

Introducing Research

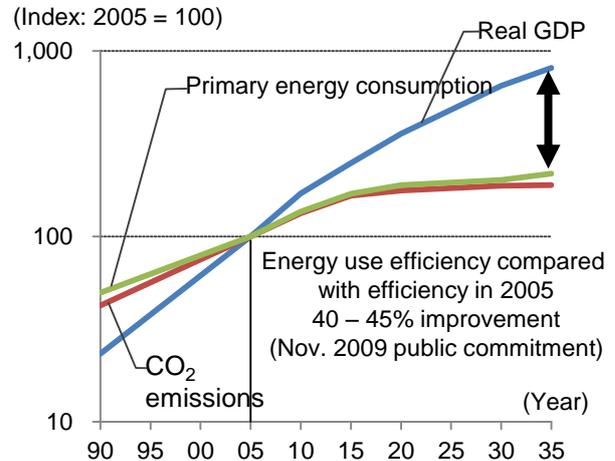
China's efforts to ensure energy security while reducing dependence on coal

Chen Wei, Deputy Principal Researcher, 1st Research Department

In 2010, China's GDP overtook Japan's, making China the world's second largest economy after the United States. In line with its high economic growth, China has also been increasing its consumption of primary energy. To address the country's environmental and resource issues, the central government's policy is to shift the country's energy mix from predominantly coal to oil and natural gas. However, domestic production of oil and natural gas alone cannot meet demand, leading to increased dependence on imports. Consequently, energy security is becoming China's most pressing issue. To avoid overconcentration in any one region or country, the Chinese government is diversifying its energy supply countries to include neighboring Russia, Central Asia, Africa and Australia, and is accelerating construction of oil and natural gas pipelines and storage bases.

1. Shifting from coal to oil and natural gas

In the 20 years from 1990 to 2010, China's real GDP annual growth increased approximately 10.5% and, at the same time, primary energy consumption also grew to a high annual rate of 5.2%. Because coal accounts for an extremely high ratio of China's primary energy, however, the ratio of CO₂ emissions during the same 20-year period grew at an annual rate of 5.9%, outstripping growth in primary energy consumption. As a result, China's energy consumption accounts for 19.3% of the entire world's energy consumption and, as a country, it also leads the world in CO₂ emissions, accounting for 29% of the world's CO₂ emissions (as of 2013). For the sake of sustainable economic growth, China must quickly achieve an energy consumption model befitting a developed country. To do this, it has committed to the goals of improving energy efficiency by 40 to 45% compared with 2005 levels, and of curbing the growth of CO₂ emissions to its ratio of primary energy consumption, or lower (Figure 1).



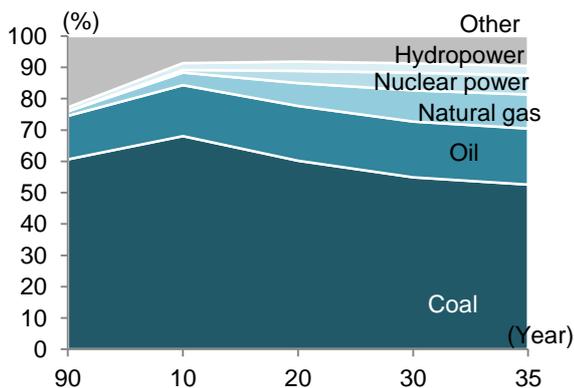
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Figure 1. Changes in economic growth, primary energy consumption, and CO₂ emissions

In December 2012, the Chinese Government announced its 12th Five-year Plan for Natural Gas Development, and in January 2013, its 12th Five-year Plan for Energy Development. Under these plans it has committed to targets to reduce the ratio of coal in primary energy from 68% in 2010 to 63% in 2015, and increase the ratio of natural gas from 2.6% in 2010 to 7.5% in 2015. By 2035, the growth of crude steel production is expected to slow, and the focus on coal consumption is expected to shift to electric power generation. In addition, environmental policies and other regulations relating to air pollution are expected to drive down the ratio of coal demand (Figure 2).

At present, the automobile sector is driving oil consumption. Air pollution is increasingly serious. While some measures that match those in advanced countries are being implemented, such as the electrification of two-wheel vehicles in urban areas and the tightening of fuel consumption regulations, there is still room for future growth in automobile ownership, which is currently at a level of about 7% of the total population, so demand for oil will increase further in the future. The government is also

promoting a shift from coal to natural gas, not only for electric power generation, but also for home heating (Figure 2).

