

COLLEGIATE GAME CHANGERS

HOW CAMPUS SPORT IS GOING GREEN



FOREWORD Robin Harris, Executive Director, The Ivy League

PREFACE Allen Hershkowitz, Senior Scientist, Natural Resources Defense Council

AFTERWORD Missy Franklin, Four-Time Olympic Gold Medalist and Student-Athlete

AUTHOR

Alice Henly

*Natural Resources
Defense Council*

SPORTS PROJECT DIRECTOR

Allen Hershkowitz, Ph.D.

*Co-Founder
Green Sports Alliance*

*Natural Resources
Defense Council*

PROJECT CONTRIBUTOR

Darby Hoover

*Natural Resources
Defense Council*

Acknowledgments

Many people contributed to the success of this work. The Natural Resources Defense Council Sports Project would like to acknowledge the Wendy and John Neu Family Foundation, The Merck Family Fund, Jenny Russell, Fred Stanback, Beyond Sport, Frances Beinecke, John Adams, Robert Redford, Bob Fisher, Wendy Neu, Josie Merck, Alan Horn, Peter Morton, Laurie David, George Woodwell, Jonathan F.P. Rose, Dan Tishman, Peter Lehner, Robert Ferguson, and Jack Murray.

The author would like to thank Allen Hershkowitz, Darby Hoover, Alexandra Kennaugh, Jenny Powers, Martin Tull, Sara Hoversten, David Muller, Mark Izeman, Parker Mitchell, and Sue Rossi for their support for this publication. The author would also like to recognize the Green Sports Alliance, the Association for the Advancement of Sustainability in Higher Education, and NIRSA: Leaders in Collegiate Recreation.

NRDC would like to acknowledge report contributions from Missy Franklin, Robin Harris, Bob Perciasepe, Stephanie Owens, Suganthi Simon, Carroll Carly, Elisa Halpin, Meghan Fay Zahniser, Margo Wagner, Judy Walton, Allison Potteiger, Pam Watts, Simon Bravo, Kristal Fehring, Celene McGowan, Scottie Rodgers, Joe Abraham, Brett Preston, David Bradshaw, Shoshana Mayden, Dave Newport, Edward von Bleichert, Bronson Hilliard, Casey Cass, Kristin Epley, Rick Villarreal, Lauren Helixon, Don Patko, Corey Hawkey, Lindsay Komlanc, Bob Beals, Ethan Nelson, Scott Johnson, Craig Pintens, Barbara Chesler, Tom Beckett, Diana Madson, Mary Beth Barham, Victoria Balta, Erin Carter, Karen Baebler, Laura Lee Dootson, Shane Stennes, Derek Hillestad, Jeff Seifriz, Christopher Werle, Maggie Emmons, Nick Brown, Wendy Craft, Karl Edelhoff, Stephanie Sims, Jacob Cravey, Martin Salamone, Tom Venturino, Lydia Vandenbergh, Judd Michael, Mark Bodenschatz, Natalie England, Jim Walker, Malte Weiland, Matthew O'Carroll, Stephanie Boyd, Julia Munemo, Lindsey Kalkbrenner, Pam Su, Erin Carroll, Jeff Elbracht, Joanne Greene, Greg Rothberg, Bob Scalise, Jason Waldron, Halli Bovia, Mick Deluca, Nurit Katz, Tim Trefzer, Jennifer Battle, Chris DeVolder, and John Silkey.

The Green Sports Alliance would like to thank their members, the U.S. Environmental Protection Agency, the Natural Resources Defense Council and the many other partner organizations that provide technical assistance and funding to support the mission of the Alliance and enable their success.

For more information about greening sports, visit www.nrdc.org/sports or www.greensports.org.

Join the conversation at #GreenSports.

Download this report at www.nrdc.org/sports/collegiate-game-changers.

Download NRDC's first Game Changer report at www.nrdc.org/game-changer.

About NRDC

NRDC (Natural Resources Defense Council) is a national nonprofit environmental organization with more than 1.4 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC has offices in New York City, Washington, D.C., Los Angeles, San Francisco, Chicago, Bozeman, and Beijing. Since 2004, NRDC has been a world leader in professional and collegiate sports greening. Learn more about the NRDC Sports Project at www.nrdc.org/sports and @NRDCGreenSports.

About Green Sports Alliance

The Green Sports Alliance is a non-profit organization with a mission to help sports teams, venues, and leagues enhance their environmental performance. Alliance members represent over 170 professional and collegiate sports teams and venues from 16 different sports leagues. Please visit www.greensportsalliance.org for additional information.

About the Association for the Advancement of Sustainability in Higher Education

The Association for the Advancement of Sustainability in Higher Education (AASHE) is an association of colleges and universities in the United States whose mission is to promote sustainability in higher education. Please visit www.aashe.org for additional information.

NRDC Director of Communications: Edwin Chen

NRDC Deputy Director of Communications: Lisa Goffredi

NRDC Policy Publications Director: Alex Kennaugh

Lead Editor: Elise Marton

Design and Production: www.suerossi.com

Cover photo courtesy of University of Colorado Boulder

© Natural Resources Defense Council 2013

This report is dedicated to John Neu,
the founding benefactor of NRDC's Sports Project,
who used his wealth imaginatively, but not for himself.
He sought to change the world and succeeded.



FOREWORD

The environmental challenges we face today—from climate change to biodiversity loss—are affecting our economy and society. Colleges and universities, which are increasingly adopting ecologically better practices, can also play a critical role in educating and inspiring students to become leaders in the movement to address these challenges. More and more colleges are offering coursework in environmental areas. Sustainability is becoming a thread that runs through, and holds together, all aspects of campus life—including college sports. Moreover, at the most fundamental level, we need a stable climate, clean air, and fresh water to enjoy the sports we love.

When college athletics or recreation facilities become “greener,” the impact reaches beyond the boundaries of that department and those buildings. College sports bring together students, faculty, staff, alumni, and fans from disparate parts of the community. By integrating sustainability into college sports, we are integrating sustainability into that shared culture, embedding it in the identity of the campus. Greening college sports also makes good business sense—environmental considerations are increasingly a part of the 21st century marketplace. College sports departments that are adopting greener practices are helping to show that sustainability can work hand in hand with good business practices—including by reducing sports facility operations costs, providing a healthier workout environment (e.g., air quality in indoor tracks, water quality in pools), appealing to new sponsors and donors, and enhancing inter-departmental collaboration.

College sports greening also empowers students by providing them with practical ways to combine an academic focus on ecological issues with hands-on work experience in sustainability. As the many examples of campus sports greening in this report illustrate, creating and implementing environmental strategies helps build the awareness, values, and skills students need to become leaders in creating a more secure and sustainable future. Students are increasingly interested in not only sustainability coursework, but also putting those ideals into practice across campus. College sports greening programs can help attract these students, while promoting the healthy practices and high-performance facilities that improve the collegiate athletics experience.

I am proud that the Ivy League has taken the lead in greening college athletics at the conference level. Through the Ivy Green Initiative, we have committed to reduce the environmental footprint of all of our championship events, and to provide resources to all Ivy League athletics departments for their own efforts to save energy and water, reduce pollution, and minimize waste, in order to become more sustainable.

I am pleased that we are not alone in these endeavors. This report illustrates a growing green movement in college sports—one that builds on the sustainability efforts already underway on so many college campuses and that is inspired by the many successful major leagues sports greening efforts nationwide. Regardless of size, division, or conference, college athletics and recreation departments across the country are launching successful sustainability efforts, and finding new ways to engage and empower students to change the world by starting on campus and leading by example. Athletics and recreation departments are also recognizing the many benefits of greening, including lower operational costs, brand enhancement and attracting new sponsors.

This is just the beginning. There is tremendous potential for colleges and universities to learn from each other, share better practices for sports greening, and motivate their communities to get involved in sustainable activities. Perhaps most importantly, by engaging students in putting environmental solutions into action, collegiate sports also has the potential to empower and inspire our future leaders to build a more sustainable society. The Ivy League is excited to be part of this growing movement and we value our partnership with the Natural Resources Defense Council to advance our greening accomplishments.



Robin Harris
Executive Director
The Ivy League

PREFACE

You are about to read the second publication in NRDC's *Game Changer* series, which documents never-before-assembled case studies of the North American sports industry's most successful greening initiatives. NRDC's first *Game Changer* report, published in September 2012, documented the *professional* sports industry's environmental commitment and accomplishments. That influential report illuminated the substantial environmental enhancements that North America's professional leagues, teams, and venues have accomplished while collectively saving millions of dollars and bringing important, non-political environmental information to millions of fans.

Now, NRDC has published *Collegiate Game Changers*, which documents the substantial greening initiatives taking place throughout North American *colleges*. The case studies in this report—another first-of-its-kind documentation of sports greening accomplishments assembled by NRDC—powerfully confirm that collegiate athletics and recreation departments are following the lead of the professional sports industry and are embracing environmental stewardship to an unprecedented degree. As you will read in the pages that follow, energy efficiency, renewable energy, recycling, composting, water conservation, safer chemicals, ecologically preferable transportation, and green building practices are all being adopted by collegiate sports departments throughout North America.



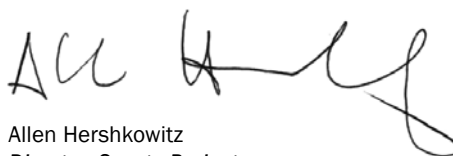
The single most important thing we can do to address the urgent ecological challenges we face is change cultural expectations and attitudes about how we relate to the planet. If politics is about getting people who think differently to do the same thing, then sports, a powerful social unifier, can play an extraordinarily useful role in bringing businesses and people together to solve our ecological problems. And it is. In combination, NRDC's two Game Changer reports illuminate how the sports industry is helping drive a cultural shift in how people view their relationship to the Earth. If politicians always have their fingers up to test the wind, then let it be known that the greening of sports is changing the wind.

The task of healing our increasingly damaged planet requires collective action, embracing all forms of cultural and economic diversity. The embrace of sports greening by colleges—which host some of the best-educated fans in all of sports—offers the encouraging prospect to positively influence the best of what future generations will have to offer. Engaging millions of collegiate sports fans about responsible environmental stewardship—including students who will soon become our business, cultural and government leaders—holds great promise for collective action. And collective action, teamwork, is what sports is all about. Mobilizing collective action is easiest if we frame the action in terms of core cultural values, and in terms focused on protecting our heritage. The genius of the sports greening movement is its recognition that to solve our ecological problems we must align our call to action with core, mainstream social values, and with a focus on protecting our heritage, whether that heritage is an outdoor little league game, college football or youngsters playing hockey on a frozen lake.

Sports is a trusted and widely embraced form of community engagement. Sports provides a trusted network to its fans, whatever the sport. For almost ten years an alliance of environmentalists and sports industry officials have tapped into the trusted social network of sports to advance the ecological message. Trusted networks provide safe emotional and intellectual space needed to help people learn, to change their minds and behavior. Sports—the sharing of support for an athlete or team, or mutually enjoying a ballgame, a race or a jewel event—provides an influential, comfortable, and non-political “trusted network.” And while trusted networks rely on both formal and informal education, we especially need to use informal education to reach all potential allies because informal education is the type that most of us most often learn from. Think of the enormous amount of detailed knowledge that tens of millions of people have about sports: this knowledge is not taught through formal educational channels. We learn it informally. Hence, the sports greening movement builds on where people are: the trusted network of informal education that sports provides to Americans, regardless of political or economic affiliation. And yet, despite its informal nature, sports greening is profoundly strategic, connecting contemplation about urgent ecological issues with an arena for conflict-free social action. The greening of sports provides powerful examples of how small actions can ripple out and make big changes happen.

Of course, the motivation underlying the rapidly growing sports greening movement—professional and collegiate—is the recognition that we are facing urgent ecological issues that can no longer be ignored or stymied by economic or political self-interest. If one studies the science, or just looks around, it is clear that the damage we are inflicting on the planet—climate disruption, biodiversity loss, water scarcity, ocean acidification, and threats to our food supply, to name only a few of the urgent concerns we must address—will affect the character of life on Earth for thousands of generations. For better or worse, the sports greening movement is addressing those issues more energetically than the U.S. Congress. The sports industry is literally working to assure the survival not only of our own children, but our children's children, our grandchildren's grandchildren and beyond.

I am proud that NRDC, perhaps more than any organization in the world, has played a leading role in cultivating the green sports movement. Our mission is to protect the world's natural resources, public health, and the environment. From launching the environmental programs at virtually all the professional sports leagues in the United States to co-founding the hugely successful Green Sports Alliance, NRDC's Sports Greening Project is a uniquely influential force in both the environmental movement and the sports industry. And our latest report about the greening of collegiate athletics is among our most important efforts to date. I am sure you will find this report informative and inspiring.



Allen Hershkowitz
Director, Sports Project
Natural Resources Defense Council

TABLE OF CONTENTS

Executive Summary	9
Chapter 1: Why Greening Campus Sport Matters	12
Chapter 2: The Ecological Basis For Greening Sports	16
Green Initiatives In Collegiate Athletics And Recreation.....	18
Chapter 3: How Campus Sport Is Going Green	20
Case Studies	
University of Colorado Boulder, Home of the Buffaloes	22
University of North Texas, Home of the Mean Green.....	29
The Ohio State University, Home of the Buckeyes	34
University of Florida, Home of the Gators.....	39
Arizona State University, Home of the Sun Devils.....	44
University of Oregon, Home of the Ducks	49
University of Minnesota, Home of the Golden Gophers	53
The University of Arizona, Home of the Wildcats.....	57
University of Washington, Home of the Huskies	63
Yale University, Home of the Bulldogs.....	68
Snapshots.....	75
Regional Sports Greening Efforts	89
Chapter 4: Recommendations for Implementing a Successful Collegiate Sports Greening Program	96
Afterword by Missy Franklin, Four-Time Olympic Gold Medalist and Student-Athlete	102
Appendix	104
LEED-Certified Collegiate Sports Venues In the United States.....	104
Survey of Green Initiatives.....	106
Glossary	112

EXECUTIVE SUMMARY

College sports are the public face of our nation's most important centers of learning, and as part of the growing sports greening movement, collegiate sports departments across the United States are making a powerfully visible commitment to greener practices. In doing so, they're engaging millions of students and other college sports fans in protecting the planet. Fans now compost and recycle on game day, ride their bikes to the stadium, and root for their favorite teams under solar-powered stadium lights, all the while helping save universities hundreds of thousands of dollars in overhead costs. More to the point, as teams and venues promote a public commitment to ecological stewardship, environmentalism becomes a mainstream issue—one that resonates with loyal college sports fans across the country, who make up the largest and most diverse audience in all of sports.¹

Photo courtesy of University of North Texas



THE VALUE OF COLLEGE SPORTS GREENING

CUTS OPERATIONAL COSTS:

Improving resource efficiency can save money and enhance facility performance, benefitting the Athletics Department, Recreation Department and Facility Management.

★ For example, see the *University of Minnesota case study* on page 53 and the *Williams College snapshot* on page 81.

EDUCATES & EMPOWERS STUDENTS:

Sports greening programs can provide students with professional development and leadership opportunities, putting their sustainability coursework into practice.

★ For example, see the *Yale University case study* on page 68 and the *University of Washington case study* on page 63.

ENHANCES ATHLETICS & INSTITUTIONAL BRANDS:

Environmental initiatives can improve brand image and provide a point of market differentiation, which is increasingly important to incoming recruits and prospective students.

★ For example, see the *The Ohio State University case study* on page 34 and the *University of North Texas case study* on page 29.

ATTRACTS SPONSORS & PARTNERS:

Sports greening can lead to sponsorship opportunities with existing or new partners who also prioritize environmental stewardship in their business operations.

★ For example, see the *University of Colorado at Boulder case study* on page 22 and the *University of California at Berkeley snapshot* on page 78.

STRENGTHENS COMMUNITY TIES:

Sports greening programs can serve as models for local stewardship, improve community relations, and strengthen alumni connections (which can help raise money).

★ For example, see the *University of Florida case study* on page 39 and the *University of Oregon case study* on page 49.

REINFORCES INTER-DEPARTMENTAL TIES:

Sports greening initiatives can help foster stronger working relationships between sports departments and an institution's administration, faculty, and campus facilities by working collaboratively towards campus-wide goals.

★ For example, see the *Arizona State University case study* on page 44 and the *Penn State University snapshot* on page 75.

ADVANCES CAMPUS-WIDE SUSTAINABILITY GOALS:

Greening programs help reduce the environmental impact of large sports venues, which can advance campus-wide environmental commitments to divert waste, reduce carbon emissions, or use more renewable energy.

★ For example, see the *University of Arizona case study* on page 57 and the *Sonoma State University snapshot* on page 86.

CREATES A HEALTHIER WORKOUT ENVIRONMENT AND PROMOTES ATHLETE PERFORMANCE:

Green building practices and operations improve indoor air quality (and water quality in pools), among other benefits, to advance athlete and user wellbeing.

★ For example, see the *University of Pennsylvania snapshot* on page 77.

Driven by student demand and university commitments to sustainability, college sports are joining all major professional sports leagues to send stronger environmental signals to society and the marketplace. With greener efforts on the field, in their arenas and rec centers, colleges and universities are demonstrating that a care for the earth's finite resources—in order to protect natural ecosystems that we, and many other species, depend on—is central to how we educate our students and train our finest athletes. In fact, students are leading the charge, from launching sports gear recycling drives and installing systems to power gym cardio machines with their own sweat to writing senior theses on improving resource efficiency at sports venues. Student-athletes are modeling greener habits—like bringing their own reusable bottles to workouts and taking shorter showers to save water and energy.

It's a trend that has been evolving in the professional sports industry for years. Greening efforts at collegiate athletics and recreation departments nationwide are helping to expand students' expectations about sustainability, advance campus-wide environmental goals, and enhance how business is done. This is also helping to popularize environmentalism and greener choices by spurring mainstream conversations about the future of our energy, food, and medical systems.

Increasingly, collegiate athletics and recreation departments are investing in energy efficiency, water conservation, recycling, renewable energy, safer chemicals and fan engagement focused on remedying some of our most pressing environmental problems. The benefits are many. The University of Colorado Boulder's athletics-focused sustainability efforts and "Ralphie's Green Stampede" sports greening brand gave the school an entry point to new sponsors. The University of North Texas powers 30 percent of its LEED Platinum stadium with wind. Located at one of the busiest intersections in the country, the stadium's three turbines are seen by an estimated 24,000 drivers daily, a visible sign of the university's environmental commitment. In 2012, The Ohio State University's dedicated fans helped achieve a top waste diversion rate of 98.2 percent in a single game and averaged 87.2 percent over the season. At Yale University, student-athletes created the nation's first Green Athletics Team Certification program for all varsity and club teams.

On campuses across the country, sports greening programs are having ripple effects. At the University of Arizona, faculty are developing an environmental course which will require students to identify sustainability opportunities within sports facilities and across campus. At the University of Florida, the "Neutral Gator program" has expanded from an athletics initiative to educate fans about their carbon footprints to an inter-departmental commitment to carbon emission reduction.

The collegiate sports greening success stories featured in this report provide valuable lessons for all campus departments and other organizations, whether they are directly involved with the sports industry or not, highlighting what sports departments, students, venues, and championship events are doing to protect our planet and educate their fans. *Collegiate Game Changers* demonstrates the many benefits of greening sports, including cutting costs, enhancing university brands, strengthening community ties, developing new sponsorship opportunities, and providing a healthier workout environment. Each campus case study explains (1) what motivated



the campus sports department(s) to implement more environmentally preferable practices; (2) how each program got its start; (3) challenges each school faced, tactics used to surmount them, and ongoing issues still being addressed; and (4) important lessons from the field as departments implemented their green initiatives.

Key findings from this report and an affiliated 2013 survey² include:

- At least 216 collegiate sports departments (97 athletics and 119 recreation) have installed recycling infrastructure throughout their sports facilities. 177 athletics and recreation departments also have a recycling program in their offices, and 163 sports departments have installed recycling bins in non-public spaces such as kitchens.
- At least 88 collegiate sports departments (41 athletics and 47 recreation) have built to LEED green building design standards when pursuing new facilities, major renovations, and/or existing facilities. Of these, at least 24 collegiate sports venues have been awarded LEED certification, with more than a dozen others anticipating LEED certification in the coming months.
- At least 162 collegiate sports departments (68 athletics and 94 recreation) have installed bike racks and other infrastructure to promote bicycle commuting at their sports venues.
- At least 146 collegiate sports departments (60 athletics and 86 recreation) have invested in more energy-efficient practices by upgrading their lighting and controls. 118 collegiate sports departments (50 athletics and 68 recreation) have conducted energy audits of their sports facilities to identify further opportunities for energy savings. 109 sports departments (45 athletics and 64 recreation) have a purchasing policy prioritizing energy-efficient models for all electronics.

- Among all athletics conferences, the Ivy League has the best-developed conference-wide environmental stewardship program. The Big Ten, SEC, and ACC also have noteworthy environmental initiatives.
- At least 122 collegiate sports departments (50 athletics and 72 recreation) procure greener cleaning products. 114 collegiate sports departments (47 athletics and 67 recreation) have also trained their custodial staff on greener cleaning practices and products.
- *For more data on environmental initiatives at athletics and recreation departments on campuses nationwide please see infographic on page 19 and the full survey results on page 106.*

Each year, more and more collegiate athletics and recreation departments across the United States are joining professional leagues, teams, and venues to avoid millions of pounds of carbon emissions, save millions of gallons of water, and shift millions of pounds of paper products toward recycled content or eliminate them altogether. Their efforts are making meaningful change and are educating millions of students and fans about protecting our planet for seasons to come. Colleges are just beginning to tap into the enormous potential to empower their students, benefit their bottom line, and engage their vast communities of sports fans by prioritizing sustainability.

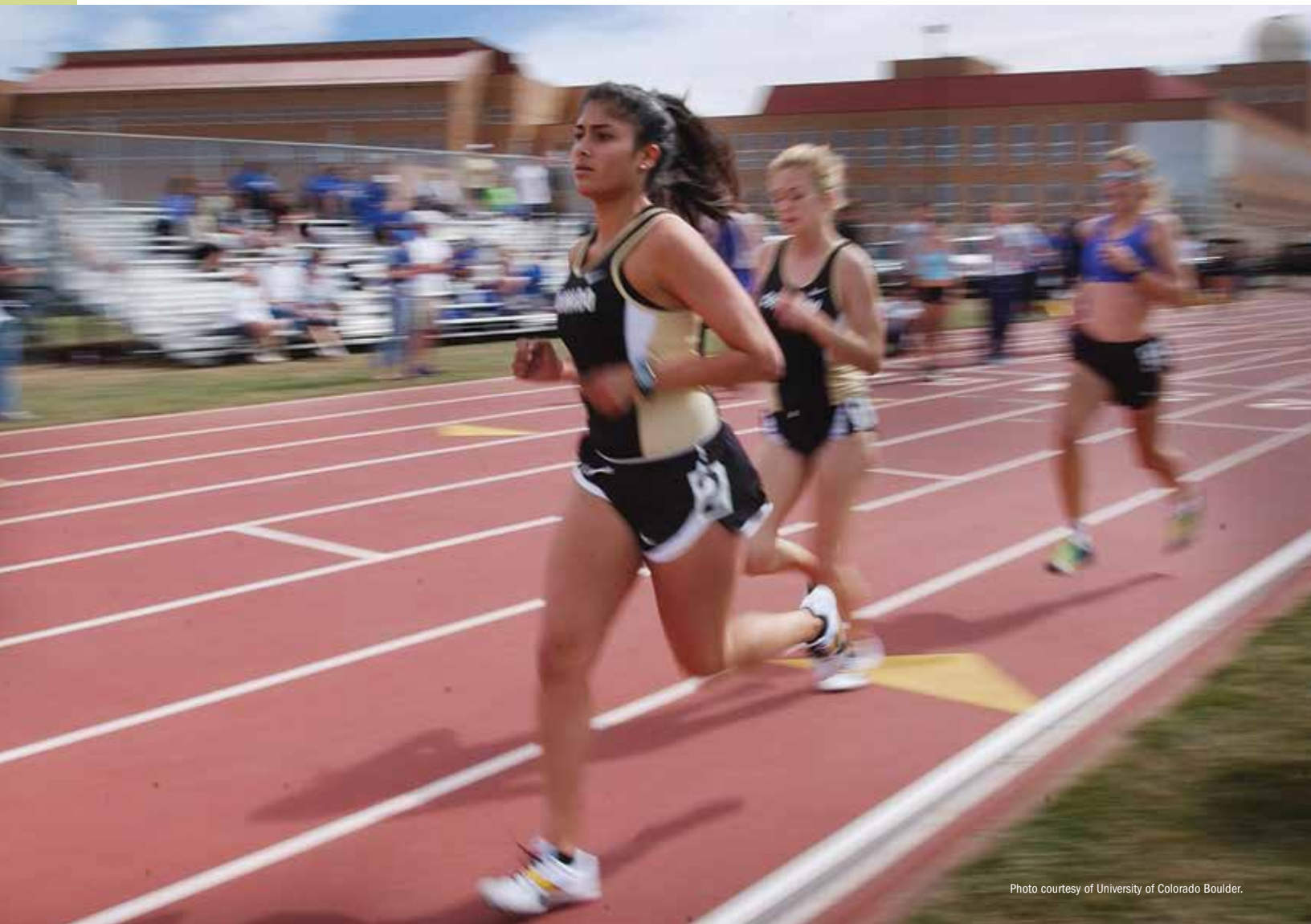
¹ <http://www.imgcollege.com/why-college>

² In the lead up to this report, the University of Arizona Office of Sustainability conducted a survey during May and June 2013 in partnership with the Natural Resources Defense Council, the Green Sports Alliance, the Association for the Advancement of Sustainability in Higher Education, and NIRSA: Leaders in Collegiate Recreation.

CHAPTER 1

WHY GREENING CAMPUS SPORT MATTERS

The sports industry is using its uniquely powerful cultural influence to help provide much-needed business leadership in ecologically sustainable practices. Following the lead of professional sports, college sports are also adopting greener practices, and, in so doing, are engaging millions of college sports fans in nonpolitical public education about environmental protection. Collegiate sports venues across the country, the hearts of our nation's centers of higher learning, are becoming champions of the sports greening movement. Collegiate athletic departments (comprising intercollegiate varsity sports) and recreation departments (encompassing club and intramural sports and gym facilities) are adopting environmentally intelligent operations and procurement policies in response to student demand, campus sustainability commitments, and bottom-line business practices modeled by professional sports venues. College sports greening programs reduce emissions of global warming pollution, protect habitat, save energy and water, reach millions of fans with environmental messages, and train future business leaders in environmental stewardship.





This report documents college sports' growing embrace of recycling, composting, energy efficiency, renewable energy, water conservation, alternative transportation, safer chemicals, environmentally preferable procurement, and greener building practices. The movement to green college sports has the potential to educate millions of college students across the United States, future leaders of our nation and the world, about the importance of protecting the environment and ecological services on which we all depend. Through their leadership, college athletic and recreation departments are showing their students, their institutions, and their surrounding communities cost-effective solutions to some of our planet's most critical ecological issues, encouraging them to be better environmental stewards.

Collegiate sports greening helps address urgent environmental pressures that threaten the future of sports and the communities in which sports are played. To engage in or simply enjoy the sports we love, we need clean air, clean water, and a healthy climate. The ecological threats we face are real. According to a senior writer for *Sports Illustrated*, Alexander Wolff, in his article "Going, Going Green," these threats are already transforming when, where, and how we play sports. "As global warming changes the planet, it is changing the sports world.... Global warming is not coming; it is here. As temperatures around the globe increase, oceans are warming, fields are drying up, snow is melting, more rain is falling, and sea levels are rising. All of which is changing the way we play and the sports we watch."²

Athletic and recreation facilities are often the centerpieces of college campuses, where students come together and school spirit is built. Consequently, college sports can serve as a valuable messenger promoting environmental stewardship. Moreover, as the "doorstep of the university," athletics often has the greatest influence among campus departments on the visibility, culture, and brand recognition of a college or university outside the campus gates.³

According to Doug J. Chung at the Harvard Business School, "The primary form of mass media advertising by academic institutions in the United States is, arguably, through its athletics program."⁴ And it goes without saying that athletics attracts students to colleges, even academically superior students. Says Professor Chung, "Athletic success has a significant impact on the quantity and quality of applicants that a school receives. And schools become more selective with athletic success."⁵

More Americans follow college sports than ever before, and its popularity continues to grow.⁶ According to the National Collegiate Athletic Association (NCAA), 181 million viewers tuned in to at least one of the 2013 NCAA Division 1 men's college basketball tournament

games on television or online.⁷ The NCAA also reports that college football games received 352 million views in 2012, with 216 million tuning in during the regular season and 126 million watching the postseason bowl games. Approximately 49 million fans in the United States also attended at least one college football game in 2012, the third-highest season attendance ever.⁸

College football is among the most popular sports in the United States, with as many followers as America's pastime, professional baseball.⁹ More than 103 million adults, or 44 percent of all adults in the nation, describe themselves as college football fans.¹⁰ College football is featured on every major media sports outlet, including CBS, ESPN, ABC, Fox College Sports, FX, NBC Sports Network, and many conference-based, regional and local networks.¹¹ In fact, IMG, the leading collegiate multimedia, marketing, and brand management company, reports that the media industry has committed \$25.5 billion in college sports broadcast fees over the next 15 years.¹²

Ultimately, collegiate athletics and recreation programs exist principally for students. Of all facilities on campus, athletic venues and recreation centers welcome the broadest cross-section—and the highest percentage—of students. More than 75 percent of college students participate in recreation department programs, according to a study by NIRSA: Leaders in Collegiate Recreation.¹³ There are also an estimated 5.5 million club sport athletes, who participate in non-varsity intercollegiate competition on campuses all over the country.¹⁴ Approximately 453,300 varsity athletes represent 1,096 schools across the three NCAA divisions nationwide. Collegiate athletic events frequently draw tens of thousands of fans, students and nonstudents alike.¹⁵

Over the past decade, an increasing number of collegiate athletic and recreation departments have initiated or expanded environmental programs, often as part of a broader campus environmental initiative. Collegiate sports programs are partnering with experts in facilities management and sustainability across their institutions to integrate environmentally progressive features into their buildings and operations, often saving money while becoming more ecologically responsible.

As the following case studies illustrate, collegiate sports greening efforts have often been spurred by student demand in combination with institutional leadership that prioritizes sustainability. Students are increasingly interested in environmental studies and sustainability in business. According to a Princeton Review survey, 62 percent of 14,125 prospective students (and some parents) representing all 50 states said that a college's environmental commitments would "strongly" or "very much" contribute to their assessment of the school.¹⁶

A 2012 survey conducted by UCLA's Higher Education Research Institute found that 26.5 percent of entering students (from 283 institutions surveyed) reported feeling it is "essential" or "very important" to help clean up the environment. Close to 40 percent of first-year students believe it is "very important" or "essential" to adopt green practices to protect the environment.¹⁷ To address growing student demand, in 2009, the Princeton Review launched a new guide, "The Princeton Review's Guide to Green Colleges," that profiles the green efforts of hundreds of colleges and universities. The 2013 edition of the guide features 322 institutions, which they consider to "demonstrate a strong commitment to sustainability."¹⁸



College sports offer an opportunity to bring sustainability into mainstream campus culture. Sport transcends political, social, cultural, and socioeconomic divides. It can also transcend campus cliques based on majors, classes, extracurricular interests, or Greek society. Loyalty to sports teams is one of the few things tens of thousands of students can agree on.¹⁹ And this trend is true beyond campuses: Only 13 percent of Americans say they follow science,²⁰ while 63 percent identify themselves as sports fans.²¹ By modeling sustainable practices to thousands of students and fans, college sports hold the potential to help sustainability cross departmental boundaries and social divides to become part of daily campus life.

College sports greening programs provide many benefits for athletics and recreation departments alongside advancing campus sustainability. They can reduce operations costs, provide a healthier workout environment to promote athlete performance, attract new sponsors and donors, enhance the athletics brand, increase fan loyalty, bolster interdepartmental collaboration, foster community ties, and provide an important informal form of education. These programs also help coaches and admissions departments recruit students who are looking for robust campus-wide sustainability programs. High-performance sports facilities designed to green building standards can help give athletics departments a competitive edge during recruiting.

Campuses have long relied on sports achievements to help define and promote their institutional identity. Increasingly, environmental stewardship is also becoming part of a college or university's brand. Sports greening can integrate sustainability into some of the institution's strongest marketing and communications platforms.

Sports can be a powerful engine for social change. Billie Jean King's epic defeat of Bobby Riggs in their 1973 exhibition match was a big step toward pay equality for women. Jackie Robinson helped to break the race barrier in Major League Baseball. The passage of Title IX created new ways to finance and support women's sports. Now, environmental stewardship is starting to benefit from the influence of sports. There is tremendous potential for collegiate sports to help move society toward more sustainable practices and lead our economy to a stronger future. It can help accelerate the cultural shift toward environmental awareness that we urgently need to effectively address the serious ecological problems we face as a planet.



Greening collegiate sports, like greening any organization, is the process of reviewing operations and procurement policies with an eye toward reducing environmental impacts. Greening incorporates environmental considerations into decisions made about the products and services purchased and offered, along with other factors such as cost, product quality, and availability. It is an ongoing enhancement process that all businesses should engage in to improve their long-term performance and to advance sustainability. Greening is helping to bring the sports industry into the 21st-century marketplace, where environmental considerations are part of managing business risk, responding to consumer interests, and promoting corporate social responsibility, all of which are essential for achieving high-performance buildings and systems.

Now collegiate sports industry leaders are enhancing how business is done and helping to expand students' expectations about sustainability. This is helping to shift the environmental movement from scientific discussions of climate change or biodiversity loss to mainstream conversations about the future of our energy, food, and medical systems. The environmental crises we face are as serious for the future of our economy as they are for the survival of thousands of species, human cultures, and natural ecosystems around the globe.

There is no single business undertaking or law that can solve our many ecological problems. Rather, addressing these issues will require countless contributions from every corner of society. However small our day-to-day actions may seem, our collective decisions add up to meaningful regional and global impacts. Most individuals and businesses can do only relatively small things, whether it's buying products made with recycled content, purchasing energy-efficient appliances, recycling, or conserving water. What is clear, however, is that everyone has to do something to address the environmental pressures we collectively face. And the many small ecological initiatives being implemented throughout the world of sports are adding up, sending an important environmental message to students and the broader American public. It offers hope that we can turn current ecological trends around.

The growing collegiate sports greening movement is providing college students with the awareness, values, and skills that will help build a more sustainable society. As the many examples of collegiate sports greening in this report illustrate, college sport is a uniquely effective tool for building a strong, sustainable, and resilient future.



Photo courtesy of University of Colorado Boulder.

Endnotes

- 1 www.imgcollege.com/why-college.
- 2 sportsillustrated.cnn.com/2007/more/03/06/eco0312/.
- 3 Frans, Ashley Kelly, "Ways in Which Intercollegiate Athletics Contribute to University Success," North Carolina State University, Raleigh, North Carolina, 2002.
- 4 Chung, Doug J., "The Dynamic Advertising Effect of Collegiate Athletics," Harvard Business School Working Paper No. 13-067, p. 2, January 2013 (revised April 2013).
- 5 Ibid., at 4.
- 6 www.imgcollege.com/why-college.
- 7 www.forbes.com/sites/aliciajessop/2013/04/08/viewership-and-social-media-help-march-madness-beat-the-super-bowl-in-ad-revenue-generation/.
- 8 www.footballfoundation.org/tabid/567/Article/53380/Passion-for-College-Football-Remains-Robust.aspx#sthash.zCKDs40u.dpuf.
- 9 www.gallup.com/poll/27127/baseball-fan-base-near-recent-low.aspx.
- 10 www.footballfoundation.org/tabid/567/Article/53380/Passion-for-College-Football-Remains-Robust.aspx#sthash.zCKDs40u.dpuf. Among adult college football fans, 61 percent are male and 39 percent female. Twelve percent are age 18–24, 18 percent are 25–34, 19 percent are 35–44, 20 percent are 45–54, 16 percent are 55–64, and 16 percent are age 65 or over.
- 11 www.footballfoundation.org/tabid/567/Article/53380/Passion-for-College-Football-Remains-Robust.aspx#sthash.zCKDs40u.dpuf.
- 12 www.imgcollege.com/why-college.
- 13 nirsa.humankinetics.com/showproduct.cfm?isbn=0736055037.
- 14 nirsa.humankinetics.com/showproduct.cfm?isbn=0736055037.
- 15 www.ncaa.org/wps/wcm/connect/public/NCAA/Resources/Latest+News/2012/September/NCAA+student-athlete+participation+hits+450000.
- 16 www.princetonreview.com/college-hopes-worries.aspx.
- 17 heri.ucla.edu/tfsPublications.php.
- 18 www.princetonreview.com/green-schools-full-list.aspx.
- 19 www.hackcollege.com/blog/2012/06/15/guest-post-5-reasons-you-should-go-to-your-schools-athletic-events.html.
- 20 www.nsf.gov/statistics/seind10/c7/c7s1.htm.
- 21 www.gallup.com/poll/15421/sports.aspx#2.

CHAPTER 2

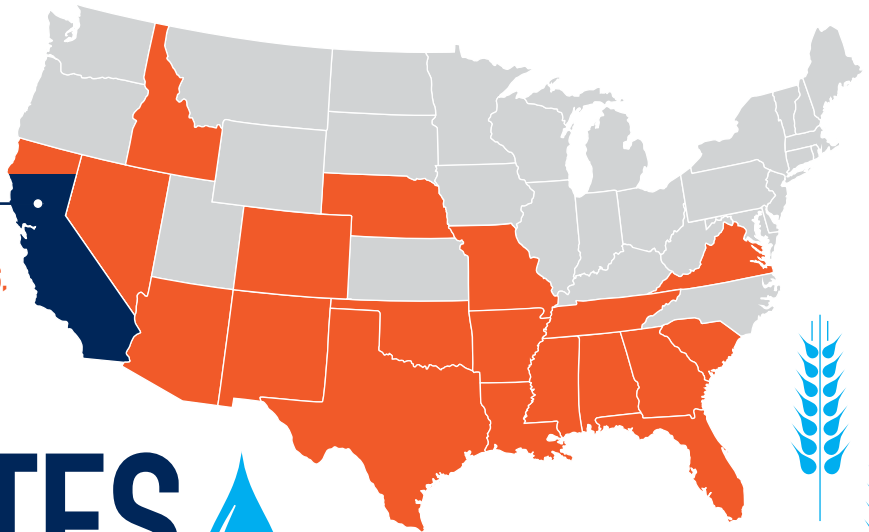
THE ECOLOGICAL BASIS FOR GREENING SPORTS

Nature is the ultimate source of all economic value. No commerce or culture is possible without clean air and water; fertile topsoil; a chemically stable atmosphere; raw materials for food, energy and medicine; or the natural processing of waste by the millions of species inhabiting our soil, water and air. It is the availability of these wells of natural capital that makes sports and other types of human activities possible. The sports industry's increasing demand for ecologically better products can help industrial leaders understand and embrace that goal. The environmental crises we face are as serious for the future of our economy as they are for the survival of thousands of species, human cultures, and natural ecosystems across the globe. For more detail on the ecological basis underpinning the greening of sports, please see chapter two of NRDC's report "Game Changer: How the Sports Industry is Saving the Environment" at www.nrdc.org/game-changer.



90%

CALIFORNIA HAS LOST MORE THAN 90 PERCENT OF ITS ORIGINAL WETLANDS, NEW YORK HAS LOST 60 PERCENT, FLORIDA MORE THAN 50 PERCENT.



36 STATES



IN 2013, THE U.S. EPA PREDICTS AT LEAST 36 STATES WILL HAVE LOCAL, REGIONAL OR STATEWIDE WATER SHORTAGES.



RECORD DROUGHTS ARE RAVAGING THE CRITICAL FOOD-GROWING REGIONS OF OUR NATION AND THE REST OF THE WORLD.




NINE OF THE 10 HOTTEST YEARS EVER RECORDED HAVE BEEN EXPERIENCED SINCE 2000.

24,000

HEAT RECORDS WERE BROKEN ACROSS THE UNITED STATES IN THE FIRST SIX MONTHS OF 2012.

EACH YEAR, IN THE UNITED STATES ALONE, **3.2 MILLION ACRES** OF OPEN GREEN SPACE ARE PAVED OVER.






90 MILLION TONS

EACH DAY WE ARE ADDING ABOUT 90 MILLION TONS OF GLOBAL WARMING POLLUTION TO OUR AIR. THESE EMISSIONS ARE ALREADY AFFECTING COMMUNITIES AND ECOSYSTEMS ACROSS THE UNITED STATES—AND ACROSS THE GLOBE.

<1%



PRESERVING THE RAINFOREST ECOSYSTEM AND THE PLANTS THAT RELY ON IT IS ESSENTIAL FOR FUTURE MEDICAL DISCOVERIES AND TECHNOLOGICAL ADVANCEMENTS. LESS THAN 1% OF THE WORLD'S TROPICAL FOREST PLANTS HAVE BEEN TESTED FOR PHARMACEUTICAL PROPERTIES, YET AT LEAST 25% OF ALL MODERN DRUGS ORIGINALLY COME FROM RAINFORESTS.

633

MARINE PLASTIC POLLUTION HAS IMPACTED AT LEAST 663 DIFFERENT SPECIES, INCLUDING ALL SEA TURTLE SPECIES, 1/2 OF MARINE MAMMAL SPECIES, AND 1/5 OF SEABIRD SPECIES.

SINCE 2006, THE OVERALL NUMBER OF CRITICALLY ENDANGERED SPECIES GLOBALLY HAS GROWN NEARLY 15 PERCENT, REACHING 3,427 SPECIES IN 2010.


3,427



1/2

IN THE DEVELOPING WORLD, ALMOST 3 BILLION PEOPLE, OR ABOUT HALF OF THE WORLD'S POPULATION, ALREADY LIVE IN AREAS OF SEVERE WATER STRESS, AND AN ADDITIONAL 1 BILLION PEOPLE ARE APPROACHING THAT SITUATION.

74%



BY 2025 74 PERCENT OF THE WORLD POPULATION WILL BE LIVING IN AREAS WITH WATER STRESS.

3 BILLION PEOPLE

MOST OF HUMANITY IS NOT FINANCIALLY OR ADMINISTRATIVELY EQUIPPED TO DEAL WITH THE CONSEQUENCES OF CLIMATE DISRUPTION, INCLUDING THE LOSS OF THEIR HOMES AND HOMELAND.

ONE-THIRD OF THE PLANET
LIVES ON A DOLLAR A DAY.



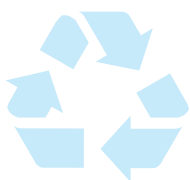
HALF OF THE PLANET
LIVES ON LESS THAN TWO DOLLARS PER DAY.



