

A Chinese Perspective on Climate and Energy

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As the world considers what to do about climate change, attention has turned to China, the most populous and fastest-developing country, for its current and potential emissions of greenhouse gases (GHGs). China's carbon dioxide emissions are now estimated to be about 24 percent of the global total, surpassing the U.S. contribution of 21 percent, although China's per capita emissions are still far below those in industrial countries. But China's rapid economic growth shows no sign of leveling off, making it more than likely that the country's energy consumption and GHG emissions will continue to grow. The energy path China follows is going to determine not only its own development course but also global environmental well-being.¹

The dominance of coal in China's energy portfolio is responsible for much of its GHG emissions, accounting for 85 percent of the total. The country relied heavily on this dirty conventional energy source throughout three decades of economic boom, and it has the world's third largest remaining proven recoverable coal reserves. The share of coal in total primary energy consumption has come down only slightly, from 72 percent in 1980 to 69 percent in 2006.²

Another source of concern is that China's energy consumption has shot up drastically since the beginning of this century, after

almost two decades of low and stable growth, mainly due to the country's skewed industrial structure. Industry uses 70 percent of China's total energy, and energy-intensive industries such as steel, nonferrous metals, petrochemicals, and construction materials account for almost half of national energy use.³

Emphasis on these energy-intensive industries has been driven by demands from an expanding Chinese urban population and from overseas markets as a result of economic globalization. The number of city dwellers increased from 370 million in 1997 to 594 million by 2007. Thus 224 million people—roughly as many as live in all U.S. cities—were added to China's cities in just one decade. Urbanites normally use three to four times as much energy as rural residents. And the need to accommodate, move around, and entertain this expanding urban population has driven up energy-intensive sectors such as power generation, steel and cement production, and the manufacture of cars, appliances, and machinery.⁴

China's increased emissions have also been tied to economic globalization. This encourages the global flow of capital and resources, driving businesses to wherever they can maximize profits. This has meant the massive relocation of energy-intensive industries to places with good investment environments and lower costs—and China is a major destination. Its entry into the World Trade Organization in late 2001 fundamentally integrated the country into the

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world economy.

While exports bring wealth to the country, continuous global demands for energy-intensive products have also accelerated heavy industrialization. China is the third largest trading nation, and industrial products accounted for more than 90 percent of total exports. A September 2008 study suggested that about one third of China's emissions were embedded in exports in 2005, a figure that was just 21 percent as recently as 2002.⁵

Since 2005, as the unbridled development of China's energy-intensive industries pressured the country's energy supply and environment, policymakers have hastened their efforts to move the country in a more sustainable direction. Although many of the energy policy changes have been for economic, health, and security reasons, they are also bringing immediate benefits to the climate.

The government is experimenting with a mix of state-led regulatory and policy tools to restructure energy-intensive industries. The most notable has been the ambitious national target for increasing energy efficiency. In early 2006 the government announced a plan to cut energy consumption per unit of gross domestic product by 20 percent by 2010.⁶

This announcement followed the 2005 launch of 10 national energy-saving projects that targeted major energy-intensive sectors, closing down and phasing out inefficient power and industrial plants and improving energy efficiency through technological innovations, financial support, and pilot projects. In September 2006, the government made eight energy-intensive industries pay more for electricity. It has also adjusted export rebates and tariffs to discourage energy-intensive exports. Since 2004, China has changed the export tariff on steel products

more than 10 times, not only scrapping export rebates of 15 percent but also levying an export tariff of 25 percent. And in June 2007 the government abolished export rebates for 533 energy- and resource-intensive and polluting commodities and imposed export tariffs on 142 of these items.⁷

At the same time that it is weaning energy guzzlers from cheap electricity and export rebates, the government has increased financial support for energy conservation projects. In mid-2007 it added 10 billion yuan to the existing 6.3 billion yuan of state bonds and an earlier input of 5 billion, making a total of 21.3 billion yuan (\$2.9 billion) dedicated to energy-saving and emission reduction projects. Some 9 billion yuan was set aside for the national energy-saving projects, 13 times as much as in 2006. The government requires financial institutions to increase credit support for such projects and encourages enterprises to raise funds through markets. Local governments have gradually followed suit and set up special funds for energy conservation, although these are too limited to make visible changes.⁸

These state-led measures need local government support to make real changes on the ground. The top leaders have taken steps to get local officials to cooperate. The macroeconomic planning body forced local governments to abandon preferential policies on land, taxes, and electricity prices for energy-intensive industries. In June 2007, the State Council (China's cabinet) made it clear for the first time that performance in meeting energy-saving and emission reduction targets could be the decisive "one-vote veto" in assessing local leaders' political performance. In other words, local officials risk their political careers if they fail to save energy.⁹

