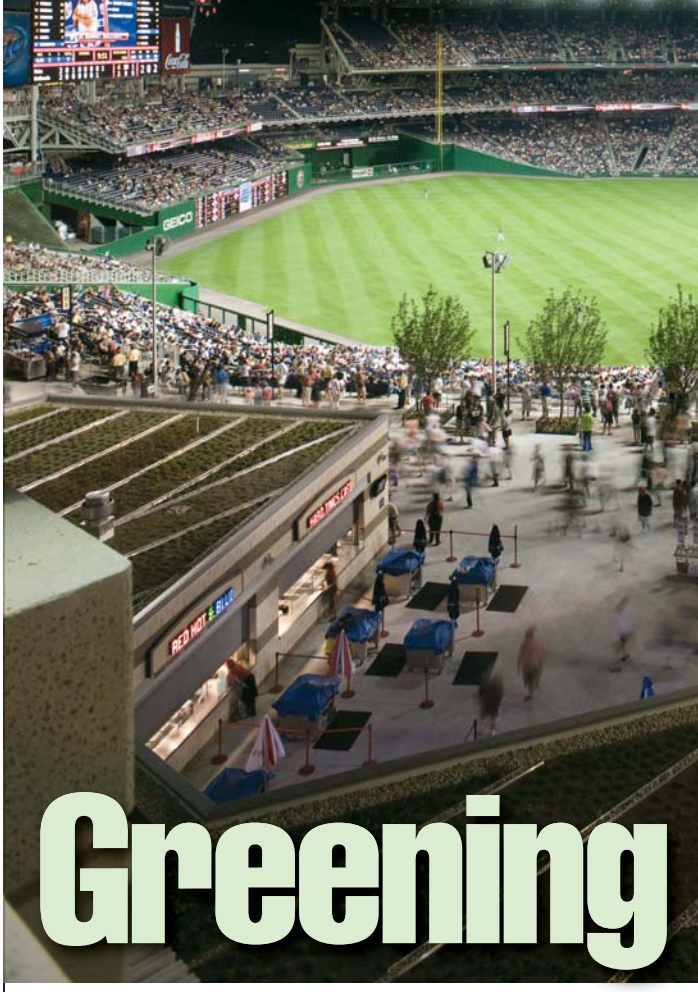
Just a few years ago, if you had predicted that Major League Baseball would be the next frontier of sustainability and green building, a lot of fans would have said you were coming out of left field. But you would have been right.



Greening

BY MEREDITH HOLMES, SWE CONTRIBUTOR

In April 2008, the Washington Nationals started the season in the new Nationals Park, the first Major League Baseball stadium to earn a Leadership in Energy and Environmental Design (LEED®) Silver rating from the U.S. Green Building Council. Reflecting the excitement this achievement generated, Oberlin College environmental studies professor and sustainability expert, David Orr, Ph.D., wrote: "A great beginning. And imagine the next steps, from totally renewable power to scoreboards that show the stadium's environmental performance, challenging other franchises to meet these standards."

This April, the New York Mets play ball in their new home, Citi Field, which boasts many green features, including energy-efficient lighting, low-flush fixtures, and a literally green roof, planted with grass and other vegetation to cool the building and absorb rainwater. Although the national sport has come to sustainability only recently, it has thrown its full weight behind the idea. Major League Baseball executive John McHale declared that the 2008 All-Star Game held July 15 in Yankee Stadium would be "the greenest event in MLB history," and that "All-Star Summer" 2008 would "demonstrate baseball's commitment to improving the environment."

