



CASE STUDY: ARIZONA STATE UNIVERSITY, HOME OF THE SUN DEVILS

CAMPUS FACTS

LOCATION:
Tempe, Arizona

FOUNDED:
1885

TYPE:
Public

TOTAL STUDENT POPULATION:
73,303 (54,404 undergraduates)

STAFF:
21,977

PRIMARY ATHLETICS CONFERENCE:
Pacific 12 (Pac-12)

PRIMARY ATHLETICS DIVISION:
NCAA Division 1

NUMBER OF VARSITY TEAMS:
22 (12 women's, 10 men's)

NUMBER OF SPORTS FACILITIES:
26 (12 athletic, 14 recreational)

SUSTAINABILITY OFFICE FOUNDED:
2004

AASHE STARS RATING:
Gold, 2011

SPORTS GREENING WORK STARTED:
2008

SPORTS FACILITY LEED CERTIFICATIONS:
Weatherup Center LEED Gold Certification
for New Construction, 2011

“SUN DEVIL ATHLETICS HAS FULLY EMBRACED THE OPPORTUNITY TO ADVANCE SUSTAINABLE PRACTICES AS AN INSTITUTION AND WITH OUR FAN BASE,” SAYS STEVE PATTERSON, VICE PRESIDENT OF UNIVERSITY ATHLETICS.

THE SUN DEVILS’ GREENING STORY: MOTIVATIONS, CHALLENGES, AND LESSONS

Arizona State University (ASU) has installed 10 solar arrays at its sports facilities, more than any other college athletics department in the nation. In 2009, the Sun Devils also built the first LEED Gold-certified collegiate arena (the Weatherup Center, used primarily for basketball training) in the United States. The Weatherup Center runs almost half of its operations on solar power and features basketball courts built with Forest Stewardship Council–certified wood. Moving forward, Sun Devil Athletics is setting “zero waste” goals for all athletics events.

WHY IS ASU GREENING SPORTS?

According to Steve Patterson, vice president of university athletics, “Sustainability is one of the pillars of Arizona State University, and it is imperative that the athletics department align itself with the goal of minimizing our carbon footprint. Athletics provides a unique opportunity to promote sustainability at our university, and Sun Devil Athletics has fully embraced the opportunity to advance sustainable practices as an institution and with our fans.”

Sustainability has been a principal goal of the ASU athletics department since 2002, when Michael Crow became university president and established sustainable education and operations as top priorities for ASU. In the spring of 2007, ASU launched its School of Sustainability, the first degree-granting program of its kind in the United States. With resources from the School of Sustainability and an endorsement from Crow, Sun Devil Athletics (SDA) pursued more sustainable practices for its day-to-day operations, events, facilities, and use of solar resources.

“Progress toward sustainability requires the reconceptualization and reorganization of all of university enterprises,” Crow says. “Nowhere is this more visible than in athletics, where the interaction between the university and its constituents is most public. It is therefore the case that athletics must lead by example, serving not only as a showcase for the commitment of the rest of the institution, but also as an inspiration and model for those who attend our athletic events.”

WHERE DID ASU START?

Athletics facilities and operations staff have worked with departments across the campus to spearhead the majority of SDA’s sustainable initiatives—from energy efficiency upgrades and renewable energy installations to improvements in the “zero waste” infrastructure. “As these sports greening programs gain momentum, a trickle-down effect is happening through the department,” says Maggie Emmons, assistant sports information director. “Recently, staff from across the department and student-athlete leaders have tried to enhance public awareness about sustainability.”



Sun Devil Athletics has worked over the past decade to advance energy conservation efforts such as energy-efficient lighting in all of its facilities, including Sun Devil Stadium, Wells Fargo Arena and the various practice facilities throughout the athletic complex. Lighting in the Mona Plummer Aquatics Center uses 93 percent less energy due to the installation of 51 new underwater 70-watt LED lights, and the Carson Student-Athlete Center flagpole lights use one-twelfth the energy due to new LED lighting.

