electricity needs; high-efficiency LED lighting; and highly efficient water-saving fixtures that help reduce usage by about 48 percent.

the 2017 Princeton Review College Hopes & Worries Survey, 64 percent of students said that a college's commitment to environmental issues would influence their decision to apply or attend the school, up 3 percent from 2016.

Buildings are the most visible representation of the health of a school. How they look and function

reflects a capacity to invest in students, and building and operating to green standards allows an institution to demonstrate its commitment to the health and success of the community.

Jaime Van Mourik is vice president, education solutions, for the U.S. Green Building Council.