



Photo: Yang Liu/Corbis

Emission-free Olympics

China is putting on its greenest face for the Olympic Games in August. The government has promised a zero-emission event and is paying special attention to the conservation and recycling of water.

| by Bert van Dijk

China has dubbed this year's Olympic Games the "Green Olympics". Clean energy and renewable energy resources are used in all the Olympic projects and venues, including solar energy, wind power, geothermal heating and sewage heat. All in all, there are 121 water-saving and comprehensive use projects in the Olympic venues, with 55 of them spread over the Olympic Green area. 'China will ensure "zero emission" Olympic venues for the first time in Olympic history,' says Wan Gang, the Chinese Minister of Technology.

The Olympic Games will attract a large number of athletes and even more spectators, who together will produce 1.18 million tons of carbon, according to Wan. But the use of thousands of hybrid vehicles, powered by electricity, natural gas or biofuels, will help reduce emissions by between 1 and 1.29 million tons. 'So we can basically guarantee that emissions will be controlled,' says Wan.

According to the Minister, the use of solar, wind and geothermal power will account for more than 26% of the heating and cooling in Olympic venues. China will also restrict the use of cars during the Games to alleviate congestion and reduce emissions.

Rainwater |

A lot of attention has been focused on the use of water. As water is a scarce resource in Beijing, the city has invested in equipment and technology to make sure that water resources are efficiently used. About 80% of the collected rainwater and 100% of non-sewage water at Olympic sites will be purified and then recycled. In addition, some of the venues, including the National Aquatics Centre, the Olympic Village and the entire Olympic Green, have advanced sewage treatment systems on site.

A solar-powered water heating system in the Olympic Village will provide hot water for showering to the 16,800 athletes who will stay there during the summer. When the games are finished, this system will provide hot water to residents in the neighbourhood.

The Olympic Green Tennis Centre has established a domestic wastewater treatment system using a biological sewage treatment method. All sewage collected in the 1,200 cubic metre reservoir will be treated with membrane biological reactors. The water will be extracted and used for watering the grounds.

The tennis courts are equipped with a geothermal heat pump system through which ground source (geothermal) energy is absorbed to cool and heat the court. The system consists of indoor heat pump equipment, a ground loop, and a flow centre to connect the indoor and outdoor equipment. The pumps use the relatively constant temperature of the shallow underground layer, with the ground loops installed in a vertical well or a horizontal loop. In the case of the court, loops are installed in 37 vertical walls.

At the Bird's Nest, Beijing's landmark National Stadium, steel gutters are spread over the roof to collect rainwater. The water will then be recycled and used to irrigate the land around the venue or flushing its toilets.

A similar mechanism, installed on the roof of the National Aquatics Centre, can collect as much as 10,500 cubic metres a year.

The "Water Cube", the Shunyi Olympic Rowing-Canoeing Park, the Olympic Village, the Olympic Forest Park, the hockey field and archery range all have high-standard sewage treatment systems that produce recycled water. ■



Photos: Frans Schellekens

Heavy loads to carry

As the most populous country in the world, China still relies heavily on bicycles for transportation. The country has the largest fleet of bicycles in the world. In 2006, the total bicycle output in China reached 85 million, of which 56 million were exported. This represents 70% of the world's bicycle trade. The Chinese bicycle industry employs 150,000 people and generates \$1 billion a year in foreign exchange earnings.

Aside from carrying people, bicycles are also widely used for logistics. In congested urban cities, such as Shanghai, bikes

are being used instead of trucks to supply stores and transport water, flowers, old paper, animals and even other bikes. People are creative in finding new ways to load as many items as possible on to their bikes.

In recent years, traditional pedal-powered bicycles are slowly being replaced by electric bikes. Gasoline-powered bikes have been prohibited in many cities, further stimulating the popularity of electric and LPG powered bikes. 19.5 million electric bikes were sold in 2006, an increase of over 60% from 2005.