HARNESSING SOLAR POWER

Sun Devil Athletics has taken advantage of the 300 days of annual sunshine in the Phoenix area by installing solar panels on nine of its facilities, including the Wells Fargo Arena, the Weatherup Basketball Training Center, and the Verde Dickey Dome. SDA's latest project is the installation of solar arrays at the Alberta B. Farrington Softball Stadium, which will be completed in September 2013. This system provides the dual function of harnessing solar energy while providing shade for fans as they watch softball games.

Arizona State University's solar portfolio is the largest of any university in the United States. The university began installing solar in 2004 and currently is ahead of schedule to reach its 25-megawatt installed capacity goal by 2015. The energy from ASU's 72 solar arrays is directed to the central power system, which supplies enough renewable energy to meet almost 40 percent of ASU's daytime peak demand used by the main Tempe campus during the day (equivalent to the energy needed to power 3,190 Arizona homes).

As of August 2013, ASU has 21 megawatts (DC) of solar capacity installed across its four campuses and the ASU Research Park, which avoids the emission of 19,903 metric tons of carbon dioxide annually compared with sourcing that energy from the power grid. According to the the EPA, this emissions reduction is equal to the yearly emissions of 3,903 passenger vehicles. By replacing fossil fuel-generated electric energy with renewable energy, ASU reports that it has reduced its carbon emissions by approximately eight percent. ASU's solar arrays:

- reduce the university's carbon emissions,
- save the university money on utilities over time,
- provide shaded parking,
- reduce building heat load,
- extend the life of roofs, and
- provide a living lab for academic sustainability initiatives.

SOLAR FINANCING

Sun Devil Athletics does not own any of its on-site solar arrays. The athletics department did not provide any of the up-front financing to install solar on its facilities, nor does it carry any of the maintenance costs. Instead, the athletics department partnered with ASU's solar team, within the university's facilities development and management department, to contract with solar developers to

ASU SOLAR CAPACITY AT SPORTS FACILITIES

SUN DEVIL STADIUM PARKING STRUCTURE

December 2008

(Provides 361 shaded parking spaces on top deck.)

Annual Production FY 2013: 1,307,385 kWh

Number of Panels: 3,510 (200-210 watts each)

Construction Cost: \$6,104,824

WEATHERUP BASKETBALL TRAINING CENTER

September 2010

Annual Production FY 2013: 249,528 kWh

Number of Panels: 672 (210 watts each)

Construction Cost: \$1,186,469

ED AND NADINE CARSON STUDENT-ATHLETE CENTER

September 2010

Annual Production FY 2013: 116,995 kWh

Number of Panels: 336 (210 watts each)

Construction Cost: \$592,453

VERDE DICKEY DOME

September 2011

Annual Production FY 2013: 296,019 kWh

Number of Panels: 700 (210 watts each)

Construction Cost: \$887,409

WELLS FARGO ARENA

November 2011

Annual Production FY 2013: 775,740 kWh

Number of Panels: 2,072 (240 watts each)

Construction Cost: \$2,531,760

ATHLETICS PARKING LOT 59

December 2011

(Provides 852 shaded parking spaces.)

Annual Production FY 2013: 3,486,784 kWh

Number of Panels: 7,616 (280 watts each)

Construction Cost: \$11,171,132

PACKARD DRIVE STADIUM PARKING STRUCTURE

October 2010

(Provides 278 shaded parking spaces on top deck.)

Annual Production FY 2013: 512,195 kWh

Number of Panels: 1,380 (210 watts each)

Construction Cost: \$2,433,287

SUN DEVIL SPORTS PERFORMANCE LOT 59E

November 2012

(Provides 27 shaded surface parking spaces.)

Estimated Annual Production in Year 1: 269,436 kWh

Number of Panels: 576 (285-290 watts each)

Construction Cost: \$1,199,175

ALBERTA B. FARRINGTON SOFTBALL STADIUM

September 2013

(Provides covered seating on upper deck.)