GREEN INITIATIVES IN COLLEGIATE ATHLETICS AND RECREATION

The sports greening movement is helping to bring important environmental messages to mainstream America through conserving energy and water, recycling, and buying environmentally preferable products. Collegiate athletics and recreation departments are working with campus facilities and sustainability staff to make their operations more environmentally efficient, and more financially viable. They are also telling their many suppliers and fans about their commitment to environmental stewardship. In doing so, college sport is helping to broaden awareness about challenges facing the future of our energy, food, and medical systems, among other important environmental issues. The following statistics are based on a 2013 survey by the University of Arizona designed to help demonstrate the reach of collegiate sports greening. This information was submitted by staff from 148 institutions, representing approximately 285 sports departments*. (Please see appendix for the full results and survey methodology.)

216



At least 216 collegiate sports departments (97 athletics and 119 recreation) have **installed recycling infrastructure throughout their sports facilities.**

88



At least 88 collegiate sports departments (41 athletics and 47 recreation) have **pursued LEED green building design certifications** for new facilities, major renovations, and/or existing facilities, with at least 24 certified sports venues to date.

162



At least 162 collegiate sports departments (68 athletics and 94 recreation) have **installed bike racks and other infrastructure to promote bicycle commuting at their sports venues.**

146



At least 146 collegiate sports departments (60 athletics and 86 recreation) have **invested in more energy-efficient practices** by upgrading their lighting and controls.

122



At least 122 collegiate sports departments (50 athletics and 72 recreation) **procure greener cleaning products.**

116



At least 116 collegiate sports departments (50 athletics and 66 recreation) have **upgraded to water-efficient fixtures.**

83



At least 83 collegiate sports departments (30 athletics and 53 recreation) have **implemented an environmentally preferable paper purchasing policy** that includes prioritizing paper with recycled content.

23



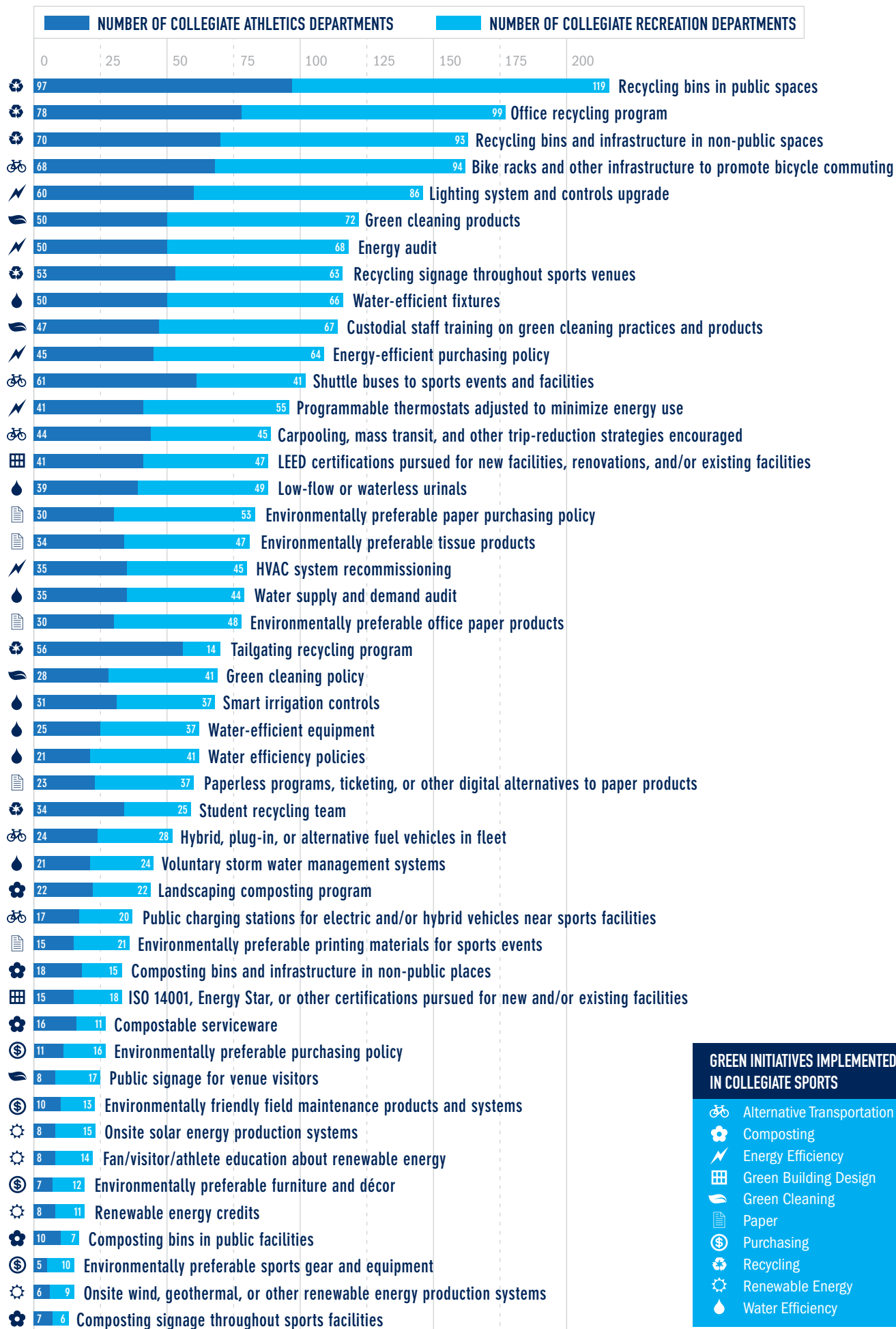
23 collegiate sports departments (8 athletics and 15 recreation) have **installed onsite solar energy production systems.**

27



At least 27 collegiate sports departments (11 athletics and 16 recreation) have **implemented an environmentally preferable purchasing policy.**

* "Sports department" is defined here as an athletics department, recreation department, or combined athletics and recreation department at an institution of higher education. These aggregated statistics are based on data collected about green initiatives at 148 institutions, representing approximately 285 sports departments.



GREEN INITIATIVES IMPLEMENTED IN COLLEGIATE SPORTS

- Alternative Transportation
- Composting
- Energy Efficiency
- Green Building Design
- Green Cleaning
- Paper
- Purchasing
- Recycling
- Renewable Energy
- Water Efficiency

CHAPTER 3

HOW CAMPUS SPORT IS GOING GREEN

NRDC has assembled 10 in-depth case studies, 20 “snapshots” of collegiate greening initiatives, and seven profiles of collegiate conferences and national organizations. These are based on a diverse range of campus submissions and published information documenting sports program greening accomplishments.

The issues discussed in the case studies that follow include energy and water efficiency, waste diversion, ecologically preferable procurement and transportation, carbon reduction initiatives, student education, and fan engagement. The initiatives profiled here are devoted exclusively to greening efforts within collegiate athletics and recreation. They do not focus on broader campus sustainability work unless campus-wide commitments are relevant to greening accomplishments within sports.

These case studies represent a diverse spectrum of collegiate athletics departments, recreation departments, sports facilities, and events throughout the United States. However, this report is not a comprehensive list of all U.S. collegiate sports sustainability initiatives, nor does it rank sports greening programs. NRDC's intent is to provide an informative guide for those planning to advance existing greening projects or implement new sustainability efforts at college and university sports programs. We hope this report will encourage other organizations to share stories about their efforts as well.

Each of the 10 campus case studies includes four sections that help explain the greening process:

1. WHY IS THE CAMPUS GREENING SPORTS?

The first section explains what motivated the campus sports department to start implementing more environmentally preferable practices.

2. WHERE DID IT START?

The second section explains how each school began its sports greening work, who was involved, and how they launched their program.

3. CHALLENGES: OVERCOME AND ONGOING

The third section describes problems faced, tactics used to surmount them, and issues still being addressed.

4. LESSONS FROM THE FIELD

The fourth section outlines notable lessons from the sports department's experiences as it implemented its sports green initiatives.

Following the case studies, we profile two collegiate athletics conferences and five national organizations, besides NRDC, that are facilitating the advance of collegiate sports greening programs. As a whole, the information compiled in this report spotlights a rapidly growing national trend. In fact, sustainable practices in collegiate sports are now so widespread that it is impossible to detail all of the impressive accomplishments taking place around campuses nationwide. This is why, in addition to the ten in-depth case studies, we have included shorter summaries of 20 additional noteworthy college and university sports greening initiatives that demonstrate the breadth of this trend.

Although there is no single road map for collegiate sports greening, the case studies presented here offer a number of insights. They document strategies that have helped collegiate sports departments advance environmental initiatives, engage a wide range of campus resources to support their efforts, and establish plans for implementing broader greening work.



Photo courtesy of University of Colorado Boulder.



Photo courtesy of University of Washington.

ELEMENTS OF AN EFFECTIVE COLLEGIATE SPORTS GREENING PROGRAM

- ★ Establish a sustainability committee of interested staff and students from within the athletics department, recreation department, and campus sustainability department.
- ★ Engage leadership from senior administration, including leadership from athletics, recreation, and sustainability departments, as early as possible.
- ★ Partner with relevant departments across campus (e.g. from facilities and transportation), as well as with vendors and community experts.
- ★ Seek out campus-based experts and learn from green initiatives at other colleges.
- ★ Identify campus-wide sustainability goals, standards, and ongoing programs. Evaluate opportunities to collaborate and build upon existing greening initiatives.
- ★ Identify technical resources available on campus, within the region, and nationally (both free and for hire).
- ★ Identify opportunities to acquire local, state and federal subsidies, which can be substantial.
- ★ Identify potential sponsors, including vendors and alumni, and bring them into the planning process early.
- ★ Set regular meetings for all interested parties. Publicize meetings to student groups, sports teams, and all related staff.
- ★ Conduct a department-wide audit to track waste generation and use of energy, water, and paper across all sports facilities, and monitor data carefully.
- ★ Write a sports greening mission statement and set goals. Make sure this mission statement is congruent with campus-wide sustainability goals.
- ★ Create a list of greening ideas, both short- and long-term. Prioritize initiatives based on return-on-investment, ecological urgency, feasibility, sponsor support, and student/fan interest.
- ★ Consider opportunities to integrate student coursework and/or senior projects into the goal-setting and implementation process.
- ★ Establish a tracking system for measuring savings, progress, and setbacks.
- ★ After implementing the plan, translate successes into easily understandable outreach for students, staff, fans, sponsors, and other stakeholders.



University of Colorado
Boulder

CASE STUDY: UNIVERSITY OF COLORADO BOULDER, HOME OF THE BUFFALOES

CAMPUS FACTS

LOCATION:
Boulder, Colorado

FOUNDED:
1876

TYPE:
Public

TOTAL STUDENT POPULATION:
29,894 (24,757 undergraduates)

STAFF:
8,932

PRIMARY ATHLETICS CONFERENCE:
Pacific 12 (Pac-12)

PRIMARY ATHLETICS DIVISION:
NCAA Division 1

NUMBER OF VARSITY TEAMS:
16 (9 women's, 7 men's)

NUMBER OF SPORTS FACILITIES:
26 (16 athletic, 10 recreational)

ENVIRONMENTAL CENTER FOUNDED:
1970

AASHE STARS RATING:
Gold, 2010

SPORTS GREENING WORK STARTED:
2007

SPORTS FACILITY LEED CERTIFICATIONS:
Basketball Training Facility LEED Platinum
Certification for New Construction, 2011;
Recreation Center LEED Platinum Certification
for New Construction (pending)

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

The University of Colorado Boulder (CU-Boulder) has one of the most diverse and effective collegiate sports greening programs in the United States, addressing recycling and composting, energy efficiency, green building design, and turf management across both athletics and recreation. CU-Boulder has converted its stadium to a "zero waste" venue, implemented an organic turf management program for all fields, and achieved LEED Platinum certification at its basketball training facility. CU-Boulder is currently working toward achieving net-zero energy use at its expanded Student Recreation Center.

WHY IS CU-BOULDER GREENING SPORTS?

"CU-Boulder has for decades pursued innovative sustainability efforts ranging from one of the nation's first collegiate recycling programs to the nation's first student-mandated renewable energy fee," says the director of CU-Boulder's Environmental Center, Dave Newport. "Expanding sustainability efforts into sports and recreation was seen as a way to highlight the positive impact of sustainability to nontraditional stakeholder groups. This work is more important than ever for all departments on campus as a 2013 survey showed that more than 41 percent of incoming students say they chose CU-Boulder in part because of leadership in sustainability."

Newport says student support for more sustainable practices is the driving force behind greening efforts across the university. Students played an important role in bringing together the athletics department, recreation services, the Environmental Center, and Facilities Management, among other campus departments, to green sports facilities and operations at CU-Boulder. "Key to our sports greening collaboration is the clear desire of students to move in this direction," says Newport.

According to Chancellor Philip DiStefano, the greening of CU-Boulder's athletics and recreation facilities provides the best opportunity to communicate the university's

deep commitment to sustainability. "Sustainability in sports helps connect the University of Colorado to its fans, supporters, alumni, students, faculty, and staff because we all share the common values of environmental protection, fiscal prudence, and social equity." Tom McGann, CU-Boulder's associate athletics director, says, "Athletics is a great springboard for sustainability. We're reducing our energy consumption and carbon footprint not only because it's better for the environment and minimizes the money spent on building operations, but also because it leaves an impression on many people, including athletes, students, faculty, staff, and fans."

"ATHLETICS IS A GREAT SPRINGBOARD FOR SUSTAINABILITY," SAYS CU-BOULDER'S ASSOCIATE ATHLETICS DIRECTOR, TOM MCGANN. "WE'RE REDUCING OUR ENERGY CONSUMPTION AND CARBON FOOTPRINT NOT ONLY BECAUSE IT'S BETTER FOR THE ENVIRONMENT AND MINIMIZES THE MONEY SPENT ON BUILDING OPERATIONS, BUT ALSO BECAUSE IT LEAVES AN IMPRESSION ON MANY PEOPLE, INCLUDING ATHLETES, STUDENTS, FACULTY, STAFF, AND FANS."



WHERE DID CU-BOULDER START?

“Our sports sustainability programs developed as part of our overall ‘zero waste’ program, green building efforts, and our pesticide-free turf management approach,” says Newport.

In 2005, staff from the Environmental Center suggested using the competitive-bidding process to develop innovative ideas from concessionaires. Recycling program development director Jack DeBell worked collaboratively with national trade groups and industry associations to develop a “menu approach” that vendors vying for contracts could use to bolster their proposals. Those early proposals underpin important steps that continue to reduce waste and increase diversion.

With contracts in place, staff and student leaders from CU-Boulder’s Environmental Center and Facilities Management kicked off the first sports greening collaborations in 2007 by partnering with the athletics department and campus recreation. With support from the chancellor, a team began assembling a plan for more sustainable operations within the university’s sports facilities.

“In developing our sports greening plans, we established realistic but aspirational goals,” says Newport. “For example, we needed to clarify that ‘zero waste’ and ‘carbon neutral’ are not literal targets. Rather, they represent goals for continuous improvement.” This helped the athletics and recreation staffs become comfortable in achieving greening goals gradually.

In 2008, the athletics department teamed up with White Wave Foods Inc. to launch the “Ralphie’s Green Stampede” waste diversion program, named in honor of the school’s mascot, a live buffalo named Ralphie. White Wave was attracted to the sports greening concept, says Newport, because it was looking for a way to reach a broad and diverse audience with information about its organic food products. “An organic and natural food company is an ideal sponsor because its products line up with the ideals of the sports greening program,” Newport explains. In 2009, the athletics department acquired hybrid vehicles by engaging Boulder Toyota as a transportation sponsor. The department then brought on a manufacturer of compostable food serviceware, Eco-Products Inc., as a sponsor and supplier.

“We marketed the sports greening program to sustainability-oriented organizations that are not normally part of sports sponsorships,” says Newport. “We explained that athletics provide a unique point of entry into a big market that supports sustainability—like the environmentally minded CU-Boulder community—which has not seen sustainability-oriented marketing at sports venues. Likewise, sports and rec bring together fans from all segments of society, so this is a great place for exposure to diverse market demographics.”



Photos courtesy of University of Colorado Boulder.

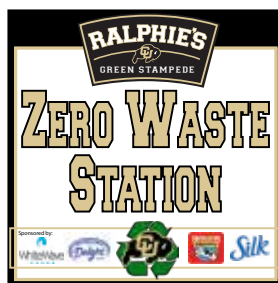
RALPHIE’S GREEN STAMPEDE SUCCESSSES

- Folsom Field was the first major collegiate sports stadium (NCAA Div. 1-FBS) in the nation to adopt a “zero waste” goal.
- In 2012, Folsom achieved a 78.5 percent waste diversion rate across all six home games (up 48.5 percentage points since the beginning of the program in 2008).
- The athletics department’s Coors Events and Conference Center was also converted to a “zero waste” facility during the 2009-10 basketball season.
- In 2012, the Green Stampede program resulted in the collection of more than 69,000 pounds of recyclable and compostable materials.
- From 2008 to 2012, the program collected more than 394,000 pounds of recyclable and compostable materials. This included more than 100,000 pounds of cans and bottles and 151,000 pounds of compostables from inside the stadium.
- Folsom Stadium’s total-season waste generation dropped by roughly 38 percent from 2008 to 2012.
- CU-Boulder achieved a single-game high of 88 percent waste diversion at the game against the University of Oregon on October 22, 2011.
- In 2012 fans helped to reduce total waste generated by more than 47 percent in the Franklin Field tailgate area.
- In the EPA’s National Game Day Challenge in October 2011, Folsom Field took first place in two of the five categories in NCAA Div. I-FBS. The two categories were “highest diversion rate” (88 percent) and “highest per capita composting” (0.153 pound per person).
- The Folsom Field “zero waste” effort could reduce as much as 455 million BTU of energy (using recovered materials in manufacture reduces energy compared with production using virgin materials).

"ZERO WASTE" PROGRAM IMPLEMENTATION AT FOLSOM FIELD

- CU-Boulder worked with Centerplate and other vendors to switch virtually all packaging used in the stadium to refillable, recyclable, or compostable materials.
- CU-Boulder and Centerplate trained staff in proper materials use and disposal.
- All public trash containers were replaced with 30 stations that have only recycling and composting containers.
- CU-Boulder procured plant-based compostable bags to collect compostable materials.
- Student volunteers are assigned to monitor all 30 waste stations and advise patrons about proper separation of materials.
- ROTC units perform recycling and compost removal during stadium cleanups on a weekly basis inside and around the stadium.
- A post-game sorting process at the campus recycling facility removes any non-recyclable or non-compostable materials brought into the stadium and discarded by fans into the stadium's recycling containers.
- All campus tailgate lots have recycling receptacles for cans and bottles on game days.

Another early source of funding for sports and recreation sustainability efforts was student fees. "Many campuses, including ours, assess a sports or recreation fee on students," says Newport. "With the strong student support for sustainability, implementing greener efforts in sports and recreation enhanced the perceived value of the student fee. Students appreciate seeing their sports funds going to promote environmentally preferable practices." From 2008 to 2013, students have financed sports greening projects, including the current \$63 million near "net zero energy" renovation of the Student Recreation Center.



RALPHIE'S GREEN STAMPEDE PROGRAM

Football tailgate areas at CU-Boulder have had a recycling collection program since 1993. However, it wasn't until 2008 that the athletics department partnered with the Environmental Center and Facilities Management to implement a "zero waste" system at Folsom Stadium. Athletics branded the effort "Ralphie's Green Stampedo" to market the program to potential corporate sponsors and it worked: White Wave Foods, Boulder Toyota, Eco-Products Inc., and the stadium concessionaire,

Centerplate, all signed on. Newport notes that while sponsorship helped fund the up-front infrastructure and outreach costs, the "zero waste" program had relatively low implementation costs, which he hopes will go down over time as the price of compostable serviceware becomes closer to that of traditional fossil fuel-derived plastic disposables. "The program is also saving money thanks to reduced trash disposal costs," he says.

It took the CU-Boulder team several months to convert 53,613-seat Folsom Stadium into a "zero waste" venue in time for the Buffs' 2008 football season. "It was the first 'zero waste' effort at a major collegiate or professional sports program in the United States," says Edward von Bleichert of Facilities Management, lead coordinator of Ralphie's Green Stampedo. "It was no small task and took a partnership among athletics, recycling services, facilities management, Centerplate, White Wave Foods, and the Environmental Center, as well as coordination with about 10 outside entities, to make the program a success."

In order to reach the goal of 90 percent waste diversion from landfill, Ralphie's Green Stampedo combines waste minimization efforts with reuse, recycling, and composting. Many operational and infrastructure changes have been needed to make this possible, including integrating compostable and reusable materials into Centerplate's operations and training all staff about proper use and disposal of materials (see "Zero Waste Program Implementation at Folsom Field" sidebar for examples of other changes).

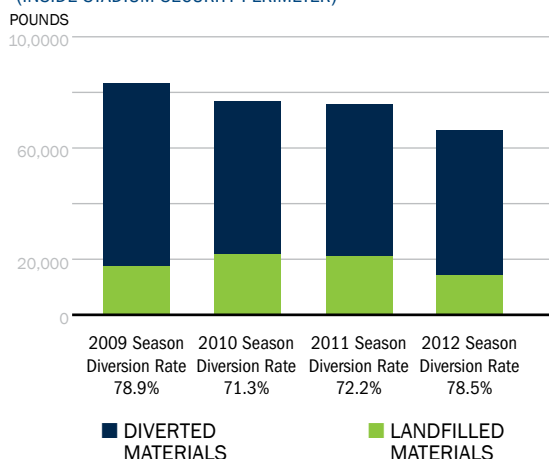
"This is often challenging as it requires coordinating and training a lot of people, including temporary concessionaire and vendor staff, sometimes with some language barriers, and student volunteers who must be recruited, trained, and rewarded," says von Bleichert. "The athletics department often relies on CU Recycling staff to help with training. We also have to coordinate security, marketing, parking, and custodial staff, as well as skybox docents."

In 2009, the athletics department expanded the program to all athletic facilities, operations, and events. "We were excited to unveil Ralphie's Green Stampedo in 2008, and we're even more excited to extend these recycling steps to all our programs," said former CU-Boulder athletics director Mike Bohn at the launch of the program expansion. "As with any aspect of what we do, we're not satisfied merely with success. We want to be the leaders in athletics program sustainability initiatives nationally."

In 2008, Folsom Field achieved a 30 percent season-long landfill diversion rate. The athletics department improved this to a 75 percent average stadium waste diversion rate for the sports seasons from 2009 to 2012.

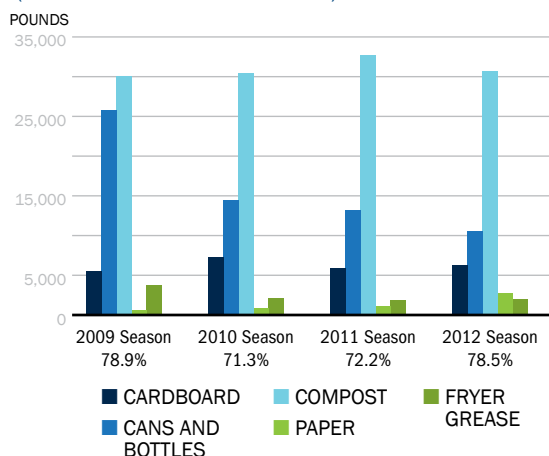
UNIVERSITY OF COLORADO ENTIRE FOOTBALL SEASON WASTE GENERATION

(INSIDE STADIUM SECURITY PERIMETER)



UNIVERSITY OF COLORADO FOOTBALL SEASON TOTAL DIVERTED MATERIALS

(INSIDE STADIUM SECURITY PERIMETER)



"Over time, our sports greening work is helping CU-Boulder get closer to our campus-wide goal of diverting 90 percent of all waste with recycling and composting by 2020," says Newport. "While we expand Ralphie's Green Stampede, what we have learned from the football program is helping inform plans for a 'zero waste' campus in the next few years, and athletics' leadership on this issue has made that possible."

GREEN BUILDING LEADERSHIP

Sustainable building initiatives at CU-Boulder have enjoyed strong student support for many years. According to Newport, "Starting in 2003, student-led initiatives spurred the adoption of a green building standard for all campus facilities. As of 2013, CU-Boulder will only build or renovate to at least a LEED Platinum standard campus-wide, a bar that has been set higher over the past decade to help mitigate the environmental footprint of our buildings."

From 2002 to 2007, the athletics department worked with Facilities Management to implement an energy conservation program at all athletic facilities, seeking to cut energy consumption by 30 percent per square foot, at a rate of 5 percent per year. This collaboration helped reinforce the value of efficiency upgrades to the athletics department and encouraged staff to consider broader sustainable building efforts.

In 2009, the athletics department began designing a new 44,000-square-foot practice facility to meet LEED Platinum standards. Opened in August 2011, the building hosts two basketball courts shared by the men's and women's basketball programs and women's volleyball.

The practice facility is approximately 40 percent more energy-efficient and 30 percent more water-efficient than other recent buildings of similar size and function. The building is cooled with an evaporation system that uses less energy than traditional mechanical systems. It is outfitted with low-flow water fixtures, high-performance insulation and windows, efficient lighting, and heating and lighting controls that optimize energy use. It also features rooftop solar panels that are capable of providing up to 12 percent of the building's electricity.

"We have built more sustainable and very energy-efficient academic, research, residential, and dining spaces," says Facilities Management's associate director of engineering and sustainability, Moe Tabrizi. "The athletic facility adds to the sustainability learning opportunities and experiences for our students throughout campus, no matter where they are."

Another green building project is CU-Boulder's expanded Recreation Center, which, according to Tabrizi, "will exceed LEED Platinum and approach net-zero energy use despite the presence of two energy-intensive indoor pools and a hockey rink." The renovation will include many new features—including an outdoor aquatics facility, an indoor turf gym, and a climbing gym—that will be unveiled during its grand opening, scheduled for April 2014.

The CU-Boulder Recreation Center expansion uses a variety of strategies to implement net-zero energy use while meeting university-wide sustainable building goals and reducing operating costs. A "net-zero energy" building has zero net energy consumption and zero carbon emissions (referring only to the carbon emissions associated with energy needed to operate the facility). The building's energy-saving features include skylights that provide interior daylighting and roof-mounted photovoltaic panels that generate electricity. Both of these features reduce electricity costs.

The building also reuses waste heat from the ice rink to heat the indoor pools and other areas of the building, further reducing the building's energy demand and annual operating costs. The architect of the project, Davis Partnership Consulting (working with Cannon Design), completed elevation studies to determine the most efficient size and location of windows and to suggest ways to minimize the building's lighting and mechanical cooling needs.



Photos courtesy of University of Colorado Boulder.

THE BASICS OF CU-BOULDER'S TURF MANAGEMENT SYSTEM

COMPOST TEA:

- CU-Boulder invested roughly \$30,000 to install seven 250-gallon brewing tanks across campus.
- A total of 70 pounds (10 pounds per tank) of premium vermicompost (compost from worm bins) is brewed to yield 1,750 gallons of compost tea, which is then applied over roughly 70 acres.
- The “tea” is injected directly into irrigation mainlines to avoid the need for manual boom or backpack sprayers.
- Compost tea is applied during an eight-hour irrigation window, four to six times per growing season, or roughly once every month.

OTHER NATURAL FERTILIZERS:

- CU-Boulder injects fish emulsion, seaweed extract, and humic acids on recreation sports fields using the irrigation system (“fertigation”).
- Up to 14 tons of dry organic fertilizer are applied five times each year.

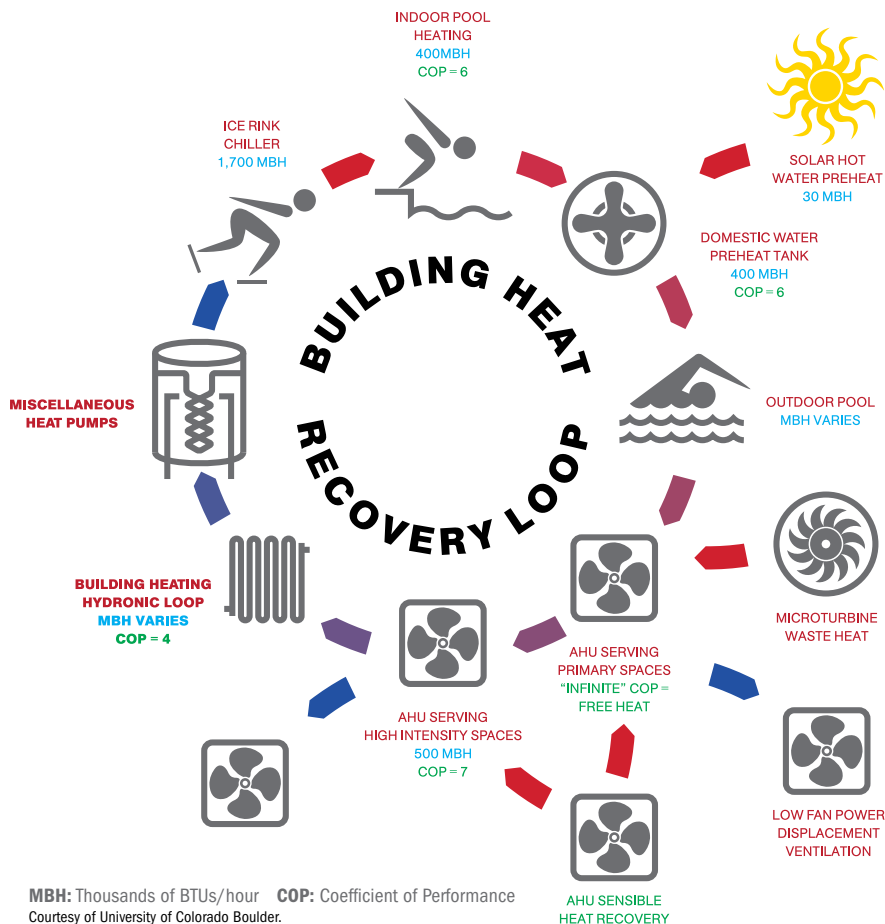
SYSTEM FEATURES:

- Three weather stations covering multiple campuses help monitor weather patterns to maximize resource efficiency.
- 18 soil moisture sensors throughout the campus monitor moisture content, soil temperature, and salinity to help track and verify baseline watering needs.
- Pump station monitoring software helps track resource use.
- All components are tied into the central irrigation computer system to integrate tracking of resource use across all operations.

BENEFITS TO FOLSOM FIELD:

- The system allows for easier manipulation of microbial and bacterial levels in sand-based sports turf.
- Use of the irrigation system reduces the need for manual applications of fertilizers.

Photo courtesy of University of Colorado Boulder.



ORGANIC TURF MANAGEMENT

Years of planning by the Environmental Center and the facilities management grounds crew led CU-Boulder to implement a pesticide-free, organic fertilizer management system for all campus turf, including most sports and recreation fields. Starting in 2011, CU-Boulder began to spray “compost tea,” a biologically active organic liquid fertilizer, through the campus-wide sprinkler system. This addition to CU-Boulder’s turf maintenance program allowed the school to maintain campus aesthetics while reducing the use of pesticides. The first phase of the pesticide reduction program cut the use of herbicides on turf areas in 2011 by 45 percent compared with 2009, and by 93 percent by the end of 2012.

“Our innovative, campus-wide compost tea irrigation system is one of the first of its kind in the country and possibly in the world,” says Newport. “Our athletics and recreation sports fields are benefiting from this system as we use it across Folsom Field and other sports turf with great success.”

The benefits of using this organic fertilizer and pest management system on campus sports fields include improved drainage, higher oxygen levels, and less compaction. These benefits lead to faster recovery after intensive use, which means the fields can be used more often with fewer adverse impacts to the quality and density of the turf. “Compost tea acts as a catalyst for bacterial and microbial agents to increase and diversify, thereby reducing the need for chemical fertilizers,” says von Bleichert. “The benefit of compost tea is that it helps to speed Mother Nature along by providing added beneficial microbes, nematodes, bacteria, and fungi, which help to break down existing soil organics for plant absorption.”

According to Ryan Heiland, CU-Boulder turfgrass manager and Outdoor Services assistant manager, it was a challenge for grounds crews to build a system that worked to spray the solution across 70-plus acres of grass. “The common belief was that you couldn’t put compost tea through a sprinkler system because the particulate matter would clog the system. It took some time, but we were able to figure out how to make it work.”

The solution, says Heiland, involved a simple change of sprinkler head filters as well as a trial-and-error approach to the plumbing of seven 250-gallon compost tea brewers set up in three separate pump stations. “We started using the organic fertilizers and methods as an experiment. Then we used them on the entire quad for two years before we told anyone about it,” says Heiland. “That way, no one would tell us that it didn’t work. You stand there and look at the grass and it speaks for itself.”

The use of compost tea provides financial as well as practical benefits, according to Jason DePaepe, assistant athletics director of facilities and manager of Folsom Field. “As with any sand-based sports turf, Folsom Field presents challenges in maintaining good levels of organic matter,” says DePaepe. “The use of compost tea allows us to fine-tune microbial and bacterial levels without the need for manual applications of other types of fertilizers. It’s an effective tool that saves us time and money. A real win-win.”

CHALLENGES: OVERCOME AND ONGOING

RESISTANCE TO CHANGE

According to Newport, the greatest challenge for sports greening projects is typically related to developing support for change. “Ideally, we seek to build support through an inclusive process where all relevant parties are invited to discuss next steps before plans are firm and before funds are identified. However, this is not always followed perfectly, and mistakes are made.” The key, says Newport, is reinforcing this collaborative approach as often as possible. “Efforts like twice-yearly sustainability roundtables with all relevant departments can reinforce team building and information sharing.”

FAN ENGAGEMENT

A commitment to sustainability can strengthen the bond between a university and the public. “We want to increase fan engagement through outreach during the sports events and increased community partnerships, such as community gardens fertilized with stadium compost,” says Newport. “Fan support offers an opportunity to build greater support for athletics and the campus—even if your team doesn’t win every game. We are just beginning to scratch the surface of sports greening as a fan engagement tool. Many pro sports teams have figured this out already. However, in a town with Boulder’s consciousness about sustainability, many fans see these efforts as baseline, not extraordinary. Engaging these more knowledgeable fans will require unique leadership.”

LESSONS FROM THE FIELD

USE POSITIVE FEEDBACK AS A CATALYST FOR IMPROVEMENT

“It was rewarding how positive our fans were about the ‘zero waste’ efforts throughout athletics,” McGann notes. “And we are very proud of the positive reactions from vendors and others as well. It’s good to know we are working with people who value environmental stewardship—and the reaction from our community affirms the value of our work,” he adds. “The positive reception empowered athletics to pursue sustainability, particularly when there was no PR downside, only a strong upside for sports greening efforts.”

ESTABLISH CLEAR PROJECT GOALS

“Winning support for goals like ‘zero waste’ requires some finesse. We first articulated a ‘zero waste by 2015’ goal. However, some partners didn’t think that was practical,” says Newport. “‘How can we have literally no waste in just a few short years?’ they asked. But by reframing the goal as an aspirational, continuous-improvement goal akin to a zero-accident goal on a construction site, a level of comfort was established that people supported.”



Photos courtesy of University of Colorado Boulder.

Photos courtesy of University of Colorado Boulder.



TAKE TIME TO LEARN AS YOU ROLL OUT YOUR PROGRAM

“At first these new efforts were hard and a little scary because there were no cookbooks on it,” says Newport. “We learned how to optimize operations by experimenting and figuring things out as we went, so the hurdles are lower for next time. New programs still require significant effort, but so does anything worth doing.”

CHANGE THE MATERIALS IN THE SYSTEM, NOT JUST THE PROCESSES FOR MANAGING THEM

“‘Zero waste’ is easier if you switch all the materials in the system to reusable, recyclable, or compostable. However, changing everything is not easy,” says von Bleichert. “The first 75 to 90 percent of materials can be changed pretty easily, but be aware of the little stuff, like coffee cup lids, potato chip bags, candy wrappers, and so forth, that are difficult to remove from the system.” Likewise, “involving campus recycling reps as early as possible in the planning process for vending contracts is key,” recommends Jack DeBell of the Environmental Center.

CONSIDER WAYS TO LIMIT NON-RECYCLABLE MATERIALS THAT ENTER SPORTS FACILITIES

“The bane of ‘zero waste’ is filmy plastics. Filmy plastics show up everywhere: plastic bags, shrink wrap, food wrappers, pallet wrapping, etc.,” says von Bleichert. “We cannot close the gap from 88 percent diversion to 95 percent diversion without finding ways to limit the amount of non-recyclable plastic entering the system—and then finding cost-effective ways to separate and recycle the plastic that does make it in.”

REALIZE THAT SPORTS GREENING IS A CAMPUS-WIDE EFFORT; SPORTS DEPARTMENTS CAN’T DO IT ALONE

“It takes a campus to green sports and recreation. All that we have accomplished in sports and recreation is the result of a campus-wide commitment to sustainability,” explains Newport. “It would be unfair and impossible to expect the athletics department to make all these improvements by itself without the campus supporting it.”

DEVELOP A ROBUST TRAINING AND OUTREACH PLAN FROM THE OUTSET

“Training is one thing I would prioritize more if I could start again. It would help move our programs to greater efficiency more quickly,” says von Bleichert. “However, we had to learn as we went along, so it was difficult to have a definitive training and outreach plan when we were changing tactics sometimes every week.”

USE GREENING TO BUILD GREATER FAN LOYALTY

“Greening our athletic facilities offers an opportunity to build greater fan loyalty and enhance support for our athletics department and the campus more broadly,” says Newport.





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

“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.”

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.”

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 CO₂ 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.



CASE STUDY: THE OHIO STATE UNIVERSITY, HOME OF THE BUCKEYES

CAMPUS FACTS

LOCATION:
Columbus, Ohio

FOUNDED:
1870

TYPE:
Public

TOTAL STUDENT POPULATION:
64,429 (50,145 undergraduates)

STAFF:
32,019

PRIMARY ATHLETICS CONFERENCE:
Big Ten

PRIMARY ATHLETICS DIVISION:
NCAA Division 1

NUMBER OF VARSITY TEAMS:
39 (20 women, 19 men)

NUMBER OF SPORTS FACILITIES:
24 (19 athletic, 5 recreational)

SUSTAINABILITY OFFICE FOUNDED:
2006

AASHE STARS RATING:
Silver, 2012

SPORTS GREENING WORK STARTED:
2007

“OHIO STATE HAS INSTITUTED A COMPREHENSIVE APPROACH TO INCORPORATING SUSTAINABILITY INTO EVERYTHING WE DO,” SAYS RON SEGA, VICE PRESIDENT AND ENTERPRISE EXECUTIVE FOR THE OFFICE OF ENERGY AND ENVIRONMENT. “THE SUCCESS OF THE OHIO STADIUM PROGRAM, WITH ATTENDANCE OF MORE THAN 100,000 PEOPLE AT EACH GAME, INDICATES THAT OTHER VENUES CAN ALSO ACHIEVE OUR LEVEL OF WASTE DIVERSION.”

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

The Ohio State University (Ohio State) is home to one of the most successful stadium recycling and composting programs in the United States. Ohio Stadium, with 105,000 seats, is the largest venue in the country to achieve waste diversion from landfill of more than 90 percent through recycling and composting. Ohio State launched its “zero waste” program at Ohio Stadium in 2011 and by 2012 achieved a top diversion rate of 98.2 percent for a single game and a season average diversion rate of 87.2 percent. Since 2012, the Ohio Stadium recycling and composting program has become the model for campus-wide “zero waste” efforts at Ohio State as well as collegiate stadiums across the country.

WHY IS OHIO STATE GREENING SPORTS?

According to Jay Kasey, senior vice president for Administration and Planning at Ohio State, “The Ohio State University is working to be a leader in sustainability, and the best place to start is at home. The ‘zero waste’ program at Ohio Stadium is proof that when we work together as one university and one community, we can have an impact beyond our campus borders.”

Sustainability at Ohio State is a campus-wide effort and every department plays an important role. Corey Hawkey, Ohio State sustainability coordinator and head of the Ohio Stadium waste diversion program, notes that the Department of Athletics provides an unparalleled opportunity to engage the greater university community in greening efforts. “The Department of Athletics is uniquely positioned to support campus [sustainability] efforts for several reasons. First, for many people, Ohio State athletic events are the gateway to campus. Second, athletic facilities contribute significantly to the university’s energy use, carbon emissions, and ecological function. And third, athletics greening is important because of the educational experiences it can bring our athletes, students and fans.”

The campus sustainability office (Energy Services and Sustainability) is housed within the department of Facilities Operations and Development. The office has been engaged in campus-wide sustainability planning and implementation since 2006. In 2010, the university established a “framework plan” to promote sustainability for the entire campus, with support from students, faculty, and staff. This planning process, with a vision extending 50 years, provides Ohio State with sustainability goals and objectives and includes the Department of Athletics’ sustainability work.

“Ohio State has instituted a comprehensive approach to incorporating sustainability into everything we do,” says Ron Sega, vice president and enterprise executive for Ohio State’s Office of Energy and Environment. “The success of the Ohio Stadium program, with attendance of more than 100,000 people at each game, indicates that other venues can also achieve our level of waste diversion.”

WHERE DID OHIO STATE START?

Sustainability efforts in Athletics started for the Buckeyes in 2007 when the sustainability office teamed up with the Department of Athletics to begin recycling at Ohio Stadium and in the adjacent tailgate lots. This recycling system began as a post-game waste-sorting initiative in which all waste was collected in trash bins at games and subsequently sent to a materials recovery facility (MRF) where recyclables were sorted out for recovery. The process recovered approximately 50 percent of game-day materials for recycling from the stadium and tailgate lots. However, as Hawkey points out, “The program was not visible, did not improve the fan experience, and provided limited opportunity to keep improving waste diversion rates.”

On the basis of this experience in 2007, the sustainability office realized that, without fan-facing recycling or composting bins, the stadium’s ability to divert waste from landfills depended substantially on the performance of the waste hauler and MRF sorting technology. “By treating all materials as trash in the stadium we were missing out on the opportunity to engage fans to help us improve waste sorting and diversion rates,” explains Hawkey. “We recognized that we needed to reevaluate our approach to waste management at the stadium.” As a result, in 2008 the university’s sustainability office initiated discussions about developing a “zero waste” program at Ohio Stadium.

The process began with the sustainability office reaching out to the Department of Athletics to better understand existing stadium processes and build a working relationship. The next step was securing a \$50,000 grant from the university President and Provost’s Council on Sustainability and pitching the “zero waste” program to other important stakeholders.

The partnership between the Department of Athletics and the campus Energy Services and Sustainability group was crucial for moving Ohio Stadium toward its waste diversion goals. A leadership team was established with representatives from Energy Services and Sustainability, Department of Athletics (stadium manager, associate director of facilities), IMG Sports Marketing, Sodexo (concessionaire at the time), and Waste Management (hauler at the time). “The leadership team provided feedback to Athletics on major issues and questions relating to planning and implementation,” explains Hawkey. “The leadership team suggested solutions and additional partners that could improve the program.”

Ultimately, Ohio State’s efforts required partnerships across the campus and with the surrounding community (see “‘Zero Waste’ Program Goals and Partners” sidebar). Support and funding for the Buckeyes’ sustainability initiatives came from both campus and athletics leadership, including the President and Provost’s Council on Sustainability and athletics director Gene Smith.

