

## **Introduction**

Rod Sheard, senior principal of HOK+Sport, has modern stadia classified into his five generations theory. Lincoln Financial Field, home of the National Football League's Philadelphia Eagles, falls into the fifth generation. In his study on stadium construction and sustainability, Sertac Erten states that this theory "underlines the potential of stadia as dynamic cells implanted into the urban fabric of a city, stimulating growth and regeneration" (532). By itself Lincoln Financial Field is just a stadium, but when it is tied to the city and connected to the neighborhoods surrounding it, the stadium becomes more than just a place where fans cheer on a team or a favorite band. The Linc, as it is commonly referred to, becomes a place that serves as a model to what a sustainable stadium (more specifically sustainable energy in this paper) should be.

## **The Original Plan**

Cowboy Stadium, the expansive new home of the Philadelphia Eagles rival the Dallas Cowboys, is a perfect example of what the organization is trying to avoid. Monthly utility bills exceed \$200,000 per month as the stadium uses 2,036,560 kWh per month or 24,439,918 kWh per year, which is roughly the amount of energy used by the entire city of Santa Monica, CA (pop. 88,000) for the entire year (Glubiak). This startling statistic may have made the Eagles owner think about the future of Lincoln Financial Field. In November of 2010, owner Jeffrey Lurie made a commitment to be the "green-standard" of the National Football League and of the sports world. Lurie, who typically refers to his team as the "gold-standard," had planned to make Lincoln Financial Field the first major stadium in the world to use self-generated energy. The organization had agreed to work alongside SolarBlue and install 80 20-foot tall spiral wind turbines on the stadium roof and also install 2,500 solar panels on the roof and sides of the structure. Also planned was a 7.6 megawatt onsite dual-fuel cogeneration plant.

A Philadelphia Eagles press release states that “engineers at Solar Blue estimate that converting the stadium to renewable energy will eliminate CO2 emissions equivalent to 500,000 barrels of oil or 24 million gallons of gasoline consumed annually. That equates to removing the carbon emissions of 41,000 cars each year.” The original plan focused on having this work done by September of 2011, but as this date approached



no signs of construction could be seen and the organization did not provide updates. Finally in early October of 2011 the organization announced that new plans were taking over. Before addressing the new plans it would be helpful to see what other NFL organizations have done since the time the Eagles announced their original plans.

### **NFL Case Studies**

Two NFL franchises have recently served as models for what the Philadelphia Eagles can follow. The Seattle Seahawks and the Washington Redskins have recently adopted the use of solar panels to help provide power to their stadium. These stadiums are currently retrofitting or have retrofitted the way the Eagles plan to do. Jeff Barker of National Geographic outlined the basic details.

#### **Seattle Seahawks – CenturyLink Field**

The Seattle Seahawks have recently installed 3,750 solar panels on a roof adjacent to CenturyLink Field. These panels are expected to generate 830,000 kilowatt-hours of electricity per year, which should reduce the stadium's utility bills by 21 percent. Apart from the solar panels, low flow toilets and upgraded heating and cooling systems have been adopted in the stadium.

