

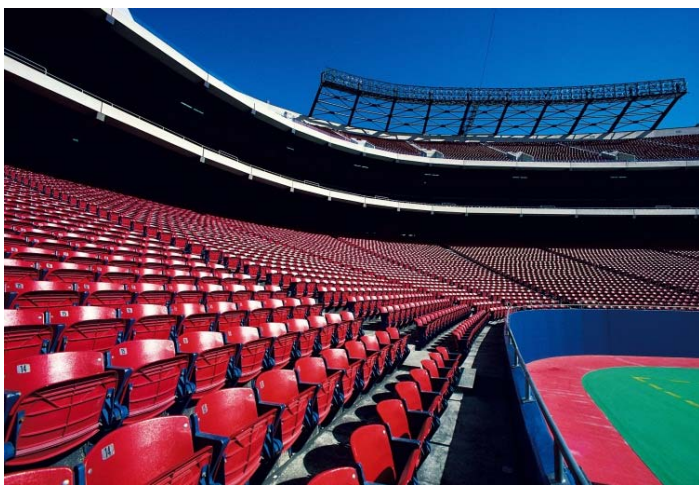


Sustainable Stadiums & Arenas

Professional and collegiate sports teams draw millions of spectators to their stadiums, arenas and associated grounds every year. Although estimates vary, the U.S. professional sports industry alone generates approximately \$20 billion in annual revenue.ⁱ Each year the top 200 stadiums in the U.S. draw nearly 181 million visitors, placing the industry in a unique position to integrate sustainability into U.S. culture. Dr. Allen Herszkowitz, a Senior Scientist at the Natural Resources Defense Council, explains the far-reaching influence of the sports industry:

Perhaps no other industry is as well suited to confirm that environmental stewardship has become a mainstream, non-partisan issue ... While only 13% of Americans say they follow science, 61% identify themselves as sports fans.ⁱⁱ

Traditionally, U.S. stadiums and arenas have not integrated sustainability initiatives into their operations. The sports industry is increasingly adopting sustainable business practices in order to mitigate its dramatic environmental footprint. Stadiums and arenas create considerable energy demands and can place a large strain on water systems. These facilities also emit large amounts of associated greenhouse gas (GHG) emissions and produce thousands of tons of waste each year. Waste Management (WM) estimates that the four major professional leagues (NFL, MLB, NBA, NHL) generate approximately 35,000 metric tons of carbon dioxide (CO₂) each year from their fans' waste activities alone.ⁱⁱⁱ The effects of the U.S. professional sports industry reach far beyond their stadiums and arenas. Franchises help shape their cities' transportation infrastructures, boost local economies and can significantly affect their regions' environmental systems.



The business of stadium and arena construction and renovation has increasingly become as competitive as the sports themselves. Modern stadiums have been designed to house sporting events, concerts and other large gatherings, and consist of a stage or field as well as areas

that allow spectators to adequately view the proceedings. Arenas are typically smaller and enclosed with a roof or dome. As stadium owners implement programs to enhance the fan experience, including increased seating, stadium-wide wireless internet, improved video displays and electronic advertising, the costs associated with higher waste volumes, increased energy needs and operating needs grow in kind. Due to this growth, a variety of sustainability initiatives have begun to take root within the professional sports industry. Sustainable planning has emerged as a model for smart financial management and continues to evolve into a platform that creates meaningful positive environmental change while reducing a franchise's exposure to future risks associated with environmental legislation and changes in building standards.

Challenges

Stadium Development

Franchises and stadiums are constantly under pressure to increase revenue and broaden their fan bases. This often compels owners to pursue renovations and expansions to existing building structures. In the past two decades, stadium and arena construction projects across all professional sports leagues have occurred at a blistering pace. In this time frame, the four major leagues have constructed 66 new stadiums and arenas for 92 of their 122 teams with several more in the pipeline. Building and renovation environmental impacts have begun to extend beyond the stadium grounds. Many franchises and stadium developments become increasingly tied to the economic and political infrastructure of the cities and municipalities in which they operate. Because of this, stadium developments are expected to seamlessly incorporate a city's transportation infrastructure or augment existing transportation systems. In order to handle the influx of thousands of fans, stadiums must invest in luring attendees through transportation systems that are integrated into the region's existing resources, including interstate highway systems, public light rail and subway systems.