“In May 2011, years of teamwork and trust building paid off with the initiation of the ‘zero waste’ program at Ohio Stadium, the largest stadium in the country to attempt a ‘zero waste’ initiative,” said Don Patko, associate athletics director for facilities, Department of Athletics. “The stadium program made recycling an important part of the fans’ experience with improved signage and recycling stations throughout the



Photo courtesy of The Ohio State University.

“ZERO WASTE” PROGRAM GOALS AND PARTNERS

GOALS

- Reduce the environmental impact of events at Ohio Stadium
- Demonstrate Ohio State’s leadership in sustainability
- Reduce costs related to stadium materials collection
- Achieve a 75 percent landfill diversion rate in 2011
- Achieve 90 percent diversion at least once by end of the 2012 football season

PARTNERS

- Alpha Tau Zeta chapter of FarmHouse International fraternity (compost sorting)
- D&D Cleaning (compost sorting)
- OSU Department of Athletics (leadership, operations and funding)
- OSU Energy Services and Sustainability Office (leadership and coordination)
- OSU Facilities Operations and Development Office (leadership, support, operations)
- IMG Sports Marketing (sponsorship)
- Mid-Ohio Food Bank (food donation)
- Ohio Department of Rehabilitation and Correction (recycling)
- OSU President and Provost’s Council on Sustainability (leadership and funding)
- Price Farms Organics, Ltd. (composting)
- PSI (education and outreach)
- OSU Navy ROTC (operations)
- Rumpke (hauling)
- Sodexo (food services)
- Solid Waste Authority of Central Ohio (support)
- Southeastern Ohio Correctional Institute (recycling)
- Vera Institute of Justice (support)

“BY TREATING ALL MATERIALS AS TRASH IN THE STADIUM WE WERE MISSING OUT ON THE OPPORTUNITY TO ENGAGE FANS TO HELP US IMPROVE WASTE SORTING AND DIVERSION RATES,” SAYS COREY HAWKEY, OHIO STATE SUSTAINABILITY COORDINATOR.

“THE ‘ZERO WASTE’ PROGRAM AT OHIO STADIUM INVOLVED SIGNIFICANT EFFORTS BY MANY DEDICATED PEOPLE TO DRASTICALLY REDUCE THE AMOUNT OF FOOTBALL GAME-DAY TRASH HEADED TO LANDFILLS,” SAYS SEGA. “WE’RE PROUD TO BE LEADERS IN THIS AREA AND LOOK FORWARD TO SHARING OUR EXPERIENCE, SO OTHERS CAN DO EVEN BETTER.”

FINANCING

FUNDING

- \$50,000 from the Ohio State President and Provost’s Council on Sustainability (2011 and 2012)
- \$37,500 annually in sponsorships from Rumpke and Solid Waste Authority of Central Ohio (starting in 2012)
- \$36,000 from Ohio State’s Energy Services and Sustainability (one-time startup costs)
- \$30,000–\$50,000 from Sodexo
- \$12,000 from the Ohio State Department of Athletics (one-time startup costs)

COSTS

- \$30,000–\$50,000 (estimate) to switch to compostable and recyclable products and food vendor-related staff time (funded by Sodexo)
- \$48,000: Up-front infrastructure, 2011 (receptacles, signage, labor, etc.)
- \$49,000 annually: Training, management, and supervision for 65 Zero Waste team members

STAFF TIME

- Sustainability coordinator: 20–25 hours per week plus 12 hours on game day and 6 hours on day after game
- Student volunteers: 10 to 12 per game (8–12 hours), and additional time for compost sorting



Photo courtesy of The Ohio State University

stadium. Adding front-of-house composting receptacles also helped increase the waste diversion rate and create a cleaner recycling stream.”

The first football season with the program in place was a great success: Ohio State was able to divert 75 percent of the 2011 football season’s waste from landfill, and after just a few months, achieved a top diversion rate of 82.4 percent. During the fall of 2012, the second season of the program, Ohio State achieved a season average of 87 percent waste diversion and a peak game diversion rate of 98.2 percent, which gave the school the diversion rate title in the Game Day Challenge.

“Zero Waste’ at Ohio Stadium involved significant efforts by many dedicated people to drastically reduce the amount of football game-day trash headed to landfills,” says Sega. “We’re proud to be leaders in this area and look forward to sharing our experience, so others can do even better.”

CHALLENGES: OVERCOME AND ONGOING

LACK OF PRECEDENT

According to Corey Hawkey, “When we decided to move Ohio Stadium toward ‘zero waste’ in 2011, no one really understood what that actually meant. There was little precedent for diverting over 90 percent of materials from a stadium that seats 105,000 fans. One of the first things that we did was to talk to our peers who had attempted ‘zero waste’ before us, regardless of their size.” The Ohio State team reached out to the University of Colorado at Boulder and the University of California at Davis to research waste management techniques and learn from the other schools’ experiences. “The things we learned from existing programs helped us avoid a lot of mistakes,” explains Hawkey. “While they were a great help, ultimately we were treading in new water and it was important to stick to the goal and stay focused on bringing together all of the knowledge of our partners.”

FINANCING AND BUY-IN

The “zero waste” program could not have been launched without support from the top echelons of the university. “Leadership from the President and Provost’s Council on Sustainability was critical to getting the ‘zero waste’ program off the ground,” explains Hawkey. “The planning support coupled with the funding for up-front infrastructure costs provided a seal of approval that helped solidify campus-wide buy-in.” This leadership motivated departments around campus to support the program with staff time and, in some cases, additional funding. Once the program secured campus-based funding, Ohio State worked with IMG Sports Marketing, an existing partner of the Buckeyes, to attract sponsorship dollars to help offset the program’s implementation costs. Ohio State also partnered with existing vendors like Sodexo, its concessionaire at the time, to transition to compostable and recyclable products and to upgrade the process for cleaning concessions and suites. Sodexo covered the additional costs in switching products, labor, and infrastructure, estimated at \$30,000 to \$50,000 (details are proprietary). “There were startup costs,” says Hawkey. “However, costs can be balanced and off-set with support from sponsors and by developing efficiencies over time.”



CONTAMINATION

“Ensuring that compost isn’t contaminated in a stadium of over 105,000 fans is quite a challenge,” says Hawkey. “The team decided from the very beginning that the program would revolve around labeling food and fiber as compost and everything else as recycling, with no trash bins in the stadium. The education outreach was targeted to this approach.” Ohio State worked to develop a program that relied on fan education and clear, color-coded infrastructure to ensure success.

To do this, the team focused on simple messaging that could be relayed in the chaotic concourse environment and stationed workers at receptacles around the stadium to help educate fans at the point of disposal. Ohio State worked with Sodexo to educate and encourage participation of concession staff. Postgame sorting processes also helped reduce contamination. Many process revisions were made to minimize contamination during the first year of implementation, and collectively these efforts helped ensure a successful program.

BEYOND OHIO STADIUM

Tailgate lots present a unique waste management challenge, and recycling efforts there are managed separately from the “zero waste” program at Ohio Stadium. High school students are hired to pass out recycling bags to tailgaters as they arrive and to help educate the fans about the program. Many fans use the bags, placing their materials in the recycling and trash dumpsters strategically located throughout the tailgating areas. Ohio State received a grant in 2012 from the Alcoa Foundation to expand the number of educators in the tailgate lots, add extra recycling infrastructure, and develop a recycling education station.



Photos courtesy of The Ohio State University.

STANDOUT GREENING ACCOMPLISHMENTS

- **Highest Diversion Rate: 98.2 percent** during game against Illinois on November 3, 2012
- **2012 Season Diversion Rate: 87.2 percent** (up 12 percentage points from 2011)
- **Student Volunteer Hours: 120** (average of three volunteers working eight five-hour games, demonstrating consistent student commitment)
- **Reduction in Landfilled Materials: 61.2 percent** in 2012 compared with 2010 (23.2 tons versus 59.8 tons)
- **Increase in Season Diversion Rate: 28.8 percent** in 2012 compared with 2010
- **Influence: At least six other institutions** have begun to research implementing “zero waste” programs since the launch of OSU’s initiative.

“ZERO WASTE” PROGRAM IMPLEMENTATION GUIDE

FROM OHIO STATE PROJECT LEAD COREY HAWKEY

I: SEEK COLLABORATORS AND REVIEW BEST PRACTICES

- Connect with other campuses implementing waste diversion stadium programs and build relationships between athletics departments. Ohio State established a database of others seeking to achieve “zero waste”: <http://go.osu.edu/zvenues>
- Learn from your peers and seek out experts.

II: EVALUATE PRODUCTS AND SWITCH TO COMPOSTABLE AND RECYCLABLE SERVICEWARE

- Work with your food vendor to develop a strategy to address all products used at concessions, considering product type and flow through the stadium.
- Collaborate with your food vendor to identify compostable or recyclable serveware alternatives that do not increase cost or negatively affect the fan experience.
- Understand that you do not have to change all products at once. Work on high impact items first.

III: UPDATE STADIUM WASTE INFRASTRUCTURE

- Conduct an inventory of existing waste containers and map their locations (this is an ideal student research project).
- Develop a plan for the consolidation and reallocation of receptacles.
- Evaluate the cost of new or repurposed receptacles, signage, and any other necessary infrastructure and begin to identify sponsorship opportunities.

IV: IMPROVE THE GAME-DAY COLLECTION PROCESS AND OUTREACH

- Develop an understanding of the waste disposal process during the game.
- Create a redeployment plan for new recycling and composting stations.
- Develop a plan to educate fans and monitor recycling and composting stations.
- Create a plan for marketing and communicating the program.
- Develop a program brand with a clear name and color scheme (Ohio State used school colors for bins: scarlet for recycling and gray for compost).
- Simplify the disposal process as much as possible. Ohio State worked with its food vendor to decide on the message “If it’s food or fiber, you compost it; anything else, whatever it is, recycle it.” Determine what process is best for your stadium and partners.

V: IMPROVE THE POSTGAME CLEANUP PROCESS

- Develop a strategy to collect materials after the game (Ohio State partners with NROTC).
- Develop a plan for the cleanup process that addresses the type of bags, location of dumpsters, and transfer of waste from container to hauling truck.
- Evaluate the stadium waste hauling contract and revise when appropriate.

VI: IMPLEMENT AND TRACK

- Complete data reports after each game, using a consistent data system.
- Implement the program throughout the season, holding regular meetings with the waste diversion committee and partners and making appropriate adjustments to the program as necessary.

VII: REVIEW PERFORMANCE AND EXPLORE NEW FUNDING

- Complete a season review and assemble report with all data.
- Consider ways to improve efficiency and effectiveness.
- Work with sports marketing to publicize extensively and identify further sponsorship opportunities.

LESSONS FROM THE FIELD

FOCUS ON PARTNERSHIPS

“Ohio State is very proud of the partnerships that were developed to support Zero Waste at Ohio Stadium,” says Hawkey. “The strong partnerships helped ensure that all the right resources were in place for success. It is important that all stakeholders wanted to succeed not only because it was good business but also because they believed in the goals.” Hawkey also cites two other important components of a campus-wide collaboration. “Support from university leadership plays a significant role in the initiation of the program. You also need a champion within the department of athletics to ensure the success of the program.”

FOSTER COMMUNICATION AMONG STAKEHOLDERS

“It is imperative to listen to the needs of all stakeholders and to take the time to learn how they do things and why,” says Hawkey. “Also, be respectful and communicate openly about why decisions are made and what results are expected from those decisions. Communicate with all stakeholders out of respect to ensure there are no surprises.”

BUILD PROJECTS OVER TIME

It will take time to reach your goals. “Do not make major changes you are unsure of. Instead, make changes incrementally and with the understanding that you can always change it back or into something else,” says Hawkey. Ohio State is extending the success of Zero Waste at Ohio Stadium across campus and all athletics facilities.

MAXIMIZE YOUR RESOURCES

The sustainability office worked with the sports marketing group and the athletics marketing offices to make sure that the program improved the fan experience by building fan loyalty and pride. It is helpful to engage sponsors and marketing from the beginning to open communication channels throughout athletics departments.

“LEADERSHIP FROM THE PRESIDENT AND PROVOST’S COUNCIL ON SUSTAINABILITY WAS CRITICAL TO GETTING THE PROGRAM OFF THE GROUND AND HELPED SOLIDIFY CAMPUS-WIDE BUY-IN,” SAYS HAWKEY.



CASE STUDY: UNIVERSITY OF FLORIDA, HOME OF THE GATORS

CAMPUS FACTS

LOCATION:
Gainesville, Florida

FOUNDED:
1852

TYPE:
Public

TOTAL STUDENT POPULATION:
49,913 (32,776 undergraduates)

STAFF:
12,440

PRIMARY ATHLETICS CONFERENCE:
Southeastern (SEC)

PRIMARY ATHLETICS DIVISION:
NCAA Division 1

NUMBER OF VARSITY TEAMS:
19 (10 women's, 9 men's)

NUMBER OF SPORTS FACILITIES:
15 (11 athletic, 4 recreational)

SUSTAINABILITY OFFICE FOUNDED:
2006

AASHE STARS RATING:
Silver, 2011

SPORTS GREENING WORK STARTED:
2006

SPORTS FACILITY LEED CERTIFICATIONS:
Baseball Facility, LEED Certification for New Construction, 2007; Heavener Football Complex, LEED Platinum Certification for New Construction, 2009; Lacrosse and Soccer Facility, LEED Gold Certification for New Construction, 2009; Golf Course Clubhouse, LEED Silver Certification for New Construction, 2009; Southwest Recreation Center, LEED Gold Certification for New Construction, 2011; Gymnastics Training Facility, LEED Gold Certification for New Construction, 2013

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

The University of Florida Athletic Association is a national leader in green building practices. In 2009, the Gators' Heavener Football Complex became the first building in Florida and the first athletic facility in the country to be awarded Platinum certification. The Gators now have five LEED-certified athletics facilities, a LEED Gold-certified recreation center, and a "Neutral Gator" carbon offset program, underscoring the university's commitment to environmental stewardship.

WHY IS UF GREENING SPORTS?

The university's president, Bernard Machen, is a founding signatory of the American College & University Presidents' Climate Commitment. In 2006 he pledged that the University of Florida would reduce its carbon emissions and help lead the nation toward a more sustainable future.

"When we conserve water, when we save electricity or produce it from renewable sources, when we burn calories instead of fossil fuels by biking to work, we help the environment. But we also gain independence," said Machen during his 2010 Earth Day address. "Strengthening our independence is one reason to pursue sustainability, but it is not the only one...Our goal is an environment of decency, quality, and mutual respect for all human beings and all other creatures." The University Athletic Association has played an important role in the campus-wide sustainability effort by taking a lead in green building design, carbon emission offsets, and waste diversion.

WHERE DID UF START?

The UF Office of Sustainability, which was founded in 2006, helped establish the Gators' environmental outreach to sports fans that same year with the first Tailgator Green Team Recycling Program. This ongoing volunteer effort, which focuses on increasing recycling on campus before and after each home football game, has diverted more than 140 tons of recyclable material from the landfill since 2006.

This early collaboration between the sustainability office and the Athletics Association helped UF recognize the visible platform sports offers for educating a large audience. Their partnership has expanded beyond football game recycling to include annual "Green Games" during the lacrosse and softball seasons, promoting environmental education to a broader fan base.

"STRENGTHENING OUR INDEPENDENCE IS ONE REASON TO PURSUE SUSTAINABILITY, BUT IT IS NOT THE ONLY ONE," SAYS THE UNIVERSITY'S PRESIDENT, BERNIE MACHEN. "OUR GOAL IS AN ENVIRONMENT OF DECENCY, QUALITY, AND MUTUAL RESPECT FOR ALL HUMAN BEINGS AND ALL OTHER CREATURES."

TIMELINE OF GATOR GREENING ACCOMPLISHMENTS

2006:

- The Office of Sustainability launches Tailgator Green Team Recycling Program to encourage recycling on campus before and after each home football game, in partnership with the Athletic Association.
- Volunteers collect recyclables and distribute bags to fans throughout game day, diverting more than a ton of recyclable containers each game.

2007:

- Baseball Locker Room Facility is awarded LEED Certification for New Construction.

2008:

- Earth Givers donates carbon offsets for home football season as part of the Athletic Association's newly established Neutral Gator initiative.

2009:

- James W. Heavener Football Complex is awarded LEED Platinum certification for New Construction, becoming first athletic facility in the nation to receive Platinum status.
- Lacrosse and Soccer Facility is awarded LEED Gold certification for New Construction. UF Golf Course Clubhouse earns LEED Silver certification for New Construction.
- The Athletic Association begins to purchase offsets through the Neutral Gator Initiative.

2011:

- Southwest Recreation Center awarded LEED Gold certification for New Construction.

2012:

- University Athletics Association begins funding programs for interns to collect and sort recyclables at Ben Hill Griffin Stadium during football games.

2013:

- Gymnastics Training Facility awarded LEED Gold certification for New Construction.



HIGH-PERFORMANCE GREEN BUILDINGS

The Gators also kicked off their green building efforts in 2006 with the construction of their first LEED-certified athletic facility, the Baseball Locker Room, which houses locker rooms, offices, support staff rooms, audio-video rooms, showers, restrooms, and storage. The venue optimized energy efficiency to cut energy use by close to 25 percent below ASHRAE 90.1 standards. The Gators also cut indoor potable water use by 36 percent and outdoor landscaping water use by 50 percent, with no potable water used for landscaping. Of the materials used for construction, 71 percent were manufactured regionally.

The Locker Room's LEED certification gave momentum to the university's green building commitments. In 2001, the university had pledged to follow LEED criteria for all major new construction and renovation projects. In 2006, after the successful baseball facility construction, UF renewed its commitment to greener building by raising the bar to a minimum of LEED Silver certification for all new buildings. In 2009, in the wake of the LEED Platinum certification of the James W. Heavener Football Complex, UF raised the standard even higher to become the first university in the nation committed to a minimum of LEED Gold certification for all new construction.

"Although the University of Florida started adopting LEED in early 2000, and it is the home of the first LEED Gold and LEED Platinum buildings in the state of Florida, we continue to learn and try to raise the bar on each project," says Bahar Armaghani, assistant director of the university's Facilities, Planning, and Construction Division, which houses UF's Leadership in Energy and Environmental Design program. "Building green using LEED has become an important part of the operational and educational culture on our campus."

UF's athletics department's second LEED facility took U.S. sports venue construction to a new level by pioneering LEED Platinum certification for a sports complex. The football complex includes weight rooms, conditioning rooms, a nutrition center, offices, meeting rooms, recruiting rooms, a hall of fame, and a welcome center for Gator fans. It was constructed in 2008 and was initially designed to achieve LEED Silver certification, the university's standard at the time.

The UF facilities department and Office of Sustainability staff worked closely with athletic facilities staff, contractor PPI Construction Management, and architect RDG Planning and Design to make the new complex a reality. This interdepartmental collaboration, supported with funding from private donors, and the university's commitment to environmental stewardship helped the team exceed Silver specifications and attain LEED Platinum certification.



Photos courtesy of University of Florida.

"This is the first athletic facility project in our history that, from the planning stage, was to be funded 100 percent privately," says Phil Pharr, senior director of development for Gator Boosters, Inc. "In about a year and a half, we had 16 donors step up and commit the entire \$28.3 million. Not many schools in the country have the fan base that could pull that off. This is just one more example of what sets the University of Florida apart from most of our peers."¹

The complex achieved Platinum certification by incorporating many green details (see "Heavener Football Complex LEED Platinum Features" sidebar). "The venue has occupancy sensors to control lighting, organic paint, and floors made out of recycled materials such as tires," says Carol Walker, assistant vice president of UF Facilities, Planning, and Construction. "Although the cost of construction was high, it will be balanced by lower operating costs, thanks to energy-efficient equipment that reduces heating and air conditioning costs." After 18 months of construction, the facility opened in mid-July 2008 in time to showcase its state-of-the-art design during the 2008 football season.

The football complex demonstrates the commitment of students, faculty, administration, and staff from many departments at UF to preserving the environment, says Armaghani. "Green buildings are not exclusively concerned with saving money through more efficient technology," she explains. "They are also investments for the well-being of people and the environment. Since we spend over 90 percent of our time indoors, we need to provide a healthy indoor environment for people. It's a great achievement for the Gators, making them number one in this area, too."³

In 2009 the University Athletic Association was awarded LEED Gold certification for its new lacrosse and soccer facility and LEED Silver for its renovated Golf Course Clubhouse. As with the football complex, the lacrosse and soccer center exceeded university standards at the time and helped provide momentum for raising the campus-wide commitment to LEED Gold.

The Southwest Recreation Center, the most popular recreation facility of the four main recreation facilities on the UF campus, was awarded LEED Gold certification in 2011 (see "Southwest Recreation Center LEED Gold Features" sidebar). The 40,745-square-foot recreation center was renovated and expanded to accommodate growing demand for intramural sports, personal training, and other athletic uses. "This facility is a modern laboratory for sustainable design and for teaching environmental awareness on campus," says Armaghani. "Students, faculty, and staff visit the center over 744,436 times per year."

The \$16.3 million building addition, funded entirely by a Capital Improvement Trust Fund fee levied on students, offers a jogging track, cardio equipment, fitness classes, strength training, and massage therapy. The building came in \$720,000 below budget, and those savings went toward further improvement and renovation of the UF weight room and basketball courts. "For this project we pushed the envelope for a LEED Platinum building. The project was designed and constructed to be Platinum," says Armaghani. "When it was submitted for review and the energy model was audited, it did not perform as well as expected and earned LEED Gold." The UF team reviewed the energy modeling process in order to improve future performance.

Student involvement was a key part of the project. The design process, which began in 2008, included students, staff, and faculty who worked to develop a shared vision. "Everyone had input into what the building would become," explains Armaghani. "In addition, the Southwest Recreation Center administration and student government conducted a survey of the student body to understand their needs. During construction," she continues, "students worked on the project to understand the LEED credits associated with construction and to understand the contractor's role in building to LEED specifications."

HEAVENER FOOTBALL COMPLEX LEED PLATINUM FEATURES

WATER EFFICIENCY

- Dual-flush toilets and other low-flow plumbing fixtures reduce water use by 40 percent.
- Native plants and efficient irrigation system decrease water demand by 50 percent.
- 100 percent reclaimed water is used for irrigation.
- 100 percent of wastewater is treated on-site (at campus wastewater treatment plant).

ENERGY EFFICIENCY

- Energy use was reduced by 25 percent.
- Facility uses building-wide energy management system (EMS) and HVAC scheduling for night, holiday, and weekend setback.
- Occupancy sensors improve lighting efficiency.
- "Demand controlled ventilation" strategy adjusts the use of fan and pump systems in response to environmental conditions.

MATERIALS

- 75 percent of existing building shell was reused.
- 78 percent of construction and demolition debris waste was diverted from landfill.
- Weight room flooring is composed of 86 percent recycled rubber from used tires.
- 36 percent of the material used on the project was locally sourced.

SITES AND INNOVATION

- Green-e certified power is used for 70 percent of the building's electrical load.
- White reflective roofing material helps reduce heat island effect.
- Highly reflective paving material reduces heat island effect.



Photos courtesy of University of Florida.



SOUTHWEST RECREATION CENTER LEED GOLD FEATURES

WATER EFFICIENCY

- Waterless urinals, dual-flush toilets, and sensed faucets reduce water use by 43 percent (each urinal alone saves 40,000 gallons annually).
- 100 percent native plants reduce water use by 90 percent.
- 100 percent reclaimed water is used for irrigation.

ENERGY EFFICIENCY

- The building uses 30 percent less energy compared with a typical building of similar size and function.
- Exterior lighting is 100 percent LED, including lights for artwork and walkways.
- Building automation systems provide fresh air delivery, temperature and humidity control, and building scheduling control.
- Advanced metering monitors heating, cooling, lighting, and general building loads to ensure energy efficiency.
- All televisions are energy-efficient LCD TVs.

MATERIALS

- 35 percent of building materials included recycled content.
- More than 25 percent of materials were bought within 500 miles to support local businesses and reduce emissions.
- 53 percent of the wood used in the project was certified by the Forest Stewardship Council.
- 78 percent of construction waste was diverted from landfill.
- Flooring is about 30 percent recycled rubber.
- All reinforcing steel, about 58.7 tons, was made with 99 percent recycled content.
- All structural steel, about 168 tons, was made from 77 percent recycled content.

SUSTAINABLE SITES

- 100 percent high-albedo material was used for all sidewalks.
- Number of bike racks was increased by 200 percent.
- EnergyStar reflective roof reduces energy needs.

INDOOR ENVIRONMENTAL QUALITY

- MREV 13 filter removes 98 percent of pollutants from air entering the building.
- All interior material (including paint, sealant, adhesive, carpet, and composite wood) has no or very low VOCs (volatile organic compounds).
- Furniture has no VOCs and includes recycled content.
- Natural light and views are abundant throughout building.
- Smoking is prohibited (UF became a no-smoking campus on July 1, 2010).



Photo courtesy of University of Florida.

NEUTRAL GATOR INITIATIVE

In 2007 the Gators began working to support the university's pledge to reduce its carbon footprint. During the fall of that year the Athletic Association offset carbon emissions associated with a football game against Florida State, the school's long-time rival. To accomplish this, campus scientists calculated the scope 1 and 2 carbon impacts associated with the game, and the Gators then purchased certified carbon credits to offset these carbon emissions.

The UF Athletic Association's efforts to mitigate its carbon footprint inspired Jacob Cravey, an avid Gator fan, to found an environmental nonprofit organization, Earth Givers Inc., with the goal of creating local carbon-offset community development projects. Earth Givers' initiative "We Are Neutral" provides carbon offsets produced by local initiatives such as low-income energy retrofits. These projects are implemented by community volunteers and are offered free of charge to the neediest residents of Gainesville, where UF is located. "The University of Florida has embraced a unique model for creating carbon offsets that focuses on community building by creating economic opportunities for those in need and providing education on sustainable practices," says Cravey.

The UF Athletic Association partnered with We Are Neutral to create "Neutral Gator," a program created to help reduce the carbon footprint of Gator athletics via a local offsets program. It also helps raise awareness across the Gator community about the importance of mitigating climate change with carbon emissions abatement. Over time, the program has grown to encompass all of the Gator Athletic Association's environmental outreach and it is now the predominant brand for sports greening at UF. Athletic Director Jeremy Foley explains that the highly visible program sends an important message about sustainability. "It's just the right thing to do," he says.

The program rests on the partnership, established early, among the UF Office of Sustainability, the University Athletic Association, We Are Neutral, and the International Marketing Group (IMG). "Each partner provided valuable insight into the workings of the Gator athletics program that made it possible to create a vibrant initiative—reaching thousands of fans on game days—which also makes a difference in the lives of individuals in Gainesville throughout the year," explains Cravey.

The Athletic Association has also continued to improve its waste management practices, as part of the university's commitment to "zero waste." For example, the Gators worked with the stadium concessionaire to acquire recyclable and compostable packaging, and to pair all stadium garbage cans with recycling bins. The team also developed marketing materials with the tagline "Put it in the right can, Gator fan" to educate fans about the waste diversion effort.

CHALLENGES: OVERCOME AND ONGOING

"The main challenges [of Neutral Gator] have been communication and implementation," says Cravey. "We have to teach people what carbon offsets are, what a carbon footprint is, and why it's important. Then we need to get them to undertake carbon-reducing actions." The continued success of greening Gator athletics depends on using established relationships to spread knowledge of environmental issues and support for this work.

In an effort to seek out new strategies to involve and educate students, Neutral Gator has partnered with the Office of Sustainability's Gator Green Team to encourage fan engagement during UF's pregame FanFest. At the Sustainability/Neutral Gator tent(s) in the tailgating area on game days, fans can play environmentally themed games, get tips for reducing their environmental footprint, and learn about the Neutral Gator offset program. The stadium also features a Neutral Gator table and in-game JumboTron video announcements to help promote the Gators' environmental initiatives and get fans involved.

Another ongoing challenge for the Athletic Association, and the university as a whole, is continuing to reduce waste sent to landfill, particularly organic waste. Athletics has joined the university in negotiations in hopes of finding a campus waste contractor who can offer a commercial composting solution.

LESSONS FROM THE FIELD

INTEGRATE STUDENTS IN GREEN BUILDING PROJECTS

Students represent the majority of campus building users. Integrating student input into the design process can help improve building performance and better address users' needs. "Through student survey results, user requests were integrated into the design of the Southwest Recreation Center," says Armaghani. "Involving students in the design, construction, and operation of a LEED building was so rewarding we are using it on other projects."

GIVE STUDENTS HANDS-ON GREENING EXPERIENCE

Neutral Gator strives to give students an opportunity to participate in activities that benefit the local community as well as the environment, such as monthly tree plantings and low-income housing retrofits. "The dedicated staff, volunteers, and interns are expected to lead by example, creating awareness and building the relationships that make what they love to do a possibility," says Cravey.

ESTABLISH PARTNERSHIPS ON AND OFF CAMPUS

"From an operational perspective, the key for Neutral Gator has been to create meaningful partnerships within the community and within the various offices of the university," says Cravey. "By supporting We Are Neutral's Neutral Gator initiative, UF is also supporting partnerships off campus that make local carbon offsets possible. These partnerships include Alachua Conservation Trust, Gainesville Regional Utilities, low-income property managers, CH2M HILL, Alachua County government, the city of Gainesville, and countless business and civic groups."

TALK ABOUT WHAT YOU'RE PROUD OF

Action and storytelling are essential for brand enhancement. "UF, Gator Athletics, and Neutral Gator are proud to see a project of this size through," Cravey says. "They are proud of the program's presence in the community and the meaningful impact of the brand within the university communities that they work in. They are proud of how the program has been able to link carbon offset activities directly to community development," he adds. "From a marketing standpoint, the goal has always been to strengthen the brand of the University of Florida as a leader in athletics, sustainability, and community involvement."

TRANSFER SPORTS GREENING SUCCESSSES TO OTHER CAMPUS DEPARTMENTS

Thanks to the success of the Athletic Association's greening program, the Neutral Gator initiative has expanded to incorporate more UF department programs, including UF Housing's laundry operations and all commencement ceremonies (as well as other campus-wide events).

DON'T EXPECT CHANGE OVERNIGHT

"Through the Neutral Gator initiative, the partners have learned the importance of recognizing that existing systems, mental models, and infrastructure don't change overnight," says Cravey. "It takes dedication and passion to shift any culture or behavioral patterns."

- 1 "James W. 'Bill' Heavener Football Complex," Florida Gatorzone website, www.gatorzone.com/facilities/?venue=gateway.
- 2 Sara Watson, "University of Florida Football Complex Draws Praise for Sustainable Design," EWRI Currents, Spring 2009, www.asoe.org/ewri/UFSustainability.html.
- 3 Ibid.

NEUTRAL GATOR GREENING ACCOMPLISHMENTS

Since 2008 the Neutral Gator Athletic Initiative has:

- Provided low-income energy retrofits free of charge to 250 families.
- Installed or exchanged 63,000 CFLs (compact fluorescent light bulbs) in the Gainesville, FL community.
- Created over 3.5 million dollars in utility savings for low-income families.
- Offset over 10,000 tons of carbon.
- Planted over 18,000 native longleaf pines on local conservation lands.



Photos courtesy of University of Florida.





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 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.



CASE STUDY: UNIVERSITY OF OREGON, HOME OF THE DUCKS

CAMPUS FACTS

LOCATION:
Eugene, Oregon

FOUNDED:
1876

TYPE:
Public

TOTAL STUDENT POPULATION:
24,591 (20,829 undergraduates)

STAFF:
4,986

PRIMARY ATHLETICS CONFERENCE:
Pacific 12 (Pac-12)

PRIMARY ATHLETICS DIVISION:
NCAA Division 1

NUMBER OF VARSITY TEAMS:
19 (10 women's, 7 men's)

NUMBER OF SPORTS FACILITIES:
18 (11 athletic, 7 recreational)

SUSTAINABILITY OFFICE FOUNDED:
2007

AASHE STARS RATING:
Silver, 2011

SPORTS GREENING WORK STARTED:
2005

SPORTS FACILITY LEED CERTIFICATIONS:
Matthew Knight Arena LEED Gold Certification
for New Construction, 2013

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

The University of Oregon Ducks have hosted some of the greenest sports events in the nation. Their newly LEED Gold-certified Matthew Knight Arena demonstrates that the University of Oregon's community partnerships and greener event practices are now driving sustainability efforts throughout the athletics department's operations.

WHY IS UO GREENING SPORTS?

Greening the University of Oregon's sports facilities and operations reinforces the university's identity as a role model for sustainability. "Oregon Athletics is committed to playing a leadership role in the university's greening efforts," says athletics director Rob Mullens. "From individual offices to our complex of athletic venues, our staff, student-athletes, and supporters are making a difference for the environment." According to Bob Beals, associate athletics department director for facilities, greening efforts at Oregon athletic facilities result from an ethos of sustainability that exists in Eugene (the university's host community) and the state of Oregon. "It reflects the community that we live in," he says. "In Eugene and Lane County, more sustainable operations are the standard." The state's bottle deposit legislation was enacted in 1971, and citywide access to curbside residential recycling was mandated in 1983. On campus, the university has been recovering cardboard and paper for recycling since 1991. The UO transportation team has studied transportation trends for football games, and UO Athletics has encouraged alternative transportation options since 1999. "It's what people expect," says Beals. "People living in our community want to do the right thing from an environmental perspective."

WHERE DID UO START?

In 2008, the University of Oregon hosted the U.S. Olympic Trials for track and field, then did so again in 2012. Thanks to the Ducks' leadership, both events are among the most environmentally responsible sporting events in the United States, with the 2008 event earning the International Olympic Committee's Sport and Environment

Award and the 2012 event earning Gold level certification from the Council for Responsible Sport (see "Standout Greening Accomplishments" sidebar).

The Oregon athletics department worked with the city of Eugene and TrackTown USA (a local organization devoted to track and field events in Eugene), along with a collection of campus partners (including the facilities and transportation departments), to plan energy use, waste management, and transportation for the events. The event team reduced the need for mobile generators by establishing an integrated energy plan which reduced and replaced energy needs. One of the most innovative activations at each event was Safeway's "TrackTown Power Station," where fans lined up for an opportunity to generate battery power by riding one of the spin bikes in 2008 or running on a human hamster wheel in 2012. The festival management team, led

"OREGON ATHLETICS IS COMMITTED TO PLAYING A LEADERSHIP ROLE IN THE UNIVERSITY'S GREENING EFFORTS," SAYS ATHLETICS DIRECTOR ROB MULLENS. "FROM INDIVIDUAL OFFICES TO OUR COMPLEX OF ATHLETIC VENUES, OUR STAFF, STUDENT-ATHLETES, AND SUPPORTERS ARE MAKING A DIFFERENCE FOR THE ENVIRONMENT."

STANDOUT GREENING ACCOMPLISHMENTS AS HOSTS OF 2012 U.S. OLYMPIC TRACK AND FIELD TRIALS

227,123 people attended the 2012 U.S. Olympic Team Trials for Track and Field, which spanned 20 acres and 10 days.

- The event team purchased 122,000 kilowatt-hours worth of Green-e certified renewable power through the local utility, EWEB, to cover 100 percent of the event's energy needs.
- 78 percent (133 tons) of event waste was recycled or composted, including waste from build-out and tear-down.
- 100 percent of serviceware was compostable.
- Additional electric infrastructure was extended to eliminate mobile generators.
- Free bus tickets were provided to ticket holders, resulting in 7,744 boardings—a 29 percent increase from 2008.
- BP America-Target Neutral provided carbon offsets for the 2,732 tons of CO₂ emissions produced by the event operations and all athletes' and officials' air travel.
- A free valet station serviced 4,575 bikes.
- Water stations were positioned around the festival to encourage the use of refillable water bottles.
- Of the 17,456 square feet of plywood used, more than 70 percent was reclaimed after the event.
- Over 1,800 people volunteered over 48,000 hours, 1,000 free tickets were provided to youth and families that otherwise could not attend, the free fan festival hosted over 5,000 people daily, and over 8,000 youth participated in the Run!Jump!Throw! activity station.

by SportsOne, engaged sponsors to support various sustainability measures either directly in their booths or via underwriting the sustainability features in the event.

Anticipating more than 220,000 athletes, media members and spectators, the event team created a multifaceted transportation plan. It introduced the first bicycle and skateboard valet service at an Olympic competition and partnered with the Lane Transit District to provide all ticketholders and credentialed volunteers with free local bus transportation.

The 2008 event achieved a 70 percent waste diversion rate, increasing to 78 percent in 2012, by using only compostable serviceware and by recycling all plastic, aluminum cans, and paper products.

"At the 2008 and 2012 Olympic Trials for track and field, we moved our community's—and I think the U.S. Olympic Committee's—expectations on sustainability from an event check-box to an approach that was integrated throughout all aspects of the event, from operations, marketing, and fan education and engagement to the athlete experience," says Ethan Nelson, chair of the sustainability committee for the 2012 Trials and ongoing liaison between the athletics department, the university, and the City of Eugene.

Following the successes of the 2008 Olympic Trials, the athletics department evaluated ways to permanently improve the environmental performance of all Oregon athletics department facilities, particularly the stadium, during large football events.

"Initially, we realized that we needed to begin by implementing simple changes," says Beals. "Low-hanging fruit was the theme; we started by taking small steps to ensure success, and that helped snowball our greening efforts." UO's greening partners included Sanipac (the local waste hauler), the campus Office of Sustainability, the city of Eugene, Lane County leadership, and the Oregon Beverage Recycling Cooperative.

To implement these early ideas, the Oregon athletics department created a sustainability committee to "foster awareness and minimize our environmental impact," says Beals. To enhance its effectiveness, the sustainability committee drew representatives from a wide range of departments, including administration, development, facilities, food/hospitality, business office, and marketing staff as well as student-athletes.

The committee began with athletics offices to lead by example, installing composting and recycling bins at workstations and throughout common areas, switching to postconsumer recycled-content paper, educating staff about recycling and sustainability, and implementing suggestions from the University Office of Sustainability's Green Office Certification program. As a result of these efforts, the athletics facilities team earned Bronze certification from the Office of Sustainability, and the physical education and recreation department earned Silver.

In late 2010, the athletics department partnered with the Office of Sustainability to complete the nation's first greenhouse gas inventory and sustainability report for a Division 1 athletics department. The report recommended implementing several new environmental initiatives throughout Oregon Athletics, including developing an environmentally-oriented purchasing policy and training staff members in "triple-bottom-line purchasing," initiating recycling and composting collection at all sports events (including at the 58,500-seat Autzen Stadium, where the football team plays), and implementing energy efficiency upgrades at all facilities.

In 2011, Oregon Athletics collaborated with the waste hauler Sanipac to upgrade the recycling system. Since 2004, the stadium had collected paper and cardboard for recycling and a post-game sorting process collected commingled recyclables from the seating bowl. Partners started by implementing a three-bin collection system—recycling, composting, and landfill—in the largest concession area and in select stadium suites. The team also engaged food vendors and concessionaires to shift serviceware to compostable materials.



Photo courtesy of University of Oregon.



The Ducks also began a recycling pilot program in the tailgating area. This initiative, undertaken in partnership with the Oregon Beverage Recycling Cooperative, provided fund-raising opportunities for student and community groups by paying them to collect recyclable containers throughout the tailgating lots. “In 2011, 43,000 beverage containers were collected, and in 2012, this amount nearly doubled to 80,000 containers,” says Beals. “This provided \$6,150 to the participating groups while eliminating independent canners [scavengers] from roaming the parking lots.”

This work helped Oregon Athletics increase the stadium’s recycling and composting rate threefold, from 20 percent to 61 percent, over the course of two seasons. By the 2012 season the indoor tailgating venue alone hit a diversion rate of 75 percent, primarily through increasing fan outreach. This reduced waste and provided for student and community engagement.

UO’s recycling initiative built upon several existing environmental programs at the stadium. Since the 1990s, Oregon Athletics has donated unsold concession food to the local food bank, Food for Lane County. And, in 2004, an athletics department employee constructed a “liquid beverage recovery container,” which allows fans to empty bottles, cans, and cups at stadium ticket gates before reusing or recycling beverage containers. This initiative enhanced public awareness of the stadium’s recycling efforts and captured liquid waste for disposal in a sanitary sewer rather than having it poured on the ground.

The stadium features two other unique programs. First, Oregon Athletics installed three nesting platforms on 100-foot field lighting poles at Autzen Stadium, Hayward Field, and the football practice fields for the annual spring return of lifetime osprey mates. All three platforms provide easy access to the Willamette River (where the birds feed). Second, a food donation drive at the annual spring football game was launched in the 1990s; spectators are admitted to the game in exchange for three cans of food. The program has provided 267,839 pounds of food to Food for Lane County and is the single-largest event benefiting that charity. At the 2012 game more than 36 tons of food were collected in a three-hour period.

CHALLENGES: OVERCOME AND ONGOING

Oregon Athletics operates eleven facilities and hosts sports programs during the game season and off-season. “It is a challenge to provide a safe facility while creating a memorable fan experience and providing services in a cost-effective manner,” says Beals. “Greening efforts don’t always rise to the top of the budget requests. As a result we look to find partners. Partnerships are critical; they allow us to enhance our resources dedicated to sustainability.”

Oregon Athletics’ partnership with the city of Eugene and TrackTown USA on the 2008 and 2012 Olympic Trials events provided momentum for yearlong sustainability efforts across all athletics facilities. However, the greening goals for the one-off Olympic event proved easier to attain than greening some of the department’s ongoing procurement practices. The Ducks are still working to turn the successful approach used at the Olympic event into standardized operations for competition events. For example, the Ducks achieved Silver level certification for the entire 2013 track and field season from the Council for Responsible Sport.

Both Oregon Athletics and the city of Eugene see sports greening as a positive investment in changing fan behavior. “All of the information coming from the Natural Resources Defense Council and the Green Sports Alliance is showing that educating fans on sustainable lifestyle choices—whether it’s composting and recycling more, driving less, eating healthy food, engaging youth in sports, or generally reducing our carbon footprint—needs to come from an approach that is fun,” says Ethan Nelson of the City of Eugene.

STANDOUT GREENING ACCOMPLISHMENTS

- In 2008, the University of Oregon, in partnership with the city of Eugene and TrackTown USA, received the International Olympic Committee’s Sport and Environment Award for North America for the sustainability performance of their U.S. Olympic Track and Field Trials events. The city of Eugene also won the Governor’s Sustainability Award.
- In 2010, Oregon Athletics and the university’s Office of Sustainability completed a sustainability report and greenhouse gas (GHG) analysis, the first for a Division One athletics department.
- Oregon Athletics increased its recycling and composting rate threefold at the Autzen Stadium football complex, from 20 percent in 2010 to 61 percent in 2012.
- Since 2005, Oregon Athletics has donated an average of 9,300 pounds of concession food to Food for Lane County during each football season.
- Since 2005, the spring football game has required a donation of three cans of food in exchange for admission, collecting 267,839 pounds of food for Food for Lane County. The game is the single largest event benefiting the agency.
- In 2010, Oregon Athletics built its Matthew Knight Arena, which was awarded LEED Gold certification in 2013.
- In 2012, the University of Oregon helped host the U.S. Olympic Track and Field Trials (for the second consecutive time) and earned Gold certification from the Council for Responsible Sport, in collaboration with the City of Eugene and TrackTown USA.



