

Woodrow Wilson International Center for Scholars



### Energy Efficiency in China Fact Sheet

In the most recent issue of *China Environment Series*, Jonathan Sinton and David Fridley examined the unexpected drop in China's energy use. Despite continued (albeit slightly slower) economic growth, energy demand has stalled—a quadrupling of the GDP from 1980 to 1995 resulted in only a doubling in energy demand. One of the major explanations for the drop in China's energy use has been strengthened energy efficiency policies and increased investments. China's expanding economy will create both challenges and opportunities for further increases in energy efficiency.

## I. Current Development of Energy Efficiency in China

Compared to other developing nations, China has led the pack in efficient energy usage. Energy intensity, calculated as the primary commercial energy consumption per unit of GDP, has fallen roughly 50 percent between 1980 and 1995. This nearly 4.5 percent drop in energy consumption per year is unprecedented among industrializing economies. Much of the credit for China's unusually low energy intensity can be attributed to central government policies, for since the early 1980s improving energy efficiency has been a policy priority and therefore has been incorporated into all of the five-year plans.

In a recent attempt to strengthen energy efficiency policy, the Chinese central government introduced the *National Energy Conservation Law* in 1998, which has been backed by significant funding. Recognizing the importance of energy conservation in light of a growing car-hungry middle class, the government allocated \$10 million (USD) for alternative vehicle research and development. The Chinese government also has undertaken numerous cooperative energy efficiency projects with foreign governments, nongovernmental and multilateral organizations.

While the Chinese government has promoted the development of a greater energy efficient economy, some of the success is more accurately a symptom of changing economics. Many observers contend that a shift in demand, driven by a changing product mix accounts for almost two-thirds of the drop in energy intensity (or increase in energy efficiency). Technology changes, unrelated to government policy, also likely have made a substantive contribution. Whether a result of intended or unintended actions, the energy situation in China could be far worse. Had the ratio of energy consumption to GDP stayed at the 1980s level, to produce the 1995 GDP Chinese industries and power plants would have had to burn at least two times the amount of coal.

# II. Challenges to Improving China's Energy Efficiency

Despite past advances, China has much work to do if it is to match the rest of the industrialized world's level of energy efficiency. Some challenges to improving energy efficiency include:

- China's high energy consuming sectors, namely industry, are anywhere from 15 to 50 percent less efficient than similar sectors in OECD countries.
- While a continued 4.5 percent yearly drop in energy intensity would by 2020 result in a level three times less than that of 1995, China's energy intensity would still be 40 percent more than the current U.S. level.
- Large coal boilers (still numbering 500,000), water pumps, and fans are on average 10 percent less efficient than those in industrial sectors of developed countries; electric motors are 60 percent less efficient.
- While the government has focused much of its regulatory energy on the industrial sector, household-level energy use has been relatively ignored. For example, most apartments in China are constructed without wall and ceiling insulation, double-glazed windows or individual temperature controls.
- Commercialization of energy efficiency technologies is difficult in China, for Chinese banks are not used to lending for energy efficiency projects. Moreover, the upfront costs for such projects are quite large.
- Insufficient enforcement of intellectual property rights protections hinders foreign investment into energy efficiency technology and research and development.
- As China has moved away from a centrally planned economy, the government's ability to promote energy efficiency will be far more difficult than in the past decade.

### III. Potential for Improvement

Because the Chinese leadership appears committed to increasing energy efficiency, and much groundwork has already been completed, the potential is high for even greater improvements in energy efficiency.

- Much of the industrial production capacity is reaching the end of its life span—Chinese industries are thus in a critical phase of technological improvement, which creates an opportunity to make great progress in energy efficiency.
- Chinese and American scholars agree that even implementing domestically available advanced technology . would result in an energy savings of nearly one-third of the present energy consumption.
- In order to encourage more investments and development of energy efficiency technologies, Chinese policymakers could establish incentives to encourage investment and trade in advanced energy efficient products, engage in more cooperative research and development with foreign governments and multilateral organizations, as well as promote intellectual property rights protections.
- The central government might also employ the help of more domestic and international nongovernmental and research centers in energy conservation initiatives. Some government organized NGOs and research centers in China already have led successful conservation campaigns. For example, the Beijing Energy Conservation Center's "China Green Lights Program" saved 22 Thermal Watts (TWh) of electricity in 1996 though the promotion of high efficiency light products, development of a competitive efficient light industry, and the fostering of positive attitudes toward energy conservation.

# III. U.S. Government and NGO Support for China's Energy Efficiency

Sino-U.S. energy efficiency cooperation is directed primarily by the U.S. Department of Energy (DOE). An energy efficiency steering committee (co-chaired by DOE and China's State Development Planning Commission) addresses a wide array of topics from discussions of energy policy, information exchange, and business outreach to research on industrial process controls and motor systems. While insufficient funding has somewhat limited the extent of U.S. government energy efficiency cooperative projects, the foundation and multilateral community—e.g., UN Foundation, The World Bank, Global Environment Facility, Energy Foundation, and W. Alton Jones Foundation—have been key supporters of NGO and multilateral energy efficiency projects in China. Some examples of U.S. projects in China:

- Department of Energy: Numerous projects under the U.S.-China Protocol on Energy Efficiency and Renewable Energy Technology Development and Utilization.
- Department of Commerce: Trade missions and Foreign Commercial Services activities to promote energy efficiency exports. .
- Battelle-Advanced International Studies Unit: Beijing Energy Efficiency Center; Business Plan Training and Energy • Efficiency Project Development.
- Environmental Protection Agency: U.S.-China Partnership for Industrial Pollution Prevention and Energy Efficiency. •
- Lawrence Berkeley National Laboratory: Building Energy Efficiency.
- National Renewable Energy Laboratory: Motors Financing and Business Partnerships.
- Export Council for Energy Efficiency: International Energy Efficiency Technology Assistance Program.
- International Institute for Energy Conservation: CFC/Copper Energy Efficiency Program in China for Energy-• Efficient Motors and Motor System; Energy Efficient Transformers.
- Alliance to Save Energy: Energy Efficiency Seminars; China Green Lights Program; China Motor Systems Energy • Conservation Pilot Program; and Sino-U.S. Energy Efficiency Teams.
- Natural Resources Defense Council: ACCORD21 Building Demonstration Project; Energy Efficient Building Codes. •
- WWF: China Air Conditioner Energy Efficiency Standard Project.
- U.S.-China Energy and Environment Technology Center, Tulane University: Energy Conversion System • Optimization for Steel Mills; Integrated Resource Planning for Major Developing Cities in China.
- Massachusetts Institute of Technology: Sustainable Urban Housing,

(Full updated descriptions these and other U.S. government and NGO projects can be found in the Wilson Center's *China Environment Series* Issue 4 at http://ecsp.si.edu/China)

#### **References and Short Bibliography**

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