The legal framework for reducing emissions has improved gradually. In 2007, China revised its decade-old Energy Conser-

vation Law, defining energy saving as a basic state policy. The law requires energy conservation to be integrated in all development plans and eases the way for enforcing and reporting through the institutional system. The law also has specific stipulations targeting industries, setting up a system to evaluate and assess energy efficiency in fixed capital investment projects, and providing more severe punishments for enterprises that fail to reach energy efficiency goals.¹⁰

Unfortunately, the state-led efforts have not sparked much enthusiasm from local governments and industries because of a lack of incentives. And the annual energy efficiency targets are rather arbitrary, with few considerations of the time frame needed by industries for such changes. As a result, the targets were not reached in 2006 or 2007. The policies and regulations do, however, indicate the central government's political will, and they have cleared many obstacles for optimal market functioning. This has opened up a potential business realm for energy efficiency technologies and services.¹¹

Yet energy saving alone cannot solve China's emissions problem. Despite some improvements, energy consumption will still rise. The country's urban population will continue to swell, with 45 percent of Chinese already living in urban areas by 2007 (compared with about 70 percent in industrial countries). Domestic demand for heavy industrial products will thus keep on growing and is far from being saturated. The country will remain a major exporter as well. Even if China meets the 2020 emission cutting target proposed in its national climate change assessment report, its emissions could more than double by then.¹²

Thus China urgently needs to introduce clean energy technologies. The country has the necessary industrial base and potential

vast market for new clean energy options and poses as a potential world leader in renewable energy. This sector has seen breathtaking development over the last three years, driven by a mix of domestic and international factors. Its rapid evolution shows how state policies can encourage the development of industries for a new market niche and how market forces can inject vitality in the private sector and achieve policy goals at a much faster pace. The reinforcement of policies and markets will likely provide the most lasting and profound force in pushing China onto a new energy path.

Aiming to diversify the country's energy portfolio, China enacted a landmark renewable energy law at the start of 2006. It requires the government to formulate development targets, strategic plans, and financial-guarantee measures for renewable energy. It also establishes a framework for sharing the extra costs of renewable energy among users and requires power utilities to buy more renewable power. In addition, the law establishes fixed premium prices and pricing mechanisms for biomass and wind power.¹³

As a result of this law and related implementation regulations, China's renewable energy sector has taken off, with wind and solar being the two leading stars. Meanwhile, a surging demand in the global market for renewable energy products, especially for photovoltaic (PV) systems in Europe and the United States, has encouraged a world-class solar PV manufacturing base to spring up in China literally from scratch.

China is quickly becoming a global leader in wind and solar power, in addition to its leading position in the production and installation of solar water heaters and in hydro and biogas development. Wind power is the fastest-growing renewable energy sector. New installed capacity grew by over 60



Courtesy of Li Junfeng

Yang Ba Jing grid-connected solar PV station, Tibet

percent in 2005, and it more than doubled in both 2006 and 2007. By the end of 2007, cumulative wind power capacity had reached roughly 6 gigawatts (GW), up from 0.8 GW in 2004—making China fifth in global wind installations. The cumulative wind installations in 2007 exceeded the target that had been set for 2010 only one year earlier. And the target for 2020 of 30 GW is now likely to be reached by 2012—eight years ahead of schedule.¹⁴

China's PV manufacturing has witnessed phenomenal development in recent years as well. Total solar cell production has jumped from less than 100 megawatts (MW) in 2005 to 1,088 MW in 2007, making China the world's top solar cell producer. Chinese experts and business leaders believe that solar cell production will exceed 5 GW by 2010, accounting for one third of the world total, and 10 GW by 2015, or two thirds of the world total by then. The country is already turning into a major solar PV base, with the lion's share of production being for export.¹⁵

In just a few years, renewable energy has become a strategic industry in China. There are more than 50 domestic wind turbine manufacturers, over 15 major solar cell manufacturers, and roughly 50 companies constructing, expanding, or planning polysilicon production lines, the key components for solar PV systems. Those two sectors employ some 80,000 people. Together with the 266,000 working in biomass and 600,000 in the solar thermal sector, renewable energy industries employ some 946,000 people in a new market niche independent of conventional energy industries.¹⁶

China currently gets 8 percent of its primary energy from renewable sources, with large hydro being dominant. The country aims to expand that share to 15 percent by 2020. Developments in the marketplace show that this target could well be exceeded. Policy tools and market forces can together push China toward a less carbon-intensive energy path. And there is considerable room for international cooperation and business initiatives to accelerate the process.¹⁷

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