

ChinaFAQs

The Network for Climate and Energy Information



Economic Drivers of Energy Use and Carbon Emissions in China

Key Points

- Macroeconomic forces – often unpredictable or poorly-understood – are crucial drivers of China’s energy use and greenhouse gas emissions.
- Booming investment in heavy industry, mainly for domestic infrastructure development, as well as rapid growth in China’s export manufacturing sector, are the two most important factors driving China’s energy consumption.
- As China’s middle class demands more goods like air conditioners and cars, domestic private consumption could be in the future (but is not yet) a major driver of energy use and emissions.
- These economic trends are rooted in fundamental political and social factors. Reform will require concentrated attention to these considerations; fortunately, Chinese leaders have indicated that creating a more energy efficient economic structure is a high-level priority.

BACKGROUND

Over the last decade, China has emerged as the leading producer of greenhouse gases and the world’s largest consumer of energy. As recently as the early 1990’s China was a net oil exporter; in 2008, China was the third largest importer of oil in the world.¹ These and other dramatic changes are rooted in macroeconomic trends that have fueled mounting energy demand.

In examining the relationship between energy and development, it is important to ask not only “how fast?” but also “what kind?” of economic growth is experienced. Between 1980 and 2000, energy consumption only doubled even though China’s economy quadrupled in size. This pattern reversed in the early 2000s, however, as energy demand grew even faster than GDP rates—much to the alarm of Chinese policymakers, who set in motion new laws and guidelines to return China’s economy to a less energy-intensive path (see [ChinaFAQs: Energy Efficiency](#)).

DRIVERS OF CHINA’S ENERGY DEMAND GROWTH

A number of drivers in the Chinese economy (as well as the political and social context) are responsible for the post-2000 uptick in energy demand

– and have implications for efforts to bring energy use back down again. Here’s what we know:

Economic Factors

Industry consumes about 70% of China’s total energy, with residential, commercial and transport users dividing up the remaining 30%. Over the last decade, however, the composition of China’s industrial sector has been shifting. The bottom line:

- **China has seen massive investment in heavy industries that make energy-intensive products such as steel, aluminum and glass for China’s domestic market.** As a result, China now makes about half of the world’s flat glass and cement, and about one-third of its steel and aluminum.

It is important to note that relatively few of these energy intensive goods are exported; most are used to support China’s construction boom. “China is now making for itself, rather than importing from abroad, more of the energy-intensive basic products (such as steel and aluminum) used to construct... roads and buildings,” (p. 8) conclude Daniel Rosen and Trevor Houser in “China Energy: A Guide For The Perplexed,” a study for the Peterson Institute for International Economics.

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- **At the same time, rapid growth in export industries (primarily lighter goods such as DVD players, toys, and clothes) have also driven emissions growth.** According to a study conducted in 2009, roughly half China's new greenhouse gas emissions between 2002 and 2005 were produced by light industrial facilities producing goods for export.ⁱⁱ
- **So far, consumption of private goods, such as air conditioners and personal cars, by China's middle class is not yet the major driver of China's emissions.** "Consumption-led demand is China's future energy challenge" (p. 4) – not its present problem, according to Rosen and Houser.

Political Factors

- **Distortions in tax, banking and financial system.** Lending policies, fixed fuel prices, and even illicit land grabs have kept the costs of capital, land, and energy to industry artificially low. Such distortions have helped keep profit margins high in energy-intensive industries, spurring rapid investment in these sectors.ⁱⁱⁱ Additionally, politically-motivated lending decisions by China's banks sometimes prop up industries that are both economically and energy inefficient.
- **Local economic incentives.** Competition among local officials to create jobs in

their jurisdictions sometimes leads to the construction of more factories than is justified. Rosen and Houser argue that "the changing composition of China's industrial structure is less the result of concerted national aspirations" than "competition among provinces, counties and cities to grow GDP, the capital stock, tax revenue and corporate profits." (p. 9) As a result, "industry seeking investment finds a sympathetic audience at the local and provincial level even while central authorities are leaning against approvals in sectors where they see... overcapacity." (p. 12)

- **Stimulus spending.** Spending by China's government in response to the global recession has helped prop up industrial sectors that otherwise faced contraction, and driven at least a short-term boom in infrastructure building. High levels of demand for the basic materials used in construction such as cement, steel and glass could slow as stimulus-related infrastructure development dies down.

Social Factors

- **High savings rates.** China has a much higher savings rate than other countries, especially the United States. That means that Chinese tend to put more of their money into China's centrally-owned banks, where capital is often loaned out to large industries

to increase their production capacity. This mode of economic growth, called "fixed capital formation," appears to be more energy-intensive than growth based on private consumption of goods.^{iv}

- **Concerns about social stability.** In the wake of the global economic downturn, concerns that wide-spread unemployment would create social frictions led the Chinese government to backtrack on economic policies designed to curb energy intensity. In 2007, for example, the government revoked tax rebates for a set of energy-intensive export industries as part of an effort to promote efficiency, but it reinstated the rebates in 2008.^v

WHERE TO FROM HERE?

Here are three reasons things could be looking up:

- **China may have turned a corner.** Reported figures indicate that China is succeeding in changing its energy intensity trajectory. Since instituting a policy in the 11th Five-Year Plan (China's economic development guidelines) to reduce energy intensity 20% by 2010, China has reported declining energy intensity each year from 2006-2009. (See [ChinaFAQs: Energy Efficiency](#))

- **Policy successes.** Recognizing the challenges of rapid energy demand growth, China has instituted policies to improve energy efficiency nationally, by closing small and inefficient power plants and factories, setting energy conservation targets for China's top-1000 energy-consuming businesses, and making financial incentives available for industrial efficiency investments (see [ChinaFAQs: Ten Key Projects](#) and [ChinaFAQs: Efficiency, 1000 Companies at a Time](#)).
- **Local incentives are changing.** In addition to delivering economic growth, compliance with energy conservation goals is being incorporated into the performance review criteria for local and provincial-level Chinese officials. (see [ChinaFAQs: Will China Be Able to Enforce Its Climate and Energy Goals?](#))

As China continues to develop, what economic sectors it chooses to pursue – and whether it institutes the fundamental reforms necessary to achieve an efficient mode of economic growth – will be crucially important in determining China's energy and greenhouse gas emissions trajectory. Integrating an understanding of the economic drivers of China's emissions into U.S. policy analysis will likewise be important in future energy and climate discussions.

This fact sheet is based in large part on Rosen, D and Houser, T (2007). "China Energy: A Guide for the Perplexed," Peterson Institute for International Economics.

This fact sheet is a product of ChinaFAQs, a joint project of the World Resources Institute and experts from leading American universities, think tanks and government

laboratories. Find out more about the ChinaFAQs Project at: <http://www.ChinaFAQs.org/>.

Notes

ⁱ U.S. EIA, "Country Analysis Briefs: China" www.eia.doe.gov/emeu/cabs/China/Oil.html.

ⁱⁱ Guan, D., G. P. Peters, et al. (2009). "Journey to world top emitter: An analysis of the driving forces of China's recent CO2 emissions surge." *Geophys. Res. Lett.* 36.

ⁱⁱⁱ Lardy, Nicholas, 2006. "China: Towards a Consumption-Driven Growth Path." Peterson Institute for International Economics, www.petersoninstitute.org/publications/pb/pb06-6.pdf.

^{iv} Liao H., Fan, Y. and Wei, Y. (2007). "What induced China's energy intensity to fluctuate: 1997-2006?" *Energy Policy* 35, 4640-4549.

^v Pew Center (2007) "Climate Change Mitigation Measures in the People's Republic of China".

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