Estimated Annual Production in Year 1: 419,832 kWh

Number of Panels: 864 (290 watts each)

Construction Cost: \$2,750,000

RECREATIONAL SUN DEVIL FITNESS COMPLEX, TEMPE (not part of SDA)

December 2012

(Provides solar cooling, heating, and domestic hot water.)

Estimated Annual Production in Year 1: 13,075 MMBtus

Number of Evacuated Tubes: 6,976

Construction Cost: \$12,559,001

LEED GOLD: WEATHERUP CENTER GREEN FEATURES

ENERGY

- An on-site 141-kWDC photovoltaic system generates 45 percent of the building's energy.
- Energy use was reduced by more than 28 percent by installing features such as high-efficiency HVAC systems, occupancy sensors, and window shades.
- An exterior of staggered masonry planes provides adjustable daylighting on practice courts to minimize installed lighting needs.
- A reflective roof and reflective paving materials minimize cooling needs and reduce the urban heat island effect.

WATER

- Water-efficient landscaping reduces water use by 50 percent.
- Low-flow water fixtures and other water-efficient practices reduce water use by more than 30 percent.

WASTE

- 65 percent of project waste was recycled during construction.

MATERIALS

- Low-VOC materials were used throughout.
- All wood is Forest Stewardship Council-certified, including the maple wood basketball court flooring.
- More than 20 percent of materials were locally manufactured.
- More than 10 percent of materials included postconsumer recycled content.

design, finance, install, operate and maintain most of the solar arrays. (The university owns five installations.) Through a power purchase agreement (PPA) with each solar developer, ASU contracts to buy all energy produced by each system at a fixed rate (per kilowatt-hour) for up to 25 years. In some cases, small annual increases may occur. The solar developers then engaged third-party owners to fund, operate, and maintain ASU's systems for the duration of the agreement. Over the long term, the fixed-rate payments will save the university on its electricity bills, which otherwise would likely increase as a result of rising rates for fossil fuel-based utilities.

Dave Brixen, associate vice president of ASU facilities development and management, explains the incentive: "ASU realizes its solar energy ROI (return on investment) when the solar price is lower than paying for 'brown power' over the long term. Our actual solar energy break-even point depends on how accurately we can predict energy price escalators and inflation over the next 20-25 years."

Sixty-six of ASU's solar installations benefit from federal and state incentives. "These systems are subsidized by a 30-percent federal tax credit," explains Brixen. "Arizona Public Service (APS) and Salt River Project provide additional incentives at varying rates. Sadly, this subsidized business model is difficult to replicate. However, ASU has embraced utility incentives better than anybody in Arizona, and probably as well as anybody in the nation."

HIGH-PERFORMANCE BUILDINGS

Sustainability has been a priority for the Sun Devils for new development projects since 2007. In April 2008, SDA broke ground on a new basketball training facility, the Weatherup Center. The original building was designed by the architecture firms Populous and Gould Evans and aimed to achieve LEED Silver certification. However, during construction, the team was able to improve several energy efficiency features to bring the project up to LEED Gold standards.

The 51,290-square-foot training center is powered by 45 percent renewable energy produced by a 141-kilowatt (DC) photovoltaic system installed on the roof, which exceeds the state's requirement that all newly constructed buildings get at least 15 percent of their power from renewable energy. The facility also features a reflective roof, porous paving materials, occupancy sensors for lighting, a high-efficiency HVAC system and other efficiency measures to reduce energy demand.

"We are proud to have worked with ASU on this monumental project," said Scott Radevic, Populous senior principal, when the building achieved LEED certification. "A forward-thinking athlete training facility like Weatherup Center is fundamental to the progress of sustainable design, which is what Populous strives for in each of our projects. Populous applauds the university's commitment to sustainability, and we are pleased with what the Weatherup Center has been able to accomplish."¹

The facility cost \$19.5 million and includes practice courts, training areas, study spaces, locker rooms, coaches' offices and team meeting areas. Sun Devil Athletics attracted a gift of \$5 million from Craig and Connie Weatherup for the project, along with other private donations and university funding.