Stadiums and arena developments often fail to adequately integrate with the surrounding areas, while negatively affecting surrounding environmental systems. The effects of these failures include higher amounts of waste material and GHG emissions associated with increased energy demands, water usage and fan transportation. Recent NFL stadiums stand out as primary examples of the extravagant costs of new construction without sustainable planning. With construction costs that reach over \$1 billion, facilities' monthly utility bills can exceed \$200,000 with annual consumption at over 23 million kWh.^{iv}

Additionally, fan transportation to and from an event can generate thousands of tons of GHG emissions a year and represent the single largest negative environmental impact of a stadium. Developments are



challenged to create low impact structures that maximize limited space and provide adequate fan transportation and parking. In order to reduce their environmental footprint, stadiums and arenas must strive to consider their surrounding community so the facility generates positive social, economic and environmental impacts.

Waste Material Management

Stadiums and arenas generate substantial amounts of waste materials from event activity as well as venue construction. This often necessitates the creation of dedicated management programs for fibers (paper products, cardboard), plastics (beverage containers, low density polyethylene films, mixed rigid plastics), scrap metals (ferrous and non-ferrous), organic materials (landscape trimmings, food waste), universal waste (bulbs, batteries), construction waste (concrete, scrap wood), and intermittent special wastes like hazardous materials.

A variety of challenges arise when implementing a comprehensive waste management program at a stadium, even if the facility only targets a few materials. Waste generated at a stadium is rarely static; the resources used for upgrades, renovations and concessions change constantly. Facilities must also account for external factors that influence material generation such as items brought into the stadium by fans, new products from third party vendors and events beyond arena gates like tailgating and community programs. A stadium's material management program must continuously evolve to effectively capture materials generated to help ensure that recyclable materials are handled and diverted accordingly. Furthermore, a majority of the materials used within stadiums are not ideal for landfill diversion. Less expensive materials, like low-grade plastics and polystyrene, satisfy single-use needs but are not easily recycled.

Franchises must additionally remain cognizant of the local, state and federal regulations that stipulate how materials are handled and stored. Some municipalities establish diversion goals that dictate operational expectations. In 2002, the City of San Francisco adopted a Zero Waste Goal (Resolution NO 007-02-COE) to divert 75 percent of the material generated within the City by 2010. Under pressure from the City, AT&T Park diverted 1,750 tons of residuals from landfill that year. This elevated the facility's diversion rate to 75%, and helped the City achieve an overall diversion rate of 77%. San Francisco has targeted a goal of 100% diversion by the year 2020, causing AT&T Park to continue exploring a more aggressive approach to increasing diversion.^v

With a growing number of fans and increasingly larger facilities to

organize, stadium and arena waste management is now more complicated than ever. A number of facilities are meeting the challenge to stay ahead of the curve by revamping their material management and sustainability programs with the goal of encompassing all materials generated at the stadium while aligning with city goals and improving cost efficiencies.

Effective Communication and Fan Engagement

One of the most important aspects of an effective stadium sustainability and waste management plan is communication. Year after year, franchises invest in large-scale marketing campaigns to bring fans to their arenas. Examples include giveaways, billboards, television and radio advertisements, and in-stadium signage. Utilizing similar tools, sports teams strive to communicate their sustainability and waste management goals in a clear manner in order to eliminate confusion and boost participation.

Promoting participation in sustainability and waste programs is challenging. The transient nature of visitors at a sporting event creates challenges to fostering a sense of fan engagement and ownership in stadium sustainability programs aimed at reducing waste and overall environmental footprint. Some attendees arrive for the first time while others show up for a few or every game of the season. In either case, the level of excitement for the event usually distracts fans from considering how to properly dispose of their waste. Consequently, facility managers and franchise marketing teams must learn to incorporate their sports and athletes into any environmental campaign.