Photos courtesy of University of Oregon.

Photos courtesy of University of Oregon.



LESSONS FROM THE FIELD

PROVIDE A POSITIVE EXAMPLE

“Oregon Athletics strives to reflect long-held values of the university, community, and state,” says Beals. “We believe that intercollegiate athletics can help set examples for more sustainable practices for university students and the community. Oregon Athletics will continue working with partners to help address environmental concerns,” he continues. “The Oregon Ducks Green Team is steadily changing waste management and sustainability issues.”

“ZERO WASTE” INITIATIVES BENEFIT FROM CONSISTENT SIGNAGE

Even without statistics for the three-bin system, staff noticed a significant difference between the first year the recycling and composting initiative was implemented and the second year in the degree of contamination of presorted waste at football games. According to Jeff Nunes, general manager for concessions, “It’s an ongoing educational process to improve diversion rates with the three-bin process. Generally, people weren’t paying attention to the new waste containers, but that has changed with time, as our patrons began to see other people presort when clearing their tables.” Subtle peer pressure can help shift the social norm, along with clear signs and the three-bin process. Nunes recommends using simple, consistent signs around waste stations that integrate with other fan education initiatives (e.g., posters, public-address announcements, videos). “It is ideal when the same signage is used from facility to facility and event to event,” says Nunes. “It allows the community and fans to develop familiarity with our methods of waste diversion.”

ESTABLISH PARTNERSHIPS

“No one person takes on this role independently,” says Beals, who in recent years has advanced partnerships with several stakeholders, including Sanipac, the city of Eugene, the Oregon Beverage Recycling Cooperative, and student groups on campus. Oregon Athletics’ greening partnerships have helped move the Ducks’ environmental initiatives forward. “Try to bring in people who show enthusiasm, then find them a role,” Beals suggests.

Scott Johnson, district manager for Sanipac, says, “We appreciate being a player in the greening evolution of the Ducks’ athletic facilities and events. By partnering with the athletics department, we are able to promote recycling awareness to city residents, businesses, and university partners. The systems developed by Oregon Athletics are becoming standard for other UO events and venues, which Sanipac serves throughout the region. Autzen Stadium presents an opportunity like none other to communicate with more than 58,000 people each Saturday during football season.”

ADAPT PROGRAMS TO BENEFIT THE BROADER COMMUNITY

“People are recognizing the need for collaborative action on environmental issues. Taking the time to think about sharing your story and helping others to shorten their learning curve is a worthwhile endeavor,” says Nelson. “Sport sustainability programs benefit from municipal programs and infrastructure and vice versa. Being able to develop community-wide programs and telling that story at sports events results in citizens thinking, ‘Hey, this is kind of cool. I can do more of this.’ That is what all of these efforts come down to, because if the fans like it, they will support the greening projects and will do more of this when they are away from the event. This benefits the entire community, not just now but into the future.”

USE ALL AVAILABLE RESOURCES

“Join the Green Sports Alliance and contact peers within your state, region, conference, or within the NCAA,” says Beals. “Look for information from other university departments, staff members, and students. There are people out there willing to participate. Welcome them and encourage them to get into the game and become game changers too.”



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 Radecic, 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:

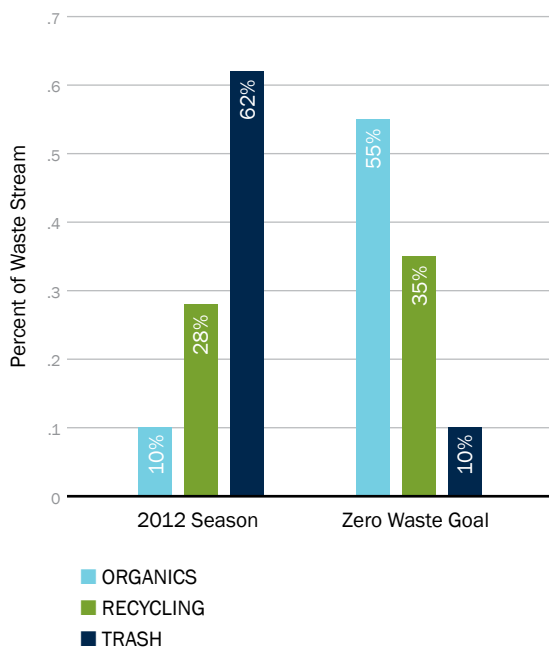
- implementing green cleaning procurement policies;
- working with the Minneapolis-based Tennant Company Group to pilot a “blue” cleaning technology, which minimizes chemical use by applying a low-level electrical charge to tap water, transforming it into a cleaning solution that breaks apart and lifts 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.



CASE STUDY: THE UNIVERSITY OF ARIZONA, HOME OF THE WILDCATS

CAMPUS FACTS

LOCATION:
Tucson, Arizona

FOUNDED:
1885

TYPE:
Public

TOTAL STUDENT POPULATION:
38,057 (29,719 undergraduates)

STAFF:
12,164

PRIMARY ATHLETICS CONFERENCE:
Pacific 12 (Pac-12)

PRIMARY ATHLETICS DIVISION:
NCAA Division 1

NUMBER OF VARSITY TEAMS:
20 (12 women's, 8 men's)

NUMBER OF SPORTS FACILITIES:
24 (14 athletic, 10 recreational)

SUSTAINABILITY OFFICE FOUNDED:
2010

AASHE STARS RATING:
Gold, 2012

SPORTS GREENING WORK STARTED:
2007

SPORTS FACILITY LEED CERTIFICATIONS:
Student Recreation Center, LEED Platinum
Certification for New Construction, 2010;
Lowell-Stevens Football Facility, LEED Silver
(or greater) Certification for New Construction
(pending)

**"ONE REASON THE UA IS
INTEGRATING SUSTAINABILITY
INTO SPORTS PROGRAMS IS
BECAUSE IT MAKES BUSINESS
SENSE," SAYS JOE ABRAHAM,
DIRECTOR OF THE UA OFFICE
OF SUSTAINABILITY.**

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

In 2010, the University of Arizona (the UA) built the first university recreation center in the United States to be awarded LEED Platinum certification. This facility is also the first in the nation to use solar energy for both heating the Olympic-size pool and cooling the building's chiller systems. The UA athletics department boasts on-site solar at the Hillenbrand Aquatic Center and resource-saving artificial football turf, and is awaiting LEED certification of the Lowell-Stevens Football Facility. The UA is successfully integrating sustainability across all sports facilities and operations, reducing both resource use and operational costs.

WHY IS THE UA GREENING SPORTS?

According to Joe Abraham, director of the UA Office of Sustainability, there is often a financial case for greening sports. "One reason the UA is integrating sustainability into sports programs is because it makes business sense," says Abraham. "Implementing new technologies and greening programs into our sports facilities helps reduce our energy and water use."

Brand enhancement is another reason the UA is advancing sports greening. "As the country pivots toward sustainability, going green also enhances the UA's reputation," explains Abraham. "For example, the UA was recently listed as one of the Princeton Review's Top Green Schools. This recognition is valuable for recruiting students."

The UA is also greening sports to support its students' interests in sustainability. "By implementing new sustainability projects supported by our student-governed UA Green Fund, the UA increases its visibility as a place where exciting green things are happening," Abraham explains.

WHERE DID THE UA START?

GREEN BUILDING LEADERSHIP

"In building a more sustainable campus, start with an institutional commitment to build green buildings," says Peter Dourlein, assistant vice president of UA Planning, Design, and Construction. "The UA requires that all new buildings and major renovations achieve a LEED rating of Silver or better. University standards on how to maintain those buildings ensure that these facilities live up to their full potential." UA Planning Design & Construction maintains these standards with UA Facilities Management and other Business Affairs units.

STUDENT RECREATION CENTER LEED PLATINUM FEATURES

SITING

- The Rec Center was built on a recovered brownfield site previously used as a parking lot.
- The facility is connected to environmentally preferable transportation (e.g. bicycling and walking access).
- A white roof was installed to reduce the heat island effect.
- The parking spots closest to the facility are reserved for electric and hybrid vehicles.

WATER EFFICIENCY

- High-efficiency plumbing fixtures have reduced the center's water use by 47.5 percent.
- Landscaped areas at the Rec Center were designed to promote passive stormwater harvesting, using filtration basins and increased permeability to reduce runoff.
- Water harvesting and stormwater management techniques include bioswales (which help remove pollution from stormwater runoff), a percolation bed beneath the volleyball court, and the capturing of HVAC condensation for irrigation.
- Plants surrounding the expansion were selected for their ability to thrive with minimal watering.

ENERGY AND ATMOSPHERE

- Synchronized energy systems save 50.4 percent of energy costs compared with costs prior to the 2009 expansion.
- Passive solar measures, such as the use of daylight and overhangs that shade glass and ground surfaces, promote energy efficiency.
- 54,000 square feet of white roofing reflects sunlight and remains cool while reducing the energy used for air conditioning.

MATERIALS AND RESOURCES

- More than 10 percent of all the materials used in construction were either manufactured or produced within 500 miles of Tucson.
- 28.75 percent of the Center's building materials were made with recycled content, including aluminum, steel, floor finishes and trim, roof insulation, and wall insulation.

INDOOR ENVIRONMENTAL QUALITY

- Rec Center users benefit from both 97.54 percent natural daylight and access to exterior views throughout 99.57 percent of all regularly occupied spaces.
- Added ventilation improves air quality.
- Interior materials and finishes have no or very low VOCs (volatile organic compounds).

The first major green building initiative at a UA sports facility, in 2009, was an \$18.6 million expansion of the Student Recreation Center. "The first place many students interact with when they arrive on campus is the Recreation Center," notes Lynn Zwaagstra, director of UA Campus Recreation. "With close to 25,000 students using the Student Recreation Center and almost 835,000 total visits last year, we are pleased to help advance our institutional sustainability goals."

The UA's department of Campus Recreation helped lead the design team for the 53,000-square-foot expansion, which doubled the amount of space for cardio-fitness, strength conditioning, and several new activities. Green building was prioritized from the outset of the design process in order to promote student health and wellness, minimize environmental impact, and conserve water, especially important in Tucson's arid climate.

Campus Recreation took advantage of on-campus experts in sustainable design, including faculty, students, and operations staff, to improve the green features of the building. For example, students and staff from the UA's College of Agriculture and Life Sciences assisted with the landscaping and water-harvesting aspects of the design. Students, along with faculty from the Department of Soil, Water, and Environmental Science, installed passive water harvesting basins to manage rainfall runoff adjacent to the facility. Facilities Management identified the efficient irrigation and mechanical systems. UA parking and transportation services dedicated prime parking spaces to low-emission vehicles.

Dourlein said that the interdepartmental collaboration was unique. "Various UA programs, students, faculty, and staff came together to make the LEED certification happen, and we couldn't be more proud." The expansion was originally designed to achieve LEED Silver certification, in accordance with UA construction policy. However, the university worked with its design firm to achieve LEED Platinum certification without affecting the original project budget," says Dourlein.

One notable design feature is the 346-vacuum-tube thermal solar collector that spans the facility's roof and produces almost 2 million kilowatt-hours of solar power each year. The solar energy drives an absorption chilling system that helps cool campus buildings. Heat, a by-product of this process, is captured and used to warm the Recreation Center's 55,000-gallon Olympic-size swimming pool. The thermal solar array provides one-third of the energy needed to heat the pool.

Another unique feature is the water retention basin built under the volleyball courts. This basin stores rainwater collected from the center's roof and allows the water to percolate into the ground, helping to minimize stormwater runoff. Dourlein also praises the UA's extensive outdoor space for helping to minimize the building's footprint. "The most sustainable building is the one you never have to build, so making the most of outdoor space—and therefore reducing the indoor conditioned space we build—is one of the greenest things we can do," he explains.

Student use of the recreation center has increased 91 percent since the building opened in January 2010. Myles Palmer, a desk assistant at the center, thinks that has something to do with the environmental quality of the new space. The previous interior "was really fluorescent, but now the windows bring in natural light that's easy on the eyes," he says. "And the old weight room didn't have the open, natural feel that the new one does." The new building uses natural daylight in 99 percent of all commonly occupied spaces and has improved indoor air quality with added ventilation.

The LEED Platinum Recreation Center isn't the only UA sports facility that features on-site solar. The Hillenbrand Aquatic Center, which has served as a training center for 45 Olympian and 61 NCAA champion swimmers, also installed a thermal solar system in 2010 to provide 20 percent of the pool's energy needs for heating, or about 400 million BTUs. Solar thermal water systems are particularly well suited to the University of Arizona, which benefits from more than 350 days of sunshine each year.



Photos courtesy of The University of Arizona.

In 2012, the UA began another green building expansion to accommodate the growing student population, this time led by the athletics department. The university expanded Arizona Stadium, home to the Wildcats since 1929, by constructing the Lowell-Stevens Football Facility, currently awaiting LEED certification (anticipated to be Silver or higher). Financed through private donations, the Lowell-Stevens Football Facility houses coaches' offices, an equipment room, a medical treatment center, team meeting rooms, and weight and locker rooms, as well as a cafeteria open to the campus and public. This construction project builds on ongoing energy efficiency measures at Arizona Stadium, including the 2010 installation of outdoor lighting fixtures that direct light more precisely inside the stadium and reduce light pollution by 75 percent.

STUDENT ENGAGEMENT

"In addition to building a green campus, the UA is working to build a student body that's engaged in sustainability," says Abraham. "One mechanism for this is the UA Green Fund." The Green Fund, created in 2010, offers financial support for students and employees who create innovative projects in areas such as renewable energy; energy efficiency; water efficiency; waste reduction; and environmental sustainability education, research, and outreach.

The Green Fund is financed with a \$24 annual fee per student per year, paid as part of tuition. The 10-student Green Fund Committee allocates its \$400,000 yearly budget to multiple projects across the university system, basing decisions on a review of project proposals submitted by students, faculty, and staff. Since 2010, the Green Fund has allocated over \$1.5 million to more than 50 projects, including projects greening UA sports events.

For example, the Green Fund Committee has provided funding to the student-run "Greening the Game" program that partners with UA Facilities Management to increase waste diversion at home football games. The student team encourages tailgaters to sort their waste, provides tailgaters with green tips and other educational materials and, with UA Facilities Management, analyzes ways to increase recycling rates. "Thanks to our partnership with students we were able to divert over 25 tons of recyclables from the landfill over the course of six home football games during the 2011 season," says Chris Kopach, assistant vice president for Facilities Management.

"UA students have led the campus on green initiatives and continue to be catalysts for sustainable change at the UA, particularly in relation to sports events," says Abraham. "Along with UA Facilities Management, students are leading the way to increase our recycling rates across the campus. In the fall of 2012, students worked with Facilities Management to install new recycling bins in over 100 campus buildings and worked with the Office of Sustainability to promote the more visible and informative bins to students and employees."

NEW STADIUM TURF

In February 2013, Arizona Athletics announced plans to install synthetic turf at Arizona Stadium to replace the natural grass. Arizona Stadium is now just the second major stadium in the country to install FieldTurf's CoolPlay, an artificial turf system that is made of recycled materials and is 100 percent recyclable, thanks to a take-back program with FieldTurf. This CoolPlay system reduces on-field temperatures by 15 to 20 degrees—an important benefit in a city as hot as Tucson—while significantly reducing the water consumption previously required to maintain the hybrid Bermuda grass.

ACCORDING TO FIELDTURF, THE "COOLPLAY ARTIFICIAL TURF":

- Can save up to 1 million gallons of water each year in avoided watering
- Is made using approximately 20,000 recycled tires for its infill layer
- Is 100 percent recyclable
- Needs no ongoing maintenance, chemicals, or other products that are typically required for natural turf management
- Can contribute toward LEED credits



“A CAMPUS-WIDE COMMITMENT TO SUSTAINABILITY THAT INCLUDES OUR SPORTS PROGRAMS INCREASES THE UA’S VISIBILITY AND REPUTATION,” SAYS ABRAHAM. “AS A RESULT, WE THINK WE’LL INCREASE STUDENT AND STAFF PRIDE, ALUMNI AND DONOR ENGAGEMENT, FAN LOYALTY, AND EVEN CONNECT WITH BUSINESSES AND CORPORATIONS THAT SHARE OUR GOAL OF REDUCING OUR ENVIRONMENTAL FOOTPRINT.”



GREEN CLEANING

“Although the UA has been recognized for its commitment to building sustainable facilities, an important component in the university’s long-term sustainability is maintaining these facilities,” says Kopach. Across the UA main campus, including in the Student Recreation Center and in all Arizona Athletics facilities, the UA has switched from potentially harmful cleaning products to environmentally preferable formulations. “Over 75 percent of traditional cleaning supplies were replaced with products developed not only for high performance but also for a reduced environmental impact and enhanced safety,” says Kopach.

These green custodial practices earned the Facilities Management custodial team a Green Guard Certification, a recognition given to only a handful of campuses nationwide. “This certificate is a formal recognition of the UA’s commitment to maintain clean, safe, and attractive facilities by procuring and properly using environmentally preferable cleaning products,” says Kopach.

CHALLENGES: OVERCOME AND ONGOING MAKING THE CASE FOR SPORTS GREENING

“One initial challenge facing many universities is the presumption that sustainability and sports aren’t a natural fit and that green initiatives don’t advance the goals of sports programs,” says Abraham. “But a campus-wide commitment to sustainability that includes our sports programs increases the UA’s visibility and reputation. As a result, we think we’ll increase student and staff pride, alumni and donor engagement, fan loyalty, and even connect with businesses and corporations that share our goal of reducing our environmental footprint.”

For example, in 2013, Campus Recreation worked with Facilities Management personnel to add a water bottle refilling station at the Student Recreation Center. This simple investment encourages students and employees to drink free, filtered tap water from reusable water bottles rather than purchasing environmentally costly bottled water. This move has been hugely popular among students, staff, and other recreation center visitors. With strong positive response, the initiative is spreading to many other parts of campus.



Photos courtesy of The University of Arizona.

ONGOING BUY-IN

“Moving sustainability forward at the UA also means eliminating silo walls between departments, an issue that many other large universities face. Finding out what motivates each group is important, as is creating a vision that serves everyone’s goals,” explains Abraham. “Taking the time to understand the different priorities and constraints of the UA units responsible for our sports facilities, programs, and events has given us a clearer way forward and a better foundation to collaborate on our institutional sustainability goals.”

Next steps at the UA include creating a mixed undergraduate and graduate-level environmental course in which students will identify sustainability opportunities and solutions at the UA, including in sports facilities. Supported by the Green Fund, the College of Engineering, and the Office of Sustainability, this course will teach students assessment methods and directly engage more students in the greening of the UA campus. “As a large research university with strong campus recreation and FBS Division I intercollegiate athletics programs, the UA is positioned to contribute to the intersection of sports and sustainability in collaboration with the Green Sports Alliance, NRDC, NCAA, NIRSA, AASHE, and other organizations,” says Abraham.

In 2013, the UA joined the Green Sports Alliance to learn from and support other professional and collegiate sports greening programs. “In addition to continuing to walk the walk, we look forward to working with the Green Sports Alliance to refine best practices and contribute to their adoption by other universities and venues,” UA athletics director Greg Byrne said after the move was announced.

ENVIRONMENTAL ASSESSMENTS FOR EVENT GREENING

“In recent years, many universities have invested significant resources to reduce the environmental impacts associated with large events. But in most cases, the majority of impact reduction focuses on ‘zero waste’ campaigns that divert waste from landfills by means of recycling and compost programs,” says Abraham. “By comparison, UA is employing a life-cycle assessment (LCA) approach that takes into account all upstream and downstream impacts of its annual homecoming event.”

According to Abraham, the UA is the first to use aspects of an LCA approach to assess the environmental impacts of a so-called “mega” event like their annual Homecoming. “With over 60,000 attendees over three days, Homecoming is the UA’s largest long-running annual event, offering a unique opportunity to engage students, employees, and alumni in sustainability,” says Abraham. In 2012, the UA used LCA methodology to evaluate some of the environmental impacts associated with attendee travel and accommodations, 25 major events, game-day festivities, and the football game, with the goal of understanding how to reduce impacts of homecoming and other large UA events as well as developing a transferable assessment method.

For this project, the UA Office of Sustainability and several campus departments assembled a team dedicated to collecting and analyzing some of the available environmental impacts data related to Homecoming. This team included a graduate assistant, two NASA Space Grant undergraduate interns, and four engineering management undergraduates. This team worked to evaluate some of the environmental data associated with the raw material extraction, material processing, manufacturing, assembly, transportation, product use, and end of life for the products used during Homecoming with the “SimaPro LCA Software” system. The team used LCA methodology based on EPA’s Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI). On game day and throughout the weekend, 120 honors students collected data from attendees at a diverse array of events.

“The assessment will be conducted again in 2013, with a number of strategies based on the 2012 assessment in place to improve the environmental performance of the 2013 Homecoming celebration in a meaningful and verifiable way,” says Abraham. “Based on our findings the Office of Sustainability will assemble an environmental better practices guide for hosting large events.”



Photos courtesy of The University of Arizona.

“IN ADDITION TO CONTINUING TO WALK THE WALK, WE LOOK FORWARD TO WORKING WITH THE GREEN SPORTS ALLIANCE TO REFINE BEST PRACTICES AND CONTRIBUTE TO THEIR ADOPTION BY OTHER UNIVERSITIES AND VENUES,” SAID GREG BYRNE, THE UNIVERSITY OF ARIZONA’S ATHLETICS DIRECTOR.



Photos courtesy of The University of Arizona.

“TAKING THE TIME TO UNDERSTAND THE DIFFERENT PRIORITIES OF THE SEVERAL UA UNITS RESPONSIBLE FOR OUR SPORTS PROGRAMS, FACILITIES, AND EVENTS HAS GIVEN US A CLEARER WAY FORWARD,” SAYS ABRAHAM.

LESSONS FROM THE FIELD

ENSURE INITIATIVES ARE SIMPLE

“To ensure buy-in, sustainability initiatives should be cost-effective and easy to implement,” advises Abraham. He suggests piloting new efforts on a small scale first, to demonstrate feasibility, gather feedback, and build confidence, before rolling them out on a larger scale.

TAKE INTO ACCOUNT SPORTS DEPARTMENT INTERESTS

“Taking the time to understand the different priorities of the several UA units responsible for our sports programs, facilities, and events has given us a clearer way forward,” says Abraham. He notes that the business angle can provide common incentives across departments, as well as concrete benchmarks for green initiatives. “Although the UA is fortunate to enjoy a campus culture that supports sustainability, going green requires much more tangible commitments and achievable goals.” One reason the UA supports sustainability is because it makes business sense. “Implementing new technologies and greening programs into our sports facilities helps reduce our energy and water use. It helps lower the UA’s bottom line.” says Abraham.

RECOGNIZE THAT DEPARTMENTS HAVE DIFFERENT CAPABILITIES

Athletics, Campus Recreation, Facilities Management, Planning Design & Construction, and other campus departments each have different budgets, staff, expertise, incentives, stakeholders, and funders. These factors influence green project feasibility and timelines. “It’s important to recognize the challenges that different departments across the university may encounter as they attempt to implement sustainable practices,” says Abraham, “especially given that universities often do not function as top-down as a business might.”

JOIN THE GREEN SPORTS ALLIANCE FOR ONGOING ADVICE AND SUPPORT

UA joined the Green Sports Alliance to learn from and support other professional and collegiate sports greening programs. “We are proud to contribute to and learn from the Green Sports Alliance to help refine industry best practices and advance our programs,” says Abraham.



CASE STUDY: UNIVERSITY OF WASHINGTON, HOME OF THE HUSKIES

CAMPUS FACTS

LOCATION:
Seattle, Washington

FOUNDED:
1861

TYPE:
Public

TOTAL STUDENT POPULATION:
42,907 (30,790 undergraduates)

STAFF:
21,977

PRIMARY ATHLETICS CONFERENCE:
Pacific 12 (Pac-12)

PRIMARY ATHLETICS DIVISION:
NCAA Division 1

NUMBER OF VARSITY TEAMS:
19 (10 women's, 9 men's)

NUMBER OF SPORTS FACILITIES:
17 (9 athletic, 8 recreational)

SUSTAINABILITY OFFICE FOUNDED:
2008

AASHE STARS RATING:
Gold, 2012

SPORTS GREENING WORK STARTED:
2010

SPORTS FACILITY LEED CERTIFICATIONS:
Football Operations Building & Husky Stadium LEED Silver Certification for the Core and Shell standard (pending 2013)

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

The University of Washington (UW) has built one of the strongest coalitions of staff and students devoted to sports greening in the nation. From their 100 percent recycled paper purchasing policy to sustainability plans and resource tracking across all athletic facilities, the Huskies are greening leaders in collegiate sports operations. Next on their agenda: LEED certification for the new Football Operations building and the renovated Husky Stadium.

WHY IS UW GREENING SPORTS?

According to Washington athletics director Scott Woodward, preserving the natural beauty of their surroundings in Washington State has been a motivator in the Huskies' greening initiative. "We're fortunate at the University of Washington to have our athletic facilities located in a beautiful landscape. Keeping that landscape beautiful through sustainability measures is a high priority for us," he says. "My staff has worked diligently to create infrastructure and procedures that will ensure that we stay green for years to come."

Although Husky Stadium first implemented a recycling program in 2000, it took 10 more years before the athletics department launched a comprehensive environmental initiative. The leadership of Seattle's professional teams (the Seattle Mariners, Seahawks, Sounders, and Storm, all of which joined NRDC as founding members of the Green Sports Alliance) helped inspire the UW athletics department's program in sports greening. The Huskies became even more convinced of the benefits of greener operations through attending Alliance forums, where Seattle's sports teams shared details of their greening practices. "Not surprisingly, Washington was one of the first collegiate programs to join the Alliance," says Karen Baebler, assistant athletics director for sport operations and chair of the Huskies' sustainability committee. "The Alliance supports University of Washington Athletics' sustainability efforts by offering strategies to become more environmentally responsible and efficient."

"WE'RE FORTUNATE AT THE UNIVERSITY OF WASHINGTON TO HAVE OUR ATHLETIC FACILITIES LOCATED IN A BEAUTIFUL LANDSCAPE. KEEPING THAT LANDSCAPE BEAUTIFUL THROUGH SUSTAINABILITY MEASURES IS A HIGH PRIORITY FOR US," SAYS ATHLETICS DIRECTOR SCOTT WOODWARD. "MY STAFF HAS WORKED DILIGENTLY TO CREATE INFRASTRUCTURE AND PROCEDURES THAT WILL ENSURE THAT WE STAY GREEN FOR YEARS TO COME."

Following the lead of Seattle's professional teams, the Huskies discovered that enhancing the sustainability of their operations not only provided resource savings but also attracted support from many campus and community partners, including corporate sponsors. "Once we started moving forward with sustainability initiatives beyond waste diversion, everything just started to snowball," recalls Baebler. "We found support from student academic programs and organizations, campus partners, and athletics department sponsors."

HUSKY STUDENT-ATHLETE INITIATIVES

Student-athletes are represented on the athletic sustainability committee and contribute to the department's efforts with project ideas of their own. For example, students integrated sustainability into the Washington Student-Athlete Advisory Committee's annual "Dawg Bowl" competition among the school's varsity teams. Teams are awarded points for accomplishments in areas such as athletic achievement, academic achievement, community service, life skills, and, as of February 2012, sustainability. Student-athletes can now earn points for team greening efforts such as adding composting to a team lounge or environmental social media outreach.

Additionally, any UW student can gain valuable professional development experience through an Athletic Sustainability Internship or volunteer opportunities. Student volunteers can earn free admission to games when staffing Green Team education booths at Husky Stadium and the Alaska Airlines Arena, where they distribute environmental information and green-themed giveaways to fans.



Photos courtesy of University of Washington.



WHERE DID UW START?

The UW athletics department launched its sustainability program in July 2010 by devising a strategic plan that encompasses all 17 varsity sports teams and 9 athletic facilities. The plan includes measuring success by tracking energy use and waste diversion; implementing resource conservation projects to promote energy, water, and paper-use efficiency; and working collaboratively with student groups and campus departments.

The athletics department's paper reduction strategies include switching from printed media guides to digital guides, and transitioning phone bills, monthly budget reports, and HR bookkeeping to digital systems. Additionally, athletics copiers and printers are now set to print double-sided to minimize use of copier paper.

An extremely important step in creating and maintaining a robust sustainability program was to build a strong sustainability team. As recently as 2010, no athletic department staff members had responsibility for sustainability programs or practices. Between 2010 and 2013 the Huskies developed a 35-person Athletics Department Sustainability Committee, initially with members from across the athletics department and shortly thereafter adding campus and private sector stakeholders. "Although our department is a large one and has excellent internal support," says Baebler, "the help and support from the Waste Management Office, Cedar Grove Composting Company, the Office of Environmental Stewardship and Sustainability, the College for the Environment, and the Green Sports Alliance have greatly contributed to the continued growth of the department's sustainability efforts."

As the committee grew, the athletics department staff began to take advantage of the expertise on the UW campus to advance both the athletics department's goals and campus-wide sustainability goals. "Our sustainability efforts started internally, but we quickly realized that the broader university community could provide many great resources," says Baebler. "Unlike professional sports teams, we are part of a larger organization, and we have an opportunity to access campus expertise and collaborate with campus groups."

A few simple green policies in the athletics department offices include a paper purchasing policy requiring the use of 100 percent recycled content paper products. UW prioritizes recycled paper because it helps reduce air and water pollution and its production uses less energy than paper produced using timber. Husky Athletics also donates all used tennis balls from its tennis program to local schools and small businesses for reuse.

During the fall of 2010, with paper use reduction practices under way, the Green Team turned to creating a waste diversion program for the athletics department. This included designing a new logo, adding compost bins alongside recycling bins, switching to compostable serviceware, implementing a polystyrene foam recycling program, airing video messaging about the greening program during games, launching the Green Minute campaign (see "The Huskies' Tactics for Increasing Waste Diversion" sidebar), organizing fan engagement giveaways, and participating in the Game Day Challenge.

Because fans in Seattle are familiar with recycling and composting in their homes and at Seattle's professional sports venues, UW's sustainability committee decided to focus first on waste diversion. "The main focus in the stadium and arena has been waste diversion," says Baebler. "We made the choice to start with waste diversion because we knew we could make an impact immediately, and we could engage thousands of fans. We could also measure our progress, which is crucial to success."

In October 2011, the Huskies competed in the Game Day Challenge, described as "a friendly competition for colleges and universities to promote waste reduction at their football games." UW Athletics reached a 46 percent diversion rate in 2011, earning second place in the Pac-12 conference and twelfth place nationally among NCAA Division I schools for total waste diversion. The department ranked second nationally for organics diversion and ninth for waste minimization.

During the 2011-12 and 2012-13 academic years, Husky Athletics expanded their Game Day Challenge practices to all sports by hosting a green-themed game for each varsity team. These "green games" were aimed at educating and engaging Husky sports fans while improving the athletics department's overall diversion. Sustainability-themed games will continue in the 2013-14 academic year.

CHALLENGES: OVERCOME AND ONGOING

The Huskies' largest ongoing initiative is the major renovation of their football stadium, scheduled to re-open for the 2013 fall football season. "The vision for the renovation of Husky Stadium includes ensuring the project is beautiful, functional, and sustainable," says Baebler. "The project goals, led by athletics director Scott Woodward, include LEED certification for both the new 70,000 square foot Football Operations Building and the renovation of the existing stadium." The project includes locally sourced wood, steel and stone; an advanced energy management system; LED lighting; and recycling 95 percent of construction waste.

"Husky Stadium is integrating resource-efficient features with multi-use design that ensures the building will be used year-round," says Chris deVolder, architect with 360 Architecture and project manager for the Husky Stadium renovation. "One of the keys to the success was including athletics operations in the design process from the beginning and engaging local resources. This includes reaching out past the edge of the stadium, working with the university and local transit authorities to design a bike parking system that accommodates day to day use as well as expanding to accommodate game day use."

360 Architecture is working with Husky Athletics to design greener infrastructure for the renovation as well as advising on long-term environmentally preferable operations for the facility. Thanks to student interest, greener operations are becoming the new norm for collegiate sports venues, explains deVolder. "Students are now coming into college not asking about sustainability performance, but demanding it. It's becoming part of how they decide where to go to school," says deVolder. "Nationwide, we're really just starting to scratch the surface of sustainability performance within collegiate sports and Husky Stadium is helping to lead the way."

In August 2013, with planning was still underway for greening stadium operations, the athletics department acquired a grant of \$3,500 from the GLAD® One Bag College Waste Diversion Grant program to help enhance waste management practices. The grant was used to bring in an environmental consulting firm, Milepost Consulting, to advise on operational efficiency and goal setting. Husky Athletics worked with Milepost to establish four teams of employees to enhance stadium operations upon reopening: infrastructure, measuring and reporting, fan engagement, and stakeholder engagement. Each team has a set of goals and strategies.

THE HUSKIES' TACTICS FOR INCREASING WASTE DIVERSION

REVERSE SORTING

Instead of sorting recyclables from a mixed waste stream, Husky Athletics was able to increase diversion by sorting out garbage and recycling what remained.

COMPOSTABLE PACKAGING

Close to 100 percent of concession packaging in Husky Stadium is either compostable or recyclable. This, along with a post-game sorting program, has increased the stadium's diversion rate and helped reduce contamination in the recycling and composting waste streams. In the renovated stadium, no garbage bins will be available.

"GO PURPLE, BE GOLD & GREEN" BRAND

Husky Athletics developed a brand for its greening program to provide consistent messaging. Recycling bins throughout all athletic facilities feature the greening slogan and logo. Volunteers, student-athletes, Harry the Husky (the UW mascot) and ushers also wear T-shirts, buttons, and hats to promote the program at home sporting events.

"GREEN MINUTE" CAMPAIGN

An in-game promotion during the second half of each football game, the "green minute" includes a fun public service announcement involving student-athletes and coaches played on the stadium's screens, encouraging fans to compost and recycle. Husky Athletics launched the campaign during the first 2010 home football game.



Photo courtesy of University of Washington.

“OUR SUSTAINABILITY EFFORTS STARTED INTERNALLY, BUT WE QUICKLY REALIZED THAT THE BROADER UNIVERSITY COMMUNITY COULD PROVIDE MANY GREAT RESOURCES,” SAYS KAREN BAEBLER, ASSISTANT ATHLETICS DIRECTOR FOR SPORT OPERATIONS AND CHAIR OF THE HUSKIES’ SUSTAINABILITY COMMITTEE. “UNLIKE PROFESSIONAL SPORTS TEAMS, WE ARE PART OF A LARGER ORGANIZATION, AND WE HAVE AN OPPORTUNITY TO ACCESS CAMPUS EXPERTISE AND COLLABORATE WITH CAMPUS GROUPS.”



Photo courtesy of University of Washington.

INFRASTRUCTURE

- Establish a two-stream waste system for fans, with bins placed only for recycling and composting, facilitated by 100 percent recyclable and compostable serviceware. Any non-recyclable or non-compostable trash will be collected in the bowl after each game by a cleanup crew managed by Husky Athletics.
- Install new color-coordinated bins with clear signage to help make use of the receptacles easier.
- Color-code serviceware products to match the bin they belong in.
- Determine the optimal number and placement of bins so fans are likely to go to the correct area to recycle and compost their waste.

MEASURING AND REPORTING

- Set goals for waste diversion, water conservation, and energy efficiency for Husky Stadium and all Husky athletic facilities.
- Gather and analyze data to help set future goals and monitor progress.

FAN ENGAGEMENT

- Enhance outreach to increase fan awareness of environmental issues and encourage support for the greening program.
- Create environmental messaging prior to the stadium’s reopening and during the 2013 fall season.

STAKEHOLDERS

- Work with partners including ARAMARK, Waste Management, Cedar Grove Composting, and other stakeholders to coordinate and optimize procedures, share better practices, and create a culture of sustainability.
- Work with student groups, interns, student-athletes and the Office of Environmental Stewardship and Sustainability to expand available sports greening resources and promote community engagement.

“Husky Athletics built a successful step-by-step implementation plan by setting roles and ongoing responsibilities for each member of the diverse team of athletics, campus, supplier, and service provider representatives,” says John Silkey, senior project manager at Milepost Consulting. “This makes an intimidating program rollout more manageable and helps monitor project progress.”

An ongoing challenge the UW athletics department faces is how to devote staff time to implementing lasting operational improvements, given that the department staff is already obligated to manage their teams and more than 400 events each year. “The staff is already so busy focusing on the teams and athletes,” explains Baebler, “that it can be a challenge to simultaneously manage the department’s sustainability programs. However, greening is an ongoing priority for Husky Athletics. The department recognizes the variety of benefits it can provide for the students, staff, environment, and the bottom line.” In order to help give the sustainability program the attention it deserves, the Huskies have turned to one of the greatest assets on their college campus: the student body. The Huskies established student internships and student volunteer roles, helping students gain valuable professional experience by implementing lessons from the classroom in hands-on greening projects, and enhancing the time spent on greening by the athletics department staff.



LESSONS FROM THE FIELD

CAPITALIZE ON EARLY ENTHUSIASM

The Huskies advise launching several outreach initiatives in quick succession to capitalize on the enthusiastic community support for new and exciting programs. “Early success came easily for our sustainability efforts, and the feedback from fans, campus, and the community was 100 percent positive,” says Baebler. “So many people were willing to partner and share resources that Husky Athletics was able to establish a strong program rapidly.”

ENGAGE MARKETING STUDENTS

“Over the years, it has become more difficult to be successful as goals are set higher and it’s no longer fresh and new for the community,” says Baebler. Husky Athletics engages student interns from the environmental studies and marketing programs to help prevent “messaging fatigue” by developing new and creative ways to keep fans interested.

ESTABLISH A SPORTS GREENING BRAND TO ATTRACT SPONSORS

“The sustainability program has been a brand enhancer,” says Baebler. “It has opened up opportunities with sponsors who may have had no interest in partnering with athletics before.” For example, Cedar Grove, the largest composting company in the Northwest, is now a sponsor of Husky Athletics. It has sponsored many sports events and has its logo on the university’s “Go Green” shirts.

USE CONCESSIONAIRE EXPERTISE

“The athletics department concluded that it was the correct move to start with waste diversion,” says Baebler. “Your concessionaires have the expertise to help grow a compost and recycling program. Using partners like these can make launching a new sustainability program more manageable.”

PARTNER WITH STUDENT CLUBS

“The athletics department has been able to partner with student environmental clubs to come up with cost-effective new and fun ideas for grassroots education,” says Baebler. Student outreach is one of the most effective ways to involve the student body and make sports greening communications memorable for students.

POSITIVE MEDIA COVERAGE ADDS TO THE VALUE OF GREENING

“As we keep striving to decrease our environmental impact, Husky Athletics is grateful for all of the support and cooperation we’ve received,” says Baebler. “The efforts of the past three years have led to articles in magazines and newspapers and speaking opportunities. It has been well worth the effort, something that the athletics department is proud of and that demonstrates the school’s forward thinking.”



Photos courtesy of University of Washington.



CASE STUDY: YALE UNIVERSITY, HOME OF THE BULLDOGS

CAMPUS FACTS

LOCATION:
New Haven, Connecticut

FOUNDED:
1701

TYPE:
Private

TOTAL STUDENT POPULATION:
11,906 (5,379 undergraduates)

STAFF:
9,323

PRIMARY ATHLETICS CONFERENCE:
Ivy League

PRIMARY ATHLETICS DIVISION:
NCAA Division 1

NUMBER OF VARSITY TEAMS:
35 (18 women's, 16 men's, 1 co-ed)

NUMBER OF SPORTS FACILITIES:
39 (29 athletic, 10 recreational)

SUSTAINABILITY OFFICE FOUNDED:
2005

AASHE STARS RATING:
Silver, 2011

SPORTS GREENING WORK STARTED:
2008

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

Yale University is home to the nation's first athletics and recreation greening program driven by student-athletes. Since establishing Bulldog Sustainability in 2008, students have motivated Yale's athletics department and many sports teams across campus to improve their environmental performance. The Bulldog Sustainability student team, with support from the Yale athletics department and the Office of Sustainability, helped set greener policies for athletic offices, launched a Green Athletics Team Certification program for all sports teams, and assembled an Athletics Sustainability Action Plan that spans all sports facilities. During the 2013-14 academic year, Bulldog Sustainability will calculate baseline energy metrics for all athletics facilities, reduce athletic transportation impacts, and upgrade the facility-wide recycling program. The Bulldogs' student-led greening approach consists of many small initiatives that together add up to a comprehensive and successful environmental program.

"YALE ATHLETICS IS PLEASED TO PARTNER WITH THE UNIVERSITY'S OVERALL SUSTAINABILITY MISSION," SAYS ATHLETICS DIRECTOR TOM BECKETT. "VIRTUALLY THE ENTIRE CAMPUS COMMUNITY, IN SOME WAY, DIRECTLY OR INDIRECTLY, IS CONNECTED TO OUR TEAMS, PROGRAMS, AND FACILITIES; THEREFORE WE SERVE AN IMPORTANT ROLE IN PROMOTING THE UNIVERSITY MISSION TO REDUCE YALE'S GREENHOUSE GAS EMISSIONS. WE ARE COMMITTED TO THE MISSION OF CULTIVATING A CULTURE OF SUSTAINABILITY BY INTEGRATING ENVIRONMENTAL AND SOCIAL VALUES INTO OUR DAILY OPERATIONS."

WHY IS YALE GREENING SPORTS?

Yale's primary motivation to green sports, according to the Athletics Sustainability Action Plan, is the opportunity to engage thousands of students and spectators in sustainable practices at Yale's sports facilities. "The Yale University athletics department has a unique role on campus in that it reaches a diverse population including students, alumni, faculty, staff, and external fans," says Athletics Sustainability Action Plan coauthor Erin Carter (class of 2012). "Whether it is through the use of our gym, participation on a team, or via spectators at intercollegiate events, the athletics department provides a highly visible outlet to lead the university in its goal of becoming a more sustainable campus."



Barbara Chesler, senior associate athletics director and lead staff liaison for Bulldog Sustainability, emphasizes that the reach of Yale athletics allows the sports greening program to enhance the school's athletic facilities while engaging the community. "Building off the Bulldog Sustainability efforts implemented since its creation in 2008, the Yale athletics department has proven that it can improve its own facilities, while also helping to change the behavior of community members," says Chesler. "The mission of Bulldog Sustainability is to cultivate a culture of sustainability in Yale athletics. We do that by integrating environmental values into internal operations and sporting events."

According to athletics director Tom Beckett, Bulldog Sustainability capitalizes on Yale Athletics' high visibility to influence the culture of the university. "Yale Athletics is pleased to partner with the university's overall sustainability mission. Virtually the entire campus community, in some way, directly or indirectly, is connected to our teams, programs, and facilities; therefore we serve an important role in promoting the university mission to reduce Yale's greenhouse gas emissions," says Beckett. "I am proud of our teams and athletes who have engaged themselves in the many Bulldog Sustainability initiatives, from helping to improve the efficiency of our facilities to the Green Team Certification to their own personal changes in behavior. We are committed to the mission of cultivating a culture of sustainability by integrating environmental and social values into our daily operations."