CHALLENGES: OVERCOME AND ONGOING STRIVING FOR ZERO WASTE

According to Maggie Emmons, "One of the largest challenges for Sun Devil Athletics this season is moving the 'zero waste' model to Sun Devil Stadium. SDA already has made important strides by increasing the recycling rate at football games from 0 tons in 2007 to 40.89 tons in 2011. We're excited to begin the transition to the 'zero waste' format for the 2013-14 season for the majority of our ticketed sports, including football."



Photo courtesy of Arizona State University.

In 2012, ASU announced that it aimed to implement a “zero waste” initiative across all four campuses by 2015. To achieve this, the university partnered with Waste Management of Arizona and is moving forward in three phases: auditing waste, developing a waste diversion roadmap, and implementing a plan. To reach the 90 percent waste diversion benchmark, ASU plans to reduce waste production by 30 percent and then to divert another 60 percent from landfill by recycling, repurposing, and composting.

The athletics department will play an important role in helping the university implement this program by 2015, though not all athletic events are included in the campus-wide goal, which is focused primarily on daily facility operations. In partnership with Waste Management and campus facilities, the athletics department will evaluate all stages of its waste management operations, including generation trends, collection flow, container and compactor placement, and front- and back-of-house solutions.

Waste Management has provided collection, processing, and recycling of waste for ASU since 2007. The company is now helping ASU devise a “Roadmap to Zero Solid Waste” to help keep the university on track toward reaching its 2015 goal. “Waste Management’s goal is to extract the maximum value from the waste stream, and we are a company that is truly committed to turning waste into a resource,” said Pat DeRueda, former Waste Management vice president for the Arizona-New Mexico area at the launch of ASU’s initiative. “We are proud to work with ASU, a leader in sustainability, to help them advance their ‘zero waste’ initiatives.”²

In support of campus-wide efforts, Sun Devil Athletics has begun implementing waste diversion at events, including several “zero waste games” during the 2013 season that have provided fans only with recycling and compost bins (no garbage bins). To date, women’s basketball, gymnastics, and baseball have achieved diversion rates of 90 percent or more for individual events. “Sun Devil Athletics and ASU leaders are looking to make ‘zero waste’ a goal for all athletic events in the future,” explains Emmons.

Athletics successfully launched its “zero waste game” initiative by placing “Zero Waste” Ambassadors next to recycling and compost receptacles. These student ambassadors educate fans about what discards to put in which bin and give tips on how fans can be more involved in ASU’s sustainability efforts. “Sun Devil fans are among the first in the NCAA whose major sports venues are all ‘zero waste’ events,” says Nick Brown, director of university sustainability practices. “It’s just one more demonstration that Sun Devil Athletics is one of the nation’s leading greening programs.”

“As Sun Devil Stadium is one of the most heavily trafficked locations on campus, Sun Devil Athletics is using green initiatives during high-profile events as a platform to introduce sustainability practices, such as ‘zero waste,’ to the hundreds of thousands of fans who attend football games throughout the season,” says Emmons. “Through the exposure of athletic events, SDA hopes fans and attendees will both learn and participate in the same sustainability practices that have already been implemented throughout the campus.”

IMPROVING ATHLETICS SERVICEWARE

Sun Devil Athletics has reevaluated its game-day serviceware in anticipation of “zero waste game” expansions. Previously, items like plastic lids and wrappers were non-recyclable. SDA worked with its concessionaire, Sodexo, to set a new procurement standard for green athletic events. “If an item is not compostable or recyclable, Sun Devil Athletics will not sell it,” says Emmons. This new measure came into effect in February 2013 at an ASU women’s basketball game.

The athletics department worked with all of its existing vendors well in advance of the rollout of the new procurement standard to help minimize any financial burdens. “SDA requested that companies provide estimates for costs associated with this more sustainable standard in advance of athletics’ actually implementing the policy,” notes Emmons.

