

A&WMA Delegation Examines China's Efforts to Improve Air Quality for the 2008 Olympic Games

by Ronald Poissant

China is the world's fourth-largest country in total area after Russia, Canada, and the United States, and is administratively divided into 23 provinces, five autonomous regions, four centrally administrative municipalities, and two special administrative regions (Hong Kong and Macao). With a population of just over 1.3 billion, China is also the world's largest and most populous country.

A strong and resilient economy is quickly pushing China to the forefront of the global financial stage. According to The Heritage Foundation, a conservative think tank based in Washington, DC (www.heritage.org), China has surpassed the United States in manufacturing output and is the global leader in the production of steel, copper, aluminum, cement, and coal.

However, since Beijing was selected as the host city for the 2008 Olympic Games, China's poor air quality has been of great concern. Known sources of air pollution include China's rapid industrialization, increasing transportation, the burning of coal and wood for cooking fuel, and the widespread use of open burning in agricultural areas. Dust storms from the Gobi desert and the use of fireworks have also been known to cause bad air episodes in Beijing.

Meetings in Beijing

The A&WMA delegation to China began its tour in Beijing with meetings at the China State Environmental Protection Administration, Tsinghua University, and the Global Village of Beijing (GVB).

About the A&WMA Delegation

Traveling under the banner of the People-to-People Citizen Ambassador Programs, which was established in 1956 by U.S. President Dwight D. Eisenhower to improve international understanding through individual exchange, the A&WMA delegation to China focused on China's air pollution control progress prior to 29th Olympic Games held in Beijing last month. During the two-week tour, October 7–22, 2007, the delegation, led by A&WMA Past-President Robert E. Hall, discussed issues such as smog, air pollution control, health effects of air pollution, mercury pollution control, and speciation studies with government officials, university professors, students, environmental groups, private companies, and citizens. The delegates included Robert E. Hall, Larry Anderson, Jack Broadbent, Erin Garner, John Godleski, Bobby Manley, Monica Mazurek, Azriel Pillersdorf, Ronald Poissant, Mark Ross, Pamela Torliatt, Robert Vranka, and Paulo Zannetti.

State Environmental Protection Administration

Chinese officials informed delegates that several projects were planned to reduce air pollution in time for the 2008 Olympic Games in Beijing. For example, in February 2008, China launched its first complete national inventory of pollution sources. The data will greatly help reduce pollution, one of the objectives of China's 11th five-year plan, which calls for efforts to build a harmonious society and improve environmental protection. In addition, large power plants and important industrial sources that can influence air quality in the Beijing region were planned to be significantly reduced or shutdown completely during the Olympic Games. The Shougang group plant, one of the biggest steel plants of China and one of the most important pollution sources in Beijing, for example, planned to reduce production to less than 30% of its normal capacity, thus reducing pollutant emissions by more than 70% during the Olympics.

Also, all construction projects in Beijing were to have been completed before the Olympics, otherwise they would be suspended until after the completion of the Games. Similarly, traffic restrictions were being considered for the duration of the Olympic Games. A complete air quality control strategy for the Beijing area was to be approved by the state council. In addition, in the first half of 2008, Beijing Subway Line 7 was put into operation and the airport line followed. By 2015, Beijing will have 19 metro lines to help relieve traffic congestion and pollution.

Tsinghua University

At Tsinghua University, delegates were told that researchers are measuring profiles for a number of emissions sources, including particulate matter (PM), volatile organic compounds (VOCs), and mercury. University researchers have developed emission inventory approaches for input into air quality models and are looking at the spatial and temporal distribution of pollutants. The researchers have done reverse modeling to verify emission inventories. In addition, they are using the Community Multiscale Air Quality Modeling System (CMAQ) and the GEOS-CHEM tropospheric chemistry models in their analyses to look at primary aerosols and the formation of secondary aerosols. For example, the researchers used the CMAQ model to calculate pollutant levels on a gridded area covering Beijing and the surrounding area (4–30 km) and found that regional emissions have a significant impact on air quality levels in Beijing, where the regional emissions contribute 30–40% of levels in Beijing.

Ronald Poissant is a professional chemical engineer located in Montréal, Québec, Canada. E-mail: ronald.poissant@hotmail.com.

Researchers at Tsinghua University have also looked at the contribution of mobile sources to ambient PM levels of air pollution and estimate that mobile sources contribute approximately 8% to the ambient levels. In the case of ozone, modeling shows that vehicles contribute approximately 38% to ambient levels. The researchers have generated and published several reports that address the contributions of various sources to ambient levels in Beijing in preparation for the 2008 Olympic Games.

Global Village of Beijing

Founded in 1996 as one of the first nongovernmental organizations in China, GVB is a nongovernment, non-profit organization dedicated to environmental education and the strengthening of civil society. GVB's focus is the promotion of sustainable development and a green life-style and its main functions include the production of environmental television programs, publications, training materials, the development of green communities, and the organization of public events and forums.

GVB receives funding from international foundations and U.S. Environmental Protection Agency programs and is now registered in California as a member of the U.S. China Association for Environmental Education.

During their visit to GVB, delegates were presented with a 30-minute slide show presentation on GVB's activities, entitled "This Endangered Planet: A Chinese View."

Meetings in Xi'an

While in the Xi'an area, delegates visited the Technical Power Research Institute (TPRI) and the village of Wang Yan Chang.