WHERE DID YALE START?

Bulldog Sustainability started in 2008 when the athletics department and Office of Sustainability hired four students to devise a plan for integrating sustainability into Yale sports operations. An anonymous donor with a strong interest in environmental programs provided the primary funding for the research team and program implementation. This donation helped establish a partnership between the athletics department and the Office of Sustainability just a few years after the Office of Sustainability was established. From the beginning, students provided the passion, research, ideas, and planning to grow Yale's sports greening effort.

SUSTAINABLE ATHLETICS STRATEGIC PLAN

In the fall of 2008, the team of four students created a sustainability plan offering short- and long-term suggestions for environmentally preferable sports operations. This Sustainable Athletics Strategic Plan included green strategies related to energy, water, transportation, waste diversion, paper use, and event concessions.

In January 2009, the NCAA invited Bulldog Sustainability team leader Sara Smiley Smith, a Ph.D. candidate at the Yale School of Forestry and Environmental Studies (class of 2013), to present the plan at the association's annual convention. Yale's ultimate goal, according to Smiley, was "to create a model of sustainable collegiate athletics that is measurable, transferable, and adaptable." This student-driven evaluation of sustainability opportunities in the athletics department and its authors' mission to establish Yale as a national sports greening leader served as a catalyst for broader campus buy-in and involvement.

STANDOUT SPORTS GREENING ACCOMPLISHMENTS

GREENER ATHLETICS AND RECREATION OPERATIONS GOALS:

- All athletics department office paper must contain recycled content. Yale Athletics currently uses office paper with 30 percent postconsumer recycled content.
- The custodial staff must use environmentally preferable cleaning products. Currently, 75 percent of department cleaning products are Green Seal certified.
- Waterless urinals must be installed in all new athletic facility construction projects.
- The athletics department is minimizing paper use by eliminating desk-side printers and copiers in athletics offices, holding paperless staff meetings, and transitioning to electronic operations.
- Energy-saving power settings must be used as defaults on all athletics office computers.

GREENER SPORTS FACILITIES:

- Recycling infrastructure was installed at 100 percent of athletics and recreation facilities (including athletics offices), and upgrades based on student proposals are planned.
- Bike racks have been installed at close to 100 percent of athletics and recreation facilities (including athletics offices).
- Water fountains were installed in almost 100 percent of athletics and recreation facilities (including athletics offices).
- Energy efficiency upgrades have been made in almost 100 percent of athletics and recreation facilities, including enhancements to occupancy sensors, lighting retrofits, and variable-frequency drives for pool pumps. 2013 facility upgrades are projected to save more than \$100,000 in energy costs annually.
- About 80 percent of all leaf waste from athletics fields is mulched for reuse in turf maintenance.
- The Yale Boat House uses organic fertilizers, which are equivalent in cost to conventional pesticide alternatives.

GREENER SPORTS TEAMS AND OUTREACH:

- Bulldog Sustainability's student-athletes created the nation's first collegiate Green Athletics Team Certification program to motivate varsity and club teams to make greener decisions, while educating coaches and athletes about environmentally preferable operations.
- Bulldog Sustainability's student-athletes established a "green team" (sustainability committee) with representatives from more than 12 varsity teams and additional club teams.
- Students created the Bulldog Sustainability brand and outreach program, placing environmental education signs in almost 100 percent of Yale's athletics and recreation facilities.

EIGHT STEPS FOR SPORTS GREENING BRANDING AND OUTREACH

LESSONS FROM BRANDING BULLDOG SUSTAINABILITY

1. **Adapt materials for each audience:** students, staff, fans, alumni, sponsors, and campus partners. Consider their knowledge to date, unique interests, and opportunities for involvement.
2. **Keep outreach positive,** encouraging, active, and forward-looking. This optimistic approach is effective in building an engaged following that is excited about getting involved. Avoid negative messages that might deter fans from long-term commitment. (Say “Do this!” instead of “Don’t do this.”)
3. **Portray the program as a long-term commitment.** Avoid terms like “campaign” or other words that indicate temporary initiatives.
4. **Clearly communicate the program’s mission,** tying all outreach back to the program’s purpose. Specify each outreach objective, such as changing the campus community’s perception of greening, encouraging more sustainable behavior, and building a greener culture and greener campus policies.
5. **Establish a consistent name and logo** for all outreach about program initiatives. This branding builds awareness of program successes and encourages the community to get involved by becoming part of the Bulldog Sustainability team. Consistent messaging and imagery should help remind people of the program goal every time they see it associated with efforts. Capitalize on the brand power of the athletics logo by incorporating it into the sports greening program logo.
6. **Integrate messages** into all existing sports facilities, operations, and outreach. Place signs at decision points around sports facilities (e.g. recycling bins, paper towel dispensers, light switches, and sinks) to remind users of the greener choices they can make. Incorporate green messaging into game announcements, programs, online articles, and social media to fully integrate greening into the athletics brand.
7. **Repeat your message** at every recycling bin, water fountain, and locker room light switch to remind students and fans to take greener action at each opportunity, until simple green actions become habit.
8. **Keep outreach humorous** as well as succinct and informative. Humor can help attract student attention and reinforce the fun atmosphere at sports events.



Today, Bulldog Sustainability is made up of 12 paid and volunteer student-athletes from a mix of varsity and club sports who serve as researchers and analysts in collaboration with staff from the athletics department and Office of Sustainability. “The Office of Sustainability, facilities, media, and public relations are our most important campus partners and play a big role in advancing our ideas,” says Mary Beth Barham, Bulldog Sustainability research assistant, varsity field hockey player, and environmental studies major (class of 2013). “Despite our being an organization sponsored by the athletics department, our success depends primarily on these campus-wide relationships and the willingness of other departments to partner with us to implement projects.”

Bulldog Sustainability students have also collaborated with campus custodial services, the Office of Transportation and Procurement, athletics concession vendors, and grounds maintenance. “We’ve also worked with human resources to help educate staff about the importance of environmental issues and actions related to recycling, our carbon footprint, energy efficiency, and saving water,” says Barham.

BULLDOG SUSTAINABILITY BRAND

During the fall of 2009, an expanded student team assembled to create a clear branding and strategic communications plan. “One of the main goals of this plan was to use sports greening to foster a culture of sustainability at Yale,” says Barham.

The team identified eight important steps they would need to take to reach their goal (see “Eight Steps for Sports Greening Branding and Outreach” sidebar). They also created signs with eco-tips posted at key “decision points” around all athletics facilities. For instance, a sign directing people to the stairs was placed next to elevators; another, encouraging the refilling of water bottles, was posted at water fountains; others were hung in locker rooms to encourage shorter showers.

“We worked to provide environmental information and tips to the many constituencies affiliated with Yale athletics: athletes, coaches, administrators, alumni, campus partners, community members, and fans,” explains Sam Teicher, former club rugby player and Bulldog Sustainability research assistant (class of 2011). “We focused on raising awareness in new ways by using humor and taking advantage of our community’s love of sports.”

STUDENT-ATHLETE-DRIVEN GREENING PROJECTS

The majority of Bulldog Sustainability initiatives begin as student project proposals, which are reviewed and approved by athletics department staff. The students decide what to research according to what they believe will have the most influence on campus culture, will be interesting to students and staff, will reduce the athletics department’s environmental impact, and will be possible to fund. “Bulldog Sustainability’s student-led initiatives are essential to our success; as students develop their own projects, they are passionate and committed to seeing it through to fruition,” says team leader Diana Madson, a M.E.M. candidate at the Yale School of Forestry and Environmental Studies (class of 2014).

Students have investigated a wide range of topics, from improving the water efficiency of Yale’s field hockey turf and transitioning the athletics department’s shuttle buses to biodiesel to upgrading the waste management plan for all athletics facilities by improving recycling bins and adding composting bins. Students have written business proposals for simple athletics office changes such as investing in reusable mugs instead of disposable cups (one student calculated that an average ceramic cup is 60 times less expensive on a per-use basis than paper cups over its lifetime). More complicated initiatives such as upgrading recycling receptacles and mapping their ideal placement were also studied.



These proposals generally address the economic, environmental, and social benefits of these initiatives and identify local procurement options. The proposals also include strategies for how the student team can support implementation. To date, Yale's athletics department has implemented several infrastructure upgrades and operational improvements based on student proposals including greener transportation initiatives, recycling infrastructure upgrades, and athletics office greening efforts. The athletics department has also committed to implementing more proposals during the 2013–2014 academic year, such as transitioning to biodiesel fuel and procuring more local food for team travel.

Students manage the research and planning of all Bulldog Sustainability initiatives and they partner with a variety of campus departments for implementation. This system relieves the pressure on athletics department staff time and includes a system for passing on the work when some students graduate. "We keep projects active by transitioning leadership to another student when members graduate," says Barham. "In

order to do this and keep track of project progress from year to year, each member is responsible for creating a project summary for each initiative they are in charge of."

"Yale Athletics appreciates the great work that all members of our Bulldog Sustainability teams have executed over the past five years," Chesler says. "It is a privilege to work with students who are so committed and demonstrate such a strong passion for improving our environment in athletics and beyond. Their creativity and resourcefulness are an example of how small initiatives can have big impact. It is another reason we are all so proud to be Bulldogs!"

Cardio Machine Charging Stations at Recreation Center

One example of a student sports greening proposal that resulted in a successful and replicable initiative was led by engineering major Henrique Rocha (class of 2009). Rocha's proposal was to install iPod and cell phone chargers that could be powered by cardio machines throughout Yale's Israel Fitness Center, located within the university's main Payne Whitney Gym, used for athletics and recreation. Rocha, in partnership with his senior thesis adviser, associate professor of electrical engineering Hür Köser, devised a mechanism that harnesses the mechanical energy generated by cardio machines during a workout to charge small electronic devices. The devices benefit the environment by replacing some polluting fossil fuel-based energy with self-generated electricity. Yale hopes to use this prototype one day for a larger-scale project to harvest the energy generated by gym users to provide power to the gym building.

Green Athletics Team Certification

In 2011, the Bulldog Sustainability student team created a Green Athletics Team Certification program for use by all sports teams, including varsity, club, and intramural. In an introduction to the certification checklist, the students wrote, "The aim of Green Athletics Team Certification is to encourage, educate, recognize, and celebrate the voluntary, sustainable efforts that athletes and coaches have taken to reduce the environmental, social, and financial costs of their games, practices, travel, and events." The certification recognizes green efforts in transportation, waste, water, energy, food, and community engagement.

GREEN ATHLETICS TEAM CERTIFICATION: SAMPLE ACTION ITEMS FOR ATHLETES

WASTE

- Use reusable athletic training materials (e.g., fabric ankle braces instead of single-use tape).
- Use reusable water bottles at every practice and game.
- Distribute team materials electronically.
- Use reusable dry-erase boards, blackboards, electronic projectors, or personal laptops instead of printed flip charts.
- Reuse, donate, or recycle used sports gear.

ENERGY

- Unplug electronics (e.g., fans, radios, hair dryers, TVs) or switch off power strips when exiting locker rooms.
- Turn off lights when exiting locker rooms if automatic sensors are not installed.

WATER

- Take shorter showers (also saves energy).
- Conserve water by running hoses only when needed and using buckets when assisting with equipment washing.

FOOD

- Go trayless during meals to help minimize food waste (as well as save energy and water).
- Choose more sustainable dining options during team travel (Bulldog Sustainability provides recommendations for varsity teams traveling to competitions throughout the Ivy League).

EDUCATION AND COMMUNITY

- Host a Green Certified Event (as defined by Bulldog Sustainability) with support from Bulldog Sustainability (for example, with "zero waste" infrastructure).
- Display Bulldog Sustainability signage and posters in locker rooms and playing areas.
- Volunteer to be a Bulldog Sustainability Green Team member to support green efforts at Yale sports events.



Photo courtesy of Yale University.

SELECTION OF YALE ATHLETICS 2013-14 SUSTAINABILITY GOALS

ENERGY

- Conduct appliance and light switch audits at all athletics facilities.
- Upgrade lighting with motion sensors and CFL bulbs in all athletics spaces.
- Conduct an audit of all HVAC systems in athletics facilities to ensure efficient operation by 2020.

WASTE

- Upgrade recycling infrastructure with improved signage and consistency.
- Install composting receptacles at athletics venues by fall 2014.

OPERATIONS

- Reduce paper consumption in the athletics department by 25 percent by spring 2014.
- Develop a sustainable dining guide for all Ivy League away competition by fall 2014.

WATER

- Upgrade water fountains to add bottle-refill stations across sports facilities.

TRANSPORTATION

- Contract with a company with biodiesel buses for athletics shuttle services by spring 2014.
- Encourage coaches to use hybrid or fuel-efficient rental vehicles when traveling for recruiting purposes.
- Increase alternative work transportation options for staff by spring of 2014.
- Develop a rideshare program that includes all athletics staff.
- Promote biking to work by increasing bike rack space at Payne Whitney Gym and the Yale Bowl Complex.
- Develop a telecommuting program for athletics staff.
- Offset all air travel by contributing to the Yale Community Carbon Fund. (The Yale Community Carbon Fund is a joint project of the Office of Sustainability and the Center for Business and Environment at Yale to support local carbon mitigation projects that go beyond Yale's immediate campus.)
- Replace gas-powered grounds maintenance crew trucks with a fleet of electric or biofueled carts.

The students created a spreadsheet of green action items that team representatives can download, complete, and submit for recognition. If teams consistently complete more than 18 green actions, they receive Bulldog Sustainability T-shirts and campus-wide recognition from the athletics department and Office of Sustainability. The certification spreadsheet also helps attract new teams to greening by providing a basic guide about how athletes can take sustainable actions (such as those listed in the "Green Athletics Team Certification" sidebar) and obtain certification.

The certification program has been a success. Twelve varsity teams, representing 269 athletes, have achieved certification. These include baseball, women's crew, women's lacrosse, men's lightweight crew, and women's golf, among others. Men's swimming and diving, women's volleyball, and softball are a few of the teams currently working toward certification.

ATHLETICS OFFICE GREENING

In 2011, the Bulldog Sustainability team worked with athletics department staff to help them achieve Green Workplace Certification from the Yale Office of Sustainability. The program covers 10 action areas, including transportation and travel, solid waste management, energy, procurement, kitchens and shared areas, and community engagement.

The athletics offices achieved the top certification level thanks to green initiatives that included placing recycling bins alongside all trash bins, providing extensive bike rack space, holding paperless staff meetings, reducing the number of desk-side printers and copiers, changing all computer default settings to energy-saving modes, and providing reusable cups and plates for meals. These efforts are coupled with greener procurement policies that require the use of paper with recycled content and environmentally preferable cleaning products (see "Standout Sports Greening Accomplishments" sidebar).

VENDOR CONTRACTS

To build on the athletics department's greener procurement policies, during 2013, Bulldog Sustainability integrated environmentally preferable criteria into Yale Athletics' concessions contracts. "Bulldog Sustainability used the Natural Resources Defense Council's Greening Advisor to generate a list of desired changes into our contracts," explains Barham. "It provided helpful guidance on environmentally intelligent food and beverage specifications as well as sample contract language and sample letters to vendors." The NRDC Greening Advisor provides advice on implementing environmental initiatives in a broad range of topic areas, including procurement of food and beverages, serviceware, paper products, apparel and souvenirs, and reusable bags and cups.

Thanks to Bulldog Sustainability research and planning, the athletics department is negotiating for all new concessions contracts to give preference to food obtained from local sources, to eliminate the use of plastic water bottles and polystyrene foam, to replace individual condiment packets with large squirt bottles, to eliminate all food waste (by donating unsold food and by composting scraps), and to give preference to the most energy-efficient food service practices.

CHALLENGES: OVERCOME AND ONGOING BUY-IN

"Some of our greatest challenges in continuing to progress include funding, staff time, and buy-in from coaches, students, and administrators," says Barham. "Commitment, leadership, and partnerships with other Ivy League institutions are key to helping us overcome these challenges." In 2012, Bulldog Sustainability began working closely with the other Ivy League athletics departments through the league's Ivy Green Initiative to share better practices and learn from others' experiences.



The Ivy League's support for sports greening is reinforcing Yale Athletics' commitment to sustainability and encouraging greater buy-in across the department. As the league hosts greener Ivy League Championships, athletes and coaches are also becoming more exposed to and engaged in conference-wide sports greening efforts.

METRICS

Since 2009, the Bulldog Sustainability team has worked to adopt a systematic approach to measurement. "The database developed for Bulldog Sustainability provides insight to many aspects of the department, including utility costs, transportation statistics, event attendance, chemical use, and greenhouse gas emissions," says Barham. "By providing quantifiable statistics, the metrics highlight areas best suited for efficiency improvements and conservation measures. They allow the project team to track and quantify the effects of sustainability over time."

"Collecting and analyzing metrics are an important part of helping to track the impact of green efficiency initiatives and upgrades within the athletics department," says Chesler. "Bulldog Sustainability recognizes that tracking progress is crucial and hopes to hire a team member who has experience analyzing large amounts of data for the fall of 2013 onward."

ATHLETICS SUSTAINABILITY ACTION PLAN

The Bulldog Sustainability team manages an ongoing action plan that outlines short- and medium-term goals (see "Selection of Yale Athletics 2013-14 Sustainability Goals" sidebar). The current action plan period, as of this report's writing, is fall 2011 to spring 2014; it covers goals related to energy, waste, food, green building, and transportation, among other areas. For example, Bulldog Sustainability plans to reduce paper consumption by 25 percent; audit and upgrade all athletic HVAC systems, appliances, and lighting; transition to biodiesel for athletics shuttle buses; and develop sustainable dining recommendations for all team travel to Ivy games.

These goals build on many existing initiatives related to green building and operations across Yale athletics. For example, 80 percent of all athletics field waste is mulched for reuse in turf maintenance. The athletics department uses organic fertilizers at the Yale Boat House, which are equivalent in cost to conventional pesticide alternatives.

Yale's athletics department also incorporates sustainability into the renovation and construction of facilities, from upgrading waterless urinals at Ingalls Rink to installing motion sensors for lighting and energy-efficient hand dryers across many sports facilities. In early 2012, Yale's golf course was renovated, and it now saves 40,000 gallons of water daily because of upgrades to the irrigation nozzles and new in-ground wireless soil moisture sensors. These efforts will have a payback period of less than four years.

According to Yale's director of energy management, Julie Paquette, a variety of other resource efficiency upgrades underway in 2013 are projected to save more than \$100,000 annually. For example, lighting upgrades at the Cullman-Heyman Tennis Center will save \$58,000 in electricity costs each year. A new variable-frequency-drive pool pump will save 110 kilowatt hours and \$17,000 in electricity costs annually. In Yale's Payne Whitney Gym, Paquette's energy management team is also replacing and adding new occupancy sensors to save \$8,600 (55 kWh) annually and upgrading showerheads to save 800,000 gallons of water and \$6,500 in water costs yearly.

Bulldog Sustainability aims to work with Paquette's team, campus facilities, and the Office of Sustainability, among other departments, to expand on these initiatives and leverage this good work for environmental outreach throughout Yale's athletics community.



Photos courtesy of Yale University.



LESSONS FROM THE FIELD

ENGAGE STUDENTS TO HELP ACCELERATE SPORTS GREENING PROGRAM GROWTH

Yale Athletics staff members minimized the amount of time they would need to spend on sustainability by giving students ownership over researching and planning the initiatives. This approach provides students with professional development opportunities and builds on coursework related to sustainability (for example, some students have used Bulldog Sustainability project proposals for their senior theses).

USE BRANDING TO ENGAGE FANS AND ATTRACT PROGRAM PARTNERS

Branding builds awareness of the sports greening program's successes and encourages the community to support Bulldog Sustainability's mission. Branding can also help attract program partners.

BE PATIENT; SMALL STEPS ADD UP

"We have learned that patience is key when tackling large sustainability projects," says Barham. "Implementing change in small steps and having perseverance are critical to long-term success."

USE POSITIVE MESSAGING

"Be enthusiastic, organized, and persistent when seeking program sponsorship," says Barham. "In our experience, local vendors and sponsors are very supportive of our green initiative and are happy to help for a good cause."

USE SOCIAL MEDIA TO ENHANCE OUTREACH

The Bulldog Sustainability team uses Facebook and Twitter to reach students and fans about events. "We have also found that social media is an excellent way to get the attention of students and fans at sporting events," says Barham. The athletics department also integrated online messaging into its website with a page devoted to Bulldog Sustainability, featuring student testimonials, bios, and resources.



Photos courtesy of Yale University.

SNAPSHOTS

The collegiate sports greening movement is now so widespread that it is impossible to feature all of the impressive environmental initiatives undertaken at campus athletics and recreation departments. Below are 20 “snapshots” of noteworthy collegiate sports greening successes that demonstrate the reach of this movement.

PENN STATE UNIVERSITY, HOME OF THE NITTANY LIONS

FIRST LEED-CERTIFIED BASEBALL STADIUM IN THE UNITED STATES

Since 2006, Penn State has been designing to LEED standards, beginning with Medlar Field at Lubrano Park, the first U.S. baseball stadium to be awarded LEED certification. Penn State Athletics’ green building practices include retrofitting campus gyms and athletic buildings with energy-efficient lighting and other energy efficiency improvements. “Maintenance improvements and energy savings were the driving force for these projects; better lighting and noise reduction were an added plus,” says Mark Bodenschatz, Associate Athletic Director, Penn State Athletic Facilities & Operations. These changes have cut electricity use across many athletic facilities, including a savings of 57 percent at the indoor swimming pool, 21 percent at the football practice field, 25 percent at the multisport complex, and 13 percent at the White Building fitness complex from lighting retrofits alone. Penn State’s new ice rink, set to open in fall 2013, is expected to consume 18 percent less energy than an average campus building. Penn State anticipates that the rink will achieve LEED Gold certification.

All Penn State sports facilities have used environmentally preferable cleaning products and processes since 2008, contributing to better air and water quality. Recycling bag dispensers in tailgating areas and a growing in-stadium recycling program have helped the 111,000-seat Beaver Stadium reach a 35 percent waste diversion rate and save Penn State \$12,500 in litter cleanup costs after every home football game. The Lions divert 85 tons of materials to recycling at each game and donate all proceeds to the United Way, with such proceeds topping \$85,000 since 1995. The impetus for these programs, according to football head coach Bill O’Brien, is to be a strong community role model. “Sustainability is a great way to lead our community, and we all have a role to play,” he says.

To help identify additional sustainability options, Penn State Athletics created a Green Team staff committee in early 2013 to help reduce the department’s environmental footprint. The 14-member team includes the director of athletic facilities, facilities managers, coaches, and student-athletes. The Green Team is working to include more student-athletes to provide them with educational and professional development opportunities. Women’s soccer head coach Erica Walsh says, “As leaders in our community, it is vital for us to seek educational opportunities in the discipline of sustainability for our staff and student-athletes. It is critical that we do our part to help continue the positive momentum of this movement and effect change both on and off the field.”

“AS LEADERS IN OUR COMMUNITY, IT IS VITAL FOR US TO SEEK EDUCATIONAL OPPORTUNITIES IN THE DISCIPLINE OF SUSTAINABILITY FOR OUR STAFF AND STUDENT-ATHLETES,” SAYS WOMEN’S SOCCER HEAD COACH ERICA WALSH. “IT IS CRITICAL THAT WE DO OUR PART TO HELP CONTINUE THE POSITIVE MOMENTUM OF THIS MOVEMENT AND EFFECT CHANGE BOTH ON AND OFF THE FIELD.”

Photos courtesy of Penn State University



UNIVERSITY OF TEXAS, HOME OF THE LONGHORNS

RECYCLING AND COMPOSTING LEADER

University of Texas (UT) Athletics first adopted more sustainable stadium operations in 1996. What started as a plastic container recycling effort on football game days has evolved into a campus-wide collaboration that includes recycling, composting, and other forms of resource conservation. “We want to continue to get better at reducing our carbon footprint during events and daily operations,” says Merrick MyCue, UT assistant athletics director for stadium operations.

In 2008, UT Athletics began to explore additional ways to reduce resource use and associated operations costs. “Through renovation and preventive maintenance as well as behavior change within each department, Athletics has reduced its annual utility expenditures by 15 percent,” says Jim Walker, director of sustainability on the UT campus. “The greatest savings have come from reducing water costs, which is very important in a state in the midst of a severe drought.”

Since 2009 UT Athletics has been enhancing DKR–Texas Memorial Stadium’s environmental profile. In early 2009 the department installed an artificial playing surface that lasts longer than natural turf, requires less maintenance, and saves 3 million gallons of water annually as well as 700 gallons of paint. UT also installed energy-efficient lighting. Beginning in 2011, UT Athletics teamed up with Keep Austin Beautiful to launch a composting program on football game days. In its second year, the program collected 16,600 pounds of compost. Forty-three tons of plastic were also collected for recycling during the 2012 football season, saving 141 cubic yards of landfill space and the equivalent of 16,235 gallons of oil and 299,068 gallons of water.

“UT ATHLETICS IS LEADING THE WAY BY ENGAGING EMPLOYEES, STUDENT-ATHLETES, AND FANS,” SAYS JIM WALKER, DIRECTOR OF SUSTAINABILITY. “AS A UNIVERSITY, WE ARE WORKING ON INTEGRATING SUSTAINABILITY INTO ALL ASPECTS OF CAMPUS LIFE, AND ATHLETICS IS A MAJOR PART OF THAT.”

In 2013, UT Athletics assembled a Green Team with about 30 members representing nearly every sport and division within the department. The Green Team implements energy conservation, paper reduction, and battery recycling events. It also helps students develop sports greening projects. “UT Athletics is leading the way by engaging employees, student-athletes, and fans,” says Walker. “As a university, we are working on integrating sustainability into all aspects of campus life, and athletics is a major part of that.”

UNIVERSITY OF CALIFORNIA, LOS ANGELES, HOME OF THE BRUINS

LEED GOLD SPORTS FACILITIES

UCLA boasts 109 NCAA championships and huge student participation in a wide variety of recreation programs. “Sports and recreation are a central part of life at UCLA for students and staff,” observes chief sustainability officer Nurit Katz. “Health and sustainability are inextricably linked, and the greening of sports is critical to creating a healthy and sustainable campus.”

According to Mick Deluca, executive director of recreation and campus life, “UCLA is taking an integrated, campus-wide approach to sports greening.” The Pauley Pavilion arena, which is anticipating LEED Gold certification in 2013, is designated as a “zero waste” operation, helping contribute to UCLA’s broader “zero waste” goals. The Spieker Aquatic Center, an outdoor 50-meter swimming pool and diving complex, received LEED Gold status in 2012, and the renovation of 13,000 square feet of existing space on campus into the Kinross Recreation Center, completed in July 2012, is also expected to receive LEED Gold certification. The recreation and athletics departments also collaborated with UCLA’s facilities division and a local gas company in winning a grant to pay for covers for the university’s five outdoor swimming pools, which reduced the cost of heating the pools by 34 percent.

Another example of interdepartmental collaboration on sports greening is the Community Bike Shop, launched jointly by the UCLA transportation and recreation departments. The Bike Shop, which is promoting an ecologically preferable form of transport, offers self-service bike repair stations as well as bike rentals, loaner bikes, and bike-sharing programs. Other recreation facility projects include the installation of low-flow showerheads and self-powered exercise equipment funded through the Green Initiative Fund (TGIF), a student grant fund for sustainability. Students taking courses at the Institute of the Environment and Sustainability have formed Action Research Teams to implement sustainability projects including athletic facility lighting improvements, recycling enhancement at sports venues and events, and a community garden with a rain catchment station at UCLA’s Sunset Canyon Recreation Center.

UNIVERSITY OF PENNSYLVANIA, HOME OF THE QUAKERS

STUDENT-ATHLETE ECO-REPS

Penn's Athletics Eco-Reps team, comprising 13 student-athletes at its launch in September 2012, is part of Penn's Green Campus Partnership, which works throughout the university to promote better environmental practices and policies. The team is led by Dan Schupsky, assistant swim coach and pool facilities manager, with support from staff members in Penn's sustainability and athletic departments. "The Eco-Reps act as an internal consulting group that researches how each team can be greener," says Schupsky. "we also plan to tackle issues related to Penn's recreation facilities."

The Athletics Eco-Reps develop programs that help Penn's sports teams and facilities adopt more sustainable practices. Each Eco-Rep chooses an environmental topic to research and then formulates practical solutions to help improve the environmental impact of Penn Athletics' operations. Topics that Eco-Reps have focused on include energy conservation in Athletics facilities, waste and recycling practices among athletes, water conservation strategies, alternative transportation, and environmental education. "Identifying issues and benchmarking were crucial to getting the program off and running," says Athletics Eco-Rep and gymnast Sara Allen, class of 2015.

The Athletics Eco-Reps team is a fundamental part of Penn's overall sports greening efforts, which also boast an impressive LEED Gold weight training center in Weiss Pavilion, a 24-acre urban park, athletics facility, and former brownfield site in Penn Park; and Shoemaker Green, a 2.75-acre public commons that is a pilot for the American Society of Landscape Architect's Sustainable Sites Initiative. "Prospective varsity athletes have expressed enthusiasm and admiration for Penn's Athletics EcoReps program," says Schupsky. "As the program evolves, it could potentially be used as a recruiting edge for attracting a well rounded student athletes."

One example of a successful recruiting tool has been Penn's ultraviolet (UV) pool disinfection system, installed by Penn's Department of Intercollegiate Athletics and Recreation in 2011. The UV system has reduced the concentration of chlorine in their pools by approximately 50 percent. "It has dramatically improved the air and water quality and directly benefits the health of our athletes," says Schupsky. "We've seen a marked decline in respiratory health issues among our swimmers since decreasing the chlorine concentration. It directly benefits our varsity athletes' ability to train at a high aerobic level as healthier athletes allows for more consistent training and better results in the long-term. So it's no surprise the UV system is a great draw during recruiting—parents and athletes ask about the indoor air and water quality of our facility all the time."

Also in 2011, student volunteers helped staff Penn's first "zero waste" basketball game. The students worked with Penn Athletics to replace trash cans with composting and recycling bins and partnered with the stadium's vendors to switch to compostable or recyclable serviceware.



Photo courtesy of University of Pennsylvania.

BOWDOIN COLLEGE, HOME OF THE POLAR BEARS

FIRST LEED-CERTIFIED HOCKEY ARENA IN THE UNITED STATES

Bowdoin College has taken a comprehensive approach to incorporating sustainability into sports operations. The college built the first LEED-certified ice hockey arena (the Watson Arena) in the United States in 2006. In fact, Bowdoin is home to two LEED-certified sports venues, the Watson Arena and the Buck Center for Health and Fitness. Bowdoin treats its athletic fields almost exclusively with organic fertilizer and has installed high-efficiency light fixtures at its basketball courts, track, and indoor tennis courts. Bowdoin is also implementing programs to transition to paperless sports operations, using Quick Response Codes, for instance, that can be scanned by smartphones.

"Partnerships between the athletics department, the sustainability office, and the facilities management department are critical to successful sports greening at Bowdoin," says Bowdoin Green Athletes cofounder Alex Tougas, class of 2014. "Student sustainability groups are important for strengthening those partnerships." Bowdoin Green Athletes, formed in the spring of 2012, is a group of student-athletes committed to developing and implementing projects to enhance the sustainability of sports on campus. The group includes an executive committee that manages student-athlete representatives from all 50 campus sports teams to help shift the culture toward supporting the college's sustainability goals. "Our athletics department, campus community, and local environment have benefited considerably from the work completed by Bowdoin Green Athletes," says director of athletics Timothy M. Ryan. "We seek to complement the sustainability efforts under way at the college and to promote environmentally conscious behavior by our teams and supporters at all of our athletics contests."

Green Athletes operates numerous recycling initiatives at athletics contests, including participation in the Game Day Challenge at the homecoming football game in the fall of 2012, where they achieved an 82 percent waste diversion rate. Green Athletes achieved a waste diversion rate of 88 percent at a 2012 men's basketball game with the help of fan education campaigns and added infrastructure. Other projects include on-campus speaker events and an athletic shoe recycling project, done in conjunction with the charitable organization "Rerun Shoes," which supports micro-entrepreneurs in Liberia, Guinea, and Mali, among other locations in West Africa.

"OUR ATHLETICS DEPARTMENT, CAMPUS COMMUNITY, AND LOCAL ENVIRONMENT HAVE BENEFITED CONSIDERABLY FROM THE WORK COMPLETED BY BOWDOIN GREEN ATHLETES," SAYS DIRECTOR OF ATHLETICS TIMOTHY M. RYAN. "WE SEEK TO COMPLEMENT THE SUSTAINABILITY EFFORTS UNDER WAY AT THE COLLEGE AND TO PROMOTE ENVIRONMENTALLY CONSCIOUS BEHAVIOR BY OUR TEAMS AND SUPPORTERS AT ALL OF OUR ATHLETICS CONTESTS."



Photo courtesy of Bowdoin College.

UNIVERSITY OF CALIFORNIA, BERKELEY, HOME OF THE GOLDEN BEARS

PLAY GREEN RECREATION CENTER

In 2008, UC Berkeley's recreational sports department launched a Play Green initiative to showcase its efforts to reduce its ecological footprint and encourage recreational athletes to take greener actions. "We wanted to use our relationship with students to educate and inspire them, but also connect them with other sustainability groups on campus," says Mike Weinberger, Berkeley's director of recreational sports. "There are a lot of student sustainability groups at Berkeley, and we weren't sure they were all talking to each other. We thought we could facilitate that by building a community that's focused on green initiatives."

"WE WANTED TO USE OUR RELATIONSHIP WITH STUDENTS TO EDUCATE AND INSPIRE THEM, BUT ALSO CONNECT THEM WITH OTHER SUSTAINABILITY GROUPS ON CAMPUS," SAYS MIKE WEINBERGER, BERKELEY'S DIRECTOR OF RECREATIONAL SPORTS.

Weinberger first looked at how the recreation department could set a greener example for the campus. He started by asking, "What are we doing as a department? What are the things that we can do to save energy or reduce pollution?" He was able to save 25 percent of the Recreation Center's energy use right away by rescheduling custodial work to take place during regular operating hours, allowing the building to go completely dark between its closing at midnight and reopening at 6 a.m. "Inevitably, there were complaints: 'I'm working out and somebody's mopping the floor next to me,'" Weinberger says. "We had to educate our users, explain what we were doing, the resource benefits, and kind of sell it."

In March 2008, the Recreation Center upgraded Underhill Field with a new synthetic turf called Sprinturf, made with recycled rubber from used tires. Other green elements of the project included recycling the concrete from the demolition of the previous surface, reusing the soil excavated for the project to construct a playing field in West Berkeley, and reducing herbicides, paint, and water use.

Also in 2008, Berkeley upgraded the Recreational Sports Facility Field House lighting system to reduce energy use, lower maintenance costs, and provide better lighting in the gyms. Throughout the Field House, existing light fixtures were replaced with high-efficiency, high-output fluorescent lamps and transformers, which were equipped with occupancy sensors that switch off lights automatically when an area has been unoccupied for 20 minutes. The change also made good business sense because installing new lighting equipment is one of the quickest and least expensive ways to reduce electrical demand. Energy use was cut by 252,000 kilowatt-hours per year for a savings of \$25,000 annually. The total cost for the lighting improvement project was approximately \$114,000, 80 percent of which was covered by a grant from Pacific Gas and Electric. Thus, the net cost was \$23,000, which was recouped in less than a year. The reduction in energy use also removes the equivalent of 132,000 pounds of CO₂ per year from the air.

UNIVERSITY OF CALIFORNIA, IRVINE, HOME OF THE ANTEATERS

GREENER RECREATION CENTER DESIGN

In the spring of 1996, UC Irvine students voted to support the construction of the \$27 million Anteater Recreation Center (ARC) with a \$70 per-term student fee. The design committee for the 90,000-square-foot facility, managed by the department of campus recreation, prioritized sustainable design even before the U.S. Green Building Council developed the LEED certification program. By 2008, campus recreation was able to achieve LEED Gold certification for its 26,000-square-foot ARC expansion. One of the highlights of the expansion is a teaching kitchen, which is used to teach sustainable cooking to the university community. Other green features include 100 percent reclaimed water use for irrigation, a cool roof (using white paint to reflect heat from the sun and reduce cooling needs), recycled rubber flooring, variable frequency drives on all mechanical equipment, and existing building recommissioning.

In 2013, the ARC also became one of UC Irvine's first "zero waste" facilities, which involved installing recycling and composting bins throughout the facility. The facilities management recycling team provided training for department custodians. This initiative helped the ARC contribute to the University of California's system-wide goal of reaching "zero waste" by 2020.

Another campus sustainability program, sponsored by UC Irvine's departments of campus recreation, human resources, and environmental health and safety, is "Green Up." The program aims to raise the environmental awareness of faculty and staff and provide tips on greener living. It is part of an annual program to improve the well-being of the campus community. In 2012, 905 faculty and staff participated in the program, along with more than 1,700 students.



Photo courtesy of University of California.

HARVARD UNIVERSITY, HOME OF THE CRIMSON

SOLAR ARRAY ATOP TRACK AND TENNIS FACILITY

In June 2012, Harvard Athletics completed construction of a 2,275-panel solar photovoltaic system, the university's largest solar energy project to date, spanning 1.5 acres of roof space atop the Gordon Indoor Track and Tennis building. The project creates approximately 650,000 kilowatt-hours of electricity annually, enough to power more than 50 average homes, and reduces carbon dioxide emissions by approximately 500 metric tons annually. "Harvard Athletics is proud of this project and the many initiatives we've undertaken to help Harvard achieve its sustainability goals," says athletics director Bob Scalise.

The solar panels deliver electricity directly to Harvard's electrical grid to power lighting for athletic fields and nearby buildings. (The electricity produced and the solar panels themselves are owned by Harvard Athletics.) The solar power helps the university meet its obligations under the Massachusetts Renewable Portfolio Standard, which requires Harvard to buy a specified percentage of its electricity from renewable sources (15 percent by 2020). The solar project cost approximately \$2.1 million, with the majority of up-front installation costs covered by a university grant for green infrastructure upgrades. The \$80,000 to \$85,000 in projected annual savings will pay back the investment within approximately

eight years. "Harvard Athletics is showing that sports and sustainability go hand in hand," says Heather Henriksen, director of the Harvard Office for Sustainability. "By building Harvard's largest solar project, the athletics staff are not only producing clean, renewable energy that will help us get one step closer to our goal to reduce greenhouse gas emissions, but they are also demonstrating a pragmatic approach to operations that will ultimately reduce costs."

"HARVARD ATHLETICS IS PROUD OF THIS PROJECT AND THE MANY INITIATIVES WE'VE UNDERTAKEN TO HELP HARVARD ACHIEVE ITS SUSTAINABILITY GOALS," SAYS ATHLETICS DIRECTOR BOB SCALISE.

The commitment to sustainability by Harvard Athletics also includes recycling at football games and in tailgating areas, creating a student-led recycling green team, installing occupancy sensors in sports facilities, and installing a cogeneration unit to heat water used in the pool and for showers at the Malkin Athletics Center complex. The cogeneration unit generates heat and electricity from a single power source, avoiding the production of 197 tons of greenhouse gases annually. "We have also installed multiple variable frequency drives in our sports facilities, including on our hot water and pool pumps," says Jason Waldron, assistant manager of operations for Harvard Athletics. "In 2013 we will replace our 700-watt arena fixtures with 358-watt LED fixtures at our basketball, hockey, and track and field arenas and our strength and conditioning facilities." This lighting upgrade involves replacing more than 150 fixtures and will save the athletics department an estimated 256,357 kilowatt-hours and more than \$32,000 each year.

WASHINGTON STATE UNIVERSITY, HOME OF THE COUGARS

AUTOMATED BIKE RENTALS

"There is tremendous student interest in cultivating the 'go green' spirit," says Kathleen Hatch, director of Washington State University's recreation department. "Because it is an institutional arm that reaches 85 to 95 percent of WSU students, the recreation department is a great place to model different practices." The department started a Wellbeing Program in 2006 to promote the critical role that a healthy environment plays in individual health. According to Erin Carroll, wellbeing coordinator at WSU, "In the same way that student interest in health and fitness has driven the recreation center development boom of the past 20 years, a growing concern among students about environmental wellbeing is now having a direct influence on how these facilities are run."

In 2010, the recreation department launched a "Green Bike" bicycle rental program with a fleet of 40 bicycles after first piloting the idea during 2009 with five bikes. The goal was to help reduce car use, decrease traffic congestion, reduce carbon emissions, improve student health through physical exercise, and increase awareness of sustainable methods of transportation. In the first year and a half of this program, 585 people used the bikes, checking them out 2,800 times and traveling a total of 12,000 miles. In 2012, students voted to continue to fund the program by approving a student fee for automated checkout stations and for the purchase of another 40 bikes. "Since September of 2010, the automated Green Bikes have been checked out over 43,000 times and we have had over 10,000 unique users," says Carroll. "We calculate that we have saved approximately 23.7 metric tons of carbon emissions relative to the use of passenger cars."

"THERE IS TREMENDOUS STUDENT INTEREST IN CULTIVATING THE 'GO GREEN' SPIRIT," SAYS KATHLEEN HATCH, DIRECTOR OF WASHINGTON STATE UNIVERSITY'S RECREATION DEPARTMENT. "BECAUSE IT IS AN INSTITUTIONAL ARM THAT REACHES 85 TO 95 PERCENT OF WSU STUDENTS, THE RECREATION DEPARTMENT IS A GREAT PLACE TO MODEL DIFFERENT PRACTICES."



Photos courtesy of Washington State University.

University recreation used the success of the bike program to launch a "Crimson Revolution" campaign later in 2010. The campaign highlights the WSU Recreation Center's sustainability efforts and encourages students to pledge to adopt greener behaviors. "The Crimson Revolution is aimed at changing behavior and positively impacting our community," says Hatch. "We had students lining up to give their 'green pledge' at a back-to-school celebration... everything from pledging to buy local, walking to school, and riding a bike more often to considering fair-trade purchases." WSU's recreation department also leads by example; for instance, in 2010, it pledged to recycle at least 40 percent of the waste produced in the Rec Center, a diversion rate that it continues to reach annually. The center also committed to reducing office paper use by 15 percent in 2010 and exceeded that goal by a wide margin, cutting paper use by 45 percent in 2011. It established a goal of decreasing electricity consumption by 2.5 percent in 2010 and actually reduced it by 18.52 percent. It also saves \$6,000 annually in reduced energy costs thanks to upgrades to their washer and dryer system. The rec department also cut natural gas use by 21 percent in 2010 and cut paper towel use by 23 percent between 2010 and 2012.

UNIVERSITY OF CONNECTICUT, HOME OF THE HUSKIES

FIRST LEED-CERTIFIED ATHLETIC FACILITY IN THE NCAA

The University of Connecticut's Burton Family Football Complex and Mark R. Shenkman Training Center became the NCAA's first LEED-certified building when it was completed in the summer of 2006. UConn Athletics achieved LEED Silver certification for the football complex by incorporating a variety of environmentally preferable features into the venue design. These include low-flow fixtures, native landscaping, locally manufactured building products, building materials made with recycled content, rain gardens, and highly reflective windows. The energy-efficient features have helped the facility cut energy use by 35 percent below 1999 ASHRAE standards, saving \$35,000 to \$40,000 per year. The water-efficient features have reduced the building's water use to a level 35 percent below EPA standards. The division of athletics agreed to cover the up-front cost premium of achieving LEED certification and today hosts green building tours for classes and outside groups.