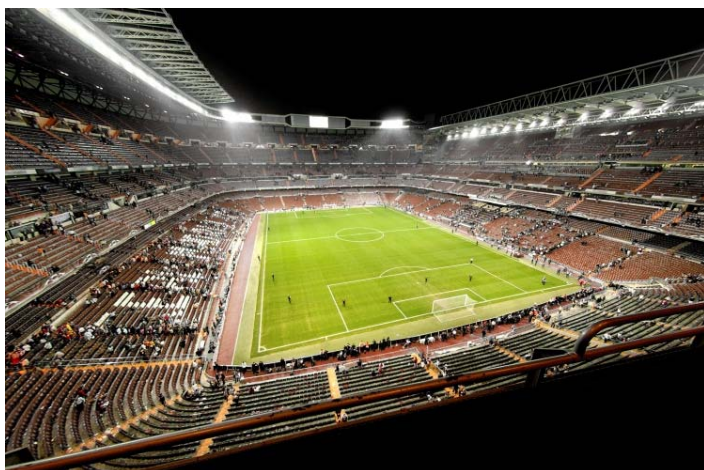
Solutions Stadium Development

In order to more effectively mitigate risks surrounding franchise development, owners should take a holistic approach when designing stadium and arena construction projects. Considering the environmental impacts of the franchise during the planning process and creating sustainability goals focused on reducing energy demands, waste outputs and GHG emissions will help drive franchise value by improving the arena's triple bottom line (people, planet, and profit). Aside from the obvious environmental benefits, weaving sustainability into the franchise brand and products allows environmental initiatives to be leveraged for product differentiation; this is especially important as competition for fans' attentions and dollars remains fierce.

New professional sports stadiums are being built at a rapid rate. A growing number of these projects focus on green building design and are applying for the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) certification. MLB's Washington Nationals Park was the first stadium to achieve certification for LEED New Construction in 2008, and facilities across the country are certifying buildings under the New Construction and Existing Buildings: Operations and Maintenance (EBOM) rating systems. Stadiums and arenas have achieved LEED Silver or Gold EBOM certifications in Atlanta, Houston, Miami, Minneapolis, Pittsburgh, Portland, and San Francisco. These LEED projects typically realize considerable cost savings. For example, the Orlando Magic's Amway Center became the first NBA arena certified as LEED Gold under the New Construction standard in 2011. The facility consumes "approximately 25% less energy and 40% less water than arenas of similar size and type, saving the team hundreds of thousands of dollars each year — including close to \$700,000 annually in energy costs alone."^{vi}

Many teams go beyond traditional sustainability initiatives while

maximizing the efforts of their existing programs. In Minneapolis, the Minnesota Twins use an innovative system that collects rainwater from various points around the stadium. The water is filtered, disinfected and used to irrigate the field as well as wash down seating areas between games.^{vii} Efficiency improvements built into New York's MetLife Stadium, including a synthetic turf playing field and waterless urinals and low flush toilets, have been estimated to reduce water consumption by 11 million gallons per year or a 25% reduction compared to its predecessor, Meadowlands Stadium. Additionally, despite being nearly over twice the size of the older stadium, MetLife Stadium was able to reduce energy use by nearly 30%.^{viii}



Some facilities do not just stand out in the industry, but in the region as well. At the start of 2013, the Philadelphia Eagles plan to play in a stadium that uses renewable energy from 14 micro wind turbines and 11,000 solar panels, the largest solar installation in the state.^{ix} This system is projected to provide roughly six times the power used for all of the Eagles' home games.^x In San Francisco, the 49ers chose to use a specialized concrete with a low- CO₂ formula for their new stadium located in nearby Santa Clara. This is estimated to reduce the carbon footprint of the stadium by 23 million pounds of CO₂.^{xi}

Creating innovative transportation solutions that promote the use of mass transit and mitigate GHG emissions is another key pillar of stadium sustainability developments. The Barclays Center, the newly constructed home of the Brooklyn Nets, is currently facing this challenge. Despite developer Forest City Ratner being required to develop a traffic mitigation plan in order to win construction approval, the arena will have only 541 parking spaces for nearly 19,000 fans. The arena's location (constructed partially over the Metropolitan Transportation Authority's Vanderbilt Yards at Atlantic Avenue) provides direct access to nine subway lines with two more located two blocks away, along with nearly 150 trains and 135 buses that arrive to the area in the hour before game time. The developers are counting on an education program that will encourage fans to take the many public transportation routes to the games instead of their personal vehicles.^{xii}

A constant stream of stadium renovations provides a unique opportunity to minimize waste and capture recyclables. As suites, clubhouses and restaurants are remodeled, there are opportunities for recycling building materials like carpet and wood. Additionally, these products can be replaced with sustainably sourced lumber, zero-emission carpet, and granite or stone products. Construction materials are not the only source of recyclable materials. When the Green Bay Packers sought to replace their scoreboard at Lambeau Field, they partnered with WM to dismantle the scoreboard and separate the materials for processing. Vinyl ad panels, steel and aluminum were

transported to local refineries for reprocessing, while video elements were disassembled to recover metals and plastics. When lighting was removed, components containing mercury, gases and other special elements were separated to recover glass and metal for recycling.^{xiii} Innovative recycling methods are constantly expanding. Despite the challenges that face non-traditional recycling programs, solutions can be found for the recycling or reuse of nearly every material with the right partner.