ASU’S “ZERO WASTE” AMBASSADORS

Sun Devil Athletics partnered with ASU Sustainability Practices in 2013 to arrange for a campus student comedy group to be “Zero Waste” Ambassadors during “zero waste” sports events. The students volunteer their time to educate fans at waste stations during events in exchange for the use of university rooms for their comedy events. “They bring a lot of charm and lightness to the education process of our fans and make it fun rather than something that could be perceived as burdensome,” says Emmons. “They also walk around tailgates at football games and encourage fans to recycle.”



Photos courtesy of Arizona State University.



Photos courtesy of Arizona State University.

SUN DEVIL ATHLETICS WORKED WITH ITS CONCESSIONAIRE, SODEXO, TO SET A NEW PROCUREMENT STANDARD FOR GREEN ATHLETIC EVENTS. “IF AN ITEM IS NOT COMPOSTABLE OR RECYCLABLE, SUN DEVIL ATHLETICS WILL NOT SELL IT,” SAYS ASSISTANT SPORTS INFORMATION DIRECTOR MAGGIE EMMONS.

LESSONS FROM THE FIELD

ATTRACT TOP TALENT WITH GREENER HIGH-PERFORMANCE FACILITIES

Colleges compete for the best athletic talent in many different ways. Offering healthier, high-performance facilities is one way to entice potential athletes by providing them with a venue that can improve their game. ASU’s LEED Gold Weatherup Center was designed to help players excel as well as attract new talent. The athletics department believes that the center gives ASU a competitive edge during recruiting. “The spaces, materials, and overall design create a competitive edge for recruitment of top national athletes,” says Krista Shepherd, vice president of the Phoenix-based architecture firm Gould Evans. “Given that the players and coaches spend a significant amount of time each day there, it was important to create comfortable spaces filled with natural light to serve as their home away from home.”³

COMMUNICATE SUSTAINABILITY PRIORITIES WHEN DRAFTING NEW VENDOR AGREEMENTS

“Sun Devil Athletics made a proactive advance toward implementing sustainable practices when drafting its request-for-proposals for services such as cleaning and waste removal,” says Michael Chismar, senior associate athletics director for operations and facilities. “By having vendors outline costs associated with specific sustainability practices, SDA is able to seamlessly execute the sustainable goals we set out to achieve.”

ESTABLISH ENVIRONMENTALLY PREFERABLE PROCUREMENT POLICIES TO SIMPLIFY OPERATIONS

SDA worked with its concessionaire, Sodexo, to develop greener procurement standards across the athletics department. This helped reduce contamination in the recycling waste streams, minimizing the need to hand-sort non-recyclable items like wrappers and lids.

INCORPORATE HUMOR IN OUTREACH TO FANS

Engaging student comedy groups to spread the word about sustainability adds humor to SDA’s sports greening outreach to fans. As Emmons explains, it can “bring a lot of charm and lightness to the education process of fans and make it fun rather than something that could be perceived as burdensome.”

SEEK OUT UNIVERSITY SUPPORT

“The goal of Sun Devil Athletics is in line with the university’s goal as a whole to be at the cutting edge in our operations and to drive innovation. We are supported by upper administration,” says Emmons. “Sustainability is a discipline that is constantly evolving, and Sun Devil Athletics has made it a priority to maximize sustainable practices in all current and future endeavors.”

- 1 Sun Devil Athletics, “ASU Weatherup Center Achieves LEED Gold Certification,” *Official Athletics Site of Arizona State University*, October 2011, <http://www.thesundevils.com/genrel/101811aab.html>.
- 2 “Waste Management, ASU Aim to Eliminate Solid Waste,” *ASU News*, January 26, 2012, https://asunews.asu.edu/20120126_zerosolidwaste.
- 3 Scott Blair, “Hoop Dreams: New Weatherup Center Fulfills Lofty Goals for ASU Basketball,” *Southwest Contractor*, August 2009, https://southwest.construction.com/features/archive/2009/0809_F4_HoopDreams.asp.