According to Richard Miller, the university's director of environmental policy, more than three dozen features of the complex promote environmental sustainability, including site selection, building design, choice of construction materials, energy and water conservation, and indoor environmental quality. The university earned LEED points for using 7,000 cubic feet of peat excavated from the site to help restore and replace wetlands that were affected by the cleanup and construction activity atop the former UConn landfill. Steel with 100 percent recycled content was used in constructing the athletic facility, and the synthetic turf for the indoor field was made using recycled material. Ninety percent of regularly occupied spaces in the complex use natural daylight, which allows passive solar heating to reduce energy costs in the winter. Permeable pavement and bioswales around the facility also help clean stormwater and reduce runoff that might otherwise cause sedimentation, erosion, and flooding. As UConn's first LEED building, the football complex paved the way for a green building policy instituted in 2007 that requires all new university buildings to achieve a minimum of LEED Silver certification.

WILLIAMS COLLEGE, HOME OF THE PURPLE COW

HOCKEY RINK ENERGY USE CUT IN HALF

In 2009, Samantha Tarnasky (class of 2009) completed a senior project that identified ways to cut energy consumption in half at the Williams College hockey rink. "This project was great because it let us go after a big chunk at once," says Todd Holland, energy conservation project manager for the college's Zilkha Center for Environmental Initiatives. With support from a Zilkha Center internship program, Corey Benson (class of 2011) spent the summer of 2010 developing an implementation plan for Tarnasky's research proposal. The college hired Clark and Green Architects to design the renovations in partnership with Gary Guerin, associate director for athletics operations, the hockey and tennis coaches, the facilities department, and the staff at the Zilkha Center.

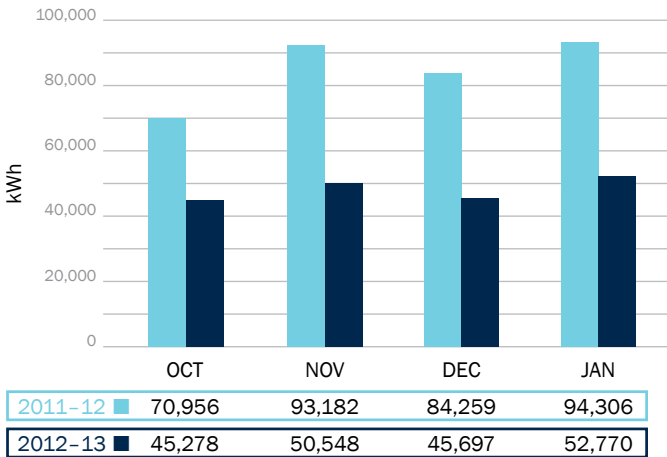
Coupling the energy upgrades with a broader renovation plan for the 60-year-old facility—including adding new locker rooms, flooring, and coaches' offices—was a major selling point for the athletics department. "They realized they could improve the performance of the facility and save thousands of dollars each year in utility costs," explains Stephanie Boyd, director of the Zilkha Center.

With all upgrades in place, the electricity savings from the first four months of 2013 came to 148,411 kilowatt-hours. Williams is on track to meet or exceed the estimated annual savings of 230,000 kilowatt-hours. Significantly, every energy-efficient decision that was made had a positive impact on the games played in the facility. "The improvements significantly improved air quality, the ice is smoother and more consistent, the building is colder, and the lighting is sharper," says Boyd.

"The first thing we noticed was the improvement to the lighting," agrees Mark Lyons (class of 2013), 2012-2013 men's hockey co-captain. "Quality lighting makes a huge difference in a high-speed game like hockey."

Next, Williams Athletics is pursuing LEED green building certifications, on-site solar, and improved waste diversion. "We will begin construction on a new football facility, which is targeted to be LEED Gold-certified," Boyd says. "We are exploring thermal solar or solar electric systems, or both, for the top of the gym and pool, and we are looking into a new dehumidification system for the pool." Through efforts of the athletics and grounds departments, the college has also been improving recycling infrastructure at athletic venues. Boyd explains that athletics projects are ideal for sustainability work because they engage both the student body and alumni supporters.

ICE RINK ELECTRICITY USE



"THE IMPROVEMENTS SIGNIFICANTLY IMPROVED AIR QUALITY, THE ICE IS SMOOTHER AND MORE CONSISTENT, THE BUILDING IS COLDER, AND THE LIGHTING IS SHARPER," SAYS STEPHANIE BOYD, ZILKHA CENTER DIRECTOR.

UNIVERSITY OF CALIFORNIA, SAN DIEGO AND SAN DIEGO STATE UNIVERSITY

LEED PLATINUM-CERTIFIED AQUATIC CENTER WITH ONSITE SOLAR

In 2007, San Diego State University (SDSU) and UC San Diego (UCSD) collaborated to install 5,000 square feet of thermal solar panels atop their co-owned Mission Bay Aquatic Center (MBAC) to heat the facility's 50-meter pool. The panels cost approximately \$100,000 and paid for themselves in energy savings in two years.

Also in 2007, SDSU installed 24-foot ceiling fans inside the school's 10-year-old recreation center to minimize air-conditioning costs. "Rec centers are not the most energy-efficient places in the world. We use a lot of electricity, we use a lot of water in bathrooms and showers, and we use a lot of air-conditioning," says Eric Huth, SDSU's recreation director. "Our building has a \$300,000 annual energy bill, and if I can reduce that by 10 or 15 or 20 percent, I can create a substantial savings for our budget."

The recreation department collaborates with an organization called the Associated Students of San Diego State, a student-led group that encourages campus sustainability efforts to be integrated into both infrastructure and operations. During the 2007 winter break, the recreation staff broke into groups of five to develop ways to mitigate the department's environmental impact. Ideas ranged from implementing greener cleaning policies to encouraging users to turn off entertainment monitors on cardio machines after use. This kind of thinking was in line with a campus-wide "Green Love Initiative" that seeks to encourage sustainable practices in all SDSU facilities. "We really got on board with the initiative and have been working since the 2008 fall semester to do as much as we can," Huth says. "I think there's been a tipping point in sustainability in the last couple of years, and it just seems like it's on everyone's agenda."



In May 2013, student-driven greening efforts helped foster a student-managed collaboration between SDSU and UCSD to achieve LEED Platinum certification (Existing Building, Operations & Maintenance) for the 40-year-old Mission Bay Aquatic Center. The certification for the facility was coordinated by only two staff members with the help of more than 30 student volunteers. The students from SDSU and UCSD (mostly members of SDSU's Green Love Committee or student chapters of the U.S. Green Building Council at both schools) completed most of the project planning over 12 months.

"Engaging the emerging generation in this mission is as important as the built environment we strive to improve," says Michelle Perez, a sustainability analyst at UCSD. "The students shared their talents, bringing fresh perspective to the project at every step. By engaging students in the MBAC LEED certification effort, both universities continue to green their schools from within." Glen Brandenburg, director of MBAC, adds that there is a strong business case for greener buildings, as well as an educational opportunity. "When we first built the MBAC we included a lot of design elements that were meant to have a long-term impact on keeping operating costs down," says Brandenburg. "And while our decision at the time was based on economics, the conservation aspects of the design features that are being implemented today have both an economic and ecological benefit. It's a win-win."

"ENGAGING THE EMERGING GENERATION IN THIS MISSION IS AS IMPORTANT AS THE BUILT ENVIRONMENT WE STRIVE TO IMPROVE," SAYS MICHELLE PEREZ, A SUSTAINABILITY ANALYST AT UCSD. "THE STUDENTS SHARED THEIR TALENTS, BRINGING FRESH PERSPECTIVE TO THE PROJECT AT EVERY STEP. BY ENGAGING STUDENTS IN THE MBAC LEED CERTIFICATION EFFORT, BOTH UNIVERSITIES CONTINUE TO GREEN THEIR SCHOOLS FROM WITHIN."



Photos courtesy of NIRSAs, San Diego State University



CORNELL UNIVERSITY, HOME OF THE BIG RED BEARS

ENERGY-EFFICIENT LIGHTS CUT COSTS

In January 2012, Cornell Athletics upgraded the lighting system at its Reis Tennis Center with new lights that deliver twice the brightness of the previous lighting and use 70 percent less energy. Lower energy costs from these lights save Cornell approximately \$20,000 per year. The old lights took a long time to warm up, so once they were turned on, they were left on. The new lights turn on and off quickly and are fitted with occupancy sensors that cover the six indoor courts. If there is no movement for 15 minutes on a court, the lights automatically shut off. The shutoff sensors not only save energy but lengthen the lifetime of the bulbs to an estimated seven years as compared with the previous bulbs' two-year life span. This saves Cornell \$2,000 annually in maintenance costs, since the new lamps do not need to be replaced as frequently as the old ones did.

The system, designed and installed by an energy services company called CleanTech Solutions, can be dimmed for moderate lighting during recreational use and turned on fully for varsity tournaments, which require brighter lighting for taping or TV. It also mixes direct and indirect light to reduce on-court shadows. "We went from the lowest to the highest light levels among Ivy League NCAA tennis facilities," says Marty Johnson, the tennis center manager, "and now others are following suit."

Cornell spent \$100,000 on this project but received a \$47,000 energy rebate from the New York State Energy Research and Development Authority, and the school expects that the improved lighting will pay for itself within three years. Cornell is now looking to install similar systems in other athletic facilities. "My hope is that we can parlay the success at Reis into an effort to retrofit more athletic spaces," says Lanny Joyce, director of energy management in the facilities services department. "Lighting is the most visible form of energy waste. Innovative lighting and controls are part of our overall energy and climate goals, and we appreciate the athletics department for bringing this forward." Perhaps most important, the lights improve the quality of play, according to women's head coach Mike Stevens. "These new lights are just much nicer to play under. They make a big difference in how you can see the ball."

SANTA CLARA UNIVERSITY, HOME OF THE BRONCOS

RECREATION CENTER PILOTS GREEN BUILDING UPGRADES

Starting in 2006, Santa Clara University used its 45,000-square-foot Malley Fitness and Recreation Center to test new sustainability-related equipment. According to the director of the Office of Sustainability, Lindsey Cromwell Kalkbrenner, “Malley Center was the first building on campus to use dual-flush toilets, the first to test compost collection of paper towels, and the first to install occupancy sensors for lighting in storage closets and workrooms.” The facility uses treated wastewater for landscaping. The collaboration between the recreation department and the sustainability office fostered stronger campus-wide understanding of the benefits of green building practices, including an improved indoor environment, user wellbeing, and cost savings.

In 2008, the director of recreation, Janice DeMonsi, took advantage of growing campus support for environmental responsibility to justify a myriad of sustainability-related purchases, such as pool tarps that minimize heat-loss, saving energy and reducing heating costs. Campus recreation also implemented a new software program in 2008 that eliminated the need for three-page carbon-copy paper membership agreements and locker rental forms. This led to a department-wide paperless initiative. Now, all department news and other information is available only online, and a single laminated news sheet is posted in the gym instead of circulated on multiple flyers. Signature forms are now half or a third of a page, among other paper reduction initiatives.

In 2011, the athletics department partnered with campus recreation and the Office of Sustainability to create a paid undergraduate sustainability internship for athletics and recreation. In January 2012, intern Megan Anders (class of 2014 and NCAA Division I volleyball player) helped advance and publicize the variety of sports greening initiatives happening across the Santa Clara campus. Anders started by educating the 1,200 daily gym-goers about the 33 self-powered cardio machines in the Malley Center. She designed “Powered by Sweat” stickers for all of the machines and produced large educational posters about the environmental benefits of the self-powered machines. These posters reminded students that by using these cardio machines during workouts, they were saving the rec center 6,330 kilowatts of electricity each month (equivalent to the amount of energy generated by 489 gallons of gas, or enough electricity to run an average laptop for five years). The self-powered machines also avoid the release of 4.4 metric tons of greenhouse gas emissions every month.

Anders also created an energy efficiency display in the gym lobby, where users could test two of the self-powered treadmills. The display, which stood for two weeks, encouraged students to think about their environmental impact and undertake greener actions in sports facilities as well as campus-wide. Anders’ eye-catching posters change quarterly and are mounted in the student-athlete training room, Leavey Event Center restrooms, and throughout Malley center. “As an athlete, I already have connections with my coaches, other coaches, media, and athletic staff. This allows me to go directly to them with requests for our greening work,” says Anders.



Photos courtesy of Santa Clara University



COLUMBIA UNIVERSITY, HOME OF THE LIONS

SPORTS CENTER BUILT TO LEED SILVER STANDARDS

In March 2013, Columbia University opened its Campbell Sports Center, the first new building at the Baker Athletics Complex in more than 60 years. The 48,000-square-foot facility, designed by Stephen Holl Architects, is expected to achieve a minimum of LEED Silver certification. The five-story center includes a variety of more sustainable building practices that reflect the university's commitment to green architecture, reinforced by Columbia's campus-wide 2012 LEED Platinum certification for Neighborhood Development and its Gold rating from AASHE's STARS program. The sports complex's green features include low-flow fixtures, high-efficiency equipment and lighting, building materials made with recycled content, bike racks, demand-control ventilation, daylighting, and rain-screen cladding (an outer layer of insulation that helps moderate the temperature of the building throughout the year and reduce energy use).

Columbia Athletics also integrates greener practices into its operations. For example, the athletics department donates all prepared but untouched concession food in partnership with the nonprofit Rock and Wrap It Up. This helps feed local people in need, saves energy and water that would have been used to make additional meals, diverts waste from landfills and incinerators, and reduces greenhouse gas emissions (from decomposing food waste in landfills). In January 2012, student-athletes also formed a Columbia Athletics environmental organization called "EcoLions." The students launched a shoe reuse program with Shoebox Recycling and have donated more than 200 pairs of shoes for reuse to date. They have also worked closely with the athletics department to roll out an environmental education campaign, posting signs and green tips throughout team locker rooms and athletics buildings.

"EcoLions is a group we created as part of the Student-Athlete Advisory Committee," says varsity athlete and EcoLions founder Emma Tuzinkiewicz (class of 2015). "We work closely with the athletics administration and have support from the Columbia Office of Environmental Stewardship to help make Columbia's sports operations more environmentally friendly. We are very excited to expand our sports greening projects in partnership with the Ivy Green Initiative and with help from the Natural Resources Defense Council." Next, Columbia Athletics will work to expand its sports facility recycling programs.



Photo courtesy of Columbia University.

"ECOLIONS IS A GROUP WE CREATED AS PART OF THE STUDENT-ATHLETE ADVISORY COMMITTEE," SAYS ECOLIONS FOUNDER EMMA TUZINKIEWICZ. "WE ARE VERY EXCITED TO EXPAND OUR SPORTS GREENING WORK IN PARTNERSHIP WITH THE IVY GREEN INITIATIVE."

UNIVERSITY OF SOUTHERN CALIFORNIA, HOME OF THE TROJANS

USING HUMOR TO ENCOURAGE RECYCLING

Photos courtesy of University of Southern California.



During the 2012 football season, the University of Southern California (USC) launched a tailgate "zero waste" diversion and certification program. This program enjoyed a very successful inaugural year. Accomplishments included engaging nine student team leaders and 410 student "peer educators," educating 40,000 to 65,000 fans per game, and diverting more than 11,581 pounds of recyclable material (including more than 23,000 plastic cups) and 2,820 pounds of compostable material from landfill. During the 2012 football season, USC Athletics partnered with USC's Office of Sustainability to conduct a waste audit and pilot a venue recycling program. The Office of Sustainability is currently partnering with the operations team at USC's Los Angeles Memorial Coliseum to map out strategies to reduce waste during game days in 2013.

"While the program is enjoying some early success, there is still a long way to go in reaching a truly sustainable game day campus experience," says Halli Bovia, sustainability program manager at USC. "For the 2013 season, we expect student peer educator recruitment to be easier as we become more established. Additionally, we are focusing on reaching out to the larger, more organized tailgates to assist them in coming on board as 'zero waste' tailgates." One of USC's most successful recycling outreach efforts to date contributed to the game day atmosphere with humor. "Rather than becoming the 'trash police,' we emphasized a more jovial educator approach," explains Bovia. "Our student team worked on program marketing and came up with a variety of ways to encourage recycling while making people laugh." The team laminated and posted humorous signs based on popular Internet memes near waste diversion stations around athletic venues and in the tailgating areas at football games. "These signs were so popular that many of them went missing by breakdown time," says Bovia. "And while the popularity of the signs is waning, we will continue to look for fun and engaging ways to create a cultural shift regarding waste on campus."

UNIVERSITY OF MARYLAND, HOME OF THE TERRAPINS

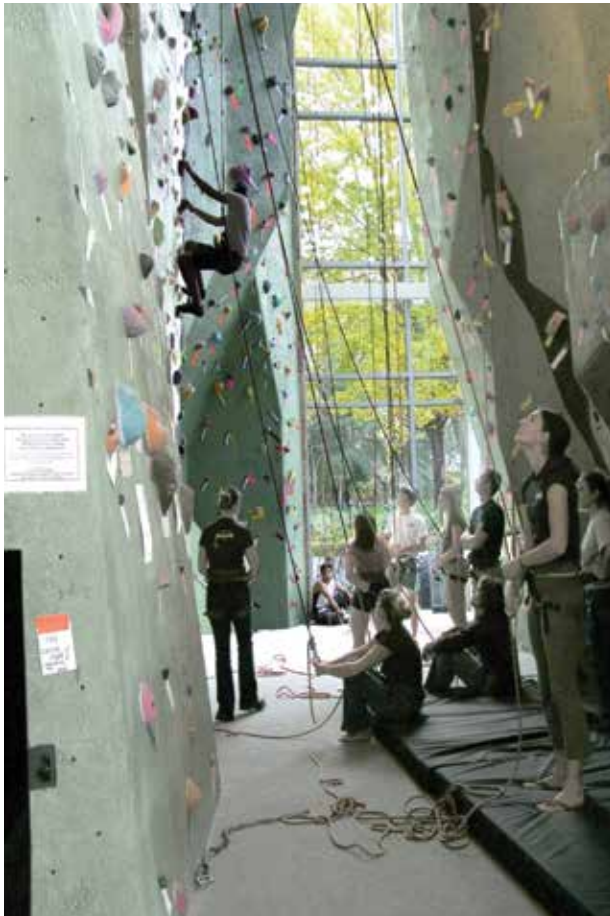
“FEED THE TURTLE” ATHLETICS RECYCLING AND COMPOSTING PROGRAM

The University of Maryland’s campus recycling rate increased from 17 percent in 2003 to 63 percent in 2010, thanks to support from its athletics program. To help boost the campus’s overall waste diversion rate, in the fall of 2006 Maryland Athletics implemented a football game recycling program in collaboration with the department of transportation services (which cleans parking lots after games) and the department of facilities management (which maintains campus grounds and facilities and transports recyclables and solid waste). The program yielded an average of two tons of recyclables at each game.

In the fall of 2008, the departments of athletics, facilities management, and dining services, with support from the administration, collaborated to develop a “Feed the Turtle” pilot program to expand recycling and institute food waste composting at all home football games. “Maryland Athletics is excited about launching Feed the Turtle as a pilot program for the rest of campus,” said Cheryl Levick, executive senior associate athletics director, at the program launch in 2008. “We are committed to the president’s sustainability initiatives and look forward to rolling out the program to 50,000 of the best football fans in the country.” The goals of the program, according to Maryland Athletics, were to divert solid waste from landfills, improve the game experience in and around Byrd Stadium, and provide environmental outreach to fans. As part of the program, Athletics distributed 140,000 recycling and trash bags to tailgaters. To promote the initiative, concessionaires gave away 5,000 reusable totes to students and other fans at the first home football game.

The program included new, custom-built containers made of recycled plastic to collect recyclables and food waste in the stadium, tailgater “valet recycling” (recycling bag pickup in select tailgating lots), and an event staff training plan. Dining services replaced polystyrene takeout containers with compostable containers made of bagasse, a plant-based product derived from the waste produced from processing sugarcane. Since the bagasse containers were more expensive, dining services launched a campaign to encourage diners to “eat in” using washable dinnerware, which resulted in a 15 percent reduction in the use of takeout containers. This helped offset the increased cost of the containers while increasing the percentage of waste that was compostable. Over the course of seven home games, the Feed the Turtle program resulted in the diversion of nearly 59 tons of solid waste from landfills and an average waste diversion rate of 41 percent for the 2008 football season. The program was expanded to include home basketball games in 2009 and to more sports in 2010, and it continues to be strongly supported by fans.

Photo courtesy of Sonoma State University.



SONOMA STATE UNIVERSITY, HOME OF THE SEAWOLVES

RECREATION CENTER GREEN BUILDING LEADERSHIP

Sonoma State University (SSU) set out in 2000 to build a recreation center that would become a model for sustainability. “Sustainable design and operations in collegiate recreation centers is not a fad. The case can be made for designing buildings that combine health, saving money, and a beneficial impact on the environment,” says Pam Su, SSU’s director of campus recreation. “Ultimately, it is the right thing to do, and the students and the campus benefit from going green. Being an early adopter and helping others in NIRSA learn from us through tours, presentations, and information have been goals from the start. We share our recreation center greening achievements in order to help others achieve success on their campuses.”

SSU recreation prioritized a concept called “biophilic design,” which involves using natural light, outside views, and outside air to improve the wellbeing of Rec Center users. Though the campus recreation department decided not to pursue LEED certification, it did use the U.S. Green Building Council’s LEED building standards to guide the design, construction, and operations of the center. “LEED credit systems remain a key resource that we return to over the years. Although we have not pursued LEED certification, we used LEED-NC to guide design and LEED-EBOM to guide operations of the SSU Rec Center,” says Su, referring to standards for new construction and the operation of existing buildings. “The information and guidance provided by these standards set our expectations, educate our staff, and inform practices throughout the facility.”

The Recreation Center’s green features include occupancy sensors, dimmable and programmable lighting, a customized building management system, efficient landscaping, low-flow faucets, 100 percent reclaimed water to flush toilets, reclaimed water for the fire sprinkler system, furniture constructed with recycled

“THE REC CENTER HAS HELPED SHAPE STUDENT EXPECTATIONS ABOUT NEW BUILDINGS AND OTHER PRACTICES ACROSS THE CAMPUS,” SAYS PAM SU, DIRECTOR OF CAMPUS RECREATION. “BECAUSE STUDENTS ARE EDUCATED ABOUT THE EFFORTS AT THE BUILDING, THEY ASK WHAT IS BEING DONE IN OTHER BUILDINGS ON CAMPUS.”

and reused materials, and environmentally-oriented educational signs throughout the building. SSU also surveyed the educational impact of the Recreation Center’s green features on the local community. “A recent occupant satisfaction survey revealed that 85 percent of those working in the Rec Center are positively influenced to go green in their personal lives because of working in the Rec Center. Many of our student employees share stories of adopting practices they learned on the job, bringing them home to ask their parents to make changes or bringing them to the workplace in their first job out of college,” says Su. “The Rec Center has helped shape student expectations about new buildings and other practices across the campus. Because students are educated about the efforts at the building, they ask what is being done in other buildings on campus.”

Photo courtesy of Sonoma State University.



PRINCETON UNIVERSITY, HOME OF THE TIGERS

WATER-EFFICIENT FIELD HOCKEY TURF

In 2012, Princeton Athletics renovated its field hockey turf to incorporate an upgraded drainage system that can hold water longer, reducing the need to re-water while also providing rapid surface drainage to prevent puddles. Jeff Graydon, Princeton’s associate athletic director for facilities, worked with AstroTurf engineers to select a system with a 3mm urethane backing and a uniform pattern of drainage holes. This allows the field to retain the right amount of moisture for the best ball movement during play while still enabling the field to drain. The turf drainage system allows the water to recharge groundwater and eliminates runoff into the stormwater system. It is designed to retain 100 percent of the water from a 100-year storm, exceeding Princeton’s sustainability goal for stormwater management. “We wanted to create a very efficient and consistent surface that gives the team with the highest skill level the best opportunity to win,” Graydon says.

“WE WANTED TO CREATE A VERY EFFICIENT AND CONSISTENT SURFACE THAT GIVES THE TEAM WITH THE HIGHEST SKILL LEVEL THE BEST OPPORTUNITY TO WIN,” SAYS JEFF GRAYDON, ASSOCIATE ATHLETIC DIRECTOR FOR FACILITIES.

In the past, Princeton’s water cannon system used as much as 12,000 gallons of water to wet the field for every practice and every game. The upgraded turf requires only 1,200 gallons and a single pass of the new, more efficient water cannons, saving at least 10,000 gallons of water each time the field is used. Even on a hot day the field needs two passes at most, using less than 2,000 gallons of water. Field hockey coach Kristen Holmes-Winn has a smartphone application that allows her to control the water cannons remotely. Princeton Athletics also developed a new method of turf placement for all irrigation heads that eliminates water loss.



UNIVERSITY OF SOUTH CAROLINA, HOME OF THE FIGHTING GAMECOCKS

TAILGATING RECYCLING IN PARTNERSHIP WITH ESPN

“The development of a waste diversion program at our athletics events has been a long-standing goal at the University of South Carolina,” says Larry Cook, university recycling coordinator. “To date, the main focus of these efforts has been football games at Williams-Brice Stadium and the surrounding tailgating areas.” The stadium can hold 80,250 fans and draws several times that number in the tailgating lots. “The costs of cleaning up after events are significant, and a successful recycling program can have many benefits,” Cook notes.

Though the University of South Carolina (SC) previously provided recycling at some football games, the permanent recycling program began during the 2009 football season, when the school hosted ESPN’s “College GameDay.” ESPN was interested in instituting environmental initiatives at the event and reached out to SC to encourage implementation of a recycling program in the stadium and at tailgating sites. During the fall of 2012, SC engaged 74 volunteers, handed out 4,400 recycling bags to tailgaters, collected 4,210 pounds of tailgater recyclables, and collected 40,700 pounds of recyclables in the stadium. The program cost SC a total of \$3,530 for bags, volunteer T-shirts, 44 hours of staff labor, and media outreach.

In working to establish an effective tailgate recycling program at University of South Carolina home football games, the organizers experienced challenges common to most recycling programs. These challenges included providing adequate access to recycling resources, educating participants about the availability of those resources and how to properly use them, reducing contamination of the collected material (especially food waste), collecting recyclables efficiently and effectively, and funding the staff and materials for the program. In the future, the athletics department, Sustainable Carolina, and the facilities department plan to expand the program’s focus to address issues of accessibility, awareness, collection efficiency, and funding to build on the tailgating program and to create consistent access to recycling resources.

REGIONAL SPORTS GREENING EFFORTS

Athletics conferences and national organizations have launched programs to support sports greening efforts on college campuses across the country. These initiatives help strengthen collegiate sports greening work by providing technical resources, organizing environmentally themed competitions, holding forums for sharing better practices, and encouraging support for sports greening initiatives from athletics and campus leadership. Some of the institutions leading regional efforts are featured below.

ATHLETICS CONFERENCES

IVY LEAGUE CONFERENCE



In 2012, the Ivy League partnered with the Natural Resources Defense Council (NRDC) and established the Ivy Green Initiative to make a conference-wide commitment to environmental stewardship. The Ivy Green Initiative is focused on enhancing the environmental profile of Ivy League championship events and providing resources to advance the greening of all Ivy League athletics departments. It is the first athletics conference greening program of its kind in the United States, with support from all Ivy League athletics directors and prominent placement on the conference's website. "This is simply the right thing to do, and it makes very good business sense," says Harvard Director of Athletics Bob Scalise. "We're proud to be involved in this initiative."

"The Ivy League is greening its championship events because we recognize the importance of sustainable initiatives to protect our planet for future generations and the future of sports," says Robin Harris, Ivy League Executive Director. "Promoting environmental stewardship helps benefit all aspects of society, produces jobs and helps protect public health. Through the Ivy Green Initiative, the League is proud to educate its students, alumni and fans about these important issues."

The Ivy League office teamed up with Ivy League athletics departments and NRDC, its technical environmental adviser, to integrate ecologically intelligent practices into the planning and production of championship events. For example, in April 2012, a new policy was established to print all championship programs on paper with a minimum of 50 percent postconsumer recycled content. The Ivy

office also encourages recycling at events by offering recycling receptacles and signs; promotes carpooling and public transit; and sends environmental tips to coaches, athletes, and parents. To date, the conference has produced greening accomplishments lists for championship events including the 2012 and 2013 Ivy League Women's Rowing Championships, the 2013 Ivy League Heptagonal Indoor Track & Field Championships, the 2013 Ivy League Fencing Round-Robins, and the 2013 Ivy League Swimming & Diving Championships.

"Through our environmental leadership on the fields of play, we are supporting the greening interests of our schools and showing our many constituents practical solutions to some of our planet's pressing ecological issues," says Harris. "Our efforts also help prove the business benefits of greening collegiate athletics."

Photo courtesy of Alice Henry.



"THIS IS SIMPLY THE RIGHT THING TO DO, AND IT MAKES VERY GOOD BUSINESS SENSE," SAYS HARVARD ATHLETICS DIRECTOR BOB SCALISE. "WE'RE PROUD TO BE INVOLVED IN THIS INITIATIVE."



BIG TEN CONFERENCE

The Big Ten and Friends Environmental Stewardship Group was formed in November 2009, when financial officers from all Big Ten schools met to identify and plan for long-term issues of environmental stewardship. The group is now made up of sustainability and facilities officials from each of the Big Ten schools, as well as staff from the University of Notre Dame, University of Chicago, University of California, University of Texas, and University of Nebraska.

“Big Ten and Friends institutions came together to discuss the potential to collaborate on energy initiatives and common environmental challenges,” says Jennifer Battle, sustainability director for Michigan State University and coordinator of the Big Ten and Friends Environmental Stewardship Group. “The success of the first meeting prompted the group to organize biannual meetings in the spring and fall. The discussion also evolved to include topics such as materials management, food, strategic planning, student engagement, and institutional metrics. The meetings have resulted in collaborations around energy efficiency and lighting, purchasing, and benchmarking.”

The institutions have learned from one another and from speakers brought in to discuss how the campuses might improve their environmental performance. “The Big Ten Environmental Stewardship Group helps us learn how different colleges are solving the same problem with different approaches,” says Faramarz Vakilzadeh, associate director of the physical plant at the University of Wisconsin at Madison.

While the group tackles campus-wide greening efforts, many of its discussions and online offerings focus on sports greening, with links to NRDC, Green Sports Alliance, and Environmental Protection Agency (EPA) resources. “The collaborations have created an environment where we can call each other at any time to discuss ideas,” says Battle.

The Big Ten also earned EPA recognition as the 2012–2013 Collective Conference Champion for its purchase of 316 million kilowatt-hours of green power, the highest among all athletics conferences. The contributing schools for this honor included The Ohio State University, Northwestern University, the University of Wisconsin, and the University of Iowa.

“BIG TEN AND FRIENDS INSTITUTIONS CAME TOGETHER TO DISCUSS THE POTENTIAL TO COLLABORATE ON ENERGY INITIATIVES AND COMMON ENVIRONMENTAL CHALLENGES,” SAYS JENNIFER BATTLE, SUSTAINABILITY DIRECTOR FOR MICHIGAN STATE UNIVERSITY AND WEBSITE COORDINATOR OF THE BIG TEN AND FRIENDS ENVIRONMENTAL STEWARDSHIP GROUP.

NATIONAL ORGANIZATIONS

NATIONAL COLLEGIATE ATHLETICS ASSOCIATION

In 2011, for the first time in the history of the Men's Final Four® basketball tournament, the National Collegiate Athletics Association (NCAA) formed a committee to integrate ecologically intelligent practices into the event's planning and production. NRDC was asked to join as a founding member of the NCAA Final Four® Sustainability Committee, teaming up with LG Electronics, Waste Management, Inc., Reliant Park, the city of Houston, and the George R. Brown Convention Center. The committee began by commissioning a sustainability performance assessment to gauge current sustainability practices at the 2011 Final Four® venues in Houston, identify opportunities for improvement, and establish benchmarks against which to measure achievements.

"WE LOOK FORWARD TO EXPANDING OUR SUSTAINABLE EFFORTS IN THE COMING YEARS, PROVIDING MORE EDUCATION ABOUT SUSTAINABILITY AND ENGAGING MORE FANS IN A SUSTAINABLE LIFESTYLE," SAYS ELISA HALPIN, COORDINATOR OF THE NCAA MEN'S BASKETBALL CHAMPIONSHIPS.

In the NCAA, 400,000 student-athletes participate in 23 sports each year with 89 national championship events, and millions follow NCAA events. Many of the 145,000 fans at Reliant Stadium for the 2011 NCAA Final Four® might have noticed the 600 newly installed recycling bins and the JumboTron messages reminding people to recycle. They may have also noticed that their programs were made with 30 percent postconsumer recycled content and FSC-certified fiber. Other noteworthy environmental accomplishments included supplying 100 percent of the energy used by the LEED Silver-certified George R. Brown Convention Center with wind power, thanks to support from the city of Houston. At Reliant Stadium, the committee purchased carbon offsets from wind and solar power projects from the Bonneville Environmental Foundation, resulting in avoided global warming emissions totaling 210 U.S. tons in CO₂ equivalents, representing about 509,000 auto miles.

The 2012 NCAA Final Four® expanded on the sustainability initiative introduced in 2011 with a new educational outreach event called "Greening the Hospitality Zone." Working with the Greater New Orleans Hotel and Lodging Association, LifeCity, and the New Orleans Local Organizing Committee for the 2012 Men's Final Four®, the 2012 NCAA Final Four® Sustainability Committee invited representatives of the hospitality industry to attend this event to share greening strategies, discuss ecotourism, and promote more sustainable practices in the hospitality industry.

In March 2012, LG Electronics continued the e-recycling project developed the previous year in Houston, allowing New Orleans area residents to drop off electronic waste for recycling at the tournament venue, the Mercedes-Benz Superdome. "The NCAA strives to make an impact on and off the court during the Men's Final Four®," said Byron Hatch, former NCAA director of championships and alliances, in a press release. "As part of our efforts, we focus on increasing awareness of sustainability each year in the Final Four city."

In 2013, the NCAA continued its commitment to environmental stewardship at the Men's Final Four games. "To celebrate the 75th anniversary of March Madness® and the NCAA Men's Final Four®, Atlanta boldly embraced a goal to make this the greenest Final Four® to date," says Tim Trefzer, sustainability coordinator at the Georgia Dome and a member of the 2013 NCAA Final Four® Sustainability Committee. "We engaged fans, student-athletes, and the community to reduce the environmental impact of one of the greatest sporting events. The NCAA made sustainability a priority early in the planning process because of the opportunity to educate the Atlanta community on environmental issues while building a road map for future cities to follow."

Some of the sustainability practices implemented at the 2013 NCAA Final Four® in Atlanta included recycling infrastructure at all event venues, a community electronics recycling event at the Georgia Dome, a clothing donation drive, repurposing all Final Four banners to create event memorabilia, obtaining paper and plastic materials made with postconsumer recycled content, reusing or recycling the Final Four® basketball courts, partnering with Atlanta's public transit agency to encourage fans to use public transit, providing a free bike valet service for those cycling to the event, and planting 75 trees in two Atlanta neighborhoods in honor of the tournament's 75th anniversary.

The NCAA also purchased renewable energy credits (RECs), predominantly from wind and solar farms in the Southeast, to offset 100 percent of the electricity used to power the Final Four® games at the Georgia Dome. "While we strive to reduce the energy consumed for the Final Four®, the purchase of RECs will help build the market for renewable energy in the United States," says Trefzer. The 2013 NCAA sustainability committee also established partnerships with hotels including the Omni CNN Hotel, the Atlanta Marriott Marquis, the Westin Peachtree, the Hyatt Regency Atlanta, the Hilton Atlanta, and the Sheraton Atlanta to support and communicate the event's sustainability initiatives to guests. Finally, the committee partnered with eight local restaurants on energy conservation, water conservation, food donation, and composting.

"The NCAA had a strong partnership with the city of Atlanta and we accomplished a great deal at the 2013 NCAA Men's Final Four®," says Elisa Halpin, coordinator of the NCAA men's basketball championships. "As part of our efforts, we are focusing on increasing green awareness each year in the Final Four® city. We look forward to expanding our sustainable efforts in the coming years, providing more education about sustainability and engaging more fans in a sustainable lifestyle."

U.S. ENVIRONMENTAL PROTECTION AGENCY

Game Day Challenge

In 2009, the EPA launched the Game Day Challenge, a friendly competition to encourage colleges and universities to reduce waste, recycle, and compost at their football games. During the challenge, colleges and universities implement, track, and report on their waste reduction and diversion programs at home football games. In 2012, the College and University Recycling Coalition, RecycleMania, and Keep America Beautiful took over administration of the Game Day Challenge, with ongoing support from EPA's National Sustainable Materials Management Program.

"The goals of the Game Day Challenge include lowering the waste generated at college football games; increasing participation by students, faculty, staff, and the community in waste reduction programs; and heightening awareness of waste reduction programs," says Stephanie Owens, EPA deputy associate administrator for the Office of External Affairs and Environmental Education.

"AMERICAN SPORTS TEAMS, VENUES AND LEAGUES HAVE BEEN LEADERS ON SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL STEWARDSHIP FOR YEARS," SAYS EPA DEPUTY ADMINISTRATOR BOB PERCIASEPE. "WE MUST CONTINUE TO LEAN ON AMERICAN INNOVATORS TO ADDRESS CHALLENGES LIKE WASTE MANAGEMENT, WATER CONSERVATION, AND POLLUTION PREVENTION—THE SPORTS INDUSTRY PROVIDES A GREAT EXAMPLE OF WHAT IS POSSIBLE."

Any U.S. college or university with a football program is eligible to participate in the Game Day Challenge. To join, schools are required to plan and implement a waste reduction program for a selected regular-season home football game. All participants must track and record data on waste generated, recyclables collected, composting collected, and attendance. Schools are then required to report their numbers within a week of the selected game via a form provided on the Game Day Challenge website. Each year there are five award winners for the following categories: waste generation (for the school with the lowest amount of waste per capita), highest diversion rate (recycling plus composting), largest reduction in greenhouse gases, highest recycling rate, and greatest per capita reduction of organic waste.

The EPA offers free technical assistance to all Challenge participants by sharing case studies and "lessons learned" from colleges and universities that have implemented sustainable materials management approaches. "This assistance can help these institutions change the way they think about materials and resources and promotes a more sustainable future," says Owens. The Game Day Challenge website also contains a variety of resources, including toolkits for how to set up and operate stadium and tailgating waste reduction programs as well as information about Game Day Challenge webinars.

"By working together with colleges and universities and other partners, we can use the excitement around collegiate sports to help institutions save money, leverage partnerships, and motivate students to engage in environmental stewardship," says Suganthi Simon, pollution prevention coordinator with Region 4.

Collegiate Sports Sustainability Summit

In 2011, university leaders from the Southeastern Conference (SEC) and the Atlantic Coast Conference (ACC) joined the EPA, Coca-Cola Recycling, Chick-fil-A Bowl, and the Georgia World Congress Center Authority to participate in the first Collegiate Sports Sustainability Summit in Atlanta. More than 20 SEC and ACC schools participated in the event.

Since its founding, the Collegiate Sports Sustainability Summit has become a national event, tripling in size, with the third annual event in 2013 comprising three days of meetings and attracting more than 105 attendees. The 2013 Summit, hosted by the Georgia Institute of Technology, drew attendance from universities across the country and featured a keynote speech by Gene Smith, the athletics director for The Ohio State University. Attendees represented the SEC, ACC, Big 10, Big 12, PAC-12, Ivy League, and Sun Belt conferences, and Division I, II, and III colleges and universities. The 2013 Summit partners included EPA, Keep America Beautiful, the College and University Recycling Coalition, Green Sports Alliance, Coca-Cola Recycling, Georgia World Congress Center Authority, and RecycleMania.

"The event offers attendees the chance to develop strategies that can make athletic and sports programs socially, economically, and environmentally responsible," explains Suganthi Simon, the pollution prevention coordinator for EPA Region 4 and lead coordinator of the Summit. "It brings together collegiate athletics staff, sustainability professionals, recreational sports, and facilities managers to share experiences of schools that have lowered costs and attracted sponsors to their programs while improving sustainability. It is designed to foster better interdepartmental relationships and increase recognition for each institution's efforts. The growth of the Summit indicates the need for a forum dedicated to the discussion of collegiate sports sustainability."

EPA College and University Green Power Challenge

Each year the EPA issues a Green Power Challenge that is open to all U.S. colleges, universities, and conferences. The agency's Green Power Partnership tracks colleges to determine the conference with the highest combined green power use in the nation. To be eligible for the challenge, an athletics conference must have at least one school in their conference registered as a Green Power Partner and an aggregate green power purchase of at least 10,000,000 kWh.

The EPA concludes the Green Power Challenge each April, naming a champion conference as well as the largest single green power user within each participating conference. The Big Ten took conference honors in 2012–13; the Pac-12 won the prior year, and the Ivy League captured the award in 2010–11.

The combined green power use of the 20 largest users among higher-education institutions within the Green Power Partnership amounts to more than 1.7 billion kilowatt-hours annually. By using green power instead of conventional power, these institutions are avoiding an amount of carbon dioxide emissions equivalent to emissions produced by the annual electricity use of over 182,000 American homes.

GREEN SPORTS ALLIANCE

As of August 2013, Alliance members represent more than 170 professional and collegiate sports teams and venues from 16 different sports leagues, including 15 NCAA sports programs and one additional university. Alliance collegiate members include Arizona State University, Davidson College, The Ohio State University, Stanford University, the University of Arizona, the University of California at Los Angeles, the University of Colorado Boulder, the University of Florida, the University of Minnesota, the University of Oregon, the University of Pennsylvania, the University of Southern California, the University of Texas, the University of Washington, Washington State University, and the University of British Columbia.

Green Sports Alliance members have made a commitment to reduce waste, conserve energy and water, and eliminate toxic chemicals, among many other ongoing greening initiatives. They are integrating sustainability into their core operations, engaging fans, and saving money in the process. “Our membership in the Green Sports Alliance has served as a tremendous resource as we shape the waste diversion and sustainability strategies of our department’s future,” says Karen Baebler, assistant athletics director of sports operations at the University of Washington. “The case studies provided give us a thorough grasp of best practices and have helped our team generate new thought about our green efforts.”

Alliance resources include an annual summit, monthly webinars, monthly newsletters, and greening “playbooks” for operations, e-waste recycling events, and onsite solar installations (co-authored by NRDC) at sports venues. The Alliance’s “Operations Roadmap” helps sports programs develop plans to reduce energy and water use, minimize waste, and adopt environmentally preferable procurement, among other topics. The Alliance also works closely with organizations such as NRDC, the EPA, AASHE, NIRSA, the U.S. Green Building Council, and NCAA conferences to provide resources specific to the needs of collegiate sports programs.

