6. August 2008

Beijing Olympics Show China's Renewable Energy Aspirations

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Beijing, China [RenewableEnergyWorld.com]

From the standpoint of energy and the environment, the Summer Olympics in Beijing, a city of 15 million people, pose a stark juxtaposition of the reality of China today and the vision of its future: a China characterized by wise environmental and energy stewardship. In recent weeks, as the world's attention has turned to the Summer Olympics in China, the media has published a steady stream of stories about the unpleasant environment that the Olympic athletes will face in China: algae blooms in the waters off of Qingdao that threaten the sailing competitions and smog and particulate matter-laden skies over Beijing, forcing some teams to train away from Beijing in advance of their competitions and forcing coaches to provide their athletes with optional breathing masks to provide some measure of protection.

Haile Gebrselaisse, the Ethiopian runner who holds the world record for the marathon, has decided not to compete in the marathon and the International Olympic Committee has raised the possibility of postponing the marathon and other endurance events. In spite of this bad press and potential postponement of some events, the Chinese are taking extraordinary steps to mitigate the impact of their soiled environment on the Summer Olympics' competitions. Some of the varied measures the country is taking include sending a small flotilla of boats and some 10,000 people to scoop up the green muck polluting the waters off of Qingdao, enforcing alternate day driving, closing some of Beijing's factories and even using artillery to try to seed the clouds to produce rainfall to clear the air that Olympic athletes will be breathing in Beijing. Unfortunately, the air pollution in Beijing has resisted the Chinese government's effort to control it. Even by the less stringent standards that China uses (China doesn't publish ozone and fine particulate matter readings) air quality has been considered unhealthy despite these initial attempts to mitigate smog and other pollutants. The failure of the Chinese government to wrest control of the atmosphere around Beijing is likely to lead to even more stringent measures just before and during the Olympics.

These more draconian measures are likely to include the temporary closure of nearly all construction sites and even more factories in and around Beijing and banning up to 90% of Beijing's private vehicles from the roads during the Olympics. These restrictions also are being imposed on neighboring Tianjin and parts of Heibei Province.

A Green Olympics

Officials from Beijing have said that the Summer Olympics will be a "Green Olympics." Though the existing environment and industrial, automotive and built infrastructure in greater Beijing will be anything but "green," the aspirations of the Chinese to create a "green" future will be on display during the Olympics.

The Olympic Stadium, aka "Bird's Nest" (credit: Jim Grisanzio)

The design and operation of the Olympic Village and Olympic venues (all of the Olympic buildings total nearly 2 million square meters) are a statement of the central government's vision of a new China powered by renewable energy and driven by conservation and environmental protection; the Olympics are putting these aspirations on display. During the Olympics, China will showcase a robust assortment of renewable energy and energy efficiency features. More than one quarter of all energy consumed at Olympic venues will come from renewable sources, including solar power, which will generate nearly 8 million kilowatt-hours (kWh) of power for Olympic facilities and wind power, which will provide 20% of the power needs of the Olympic venues. Suntech Power of Wuxi, Jiangsu Province provided the 130 kW solar system for the Olympic Stadium, also known as the "Bird's Nest." In addition, Canadian Solar provided 66 kilowatts (kW) of building-integrated photovoltaics (BIPV) for the lampposts along Olympic Boulevard.

The wind farm that will supply power to the Olympic venues in Beijing is Beijing's first; it is comprised of 43 wind turbines (each 1.5 megawatts (MW)) developed and manufactured by a Chinese wind turbine company.

The solar energy hot water system that has been installed in the Olympic Village is designed to provide sufficient hot water to satisfy the washing needs of the Olympics' 12,000 athletes, trainers and other personnel, and to provide potable water.

Eighty to ninety percent of the streetlights in the vicinity of Olympic venues will be solar-powered streetlights. Another system that is being displayed at the Olympics is a new solar technology known as the SolarWall hybrid PV/thermal system that produces both electricity and heat.

The National Aquatics Center — known as the "Water Cube" — was built to allow the roof and the outer surfaces of the building to collect and recycle as much as 140,000 tons per year (tpy) of rainwater, clean water and pool water. Advanced building techniques are said to allow Olympics venues to save 50% or more of the energy consumed by typical buildings. One prominent example is the high efficiency thermal polymer skin encasing the National Aquatics Center, that greatly decreases energy consumption at that Olympic venue.

More than 500,000 trees were planted in and around Olympic venues and on the Olympic green. There will be 500 alternative energy vehicles operating within the Olympic Village and some of the fans that attend the Olympic competitions in Beijing may ride to the events in one of the 1000 new Beijing public transportation vehicles that run on biodiesel.

The renewable energy vehicles being used at the Olympics include 20 hydrogen fuel cell, 55 electric and 25 hybrid passenger vehicles. In Qingdao, the Olympic Sailing Center, which was constructed at a cost of more than 11 million Yuan [US $1.6 million], uses solar power technology to operate the air conditioning system in summer, provide heat in the fall and winter and supply hot water year round; the system will save an estimated 900,000 kWh and 700,000 Yuan [US $102,000] each year, allowing for a 15-year recovery of the investment in that Olympic facility. The Qingdao Olympic Sailing Center also utilizes a seawater-source heat pump technology.

As is so often the case in China, the Summer Olympics in Beijing present two contradictory views of China's environmental and energy stewardship. Will China's future development realize the promise of the enlightened environmental and energy infrastructure now on display at the Olympic venues or will the Olympic Village turn out to have been just a Potemkin Village? Stay tuned.

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