Technical Power Research Institute

TPRI is a research organization devoted to engineering technologies and, in particular, fossil-fired power plant equipment. As one of the principal research institutions for the Chinese power sector, it has an excellent reputation for its qualified technical consultation services. Its primary areas of research include coal ash and limestone characterization, low-nitrogen oxides (NO_x) combustion, desulfurization and denitrification, fly ash utilization, and thermal system optimization. TPRI's Green Gen program activities include integrated gasification combined cycle, natural gas combined cycle, coal gasification, renewable power, and nuclear power.

Wang Yan Chang Village

Finding alternatives to wood and coal for cooking fuel is becoming an increasingly urgent task in China's central Shaanxi province. Like many parts of China, it has suffered from decades of deforestation and soil erosion. The government is now addressing the problem by placing severe restrictions on tree felling and wood cutting and by undertaking a reforestation program.

The Shaanxi Volunteers Mothers Association for Environmental Protection—a largely voluntary group of women dedicated to improving environmental quality in China—have overseen the installation of thousands of



Workers stand near the new Olympic Stadium in Beijing, amidst hazy conditions on October 25, 2007.

biogas systems in farming households across the province. The main source of the gas is methane generated by waste from humans and pigs.

Most biogas systems provide enough fuel for a two-burner stove and a single outdoor light. The waste is sluiced directly into the biogas pit, warm water is then added, and through a process of anaerobic digestion, gas is produced, which is then piped into the home. An added benefit is that the remaining slurry acts as an effective fertilizer, allowing farmers to cut down massively on their use of chemical fertilizers.

A biogas system typically costs US\$380–\$560, depending on its size. The farmers pay approximately one-third of the cost. Savings of around 1000 yuans (US\$120) per year can be achieved by families who produce and use the biogas regularly due to a reduction in expenditure on coal or wood, fertilizer, and electricity. The biogas systems usually pay for themselves within 18 months. During their visit to the village of Wang Yan Chang to see the biogas systems in use, delegates spontaneously donated enough funds to pay the cost of one complete biogas installation.

Meetings in Kunming

While in the Kunming area, in Southwest China, delegates visited the Yunnan Environmental Science Society (YESS) and Yunnan Green Environmental Protection Engineering Co. Ltd.

Yunnan Environmental Science Society

Founded in 1981, YESS was organized by people working in the environmental field to enhance environmental protection in the Yunnan province. YESS has approximately 1200 individual members and 22 organizational members from across the Yunnan province. The society services its members, enterprises, and the local government by

- organizing academic sharing and exchange and promoting cooperation among different disciplines;
- providing environmental impact assessment and appraisal, technology consultancy, and environmental education and training;
- performing environmental research; and
- securing the legal rights of environmental scientists.



Delegates and guests with local and national guides in the Tiananmen Square on October 12, 2007.

Delegates learned that the Yunnan province has made significant progress in pollution control in recent years. For example, an air quality surveillance network has been established in the Kunming area, which includes nine monitoring stations. As a result, annual air pollution emission statistics are now provided to the State Environmental Protection Administration.

Yunnan Green Environmental Protection Engineering Co.

The Yunnan Green Environmental Protection Engineering Co., registered in 1998, holds three new patents and a national distinction award. The company designs and manufactures water and wastewater treatment equipment, air treatment equipment, and other environmental protection products.

Company representatives told delegates that the company has successfully produced ethanol and organic fertilizers from waste. Also, the company has succeeded by encouraging farmers to use more environmentally friendly organic fertilizers instead of chemical fertilizers. The cost of organic fertilizers actually works out to be less than the cost of synthetic fertilizers.

Cultural Visits

Delegates also had the occasion to experience the Kung Fu theatre show in Beijing; tours of Tiananmen Square, the Forbidden City, and the Great Wall in Beijing; the Old Xi'an City Wall, an ancient temple, the Terra Cotta Warriors and museum, and a Jade factory in Xi'an; and a silk store and the Stone Forest in Kunming. An amateur DVD movie of the trip, produced by Paolo Zannetti, is available by contacting Robert E. Hall at hall.bob@epa.gov.

Summary

Throughout the trip, delegates had the wonderful opportunity to learn more about China, its people, its history, its present, and its future. China's economy is growing rapidly. This brings important changes in China and

elsewhere in the world. The quality of life in China is expected to increase as the gross national product per capita is projected to double in the next five years. Furthermore, the environmental quality of life should greatly improve in the next five years, as evidenced by the determination of citizens and government officials to enforce better environmental policies and solutions. Chinese environmental quality improvement expectations constitute very good news for both China and the rest of the world. **em**

People-to-People Announces A&WMA Delegation to India

Date: December 7–16, 2008

Delegation Leader: Robert E. Hall,
A&WMA Past-President



A delegation of environmental professionals specializing in issues related to air and waste management has been selected to participate in a bilateral exchange with their professional counterparts in India, under the auspices of People-to-People Citizen Ambassador Programs.

India represents diversity in all its forms, including its people, religions, traditions, clothing, dialects, and habits; even India's landscape ranges from the highest mountain peaks to rolling plains to coastlines on three seas. This fascinating country, linking East Asia and Europe, but belonging to neither, exudes a deep mystery.

For more information about this program and to register, go to www.ambassadorprograms.org/upcomingprograms/science_tech/hall-robert_12-2008.asp.

People-to-People Citizen Ambassador Programs has been conducting educational programs for professionals since 1956. Each year, People-to-People Citizen Ambassador Programs develops more than 150 professional delegations across the globe, covering fields as diverse as education, law, medicine, science, and agriculture.