Waste Material Management

Developing a clear waste management strategy that incorporates a customer-facing recycling and organics collection program can divert most materials from the landfill. Programs can begin collection of traditional recyclables (aluminum, paper, plastic, cardboard) in a single stream where this service is available, but can expand to capture food waste or reusable items. Stadiums across the country are implementing programs to capture recyclables and food waste, and to eliminate packaging and disposable serving ware from the waste stream. CenturyLink Field in Seattle is attempting to set the benchmark for stadiums and their material management and sustainability programs. The facility started tracking its recycling rate in 2006 with a baseline diversion rate of 35%. In 2011 the stadium partnered with WM and implemented a single-stream recycling program aimed at maximizing material capture and diversion. The partnership yielded impressive results within the first year. Through the creation of a recycling center, consistent signage and containers, and training and dedication of the stadium staff, the diversion rate jumped from just over 70% to 90%. CenturyLink is committed to taking this successful program to the next level by engaging its vendors and supply chain to eliminate difficult-to-recycle materials from the waste stream and truly pursue zero waste in its stadium operations.

Stadiums and arenas have also moved toward finding innovative ways to capture materials at the point of generation and bringing their waste and recycling programs directly to the spectators. One popular solution is the use of Fan Cans™ to demonstrate a commitment to recycling. These specially designed, branded cans feature standard recycling containers with a batting helmet, football helmet, or auto-racing helmet over the lid.^{xiv} These cans stand apart from traditional trash receptacles and can effectively draw attention to the program. Many are co-branded with logos of the service providers, offering unique opportunities to demonstrate a team's commitment to sustainability as well as their work with corporate sustainability or recycling partners.



Effective Communication and Fan Engagement

Messaging is a crucial element of designing an effective sustainability plan. This means creating effective and consistent signage throughout the stadium and incorporating aspects of the sustainability plan into communications across all mediums. This often means the creation of multilingual signage placed in strategic locations, and providing training for vendors and temporary and permanent staff members on the waste management programs.

The Philadelphia Eagles worked with the Citizen Group to implement a full scale marketing campaign for their “Go Green” program. The series features scoreboard, print and billboard media featuring statements like “It’s Time for some Serious Trash Talk” and “Trash the [Rivals] Giants, Skins and Cowboys, but Please Recycle the Cups”, and using the tagline that “When We Recycle, Everybody Wins”.^{xv} Additionally, the team has produced a “playbook” for fans that includes statistics and other information about the program, along with an interactive website.

Franchises must also focus on what happens outside of their arenas. Throughout the country, local sports teams use their stadiums as platforms for engaging fans about sustainability and creating change within the community. Some teams host e-waste drives before games outside the stadium,^{xvi} while others help plant trees or build energy-efficient Habitat for Humanity housing.^{xvii} Often teams pair these drives or projects with appearances from players, mascots or other team officials.

Many local sports teams focus on local legacy programs as well. As part of the 2012 All-Star Game in Kansas City, MLB partnered with the local Boys & Girls Club and Operation Breakthrough to renovate the Club’s facility using environmentally friendly materials. During the renovation, they used low-emitting paints and sealants, water efficient fixtures, and locally sourced materials.^{xviii}



Industry Partnerships

The professional sports industry is not alone in its goal to become a more sustainable industry. Partnerships with municipalities, non-profit organizations and leading environmental firms such as WM help

franchise owners achieve their sustainability goals. Leading the sports industry in its campaign for sustainability is the Green Sports Alliance (GSA).

The GSA was founded in 2010 with the goal of helping sports franchises, stadiums and leagues achieve their commitments to sustainability and enhanced environmental performance.^{xix} The alliance has members from 13 sports leagues and nearly 100 professional and college teams and venues. The organization focuses on increased communication and collaboration between all teams and leagues regarding their sustainability initiatives while helping develop innovative sustainability initiatives. The GSA also hosts a yearly summit where venue operators, sports team executives, environmental scientists and environmental solutions providers participate in sustainability focused workshops and discussions. Waste Management served as the presenting sponsor of the 2012 Green Sports Summit, September 5-7, in Seattle.

Conclusion

The professional sports industry is being challenged to weave sustainability into the fabric of their franchises, stadiums and arenas. These facilities have set the stage for showcasing not only sports and other large events, but each city’s commitment to sustainability and building a healthy community. Many stadiums have begun the implementation of waste minimization strategies, GHG reduction strategies, and the installation of alternative energy technologies, and more are exploring their pathway to sustainability each day.

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