We thought it was only a game

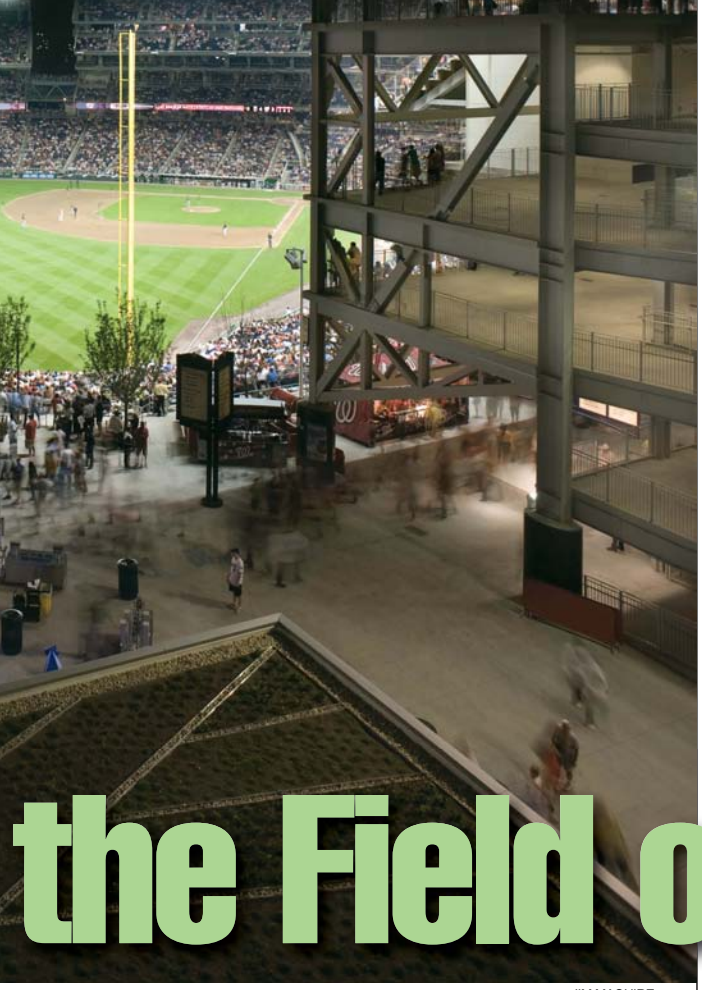
Why do we need environmentally friendly stadiums? We live and die with our home teams, and every spring we hope for a shot at post-season play, but we don't associate environmental impact with baseball. It's time we did, because sports have a very big impact on land use, energy and water consumption, and generation of solid waste. Eighty million people go to baseball games every year. According to the U.S. Green Building Council, commercial and residential buildings account for 39 percent of all CO_2 emissions in the United States. That's the largest single source; industry contributes 29 percent, and transportation, 33 percent. Most of the building sector's emissions are from burning fossil fuels to power lights, heating and cooling systems, and appliances. Buildings account for 72 percent of the U.S. electricity load.

Even though they are not used year-round, sports facilities are among the thirstiest consumers of water and electricity. The 75,000 New England Patriots football fans who converge on Gillette Stadium for a game use from 600,000 to 1 million gallons of water between kickoff and the last second. Because night games are now standard in almost every MLB city, lighting the diamond has increased electricity consumption. Despite the current economic slowdown, the USGBC estimates that 15 million new buildings will go up by 2015. So green construction is and will continue to be a powerful weapon in the fight against climate change. As aging baseball parks are replaced, the new facilities will be among the most high-profile commercial construction projects in their regions. Already in the works are new ballparks for the Minnesota Twins, the Florida Marlins, the Tampa Bay Rays,

National Pastime, Public Responsibility

Bart Giamatti, Ph.D., Renaissance scholar, Yale University president, loyal Red Sox fan, and briefly (April 1 to Sept. 1, 1989) commissioner of Major League Baseball, explained better than anybody why we need to pay attention to baseball parks. In his book about the sport, *Take Time for Paradise*, he wrote:

"Public places require constant care — they require cleanliness, reasonable order, coherence, and accessibility … so that the energy, the fervent zeal, the rousing excitement, and the happy camaraderie of competition we so value when we come together can continue to flourish for masses of us in the artificial but real confines of that special world, set aside, but urban, the stadium holding paradise, the public place for public pleasure."



JIM MAGUIRE

the Field of Dreams

and the New York Yankees, with rumors of major projects for the Los Angeles Dodgers and San Francisco Giants.

This year, for sure

In 2008 MLB partnered with the National Resources Defense Council (NRDC), launching the Team Greening Program, to make every aspect of the sport more environmentally friendly. The NRDC has surveyed the facilities and operations of all 30 teams, looking at everything from the chemicals used to draw the baselines to the hot dogs served at home and the energy consumed at away games, to the paper the programs are printed on. Changes based on survey data have been implemented in many stadiums. In addition, the NRDC has developed an online tool (http://www.greensports.org/mlb) that outlines best practices for sustainability and suggests local partners for sustainable projects.

