



## NRDC Strives to Minimize the Toll from Coal in China

China is the world's largest coal producer and consumer. The nation produced more than 2.3 billion metric tons of coal in 2006—nearly 45 percent of the world's total and more than the United States, Russia, and India combined. NRDC is working with China to reduce this reliance on coal—and cut down on coal's accompanying health and safety hazards—by aggressively targeting energy efficiency and renewable energy goals, and promoting coal gasification with carbon capture and storage.

### Coal Production and Use Threatens Health and Safety

China's coal industry is the most dangerous in the world. There were more than 6,000 mining-related deaths officially reported in 2004, 5,986 in 2005, and 4,746 in 2006.

Coal production and consumption also creates serious health and environmental problems, including:

- **Water pollution** from acid mine drainage, methane and dust emissions, and coal waste, as well as land subsidence from coal mining.
- **Sulfur dioxide**, which in turn causes acid rain. Acidic rain falls on one-third of Chinese territory, eroding buildings and roads, damaging crops and forests, and killing aquatic life in lakes and rivers.

The government estimates that the economic losses from acid rain due to reduced crop yield and forest wood stock alone are up to 110 billion RMB (\$14 billion) a year. China's heavy reliance on coal makes the nation the world's number-one emitter of sulfur dioxide.

■ **Airborne fine particulate matter** damages human respiratory systems and triggers lung cancer. And American researchers have found that air pollution from Asia crossing the Pacific Ocean to the United States.

■ **Carbon dioxide (CO<sub>2</sub>) emissions in China**, are estimated to surpass those of the United States as soon as 2007. China's share in global CO<sub>2</sub> emissions was 8 percent in 1980, but rose rapidly to 18 percent by 2004.



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### China Pledges to Reduce the Dangerous Effects of Coal

The Chinese government has committed to a 20 percent reduction in energy consumption per unit gross domestic product by 2010 and has set a target of generating 16 percent of its energy from renewables by 2020. Chinese experts believe that by 2050 coal should be able to account for less than 50 percent of the nation's total energy consumption. Even if efforts to reduce coal dependence are effective, coal will nonetheless likely remain a major energy source in China for the foreseeable future. Thus, major actions to support safer, more efficient, and cleaner coal production and use in China are essential.

One important technological solution for cleaner coal use is coal gasification with carbon capture and geologic storage (CCS), which NRDC has been working on in China for years. Instead of burning coal, a gasification process converts dirty coal into a cleaner synthetic gas that can generate electricity more efficiently than a conventional pulverized coal power plant. More significantly, it is much cheaper to remove carbon from synthetic gas than from the flue gas of coal combustion with today's technology. The Intergovernmental Panel on Climate Change has concluded that long-term geologic sequestration of CO<sub>2</sub> is viable. A preliminary study estimates that the total CO<sub>2</sub> storage capacity in deep saline aquifers amounts to at least 143.5 gigatons of CO<sub>2</sub> in China—40 times China's total CO<sub>2</sub> emissions in 2003.



### Coal By the Numbers in China

- 76 percent of the country's primary energy production and 62 percent of commercial energy consumption is provided by coal.<sup>1</sup>
- Around 80 percent of China's electricity, 75 percent of its industrial fuel, and 65 percent of its raw chemical materials are currently derived from coal.
- 87 percent of China's proven technically recoverable energy reserves comes from coal. Hydropower, oil, and gas constitute 9.5 percent, 2.8 percent, and 0.3 percent, respectively.

<sup>1</sup> Primary energy is the energy embodied in natural resources, e.g. coal, crude oil, hydropower, natural gas, sunlight, and wind. Commercial energy is processed energy products sold to end users, e.g. electricity, steam, coal gas, coke, and diesel.

Technologies for coal gasification and CCS already exist, but their use entails extra costs and thus cannot yet compete with conventional coal power when there is no requirement for controlling carbon emissions. In order to spur the use of these technologies, it is critical to support large-scale demonstrations, provide financial incentives, and restrain high-carbon options. To this end, NRDC has supported Chinese experts in studying the technical, institutional, and regulatory barriers to coal gasification application, successfully advocated for increased governmental attention to increase attention to coal gasification-based polygeneration development, and promoted the formulation of a roadmap for early demonstration and commercialization of advanced coal technologies in China.