## Washington Redskins – FedEx Field

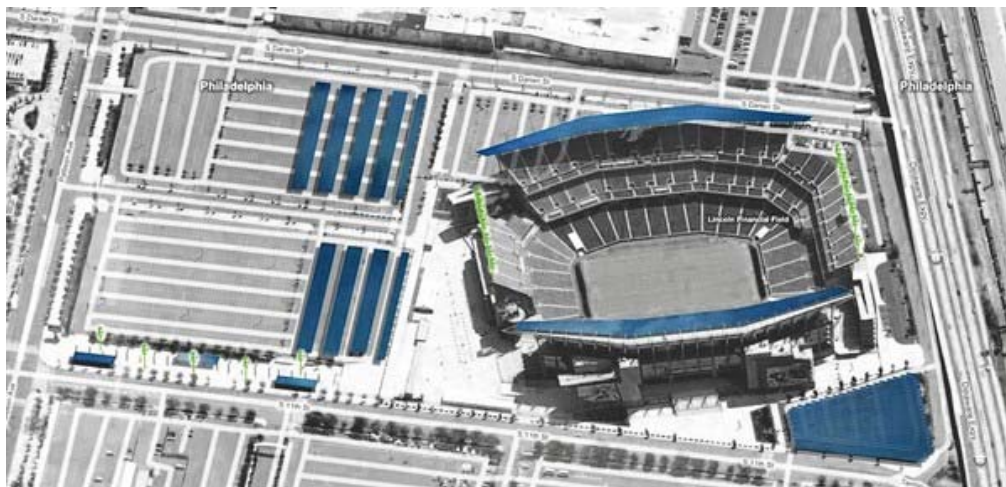


To begin their 2011 season, the Washington Redskins unveiled a solar panel system. The 7,500 panels, which according to Barker will provide up to 20 percent of the stadiums power on game days and will help to provide energy on non-

game days, were installed over one of the stadiums parking structures. Along with the solar panels, 10 electric car charging stations are being introduced.

### Revised Plan

Unfortunately, plans had to downsize. The organization realized the task was not going to be as easy as they had originally thought. Massive rewiring to the entire stadium would have had to been done to handle the amount of energy created. The energy also could not be harnessed by existing transformers. Despite this news, Don Smolenski, COO of the Philadelphia Eagles, has said Lincoln Financial Field will still have the largest kilowatt-hour output in the NFL. This will be between 3.7-4.0 kilowatt-hours per year.

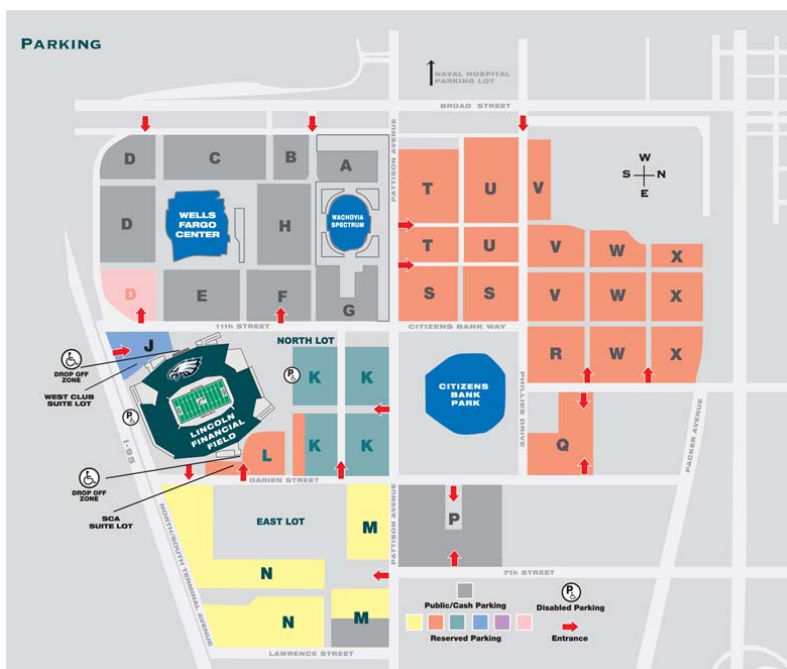


Blue Indicates location of the solar panels, while green shows where turbines would be located.

In an interview with The Morning Call, Smolenski said, "the workhorse of the original project was going to be this co-generation plant powered by natural gas, whereas in this project, the workhorse is actually the solar arrays" (Fierro). The solar arrays will now, like the Washington Redskins, be prominently featured in the parking lots around the stadium. The wind turbines, which were going to be the visual highlight of the original plan, are now being limited because team officials fear their shadows could interfere with play. Waste heat, generated from the solar panels, will now help to heat water used in the stadium. Financially, regardless of a new plan being put in place, the team expects to save close to 60 million dollars over a 20 year period.

### Other insights

Owners like Lurie may be interested in creating their own energy because they could possibly gain income from it. Alan Locke, a founding principal at a consulting firm, says that stadiums aren't always used but still would be generating solar and wind energy. "With lower photovoltaic prices, and with wind turbines, it is possible to actually go beyond net zero, and move into net power generation, especially for larger structures that are less used, or used passively" (*Power Play-redefined*).