Speaking at Boston's Fenway Park, Allen Hershkowitz, Ph.D., senior scientist with the NRDC, said, "This is the most culturally influential league — they're the world champions!" (The American League Boston Red Sox have won the World Series seven times, most recently in 2004 and 2007.) He pointed out that by embracing environmentalism, Major League Baseball takes the issue out of politics and brings it into people's lives in a way that makes sense to them. Baseball's image also benefits by being associated with the increasingly popular ethos of sustainability.

Staying ahead of the curve

But there's more than good public relations driving the greening of baseball. Sustainability makes economic sense. In 2004, when the Washington, D.C., city council made LEED certification a condition of building the Nationals stadium, it didn't seem possible; earning LEED points can be a big up-front expense. But the Silver certification boosted construction costs for the Nationals stadium by less than 2 percent. LEED certification added less than 1 percent to the construction budget of an indoor sports training facility completed in 2006 by HOK Sport for the University of Connecticut. That's a small, short-term price to pay for significant long-term savings on energy, water, and waste management. More and more universities — both public and private — and state and local governments are requiring all new construction to meet LEED standards. A McGraw-Hill study estimates that the green building market (residential and non-residential) will double between now and 2013, to $96 to $140 billion.

Stephanie Graham, an interior designer and former professor at the University of Kansas, can thank the promising green building market for her new job. In 2007 she became the sustainability coordinator for HOK Sport, the Kansas City, Mo., architectural firm that designed many of the major league baseball parks built recently, including Citi Field and Nationals Park. HOK has about a dozen other sustainable sports projects in various stages of development. Graham's job is to bring together all the experts involved in sustainability planning and implementation, at the right time. She said, "I see myself as a facilitator. It's crucial for a project as big and complex as a baseball park that all the disciplines — architects, engineers, and planners — come to the table and talk to each other. The great thing about designing a sustainable building is the interaction of the team members." Graham works closely with engineers representing a variety of disciplines. "The mechanical engineers are most critical to my job," she said. "They are responsible for the energy model, the HVAC system, which informs the building envelope and affects almost every other aspect of the building."

A whole new ball game

Because baseball parks are newcomers to sustainable design, and LEED certification was originated for office buildings, Graham and her

Stephanie Graham is the sustainability coordinator for HOK Sport, where she works with all disciplines in the planning and implementation of green sports facilities.

Sustainability Sampler

Ballparks built in the last few years have incorporated the latest in green engineering and have benefited from top-to-bottom sustainable planning, but clubs in middle-aged and even vintage parks are greening their operations and retrofitting their stadiums. At Fenway Park, volunteers augment the recycling program by circulating with giant plastic bags so fans can recycle from their seats. On Earth Day 2008, the Seattle Mariners played the first carbon-neutral game in MLB history, by purchasing carbon offsets and 58,000 kilowatt hours of "green power" credits. The San Francisco Giants teamed with the San Francisco Bicycle Coalition to provide valet bike parking at all home games. The Giants, the Colorado Rockies, and the Cleveland Indians have solar panels on their stadiums. The Chicago White Sox recycle all paper and plastic collected during home games at Cellular Field, and since 1992, the club has diverted 570 tons of paper, plastic, aluminum, and cardboard from landfills.

Citi Field, Queens
Home of: New York Mets
Opens: April 2009
Green features:
- Easy access to public transportation
- Carpool program for fans
- Demolition and construction waste recycling
- Energy monitoring system
- Green cleaning products
- Energy-efficient lighting
- Storm water filtration system
- Waterless urinals, low-flow fixtures
- Green roof

Coors Field, Denver
Home of: Colorado Rockies
Opened: 1995
Green features:
- On-site wetland filter storm water management system
- Energy-efficient, xenon-bulb scoreboard
- Compact fluorescent lights in offices
- Double-glazed windows
- 95 percent of reinforcing bar is recycled steel
- Waste recycling program