“A primary value of the Green Sports Alliance is that it enables sports organizations with a wide range of operations challenges, stakeholders, and goals to share their greening experiences,” says Martin Tull, the organization’s executive director. “The collegiate members of the Alliance learn from the successes and challenges of professional sports greening programs and from each other, and they provide invaluable lessons to help all members advance their environmental profile.”

Membership in the Alliance is open to any sports team, venue, league, or collegiate program. The Alliance helps its members reach their environmental goals by providing direct support, facilitating networking with recognized leaders in the industry, compiling better practices in venue operations and communications, and hosting workshops. It works with a wide range of stakeholders at universities, from athletics department staff to facility operators to sustainability and recycling coordinators, and helps to increase collaboration between departments in order to reach common goals.

In addition to its 16 official collegiate members, the Green Sports Alliance has offered advice to nearly 50 universities seeking information on sports greening in the 2012–2013 academic year alone. The Alliance has held discussions on the conference level with the Pac-12, Big Ten, and West Coast Conference. Its staff and members have given presentations or helped design content on sustainability in collegiate athletics and recreation programs at multiple conferences, including the Collegiate Athletic Facilities Summit, the AASHE conference, the Collegiate Sports Sustainability Summit, and the Stadia Design and Technology Expo.

“OUR MEMBERSHIP IN THE GREEN SPORTS ALLIANCE HAS SERVED AS A TREMENDOUS RESOURCE AS WE SHAPE THE WASTE DIVERSION AND SUSTAINABILITY STRATEGIES OF OUR DEPARTMENT’S FUTURE,” SAYS KAREN BAEBLER, ASSISTANT ATHLETICS DIRECTOR OF SPORTS OPERATIONS AT THE UNIVERSITY OF WASHINGTON.

WHO’S ON BOARD

Since launching nationally in March 2011, the Green Sports Alliance has grown to over 170 teams and venues from 16 sports leagues.

Alliance Members include:

17 MLB Teams/Venues	15 NCAA Athletics Departments	13 NHL Teams/Venues
12 NFL Teams/Venues	7 NBA Teams/Venues	3 MLS Teams/Venues
GREEN SPORTS ALLIANCE	PLUS: AEG Venues, Minor League Teams/Venues, Racetracks	2 PGA Tournaments

NIRSA: LEADERS IN COLLEGIATE RECREATION

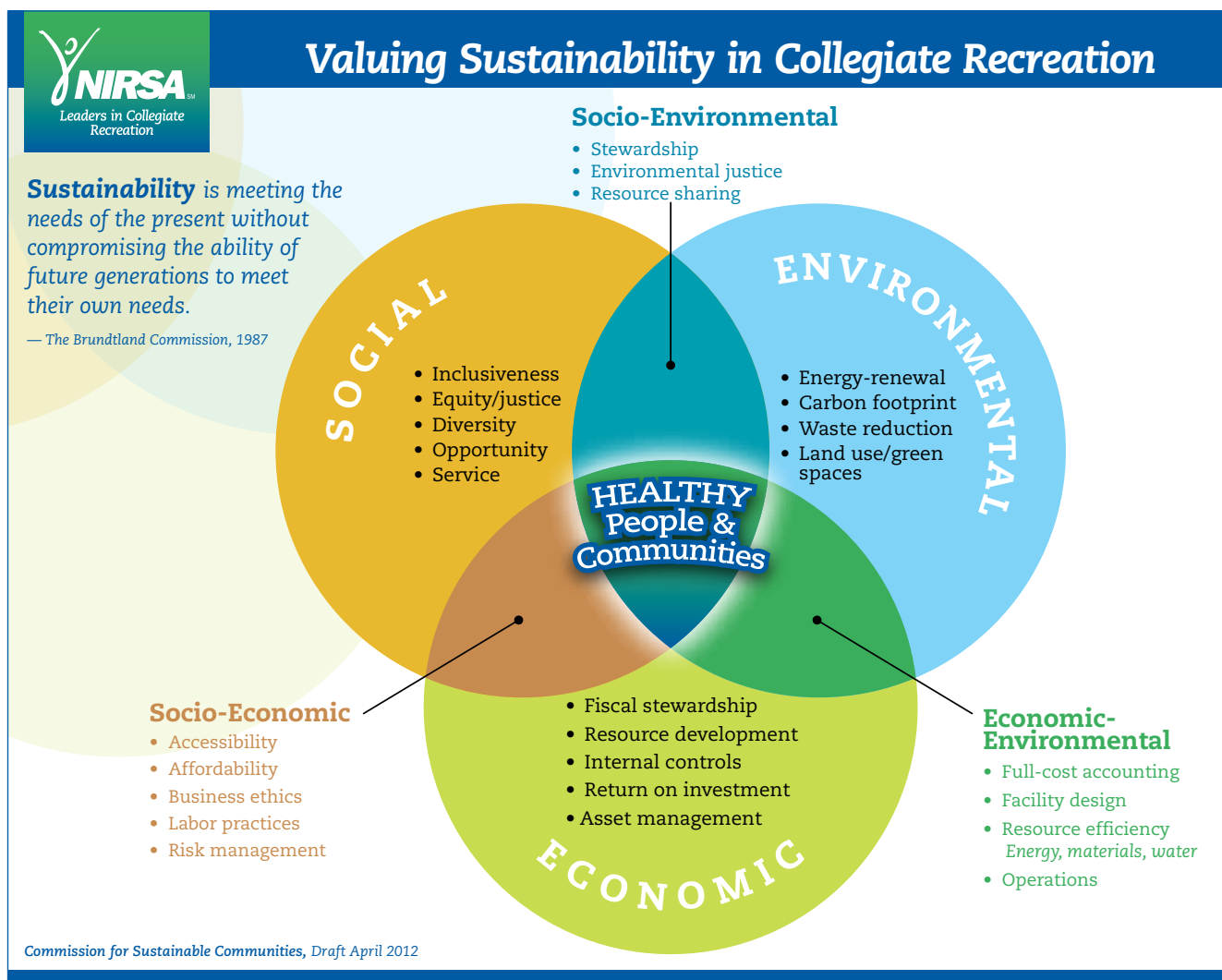
NIRSA Commission for Sustainable Communities

NIRSA: Leaders in Collegiate Recreation (NIRSA), founded in 1950, is a member-based organization devoted to collegiate recreation and comprised of nearly 4,000 professionals, students, and businesses serving approximately 7.7 million students. Sustainability is one of NIRSA's core principles and is at the forefront of the value initiatives underlying the association's envisioned future.

"To create the conditions for a more sustainable future, higher education has to provide college and university graduates with the skills and knowledge that will prepare them to meet future challenges," says Pam Watts, executive director of NIRSA. "There are many reasons why collegiate recreation should play a leading role in these efforts. Campus recreation departments interact with a larger percentage of the campus population than nearly any other entity on campus. They also have traditionally had one of the largest carbon footprints on campus. As NIRSA assessed the future of collegiate recreation, sustainability emerged as critical for the work of our members."

In December 2011, NIRSA formed a Commission for Sustainable Communities with the goal of developing a multiyear plan for integrating sustainability into the association and all domains related to the recreation profession. "The sweet spot for NIRSA is inspiring the development of healthy communities worldwide, and sustainability offers students and practitioners in the field the ideal lens through which we can focus our efforts," says Watts. The NIRSA Commission for Sustainable Communities has collaborated with thought leaders and engaged the association's membership to develop a number of resources aimed at moving the culture of collegiate recreation toward sustainability.

Their work has led to the distribution of a visual model for valuing sustainability in collegiate recreation. The model, shown below, is based on three pillars of sustainability—social, environmental, and economic—and is tailored specifically for collegiate recreation. The commission also developed a list of questions to help members think about what sustainability means within their own campus programs and facilities. "As educators, NIRSA professionals have an opportunity to influence future leaders of the world by actively valuing sustainability in collegiate recreation programs," says Watts.





ASSOCIATION FOR THE ADVANCEMENT OF SUSTAINABILITY IN HIGHER EDUCATION

The Association for the Advancement of Sustainability in Higher Education (AASHE) is an association of colleges and universities in the United States whose mission is to promote sustainability in higher education. The organization, a member-based nonprofit founded in 2001, “provides resources and a network of support to enable institutions of higher education to advance sustainability in everything they do, from governance and operations to education and research,” says Meghan Fay Zahniser, director of programs at AASHE.

AASHE began outreach on sustainability to collegiate athletics departments in 2009. In July of that year, the group released its “Collegiate Athletics Department Sustainability Survey Report,” which indicated that almost 75 percent of respondents expected the emphasis on environmental programs in their campus athletics departments to increase in the future. The survey found that fewer than 10 percent of collegiate athletics departments had developed a formal sustainability plan, but that 15 percent were actively considering one. (The survey was distributed to the 119 athletics departments in the NCAA Football Bowl Subdivision, formerly known as Division 1A, and 97 institutions responded.)

One of AASHE’s most successful programs is the Sustainability Tracking, Assessment, & Rating System (STARS). STARS is a voluntary self-assessment for colleges and universities to measure their sustainability performance. STARS recognizes sports greening initiatives within the operations category in areas such as waste, water, and purchasing. There is also an innovation category that gives points for work that is not otherwise captured in the STARS self-assessment that could include sports greening efforts. For example, in 2010, the University of Colorado at Boulder acquired an innovation credit for being the first NCAA football stadium to adopt a “zero waste” policy (see the University of Colorado Boulder case study).

“AASHE has different resources to support collegiate sports greening,” says Zahniser. “A benefit of being an AASHE member is access to guides like the Green Athletic Centers, an online resource that features case studies of LEED-certified athletics and recreation facilities.” The AASHE website also features Campus Sustainability Forums, online platforms that foster conversations within the higher-education community on a variety of greening issues related to sports venues, including turf management and recycling.

AASHE publicizes the sports-related greening accomplishments of its member schools via outreach platforms that include its annual campus sustainability conference (North America’s largest), newsletters, professional development workshops, webinars, a blog, and social media pages. For example, AASHE is collaborating with NRDC and the Green Sports Alliance to promote case studies on the greening of campus sports. “We have an active blog and social media presence with posts that focus on how NCAA rivalries can promote sustainability,” says Zahniser. “And each year at AASHE’s annual conference, sports greening is covered among various topics during the educational sessions. On our website, members can find information on emerging trends in greening athletics.”

RECOMMENDATIONS FOR IMPLEMENTING A SUCCESSFUL COLLEGIATE SPORTS GREENING PROGRAM

The following recommendations are based on lessons from some of the most well-developed sports greening initiatives on campuses across North America. These recommendations focus on helping college sport programs begin or build upon their environmental work. By implementing some of this advice, collegiate sports departments can gradually improve the efficiency of their operations, reduce overall environmental impacts, enhance their brands, diversify and strengthen sponsor relationships, and engage fans on this important issue. The recommendations below are diverse, as greening strategies vary by location, institutional priorities, partnership support, and on-campus resources.



Photo courtesy of University of Colorado Boulder.

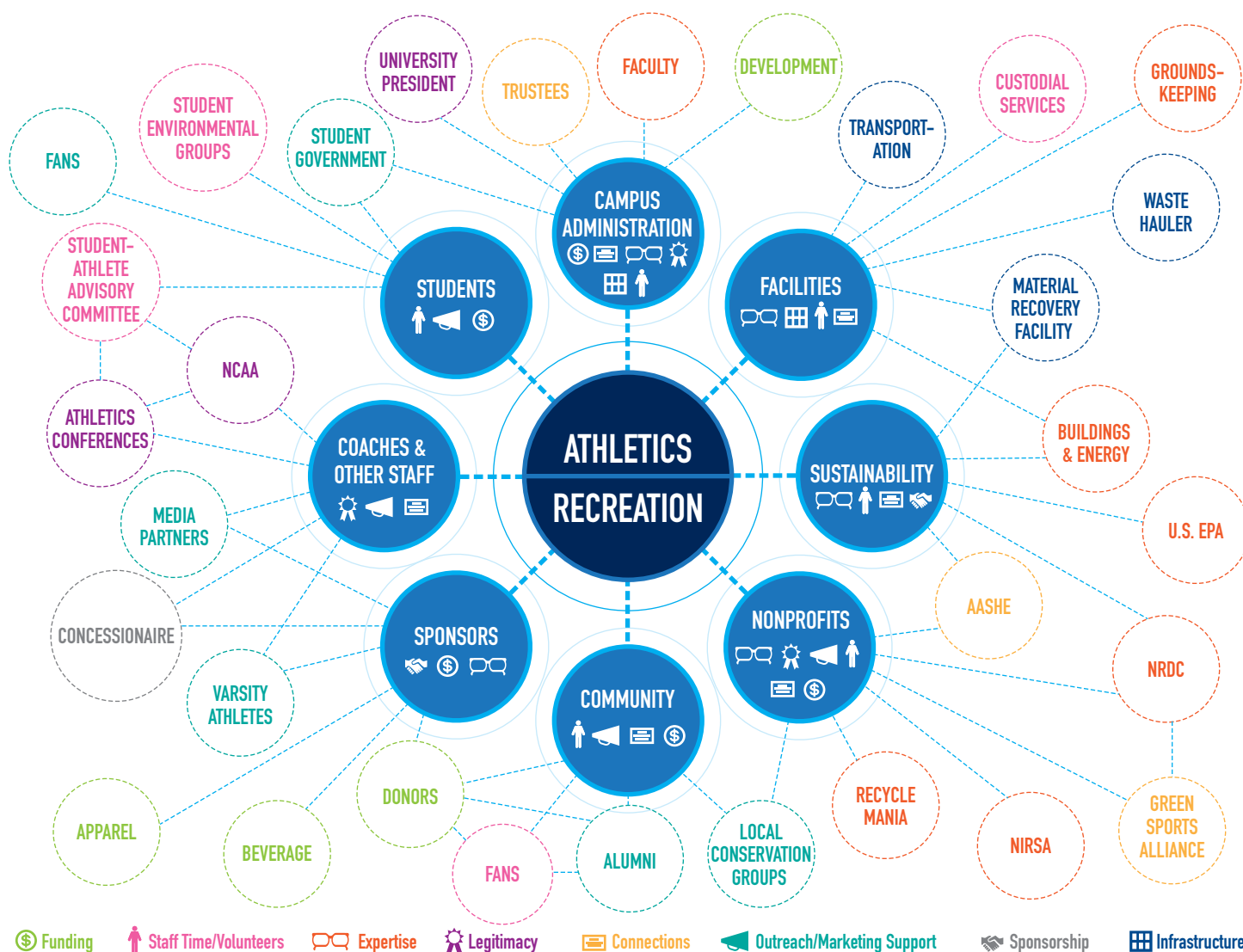
1. ENGAGE DIVERSE CAMPUS STAKEHOLDERS

A successful sports greening program requires support from university leadership and diverse departments across campus. To encourage interdepartmental buy-in, sports greening initiatives should align with campus-wide sustainability goals. Start by researching institutional greening priorities, whether or not they are formal commitments. Inventory existing on-campus resources. Identify opportunities for sports departments to support broader campus objectives, such as “zero waste” goals or greenhouse gas reduction goals. These initiatives should aim to be measurable, with clear plans for implementation. Quantifying the impact of sports greening projects can help attract institutional funding and build campus-wide support.

Recognize that each campus department—athletics, recreation, facilities, construction, and sustainability, among others—has different staff, budget, expertise, incentives, and priorities. These factors influence interdepartmental interest in and support for sports greening efforts. Listen to the needs of all stakeholders. Take the time to learn how they do things and why. Tailor greening objectives and plans according to the challenges that different departments and facilities may face. Consider testing new efforts on a small scale first (such as at a single game or in a specific venue), to demonstrate feasibility, gather feedback, build confidence, and gain stronger support. Then develop plans to roll out greening initiatives on a larger scale (such as throughout a season of competition or across several facilities).

The following graphic provides a snapshot of the variety of on- and off-campus stakeholders that can contribute to a successful greening program within the athletics and/or recreation departments on your campus. As the titles, responsibilities, and organizational structure of these groups vary significantly from campus to campus, this is only an example of potential sports greening partners and the assets each may offer. Consider mapping out your own network by identifying the various stakeholders that could benefit your campus sports greening efforts. These partners can bring resources to the table, such as funding, staff time and/or volunteers, expertise, legitimacy, connections, outreach and/or marketing support, sponsorship, infrastructure, and experience. Evaluate the value existing or potential partners could bring to your program.

SAMPLE NETWORK OF CAMPUS SPORTS GREENING STAKEHOLDERS



STUDENT-LED SPORTS GREENING PROJECT IDEAS

Students can help attract support for sports greening on your campus by leading new projects. Work with facility managers and other athletics or recreation staff to launch or expand your varsity or club team's greening work. Below are some project ideas to consider. These initiatives are often relatively easy to implement and can help build interest in broader infrastructure and operational greening.

- **RECYCLING AND GREENER TAILGATING:** Create a green team of student volunteers to collect recyclables during games and tailgates. Also consider handing out bags to tailgaters for collecting recyclables, then picking up the bags later or designating drop-off stations nearby.

- ★ See *University of Oregon case study and Penn State and University of Southern California snapshots for examples.*

- **FOOD DONATION PROGRAM:** Instead of throwing away unused food, establish a donation program following athletic events to send untouched leftover food to a nearby food bank or another place of need. Contact your local food bank, visit Feeding America (feedingamerica.org) for information about food banks near you, or visit Rock and Wrap It Up! (rockandwrapitup.org) for information on its college donation program.

- ★ See *Columbia snapshot for an example.*

- **SPORTS GEAR RECYCLING DRIVE OR DONATION**

PROGRAM: Start a recycling drive encouraging students to donate, exchange, or sell used sports gear. Consider arranging campus-wide sports gear donation events (including clothes, shoes, and equipment) to benefit local schools or places of need. Ask the athletic equipment manager(s) to contribute any unused or outdated team gear. There are also several programs—such as Reuse-a-Shoe (www.nike.com/us/en_us/c/better-world/stories/2013/05/reuse-a-shoe) and Shoebox Recycling (shoeboxrecycling.com)—that can provide collection bins for used shoes to install in sports facilities.

- ★ See *Bowdoin College and University of Pennsylvania snapshots for examples.*

- **ENVIRONMENTAL EDUCATION CAMPAIGN:** Create signs for all athletic facilities to educate fans and athletes about easy things they can do to reduce energy, recycle, etc. Post more detailed posters in high-traffic areas such as locker rooms, gyms, and elevators. Partner with the sports marketing manager(s) to design a sports greening program brand with a name and logo to help publicize your sports greening accomplishments and encourage people to get involved.

- ★ See *Yale and CU-Boulder case studies for examples.*

- **COMPOSTING PROGRAM:** Create a green team of student volunteers to set up stations for food waste from tailgates. Consider also handing out bags for tailgaters to use to collect their own compost, then picking them up later or designating drop-off stations nearby. Partner with the campus waste department to arrange to haul bags of food waste to on-campus or off-campus compost centers.

- ★ See *Ohio State case study and University of Texas snapshot for examples.*

- **E-WASTE DRIVE:** Host a used electronics recycling event at a major sports event. Arrange to have a local e-Stewards-certified recycler to help collect and haul the waste. Publicize the event well in advance, with outreach to all teams, dorms, and campus departments. Circulate notices with information about the kinds of electronic waste that will be accepted, and post signage at the event with pictures of acceptable items.

- ★ See *NCAA section of “Regional Efforts” chapter for examples.*

2. INVOLVE STUDENTS

Students can help advance collegiate sports greening efforts in many ways. Encourage students to take ownership of the research and planning for sports greening initiatives. This can reduce demands on staff time and departmental resources. Seek student input when designing new facilities; developing a better understanding of users' needs can help improve building performance. Engage students majoring in environmental studies, sports management, and/or marketing to develop creative, perhaps humorous outreach that helps to keep fans engaged and prevent “messaging fatigue.” Students have valuable insights about the best ways to appeal to their peers. Student involvement can also help attract support from faculty, campus administration, and other departments.

To attract volunteers for sports greening projects, offer students hands-on work experience that can benefit their resumes. Present options for students to make short-term commitments as game-day recycling staff (“green teams”) or longer-term commitments as research interns. Recognize volunteers with in-game announcements and online shout-outs. Consider providing “green team” gear (T-shirts or hats) to reward volunteers, and/or host an annual thank-you event (with healthy food and “zero waste” goals). Also, establish a system for students to report about each project that they manage. File their reports to record progress and allow for smoother transitions from year to year as students graduate.

3. RECRUIT GREENING CHAMPIONS WITHIN ATHLETICS AND RECREATION

Many athletics and recreation greening initiatives are launched by a single student or staff member motivated to implement change. Ultimately, however, a successful sports greening initiative needs to be embedded in the culture of the athletic and recreation departments. Host a meeting for all interested students and staff to recruit multiple greening champions for ongoing support and input. Solicit campus-wide buy-in. One way to involve staff at different levels is to create environmental mission statements for the athletic and recreation departments that support broader campus-wide sustainability goals. Develop environmentally preferable purchasing policies and vendor contracts for greening champions to rely on in order to support your environmental goals.

4. AUDIT YOUR WASTE GENERATION AND ENERGY, WATER, AND PAPER USE TO SAVE MONEY

Work with facilities staff to commission energy, water, and waste audits to identify opportunities for resource conservation and financial savings in your sports facilities. During an energy or water efficiency audit, a trained engineer conducts an analysis of your facilities and identifies opportunities for enhanced efficiency that will likely save your department (or institution) money and improve your environmental performance. (While energy audits can be very involved and require a high degree of training, facilities or other staff on your campus may have the expertise to conduct these audits. Or check with your local utility to see if it provides free energy or water audits.) Use the data collected to determine the financial and operational feasibility of various infrastructure upgrades and improvements to building management systems. This information will help prioritize infrastructure upgrades for your sports venues based on the estimated return on investment. Similarly, audit waste generation and paper use to identify efficiency opportunities in those areas.



5. START WITH SPORTS GREENING EFFORTS THAT HAVE THE FASTEST RETURN ON INVESTMENT

Start with cost-saving environmental initiatives to help garner athletics department and institutional support. Improved efficiency means less waste, which often translates into cost savings as well as energy, water, and other resource savings. Meet with facilities and operations managers to identify “low-hanging fruit” upgrades, some of which may already have been implemented in other campus buildings. A sports greening program that begins with financially sound environmental initiatives—such as upgrading to more efficient lighting fixtures, double-siding paper copies, printing less frequently, or installing water-efficient fixtures and appliances—will help the program gain momentum by cutting costs and help attract interest for other greening opportunities. If possible, minimize infrastructure upgrade costs by purchasing new products (such as LED lights) in bulk for multiple facilities. Keep track of savings and publicize them to staff and the administration to encourage lasting behavior change. For example, record decreases in copier paper orders, calculate the money saved, and congratulate staff for their achievement.

6. MEASURE YOUR OPERATIONS

Track environmental data such as energy and water use, waste generation, and paper use to assess facility performance and identify opportunities for resource savings. Consistent data tracking across all sports facilities also allows you to set short- and longer-term goals and compare ongoing performance with past performance. Quantify successes to determine where your greening investments are making the most impact and inspire your department to make further investments.

Some institutions have campus-wide tracking systems to measure energy consumption, water use, and waste disposal recycling. Where available, submetering energy in campus buildings can provide more specific data to help identify the most energy-intensive equipment or programs within a facility. Take advantage of your campus’s data gathering systems and any submetering initiatives. If your campus hasn’t yet implemented an environmental measurement system, you can track your facilities’ resource use with tools like the EPA’s Portfolio Manager and WasteWise programs. Or you can develop spreadsheets specific to each facility with data supplied by utilities, vendors, and service providers. Partner with campus facilities or other staff to enhance your measurement system and data analyses.

7. RECOGNIZE THAT A SHIFT TO ENVIRONMENTALLY PREFERABLE PRODUCTS AND OPERATIONS TAKES TIME

Goods and services supplied in the marketplace are created using infrastructure that has been built up over many decades. This infrastructure often includes environmentally harmful production practices, and it may be supported by environmentally harmful subsidies, regulations, and vendor relationships that can make it difficult to implement change. Some environmental initiatives, such as energy efficiency audits, educational signs about conservation, and paper reduction measures, can progress quickly. But other adjustments, such as changing energy-consuming technologies, measuring impacts, shifting to postconsumer recycled-content paper products, procuring compostable serviceware, developing a recycling-based waste management system, and providing ecologically preferable food service, can take a few years to implement.

This should not deter you from taking the small steps needed to make gradual progress. Give athletics and recreation departments the time they need to make these adjustments. Let the initiative unfold as slowly as needed to maintain staff comfort and proper training and to respect existing vendor commitments and budgetary restrictions. Frame greening goals as aspirational, and focus on gradual, continuous improvement to relieve concerns staff may have about achieving campus-wide sustainability commitments in a short time frame. This will help assure the longevity, stability, and buy-in of the greening program. Moreover, longer-range planning allows athletics and recreation departments to consider investing in capital improvements that will save money over time.

8. REALIZE THAT GREENING IS A JOURNEY, NOT A DESTINATION

Greening means reviewing your operations and procurement with an eye toward reducing environmental impacts. It is an iterative, ongoing process. Greening means more than following a checklist, although checklists can be useful. Greening also means integrating environmental criteria into ongoing decisions about operations and the procurement of products and services. Where possible, integrate environmental criteria into purchasing policies, vendor contracts, and organizational reporting. Frame greening goals as aspirational, to encourage ongoing improvement.

Greening is a continuously evolving endeavor because more efficient, environmentally preferable products and services enter the market all the time. If you aren't able to find the product or service that meets your environmental needs, keep looking, and let your vendors know what you want; chances are that the product will be available before long. Educating staff, students, fans, vendors, and partners is also an ongoing process. By visualizing greening as a journey, you can celebrate accomplishments along the way and create a flexible initiative that responds to changes in institutional priorities and takes advantage of innovations in the marketplace.



Photo courtesy of University of Florida.

9. ENLIST SPONSORS, VENDORS, AND OTHER PARTNERS

Engage external groups early on and strategically to take advantage of all available expertise and funding when planning your sports greening efforts. Inform existing and potential partners of plans for new greening initiatives. Welcome input from strategically selected vendors, sponsors, nonprofits, and local organizations that may have greening expertise and resources. Communicate your financial limits and environmental priorities. Clarify why changes are being considered, how partners might provide support, and what results are expected. Identify and exploit opportunities for joint benefits and outreach.

Encourage the development of new sponsorships around greening. Greening can broaden sponsorship opportunities with existing or new partners who want to affiliate with your goals of environmental stewardship. Involving sponsors and vendors can provide financial, organizational, and media support for your goals. These partners may bring funding, advertisements, infrastructure, and products to your greening effort. Consider using a competitive bidding process to solicit innovative proposals from concessionaires and other vendors, encouraging them to bolster their proposals with greener features. Also consider working with marketing staff to improve the fan experience as part of greening efforts. Involving your sponsors, vendors, and local NGOs sends a valuable signal to the marketplace and your community that environmental issues are important to your institution.

10. USE GREENING FOR BRANDING ENHANCEMENT

Consistent branding, communicating the program's mission, and publicizing successes help attract program supporters and partners. Establish a program name, logo, and perhaps a mission statement at the outset of your program. Ensure that initiatives are effectively and accurately publicized (it's okay to exhibit pride in your achievements, but don't overstate your successes) and use positive, authentic messages that appeal to your audience.

Greening initiatives can provide opportunities for fans to interact with teams in their community. Fan engagement can be as basic as incorporating visible and well-marked recycling bins at a stadium, inviting community participation in green events (such as sports gear donation drives), or featuring ongoing displays at a sports facility. Public service announcements or other broadcast initiatives can also yield great fan response. Some athletics and recreation departments (and professional leagues and teams) have modified their websites and social media outreach to engage fans in their greening initiatives. Some communities coordinate sports greening initiatives with community goals and information-sharing. Build a culture of sustainability at sports events. Use simple, consistent signage that is integrated with other fan education initiatives (e.g., posters, public address announcements, videos).

11. NEVER GREENWASH

Communicate success stories and challenges authentically, and never greenwash. Exaggerating your environmental achievements will undermine confidence in your good work and do long-term damage to your sports greening program and brand. There is no shame in announcing a small accomplishment, or in describing challenges along with goals. Indeed, all we can do are small things; no single business undertaking can solve our many ecological problems. However small our day-to-day actions may seem, whether it's buying products made with recycled content, using renewable energy, or conserving water, our collective steps add up to meaningful regional and global impacts. Clearly, everyone has to do something, regardless of how small it might seem, to reduce his or her ecological footprint and encourage others to do the same.

12. LEARN FROM PEERS AND EXPERTS

Several national organizations can offer support by sharing information about successful greening practices in place at athletic and recreation facilities across the country. Learn from your peers' experiences, and take advantage of existing nonprofit resources—including those provided by NRDC, AASHE, the EPA, the Green Sports Alliance, and NIRSA—to help provide strategies, data collection tools, and advice on greener products, technologies, and processes. Gather information from other university departments, staff members, and students.

To get started today on greening your sports department, facility, team, or event, consult the NRDC Greening Advisor at www.greensports.org for in-depth suggestions on how to adopt greener practices. The Greening Advisor is a free, online guide that helps sports programs implement environmentally intelligent practices to improve the efficiency of operations, uncover opportunities to cut costs, enhance brands, and benefit public health. It covers everything from energy audits and water conservation to purchasing, transportation, and waste management.

RECOMMENDATIONS FOR SUSTAINABILITY STAFF

Greening college sports holds the potential to transcend departmental divides on campuses. The following strategies aim to help sustainability-focused staff collaborate better with athletics departments and help environmental stewardship become part of daily campus life.

1. DO YOUR RESEARCH

Before approaching athletics staff, do your homework. Understand the systems already in place and be prepared to build the case for sports greening. Below are some suggested questions to investigate. This information will help you understand the athletics department's motivations, objectives, and interests.

- **What are the operational issues most important to the athletics department? What are the primary building management objectives in the short and medium term?** This is crucial for aligning greening goals with the athletics department's existing priorities.
- **What green efforts are already in place at athletic facilities?** Inventory existing green procurement practices, resource-efficient equipment, green building features or certifications, green outreach, and other sustainability efforts accomplished by athletics. Start by congratulating athletics staff on their accomplishments to date.
- **Who funds the athletics department?** This might be a source of funding for greening efforts. Who pays the athletics department's utility bills? This will indicate who is most interested in auditing energy and water use in athletic facilities.
- **Does the athletics department have sponsors and an outside concessionaire? If so, who are they and how might they be brought into the greening program?** Existing sponsors and vendors may have environmental commitments or green product lines. They are a potential source of funding for environmental projects.
- **Who are the typical users and maintenance staff for each athletic facility? When was each facility built or most recently upgraded, and what type of technologies does each have?** This will inform opportunities for infrastructure upgrades or renovations.
- **Are there any prominent student-athlete or public concerns about air or water quality in the region or at athletic facilities?** This may provide an opportunity to improve athlete health and performance with an indoor environmental quality assessment and upgrade.

2. BUILD YOUR CASE

Communicate the value of sports greening as a means of meeting the athletics department's existing objectives. The athletics department will devote staff time and resources to greening work only when its leadership understands the value of greening. Build a strong case for sports greening by identifying the benefits it can provide for athletics. Consider which benefits are the most appealing when engaging each division of the department, and prioritize accordingly. For example, sports greening can help:

- | | | | | |
|-------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------|
| • save money on facility operations | • build greater fan loyalty | • attract new donors | • offer a strong platform for environmental education | • achieve campus-wide sustainability goals |
| • attract new sponsors | • enhance athlete health and performance with higher-performance buildings | • strengthen alumni connections | • strengthen interdepartmental ties, including with faculty | • boost the athletics department brand |
| • expand existing sponsorships | | • bolster community ties to potentially increase ticket sales | | |

3. OFFER SOLUTIONS, OPPORTUNITIES, AND SUPPORT

Sustainability is a confusing term. Provide athletics with concrete sports greening project examples. Point to successful initiatives at similar peer institutions. Present a menu of greening opportunities for athletics to choose from. Indicate available resources and partners on and off campus for successful implementation. Help identify the assets these partners can provide for sports greening work, including funding, expertise, infrastructure, project legitimacy, and outreach support. Don't assume athletics staff will have the time or resources to run a new greening program. Offer ongoing staff support and/or help recruit student interns and volunteers.

4. UNCOVER CHAMPIONS

Identify athletics staff members and/or student-athletes who demonstrate a personal interest in protecting the environment. They may have additional insight into opportunities for athletics department greening work. Reach out to a variety of stakeholders within athletics, such as administrative staff, coaches, athletes, marketing and development staff, and custodial and grounds staff. Approach these potential "champions" by applauding their current green initiatives and then offering them additional greening opportunities.

5. HELP STRATEGIZE ON FUNDING, AND IDENTIFY POSSIBLE SPONSORS

Help athletics align with campus-wide sustainability commitments, and identify any available campus funds for sports greening initiatives (such as a university president's sustainability fund). Investigate whether there are accessible local, state, or federal subsidies for renewable energy or other athletics greening work. Assist athletics in identifying new or existing sponsors with commitments that may align with an athletics greening program. Help investigate payback periods for infrastructure upgrades, and encourage athletics to set aside savings on utility bills for further green investments.

AFTERWORD BY MISSY FRANKLIN, FOUR-TIME OLYMPIC GOLD MEDALIST AND STUDENT-ATHLETE

As student-athletes, we know what it means to push our bodies. With each hour spent in the pool, on the field, or in the weight room, we know that only hard work makes us stronger athletes and competitors. But we often take for granted that we're not simply pushing ourselves. Even as we depend on clean air and water to perform, every day we are putting stress on the environment through the facilities we use, the energy we consume, and the waste generated at our sporting events. That's why I am thrilled to see the progress being made by college and university sports programs around the country to improve the health of our environment and all of us who depend on it.

Since I first put on a swim cap at age five, I've known that I had a special relationship with the water. Gliding through the pool often feels more natural to me than being on dry land. Maybe it's because I've got feet the size of flippers that I feel a special connection to other animals that share the water. It's their grace that I try to emulate; their ease and speed that I aim for in every practice.

I've always felt privileged to have this connection to the water, but known that with it came a certain responsibility. Only in a healthy environment can we truly test our physical limits. Imagine trying to swim 200 meters or sprint toward the finish line of a 100-meter dash while gulping down dirty, polluted air. A healthy environment means stronger athletes, and stronger athletes mean better races, games, and matches for everyone to enjoy. Let's face it. America is a nation of sports fanatics, and for all of us who eat, sleep, and breathe sports, environmental stewardship should be a top priority.



© Photo by Bob Martin/Sports Illustrated/Getty Images

As this report shows, collegiate sports programs are recognizing this and taking control of their own sustainability. While student-athletes train to perfect their own performance, athletic directors, facilities managers, recreation coordinators, and others are constantly improving the performance of their own sporting venues. With LEED-certified buildings, water efficiency, recycling programs, renewable energy, efficient lighting, heat recovery, and more, collegiate programs are competing in a whole new arena, aiming to be the most responsible, cleanest programs out there.

I've been so inspired by the stories: Ohio State University recycles or composts over 90 percent of waste in their stadium, Arizona State University runs its Weatherup Center almost entirely off of solar panels, and my new home, the University of California at Berkeley, has dramatically cut down on the energy use at its athletic facilities through more efficient lighting and smarter power use.

These programs and so many others should be celebrated far and wide. They are making a true difference not just on the playing field, but also for their communities. College campuses are healthier because of them, and are now helping to stop some of the biggest problems we face, like climate change. And just as we've seen professional sports teams and leagues bring sustainability into mainstream discussions at the Super Bowl, NBA All-Star Game, Winter Classic and World Series, colleges are now setting an example for the entire country. If college stadiums can tackle efficiency, why not high school gyms? If sports fans see the ease of recycling at college basketball games, why not at home?

I am unbelievably excited to be starting my first year at Cal. I can't wait to share a pool with some of the nation's best female swimmers, and to be surrounded by such a rich history of student activism. As the home of so many political causes, like the Free Speech Movement, this campus is now full of energy to help save our planet. I know I'll be joining the fight, working to make our athletic programs more sustainable while learning about environmental problems and solutions in the classroom.

To my fellow students at Cal and other schools: if you've been inspired by the stories in this report, I encourage you to join the cause, too. You *can* do something similar on your campus. Read the case studies closely, and present the lessons you learn to leaders in your school's administration, athletic, and recreation departments. Only by standing up, speaking out, and getting involved can we get the ball rolling.

As we kick off the fall season, student-athletes, fans, and alumni have some good competition to watch, and it's not just on the field. College athletic programs are racing to be the best, most responsible environmental stewards out there. It'll be an exciting race to watch, and this time, everyone stands to win.

A stylized, cursive signature of Missy Franklin. Below the signature, the letters "USA" are written in a simple, sans-serif font, followed by the Olympic rings logo and the year "2012".

Missy Franklin
Class of 2017, University of California at Berkeley
Four-Time Olympic Gold Medalist, London 2012
World Record Holder, 200-Meter Backstroke



Photo courtesy of Missy Franklin.

APPENDIX

LEED-CERTIFIED COLLEGIATE SPORTS VENUES IN THE UNITED STATES

When designing or renovating their facilities, increasing numbers of collegiate sports venues are turning to the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification as a guide to help them improve their environmental performance and boost their bottom line. As of this printing, at least 24 collegiate sports venues in the United States and Canada have received certification for one or more LEED standards and more than ten others are currently pursuing certification.

The LEED building rating system is an internationally recognized standard for sustainable building design. The standards, which cater to a variety of building projects and types, incorporate a range of environmental and public health considerations, including energy efficiency, building site selection, indoor air quality, and water use. Materials and resources used to construct buildings and keep them running smoothly and comfortably all have environmental impacts. Green buildings and operations are designed to minimize these impacts by using environmentally preferable construction materials and techniques, including reducing water and energy use, minimizing waste, and making better use of natural features like shade, daylight, and rainwater. By streamlining and improving design and construction, green buildings reduce their contribution to biodiversity loss, global warming, and many other environmental pressures.

2006

JUNE

Penn State University, Medlar Field at Lubrano Park, LEED Certified for New Construction

★ *First LEED certified baseball stadium in the nation, professional or collegiate*

2007

AUGUST

University of Connecticut, Burton Family Football Complex and Mark R. Shenkman Training Center, LEED Silver Certified for New Construction

★ *First LEED certified football complex in the nation*

2008

FEBRUARY

University of Florida, Baseball Locker Room Facility, LEED Certified for New Construction

2009

MAY

University of Florida, Heavener Football Complex, LEED Platinum Certified for New Construction

★ *First LEED Platinum sports venue in the nation*

University of Florida, Golf Course Clubhouse, LEED Silver Certified for New Construction

JULY

Bowdoin College, Sidney J. Watson Arena, LEED Silver Certified for New Construction

★ *First LEED certified hockey arena in the nation*

AUGUST

University of California at Irvine, Anteater Recreation Center Expansion, LEED Gold Certified for New Construction

SEPTEMBER

University of Minnesota, TCF Bank Stadium, LEED Silver Certified for New Construction

★ *First LEED certified football stadium in the nation*

2010

FEBRUARY

Baylor University, Allison Practice Field, LEED Silver Certified for New Construction

AUGUST

University of Arizona, Student Recreation Center, LEED Platinum Certified for New Construction
★ *First LEED Platinum recreation center in the nation*

New Mexico State University, Football Coaches Office, LEED Silver Certified for New Construction

2011

FEBRUARY

University of Florida, Lacrosse Locker Room Facility, LEED Gold Certified for New Construction

APRIL

University of Virginia, Davenport Baseball Stadium Addition, LEED Certified for New Construction

AUGUST

Arizona State University, Weatherup Center, LEED Gold Certified for New Construction
First LEED Gold collegiate arena in the nation

OCTOBER

University of Florida, Southwest Recreation Center,
★ LEED Gold Certified for New Construction

University of North Texas, Apogee Stadium
LEED Platinum Certified for New Construction
First LEED Platinum football stadium in the nation

Virginia Polytechnic Institute and State University, Football Addition, LEED Silver Certified for
★ New Construction

DECEMBER

University of Pennsylvania, Weiss Pavilion, LEED Gold Certified for New Construction

2012

MAY

University of Colorado at Boulder, Basketball Training Facility, LEED Platinum Certified for New Construction

JUNE

University of California Los Angeles, Spieker Aquatic Center, LEED Gold for New Construction

2013

APRIL

University of Oregon, Matthew Knight Arena, LEED Gold Certified for New Construction

MAY

University of California at San Diego & San Diego State University, Mission Bay Aquatic Center, LEED Platinum for Existing Buildings, Operations and Maintenance

University of Florida, Gymnastics Facility Renovation and Addition, LEED Gold Certified for New Construction

JUNE

Texas Christian University, Amon G. Carter Stadium Locker Room, LEED Silver Certified for Commercial Interiors

Survey of Green Initiatives Associated with College Varsity, Campus Recreation, and Club Sports Programs, Events, and Facilities

From May-June 2013, the University of Arizona Office of Sustainability administered a survey with support from the Natural Resources Defense Council, the Green Sports Alliance, the Association for the Advancement of Sustainability in Higher Education, and NIRSA: Leaders in Collegiate Recreation, to:

- Identify sustainability initiatives implemented within college varsity, campus recreation, and club sports programs, events, and facilities, with a focus on the United States;
- Determine which campus groups are primarily responsible for implementing green initiatives;
- Understand how students and fans are involved in collegiate sport sustainability initiatives; and
- Promote successes.

The purpose of the survey was to establish a baseline of green initiatives associated with college and university sports programs, facilities, and events. By creating this baseline and reporting the results, we aim to better understand the field and promote green pathways for higher education sports programs, facilities, and events. We also hope that survey results serve to stimulate additional research that reveals more about opportunities, challenges, and other issues impacting the proliferation and benefits of sustainability initiatives related to college and university sports programs, facilities, and events.

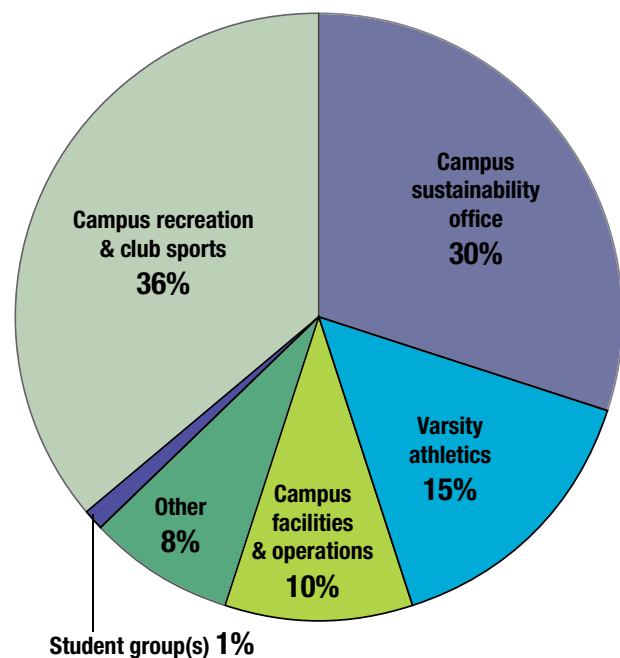
Survey Method and Analysis

The survey was administered via email using Survey Monkey®. The recipient list of more than 1200 individual email accounts was a compilation of lists created by the Green Sports Alliance, NIRSA, NRDC, and the UA Office of Sustainability. Individuals contacted were of various affiliations within their respective universities, such as

About the survey:

- 175 completed responses
- 148 colleges & universities
- 49 athletic conferences

Figure 1. Respondent Affiliation



facilities operations, varsity athletics, campus recreation, or campus sustainability offices. Data from the survey were cleaned to remove double counting, primarily by merging multiple responses from an institution so that each institution had one survey associated with it.