As a part of their retooled plan, the Philadelphia Eagles are also going to be adding extra solar panels to some of their parking lots as mentioned above. While providing energy, this will also help to eliminate some of the blacktop that surrounds Lincoln Financial Field. The field is part of the

South Philadelphia Sports Complex, which houses three sports arenas, but with them also contains an estimated 22,000 plus parking spaces (SCSSD). These parking spots create an oven-like environment that fans must cross, and by taking spaces away it helps to cool the surround area, helps the fans and Philadelphia.

Apart from their energy creation plan, Lincoln Financial Field already composts more than 25 tons of organic waste a year and has replaced more than 600 toilets in order to conserve water according to an EPA blog entry (The Keystone State's Sustainable Sports). The Philadelphia Eagles "Go Green" portion of their website discusses this and highlights include:

A recycling plan that in 2010 recycled more than 360,000 lbs. of bottles and cans. This saves 3,027 million BTU, the equivalent of 24,238 gallons of gasoline - an amount that could run your car for 40 years. The Eagles recycled more than 280,000 lbs. of paper and cardboard. Recycling this amount of paper is equivalent to saving about 8 trees.

### **Fitting in with the city**

In 2008, Philadelphia Mayor Michael Nutter, introduced a plan called Greenworks. Greenworks (link in sources) is a set of suggested guidelines that Philadelphia hopes to follow in order to become the greenest city in The United States. The Philadelphia Eagles plan for Lincoln Financial Field meets some of the targeted guidelines:

#### **Energy**

Target 2 – *Reduce citywide building energy consumption by 10 percent.*

Greenworks suggests that this could be achieved by providing incentives for smarter builders and by replacing energy draining appliances. The Philadelphia Eagles have said their new plans would help to supply about a third of the stadiums total energy usage, more than the suggested 10 percent.

Target 4 – *Purchase and Generate 20 percent of electricity used in Philadelphia from Alternative Energy Sources.*

Instead of getting most of its power from coal based sources, Lincoln Financial Field will now be using their planned solar panel arrays and wind turbines,

along with their water heating plant to help supply some power to the stadium. While this may not satisfy all of Greenworks' suggestions, it is a step in the right direction for the city.

## **Economy**

Target 12 – *Reduce Vehicle Miles traveled by 10 percent.*

The current plans at Lincoln Financial Field do not address the issue to make their location easier to access by public transportation, pedestrians, or by cyclists. The stadium is located between two major interstates, I-95 and I-76, and served by the southern terminus of the Philadelphia subway system, but unfortunately is at one of the southern most points in Philadelphia. This issue of reducing vehicle miles is not something that the Eagles could solve alone and would require help from SEPTA and the Philadelphia Streets Department.

Target 14 – *Double the Number of Low and High Skill Green Jobs*

According to the press release of the original Philadelphia Eagles plan, “the Eagles' renewable energy plan will create hundreds of jobs for the Philadelphia area. SolarBlue anticipates directly employing 200 local people during the year-long design and installation phase. One-quarter of these jobs will be permanently maintained over the 20-year operational horizon. In addition, the project will generate approximately 600 indirect jobs in the surrounding region as a result of Solar Blue's commitment to utilize local contractors, vendors and suppliers, as available.” While SolarBlue and Eagles have parted ways, the new energy company the Eagles work with should be held to the same standards.

## **Conclusion**

While the plan has been delayed and construction yet to start, making Lincoln Financial Field a more sustainable building in Philadelphia is a step in the right direction; not just for Philadelphia but for the nation and world to see. The stadium which opened up in 2003 was built during a period of rapid sports facility construction in the United States and during this time making sustainability a key focus for the building may not have been an important element. Now, almost 10 years after ground broke, sustainability is a key

element to any building construction. The organization is focused on fixing their course and proving something that people in the city can be proud to be known for. Some may say that the building is just a sports stadium and may not hold the prestige of being a skyscraper or an office building, but it is something known nationally by sports and concert fans and is shown to the world on a weekly basis through NFL, NCAA games, and other events. Other NFL teams and major sports franchises are lining up to join the Eagles in taking a step in the right direction.

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