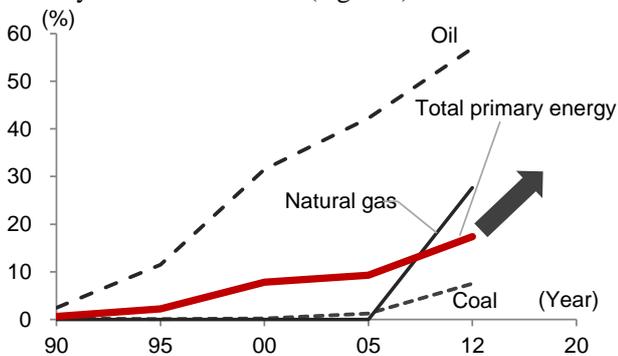


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Figure 2: Energy consumption by type of primary energy

In its 11th and 12th Five-year Plans, the Chinese Government incorporated goals of reinforcing exploration development for oil and natural gas, stabilizing crude oil production volume, and accelerating natural gas production, and it has been accelerating the development of deep sea oil and gas as well as coal seam gas along with the development of oil and natural gas resources in the Sichuan and Tarim basins. Meanwhile, development of shale gas as a non-conventional energy resource is underway in the Sichuan Basin but technological difficulties caused by the peculiar topography of the area are proving a challenge.

However, China must rely on energy imports from overseas as the development of domestic oil and natural gas resources alone cannot keep pace with increasing consumption. In 2010 dependence on oil imports reached close to 60%, while dependence on natural gas exceeded 30%. Increased dependence on natural gas and oil has resulted in increased dependence on primary energy imports overall, and energy security has become an issue (Figure 3).



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Figure 3. Dependence on primary energy imports

2. Focus on delivery and storage for energy security

To ensure energy security, the Chinese Government is bolstering its crude oil and natural gas delivery and storage facilities. In the 12th Five-year Plan of January 2011, the Chinese Government announced that it would construct the 3rd and the 4th East-West Gas Pipeline and establish oil storage infrastructure. In the January 2013 12th Five-year Plan for Energy Development, it also announced that it would step up its construction of storage and transport facilities. Furthermore, in April 2013, the Politburo Standing Committee of the Communist Party of China announced 8 top priority policies aimed at promoting the stable development of external economic affairs, expanding the import of energy resources and advanced technology and equipment, and coordinating the storage, processing and importation of key products. Moreover, at the sixth meeting of the Leading Group for Finance and Economic Affairs in June 2014, Xi Jinping, President of the People's Republic of China, further emphasized plans to step up construction of energy delivery and storage facilities.

3. Securing resource suppliers and stepping up construction of crude oil and natural gas delivery and storage facilities

China's national leadership under Xi Jinping is focusing on energy diplomacy and placing particular importance on energy procurement relationships with Central Asian countries known as the "Silk Road Economic Belt." China also expects to import crude oil from Russia, Central Asia, Africa, and the Middle East, and natural gas from Russia, Central Asia, Middle East and Oceania by 2040 (Table 1).

Oil and natural gas pipelines to import crude oil and natural gas from the Middle East via Myanmar rather than the Straits of Malacca are currently under construction, and the natural gas pipeline is expected to come on line in July 2014. In addition, production in a new oil field in Turkmenistan commenced in September 2014. While supply of natural gas via a pipeline from Russia from 2018 has been agreed, adjustment negotiations over the method of calculating prices are expected to continue until the end of 2014. In addition to energy procurement from overseas, the country is beefing up its domestic crude oil and natural gas storage bases and equipment, and already has storage bases and facilities for oil and natural gas in more than 10 locations

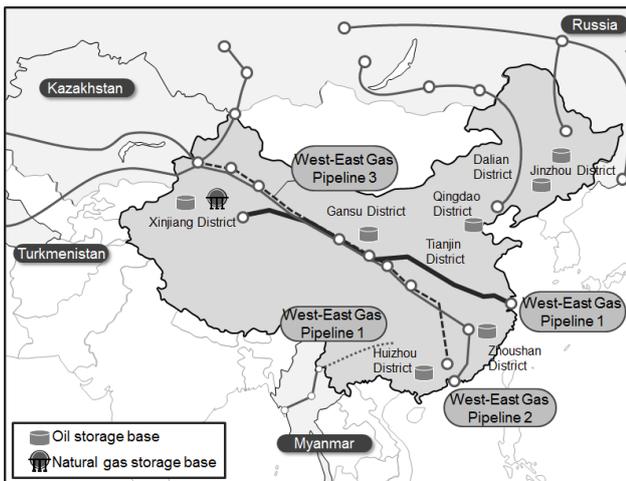
(Figure 4).

Table 1. China's suppliers of crude oil and natural gas

Importing country	Import Year/Units	Crude Oil		Natural Gas	
		2012	2040	2012	2040
		(10,000b/d)		(Bm3)	
Total		540	1,170	39.7 (21.4)	306 (215)
Former Soviet Union region		70	250	21.4 (21.4)	248 (215)
Africa		130	200	-	-
Middle East		270	640	7.7	34
Central & South America		60	-	-	-
Oceania		10	-	4.8	24
Southeast Asia		-	-	5.8	-
North America		-	80	-	-

Note: Figures for natural gas in parentheses represent imports via pipelines. Others are LNG.

Prepared by Hitachi Research Institute based on data from The Institute of Energy Economics, Japan (IEEJ)



Prepared by Hitachi Research Institute based on available data

Figure 4. Crude oil and natural gas delivery and storage facilities

Hitachi Research Institute will continue to keep a close watch on China's energy policies and changes in the business environment.