Questions were asked across the following ten areas of campus sustainability: alternative transportation, composting, energy efficiency, green building design, green cleaning, paper initiatives, purchasing, recycling, renewable energy, and water efficiency.



Survey Findings

A total of 175 individuals responded to the survey. The majority of the respondents were affiliated with either campus recreation and club sports or campus sustainability offices, while 1 percent of respondents were affiliated with student groups (see Figure 1).

Survey respondents came from 148 institutions, which represented 49 athletics conferences and community colleges and included three Canadian universities. Institutions ranged from small liberal arts schools to large research universities.

Campus sustainability areas with the most initiatives implemented were, in descending order, recycling, energy efficiency, water efficiency, alternative transportation, paper purchasing, and green cleaning. Areas with the least initiatives implemented were renewable energy, purchasing, green building design, and composting (see figures in each initiative area for in-depth results). The top initiatives implemented across varsity and campus recreation facilities combined were:

- 1. Installed recycling bins in public facility spaces,
- 2. Established office recycling program,
- 3. Installed recycling bins and infrastructure in non-public spaces,
- 4. Installed bike racks and other infrastructure to promote bicycle commuting,
- 5. Upgraded lighting system and controls,
- 6. Procured green cleaning products,
- 7. Conducted energy audit,
- 8. Installed recycling signage throughout sports venues,
- 9. Upgraded to water-efficient fixtures, and
- 10. Trained custodial staff on green cleaning practices and products.

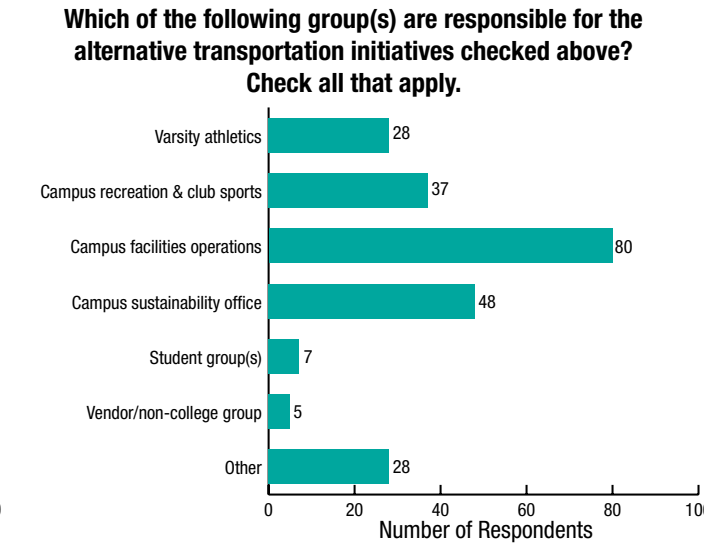
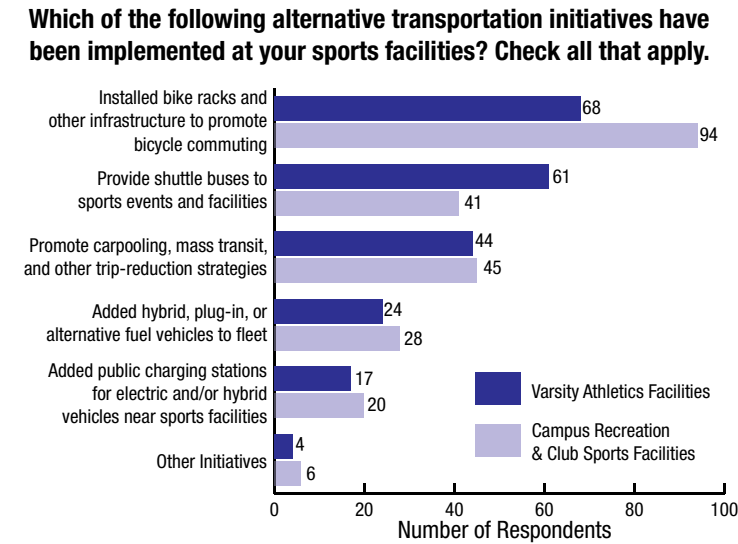
Respondents identified multiple groups as responsible for implementing green initiatives. “Campus facilities operations” were indicated the most as having responsibility in the implementation of initiatives, followed, in order of aggregate counts across initiative areas, by “Campus sustainability office,” “Campus recreation & club sports,” “Varsity athletics,” “Student group(s),” “Other,” and “Vendor/non-college group.” To be clear, this finding does not indicate that “Campus facilities operations” are the most responsible for green initiatives, but that they are consistently perceived as one of the responsible parties for implementing green initiatives in varsity athletics or campus recreation facilities.

Lastly, it is important to note that recycling and composting were the areas that had the greatest responses of “Student group(s)” having responsibility for green initiatives. All other initiative areas were dominated by employee groups, namely “Campus facilities operations” and “Campus sustainability office.” However, in every initiative area there was shared responsibility for implementation of green initiatives.

Limitations and Future Improvements

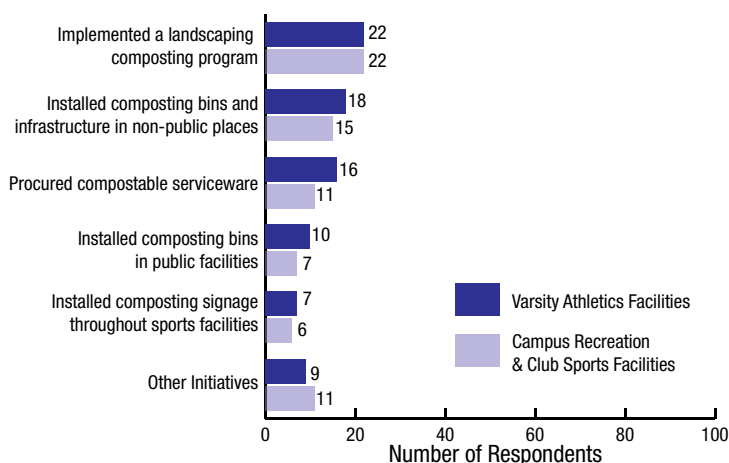
While this survey provides an interesting perspective on green initiatives in higher education sports facilities, two limitations provide direction for further research. First, student participation in the survey was very limited. Secondly, an initial goal of the survey was to study fan involvement in green initiatives in higher education sports, but at this time fan involvement cannot be interpreted from the current data set. Further research into student involvement and sports fan involvement is needed to address these limitations and may influence how the survey is administered in the future.

Alternative Transportation

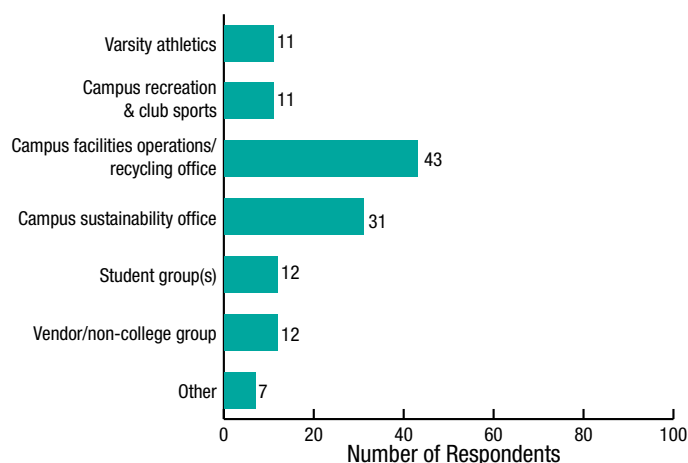


Composting

Which of the following composting initiatives have been implemented at your sports facilities? Check all that apply.

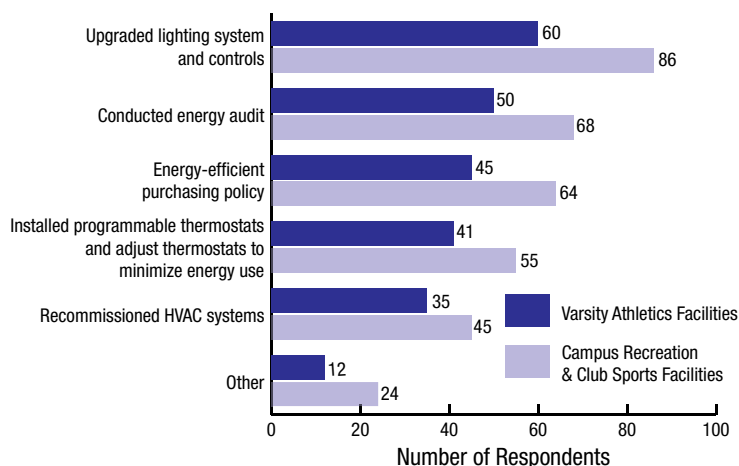


Which of the following group(s) are responsible for the composting initiatives checked above? Check all that apply.

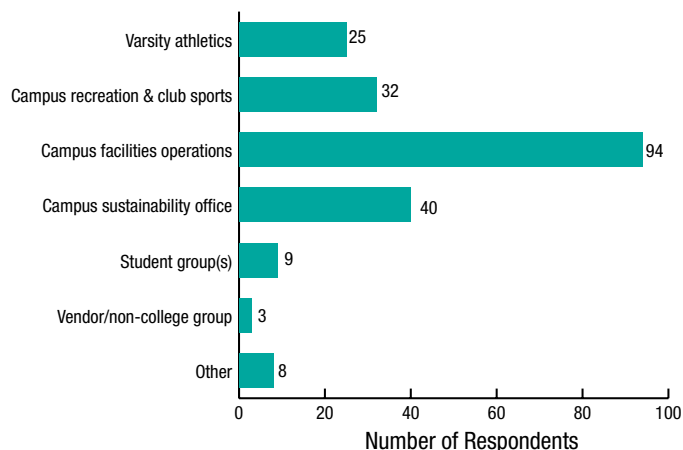


Energy Efficiency

Which of the following energy-efficiency initiatives have been implemented at your sports facilities? Check all that apply.

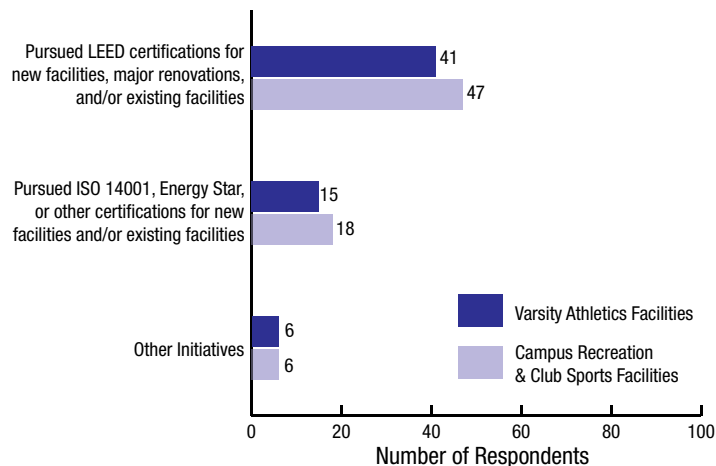


Which of the following group(s) are responsible for the energy-efficiency initiatives checked above? Check all that apply.

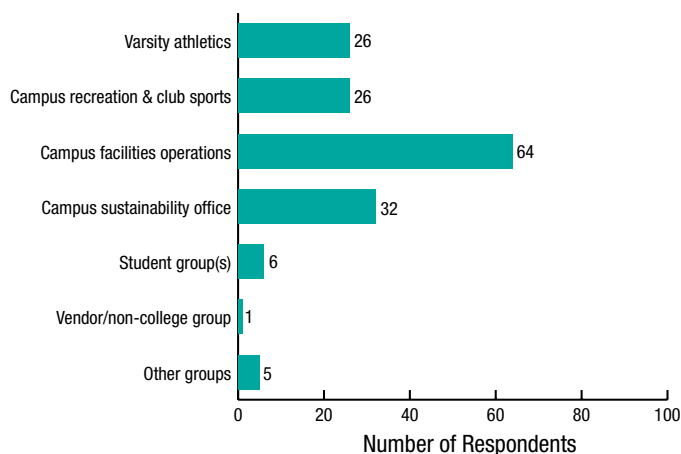


Green Building Design

Which of the following green building design initiatives have been implemented at your sports facilities? Check all that apply.

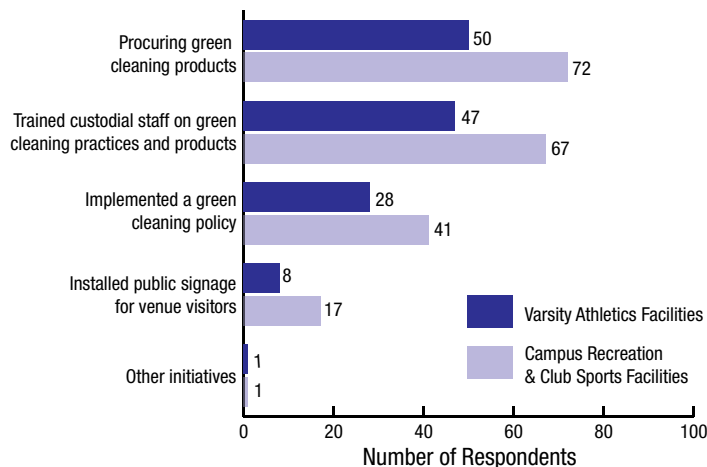


Which of the following group(s) are responsible for the green building design initiatives checked above? Check all that apply.

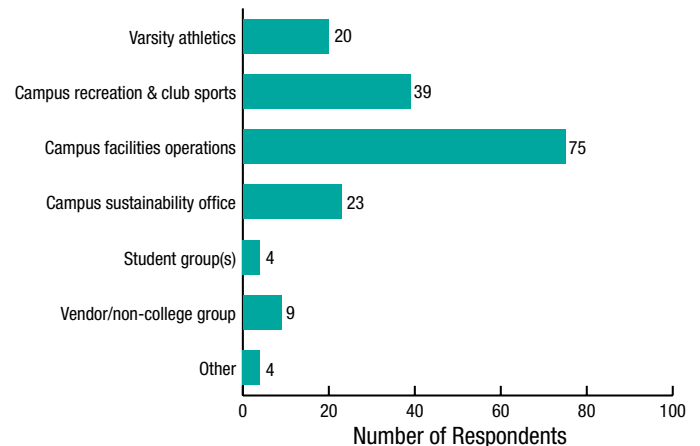


Green Cleaning

Which of the following green cleaning initiatives have been implemented at your sports facilities? Check all that apply.

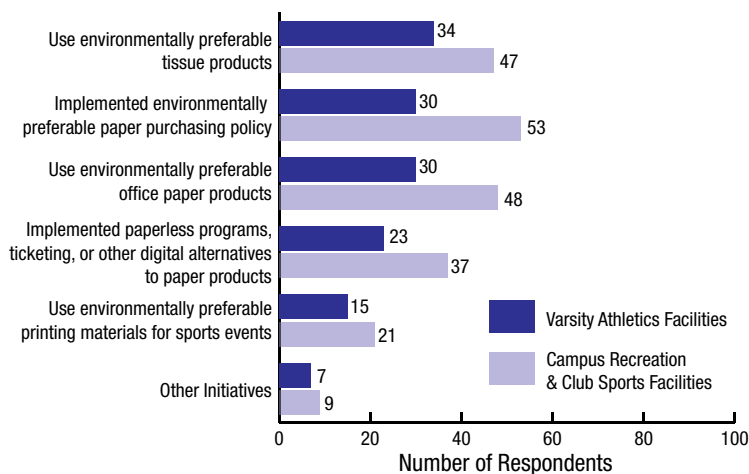


Which of the following group(s) are responsible for the green cleaning initiatives checked above? Check all that apply.

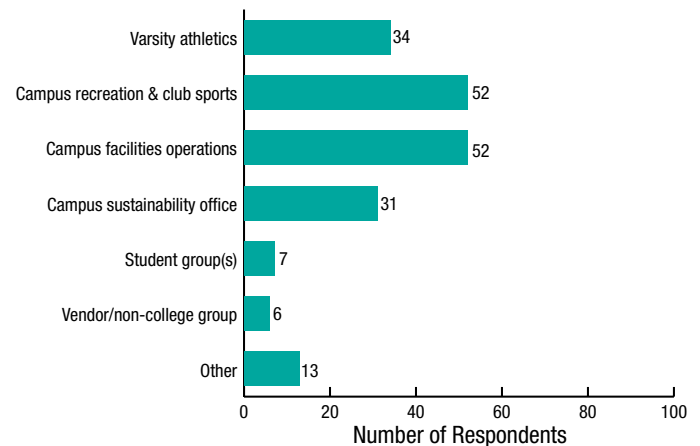


Paper

Which of the following paper initiatives have been implemented at your sports facilities? Check all that apply.

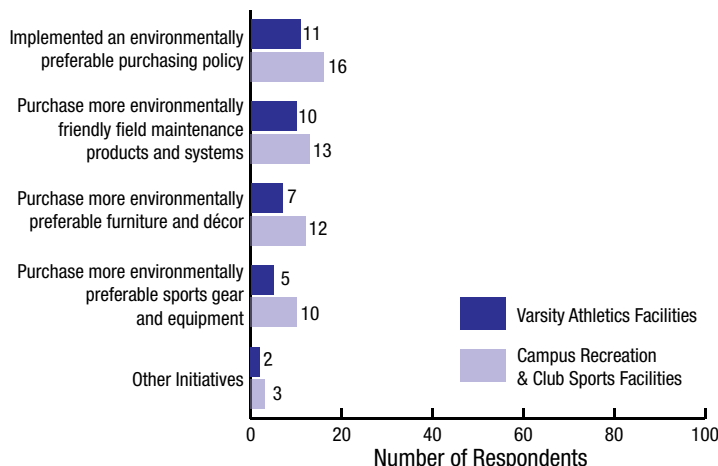


Which of the following group(s) are responsible for the paper initiatives checked above? Check all that apply.

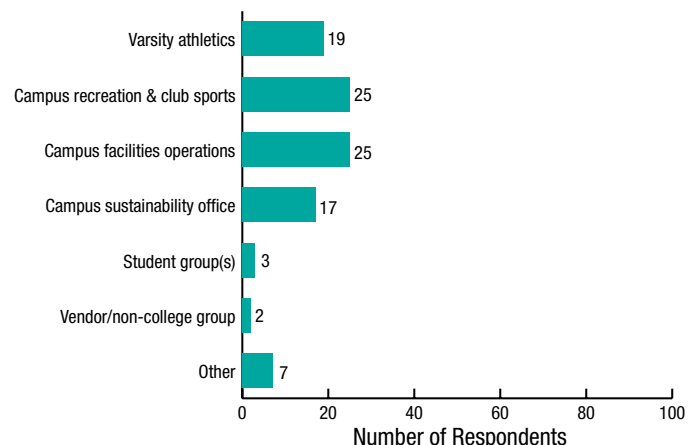


Purchasing

Which of the following purchasing initiatives have been implemented at your sports facilities? Check all that apply.

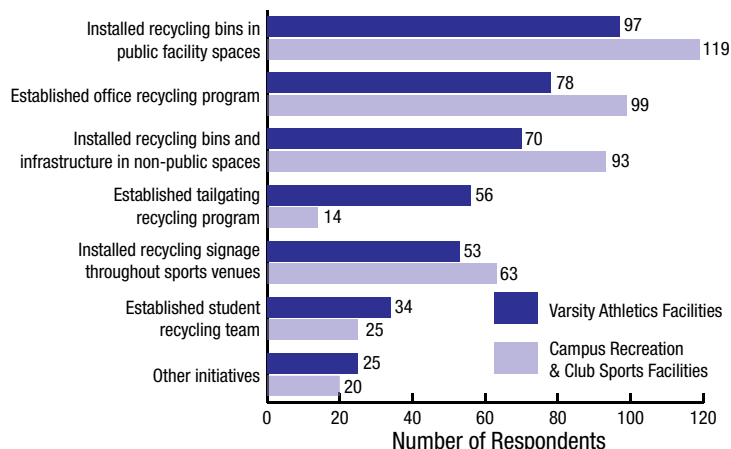


Which of the following group(s) are responsible for the purchasing initiatives checked above? Check all that apply.

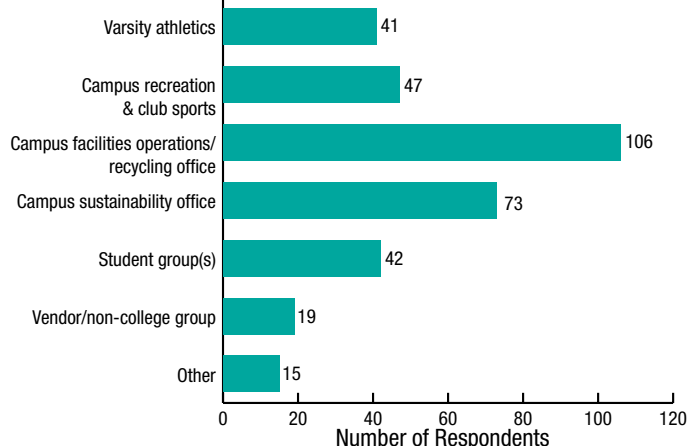


Recycling

Which of the following recycling initiatives have been implemented at your sports facilities? Check all that apply.

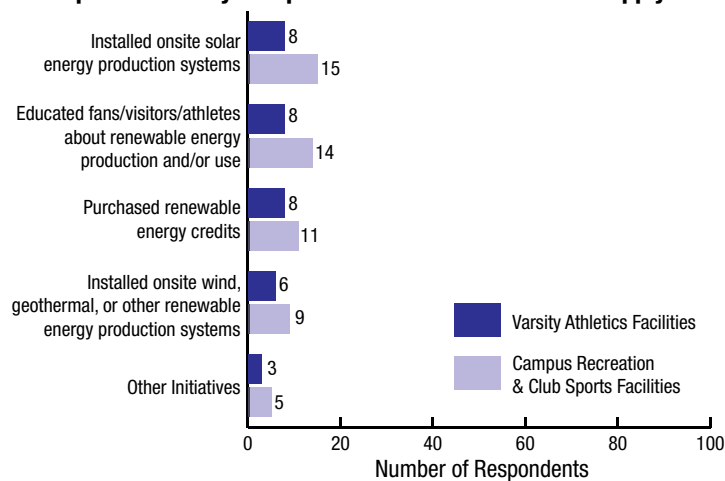


Which of the following group(s) are responsible for the recycling initiatives checked above? Check all that apply.

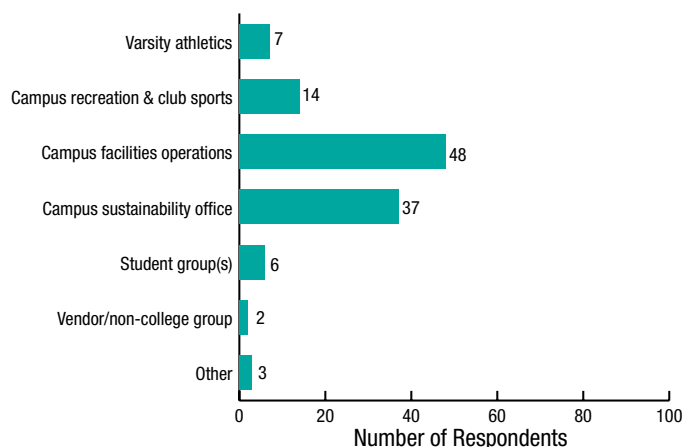


Renewable Energy

Which of the following renewable energy initiatives have been implemented at your sports facilities? Check all that apply.

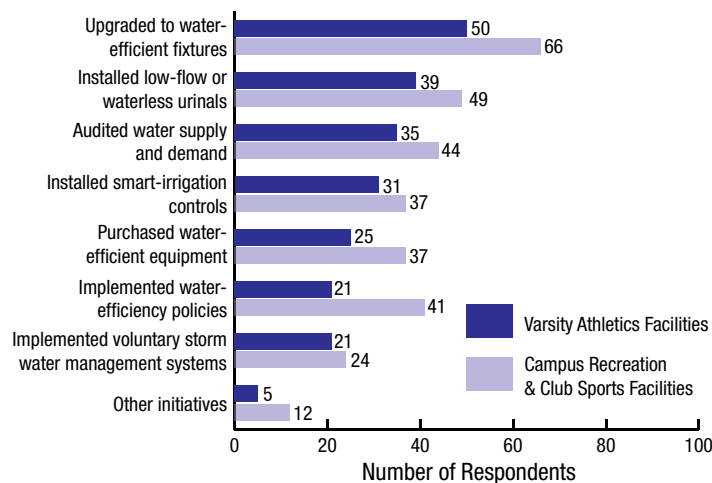


Which of the following group(s) are responsible for the renewable energy initiatives checked above? Check all that apply.

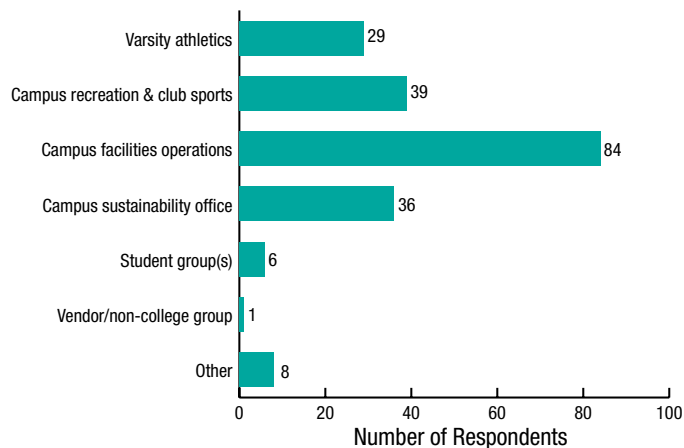


Water Efficiency

Which of the following water-efficiency initiatives have been implemented at your sports facilities? Check all that apply.



Which of the following group(s) are responsible for the water-efficiency initiatives checked above? Check all that apply.



Participating Colleges & Universities

Angelo State University
 Arizona State University*
 Arkansas State University
 Ball State University*
 Boise State University
 Boston College
 Bowling Green State University
 Brigham Young University
 Brown University
 Bucknell University
 California State University, East Bay
 California State University, San Bernardino
 Central College
 Coastal Carolina University
 Colorado School of Mines
 Cornell University*
 Creighton University
 DePaul University*
 East Carolina University
 East Stroudsburg University
 Eastern Kentucky University
 Emory University*
 Farmingdale State College, SUNY
 Flathead Valley Community College
 Florida International University
 Florida State University*
 Franklin Pierce University
 George Mason University*
 George Washington University
 Georgetown University
 Georgia Southern University
 Gonzaga University
 Grand Valley State University*
 Indiana State University
 Indiana University*
 Inver Hills Community College
 Jackson State University
 Kent State University
 Lafayette College
 Lamar University
 Lehigh University
 Lewis University
 Louisiana State University
 Marquette University*
 Marshall University
 Miami University*
 Middle Tennessee State University
 Missouri State University*
 Mount Royal University
 New Mexico State University*

Niagara University
 North Carolina State University*
 Northwestern University
 Ohio State University*
 Oklahoma State University*
 Pepperdine University
 Portland State University*
 Princeton University*
 Rochester Institute of Technology
 Sacred Heart University
 Salisbury University
 Sam Houston State University
 Santa Clara University*
 Seattle University
 Sonoma State University
 Southern Illinois University Carbondale
 Southwestern University
 St. Ambrose University
 St. Louis College of Pharmacy
 Stanford University*
 Syracuse University
 Tennessee State University
 Texas A & M University - Corpus Christi
 Texas State University
 Texas Tech University
 Towson University*
 University at Albany*
 University of Akron
 University of Alabama
 University of Alabama at Birmingham
 University of Arizona*
 University of Arkansas*
 University of British Columbia*
 University of California, Los Angeles*
 University of California, Santa Barbara*
 University of Central Florida
 University of Cincinnati
 University of Florida*
 University of Georgia
 University of Houston*
 University of Idaho
 University of Illinois
 University of Illinois at Chicago*
 University of Iowa
 University of Kansas*
 University of Louisiana at Lafayette
 University of Maine
 University of Maryland, Baltimore
 University of Massachusetts Amherst*
 University of Michigan*

University of Minnesota*
 University of Mississippi
 University of Nevada Las Vegas
 University of New Hampshire*
 University of North Carolina at Chapel Hill*
 University of North Carolina at Greensboro*
 University of North Dakota
 University of North Florida*
 University of Notre Dame*
 University of Oklahoma
 University of Oregon*
 University of Portland
 University of Richmond*
 University of San Diego
 University of South Carolina Upstate
 University of South Florida*
 University of Southern California
 University of Southern Indiana
 University of Southern Mississippi
 University of Tennessee at Chattanooga
 University of Tennessee at Knoxville*
 University of Texas at Arlington*
 University of Texas at Austin*
 University of the Pacific
 University of Tulsa
 University of Washington*
 University of Waterloo
 University of West Florida
 University of Wisconsin, Eau Claire
 University of Wisconsin, Green Bay*
 University of Wisconsin, Madison
 University of Wisconsin, Oshkosh*
 Utah State University
 Vanderbilt University
 Villanova University
 Virginia Commonwealth University*
 Viterbo University
 Washington State University
 Weber State University*
 West Virginia University
 Western Carolina University
 Western Kentucky University*
 Western Michigan University
 Winona State University
 Winthrop University
 Xavier University
 Yale University*
 Youngstown State University

***indicates participation in AASHE STARS**

GLOSSARY

Bioswale: A landscape feature designed to remove pollution from surface runoff water. It is made up of a depressed drainage course with sloped sides that is filled with vegetation or compost, which aids in trapping pollutants and silt.¹ Bioswales are commonly used around parking lots to manage automotive pollution that collects by the pavement and is flushed by rain. The bioswale, or other type of biofilter, surrounds the parking lot and treats the runoff before releasing it to the watershed or storm sewer.²

Carbon neutral: An operations achievement claim that should be avoided and that implies having a net zero carbon footprint. This is an aspirational concept based on balancing a measured amount of carbon released (the total amount related to a project) with an equivalent amount sequestered or offset. In practice, carbon neutrality is unattainable because it is not feasible to identify and offset all of the carbon impacts associated with a given activity. A claim related to carbon neutrality requires a comprehensive, correctly performed greenhouse gas inventory (and subsequent offsetting or elimination) of the carbon emissions associated with every stage of raw material acquisition, transport, production, use, and disposal for all related goods and services. This is impossible to achieve for every item or service associated with an event because accurate data for each stage of production are not available for the majority of goods and services, including carbon impacts associated with the manufacture, use, and disposal of most plastics, paper, solid wood products, textiles, chemicals, and vehicles. As a consequence, NRDC advises against using the term “carbon neutral” and instead recommends stating precisely which carbon emissions have been offset or avoided—for example, “All the electricity used to power the stadium was supplied by renewable energy” or “All the electricity used to power the stadium was offset by RECs.” Saying “We are playing in a carbon neutral stadium” or “This is a carbon neutral event” would be a misleading and inaccurate claim.

Carbon offset: A quantity of avoided greenhouse gas (GHG) emissions, measured in units (metric tons) of carbon dioxide equivalent (CO₂e), achieved as a result of an investment in a non-carbon-emitting energy technology. The investment is equal in kilowatt-hours (or megawatt-hours) to the amount of carbon emitted by the energy technology typically associated with an event. The emissions avoidance associated with the non-carbon-emitting energy technology can be sold to an event and enable the purchaser to claim those GHG reductions as its own. These reductions can then be claimed to offset any GHG emissions for which the event is responsible.

Council for Responsible Sport: An organization founded in 2007 that supports, certifies, and celebrates responsibly produced sports events. The Oregon-based 501(c)(3) nonprofit organization aims to provide objective, independent verification of the socially and environmentally responsible work of event organizers.³

e-Stewards: A certification program for electronics recyclers. It is the most responsible electronic waste certification program and the only one to comply with international law. E-Stewards (e-stewards.org) is designed to provide market incentives that drive certification of the entire recycling chain that manages the toxic materials contained in electronic waste. In addition, e-Stewards is developing a program to qualify or certify companies that collect and transport electronics, in order to increase the total volume of electronics managed in a globally responsible manner. Together, these programs will create a network of responsible collection and processing entities, ensuring businesses and consumers that their old technology will not be exported to poor nations and poison vulnerable populations, recycling workers, or the global ecosystem.⁴

Forest Stewardship Council (FSC): An independent, nonprofit, membership-led organization that sets standards under which forestry practices are certified. The FSC Forest Management certification provides assurance that forests are being managed to higher environmental and social standards. The FSC Chain of Custody certification provides assurance that products bearing the FSC label directly support more responsible forest management.⁵

Game Changer: A report released in 2012 by the Natural Resources Defense Council (*Game Changer: How the Sports Industry Is Saving the Planet*) featuring leading examples of professional sports greening successes in North America. Download the report at www.nrdc.org/game-changer.

Game Day Challenge: In 2009, the EPA launched the Game Day Challenge, a friendly competition to encourage colleges and universities to reduce waste, recycle, and compost at their football games. During the challenge, colleges and universities implement, track, and report on their waste reduction and diversion programs at home football games. In 2012, the College and University Recycling Coalition, RecycleMania, and Keep America Beautiful took over administration of the Game Day Challenge, with ongoing support from EPA's National Sustainable Materials Management Program.

Green-e Energy: The nation's leading voluntary certification program for renewable energy. For more than a decade, the program has been certifying renewable energy that meets environmental and consumer protection standards developed in conjunction with leading environmental, energy, and policy organizations. Green-e Energy (www.green-e.org) also requires that sellers of certified renewable energy disclose clear and useful information to potential customers, allowing consumers to make informed choices.⁶

Greening: The process of reviewing day-to-day operations and procurement policies with an eye toward reducing environmental impacts. Greening is an ongoing process that incorporates ecologically meaningful considerations into decisions about the products and services purchased and offered, often with due regard for other factors such as cost, product quality, vendor reliability, and availability.

Green Seal: A nonprofit organization that recommends sustainability standards for products. Green Seal has been offering product certification and promoting sustainability in the marketplace since 1989.⁷ The organization certifies household products, construction materials, paints, paper products, food packaging, institutional cleaning products, and personal care products, among other items.

Green Sports Alliance: A nonprofit organization with a mission to help sports teams, venues, and leagues enhance their environmental performance. The Alliance (www.greensportsalliance.org), cofounded by NRDC and Paul Allen's Vulcan Inc., launched nationally in March 2011 with six professional teams and five venues. As of August 2013, Alliance members represent more than 170 professional and collegiate sports teams and venues from 16 different sports leagues.

Green team: A term that, in sports, often refers to a group of volunteers collecting recyclable materials (usually plastic bottles and cups and aluminum packaging) during a sports event to help increase the efficiency of recycling. (In other contexts, *green team* may refer to an organization's eco-committee, or group of employees focused on environmental improvements.) NRDC has coordinated recycling "green teams" at Major League Baseball's World Series, the MLB and NBA All-Star Games, and the U.S. Open tennis championship. Contact NRDC at greensports@nrdc.org for guidance on starting or improving your own green team.

Leadership in Energy and Environmental Design (LEED): An environmental certification program for buildings, homes, and communities that guides design, construction, operations, and maintenance. LEED is the most widely recognized and used green building program worldwide. LEED certifies 1.5 million square feet of building space each day in 135 countries. As of 2013, more than 54,000 projects are currently participating in LEED, representing more than 10.1 billion square feet of construction space.⁸

Life cycle assessment (LCA): An analytical technique to assess the environmental aspects and potential impacts associated with a product, process, or service, by: (1) compiling an inventory of relevant energy and material inputs and environmental releases, (2) evaluating the potential environmental impacts associated with identified inputs and releases, and (3) interpreting the results to help you make a more informed decision.⁹ This analysis takes into account all production stages, from cradle-to-grave (including raw material acquisition, transport, materials processing, manufacturing, distribution, use, repair and maintenance, and disposal or recycling).¹⁰

Natural Resources Defense Council (NRDC): An international nonprofit environmental organization with more than 1.4 million members and online activists. Since 1970, NRDC's lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. In 2004, NRDC launched its sports greening program, pioneering the field. NRDC is the principal environmental advisor to Major League Baseball, the National Basketball Association, the National Hockey League, Major League Soccer, the U.S. Tennis Association, and the Ivy League and is one of the advisors to the National Football League and the National Collegiate Athletic Association. NRDC's work greening North American professional and collegiate sports is the most comprehensive and successful program in the world. In 2009 NRDC cofounded the Green Sports Alliance. Learn more at www.nrdc.org/sports and @NRDCGreenSports.

NRDC Greening Advisor: A free, comprehensive, web-based environmental guide for sports leagues, teams, and venues. The NRDC Greening Advisor includes advice on a wide spectrum of environmental issues, including energy efficiency, water conservation, paper use, transportation, composting, recycling, and greener procurement. The guide earned the U.S. EPA's Environmental Merit Award in 2008. View this resource at www.greensports.org.

Recommissioning: The process by which a building is technically evaluated at some time after its initial completion and occupancy. Recommissioning is a check to ensure that building systems are still functioning as well as originally planned and constructed (or better) and to identify where higher-efficiency opportunities exist or where operating procedure changes or drifts in control calibrations have affected the performance of the building's mechanical systems.

Renewable energy certificate (REC): A tradable legal mechanism that represents the environmental benefits associated with one megawatt-hour of electricity generated from a renewable energy resource. These certificates may be sold and traded, and the owner of the REC can legally claim to have purchased renewable energy. RECs incentivize the production of renewable energy by providing a source of revenue to those generating electricity from renewable sources.¹¹ Instead of buying renewable energy directly from their electricity provider, purchasers of RECs ensure that renewable facilities deliver clean energy into the grid and displace nonrenewable energy sources, thereby preventing the emission of greenhouse gases associated with fossil fuel generation. RECs are not the same as carbon offsets, which are designed to offset carbon emissions associated with energy use.

Solar power purchase agreement (SPPA): A financial arrangement in which a third-party developer owns, operates, and maintains the photovoltaic (PV) system, and a host customer agrees to site the system on its roof or elsewhere on its property and purchases the system's electric output from the solar services provider for a predetermined period. With this business model, the host customer buys the services produced by the PV system rather than the PV system itself. This framework is referred to as the "solar services" model, and the developers who offer SPPAs are known as solar services providers. SPPA arrangements enable the host customer to avoid many of the traditional barriers to adoption for organizations looking to install solar systems: high up-front capital costs; system performance risk; and complex design and permitting processes. In addition, SPPA arrangements can be cash flow positive for the host customer from the day the system is commissioned.¹²

Sustainability: A widely used but vague term that has most commonly been defined via the concept of sustainable development as established by the Brundtland Commission of the United Nations in 1987: “Sustainable development is development that meets the needs of present generations without compromising the ability of future generations to meet their own needs.”¹³ Sustainability involves reconciling ecological, social, and economic goals.

U.S. Green Building Council (USGBC): An association dedicated to promoting ecologically intelligent building and neighborhood design. Today the USGBC is made up of 77 chapters, 13,000 member organizations, and 188,000 LEED professionals.¹⁴ The USGBC’s constituency includes builders and environmentalists, corporations and nonprofits, elected officials and concerned citizens, teachers and students. In March 2000, the USGBC launched the LEED (Leadership in Energy and Environmental Design; see separate entry) green building certification system to single out commercial, institutional, and residential projects noteworthy for their environmental and health performance in both the United States and abroad.¹⁵

Zero waste: An aspirational concept focused on reducing waste and collecting and routing discarded materials to their ecologically optimal use, which is usually recycling and composting. “Zero waste” adherents encourage designing and managing products and processes so as to reduce or eliminate the volume and toxicity of waste, and in general avoid burning or landfilling materials. Businesses and communities that achieve over 90 percent diversion of waste from landfills and incinerators are often considered to be successful in complying with the “zero waste” concept. As with the term “carbon neutral,” NRDC advises that organizations take care to specifically define waste reduction, recycling, and composting achievements where feasible and to use “zero waste” only to indicate an aspirational goal.

- 1 Hogan, C. Michael (2010). “Bioswale,” *Encyclopedia of Earth*, Eds. Marietta Loehrlein and Cutler J. Cleveland, Environmental Information Coalition, National Council for Science and the Environment, Washington, D.C.
- 2 Loechl, Paul M., et al. (2003). *Design Schematics for a Sustainable Parking Lot*. U.S. Army Corps of Engineers, Research and Development Center. Construction Engineering Research Laboratory, Champaign, Illinois. Document no. ERDC/CERL TR-03-12.
- 3 www.councilforresponsiblesport.org/about/.
- 4 e-stewards.org/about/.
- 5 <https://us.fsc.org/about-certification.198.htm>.
- 6 www.green-e.org/getcert_re.shtml.
- 7 www.greenseal.org/AboutGreenSeal.aspx.
- 8 www.usgbc.org/about.
- 9 <http://www.epa.gov/nrmrl/std/lca/lca.html#define>.
- 10 U.S. Environmental Protection Agency, *Defining Life Cycle Assessment (LCA)*, October 17, 2010.
- 11 www.b-e-f.org/learn/articles/#whatisarec.
- 12 <http://www.epa.gov/greenpower/buygp/solarpower.htm>.
- 13 United Nations General Assembly (1987), *Report of the World Commission on Environment and Development: Our Common Future*, transmitted to the General Assembly as an annex to document A/42/427: Development and International Co-operation: Environment, retrieved on February 15, 2009.
- 14 www.usgbc.org/about.
- 15 www.usgbc.org/about/history.





www.NRDC.org/sports

NEW YORK

40 West 20th Street
New York, NY 10011
Phone 212-727-2700

BEIJING

G.T. International Centre
Room 1606
3A Building 1
Yongandongli
Jianguomenwai St.
Beijing, China 100022

CHICAGO

2 N. Riverside Plaza
Suite 2250
Chicago, IL 60606
Phone 312-663-9900

LOS ANGELES

1314 Second Street
Santa Monica, CA 90401
Phone 310-434-2300

BOZEMAN

317 East Mendenhall Street
Suite D
Bozeman, MT 59715
Phone 406-222-9561

SAN FRANCISCO

111 Sutter Street
San Francisco, CA 94104
Phone 415-875-6100

WASHINGTON, DC

1152 15th Street NW, Suite 300
Washington, DC 20005
Phone 202-289-6868

GREEN
SPORTS
ALLIANCE

www.greensportsalliance.org



www.aashe.org



Printed on 60% post-consumer recycled
content paper using vegetable-based inks
and 100% wind power.