Great American Ballpark, Cincinnati
Home of: Cincinnati Reds
Opened: 2003
Green features:
- Concrete and steel from old stadium used in construction
- Extensive use of local building materials
- Carpeting and restroom partitions used recycled content

Nationals Park, Washington, D.C.
Home of: Washington Nationals
Opened: 2008
Green features:
- LEED Silver rating from USGBC
- Brownfield redevelopment site
- Easy access to public transportation
- 5,500 tons of construction waste recycled
- Building materials have minimum 10 percent recycled content
- Regionally produced building materials
- Low-VOC paints and glues
- Ground and storm water filtration system screens debris
- Drought-resistant landscaping
- Vegetated 6,300-square-foot roof

team are always learning. "We gather a lot of data before we begin designing," she said. "Looking at insulation for the Nationals stadium, we found that insulating the walls would have little effect on energy savings, but insulating the roof would have a significant impact."

Graham also found that ballpark concessions are responsible for a startling share of water consumption. The Nationals Park is saving 3.6 million gallons of water a year by using low-flow fixtures in food preparation, in addition to those in other areas of the stadium. She also looks at data generated by a building project once it's in operation. The Nationals stadium is a year old, and it's time to compare actual energy use with the projections. The U.S. Environmental Protection Agency will work with the club, advising them on continued energy savings. Graham thinks that the competition inherent in sports is a factor in baseball's enthusiastic adoption of sustainability. "If one team gets a green stadium, then their rivals want to build an even greener one."

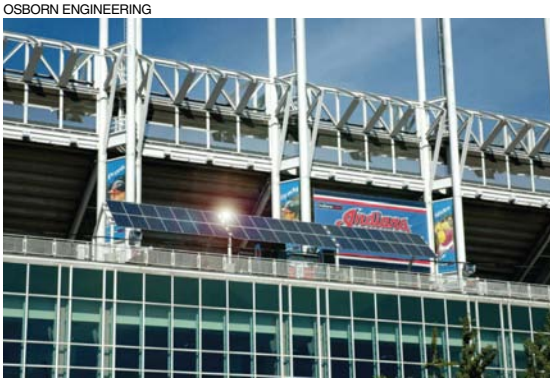
Baseball parks present some unique challenges to LEED compliance, according to Brian Kane, P.E., LEED AP (accredited professional) with Osborn Engineering, a Cleveland-based architectural and engineering firm with a long history of building major league baseball stadiums. The first hurdle is the site. One of the biggest impacts of a baseball stadium is CO_2 emissions from car traffic before and after games. It's very important that stadiums be convenient to public transportation. In St. Louis, for example, a light rail stop was built across from the park, just for baseball fans.

"The amount of land required for a ballpark is huge," said Kane, a mechanical engineer. "If it's in an urban area, which most baseball stadiums are, there are many properties to acquire, some of which might be brownfields. If the site is in a suburban area, there's more open land, but you might have to deal with wetlands and riparian protection."

Another significant challenge is the storm water management system. "Ballparks generate tons of debris — peanut shells, paper, cans, etc.," said Kane. "Controlling the quantity and quality of storm water runoff can be a nightmare. You've got to install a good system of filters to keep the debris out of streams and other natural waterways and to compensate for all the impervious surfaces. LEED operations in a stadium environment is a balancing act," he explained. "For example, you want to use low-flush fixtures to cut water use, but you can't go too low and sacrifice performance in an area that's important to visitors."

In 2007 Kane worked with Christopher Wynn, AIA, and director of design for ballparks at Osborn, to renovate Heritage Park, the Cleveland Indians Hall of Fame in Progressive Field. The project was not LEED-rated, Wynn said, "But we design every project with LEED in mind; every project has sustainability possibilities." Storm water flow was analyzed, and a new natural percolation system was installed, so that water drained directly into the soil, without connecting to the city storm water system. "I think in the near future, all major-league sports projects will be LEED-rated," Wynn said. "Right now baseball is much more on board with sustainability than other sports are." ■

OSBORN ENGINEERING



The Cleveland Indians were the first American League team to use solar panels in its ballpark. The power generated by the forty-two 200-watt photovoltaic modules is fed into the park's electrical system, reducing traditional energy use.