

Environment/Energy

Market Environment

Industrial growth and decades of poor resource management have left China with a range of environmental problems. Water resources in China are scarce given the country's immense population, and most are concentrated in the south or east. Factories and cities dump an estimated 40–60 billion tons of wastewater and sewage into China's lakes and rivers each year, 70% of which are considered seriously polluted. An estimated 600 million Chinese rely on daily water supplies contaminated to some degree by human and animal waste, and a 2004 study by consulting firm Frost & Sullivan found that China would have to spend \$48 billion on 10,000 more wastewater treatment plants just to reach a 50% treatment rate.

Coal-fired power plants provide nearly 70% of China's electricity and coal is commonly burned for home heating. As a result, China leads the world in sulphur dioxide emissions and acid rain. The environmental effects of Chinese emissions reach as far as California. According to the World Bank, 16 of the world's 20 most polluted cities are in China. The State Environmental

Ties That Bind

Protection Agency (SEPA) tested the air in 300 Chinese cities in 2002 and found that two-thirds failed World Health Organization air quality standards. By 2020 the government hopes to reduce the amount of energy produced by coal to 54%, with the remaining 46% coming from oil, natural gas, nuclear and renewable energy sources.

Massive deforestation and draining of marshes in China has eroded grass and agricultural land and led to rapid advancing of deserts, producing dust and sandstorms reaching Korea and Japan as well as cycles of drought and flash floods. Only 15% of China's land is arable, compared with 49% for India, and the Ministry of Land and Resources reports that as many as 22 million acres have been lost in the past 10 years, forcing China to increase agricultural imports.

With 22% of the world's population, China has only 8% of its renewable fresh water. Soil erosion dumps adds 5 billion tons annually to river and lake silt deposits. Dam construction along the Yellow River and in the Huai River Basin during the communist era have forced downstream cities and towns to build reservoirs and drill ever deeper wells draining underground aquifers in search of water. Land in the center of Shanghai has sunk more than 6 feet since the 1960s, as a result of deep drilling for potable water. The port city of Tianjin on the northeastern coast has all but drained some 300 tributaries feeding the Hai River on which it is located, with some 30 dams and reservoirs. Agricultural runoff, industrial dumping and urban waste have polluted the reservoirs to the extent that the city of 9 million now diverts water from the Yellow River.

Nearly half of the world's 45,000 large dams are located in China. The largest, Three Gorges Dam across the Chang River, began construction in 1994, with completion of the entire project scheduled for 2009. Building the \$25 billion project, which will generate over 18,000 megawatts of hydropower annually, required relocation of 1.3 million people for a 373-mile reservoir upstream. A massive North-South Water Transfer (NSWT) project is underway to redistribute Yangtze River Basin water to Northern China via a series of canals. The 722-mile, \$9 billion "Eastern Line," the least complex and expensive of the three, will deliver water to the Huang, Huai and Hai River Basins and to the Shandong Peninsula, including the cities of Beijing and Tianjin, by 2008.

Still, China is experiencing its worst drought in more than 50 years. That in turn is cutting output of hydroelectric power generation from Three Gorges and other projects. Hydropower plants and reservoirs in Chongqing municipality ceased all operations in late August 2006. Water shortages and high oil prices have in turn increased reliance on coal for energy production in recent months.

In July 2004 an 83-mile long flow of factory wastes on the Huai River killed fish and wildlife because so much water had been diverted from the Huai that it could not clean itself. In November 2005 a petrochemical plant explosion released 100 tons of benzene into the Songhua River in northeastern China, potentially affecting 3.8 million people. Since then more than 130 accidents contaminating China's water supply have been reported. An April 2006 spill from two paper mills buried part of the Inner Mongolian village of Sugai after residents tried to stop the spill with a makeshift dike.

These and nearly 50 other major environmental accidents and discharges reported by SEPA have prompted serious government attention. SEPA places the cost of environmental damage in China in 2004 at about \$64 billion, just over 3% of GDP; other estimates place the damage at as high as 10%. Pressure is coming from other quarters as well, among them:

- Local constituencies affected by pollution
- Urban, affluent Chinese with rising quality of life expectations
- Domestic and foreign NGOs
- International agencies setting environmental requirements to funding
- Neighboring governments complaining of dust, smog and acid rain
- Prestige concerns as the 2008 Olympics approaches

China is participating in a World Bank carbon trading system growing out of the Kyoto protocol to reduce greenhouse gas emissions worldwide. Long underfunded, SEPA's resources have been increased, including 11 new regional offices to strengthen local pollution monitoring and enforcement efforts. \$175 billion has been committed to environmental cleanup during 2006–2010 for industrial wastewater treatment, improved air quality in 113 cities, 31 provincial level dangerous waste disposal centers, sewage treatment plants in 10 river valleys, and other projects. In February 2006 SEPA announced a "Green GDP" pilot program in 10 regions, to measure performance of local leaders in meeting environmental goals, and to assign a political cost to reckless development for its own sake that has been common at the local and provincial levels. China is also studying \$24 billion worth of proposed projects for coal-to-liquids (CTL) and coal gasification to ease pollution. And with the PRC's auto market expected to grow from 20 vehicles per 1,000 people today to 267 per 1,000 in 2030, carmakers and environmentalists see China potentially providing the critical mass of customers that will enable conversion from the combustible engine to hydrogen fuel cells worldwide.