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Transition to low carbon energy policies in China—from the Five-Year Plan perspective

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ABSTRACT

Energy policy plays a critical role not only in the energy development, but also in the social and environmental aspects of a nation. Five-Year Plan for National Economic and Social Development is one of the most important government plans, which documents the national strategy during that period. This study presents a critical review of 12 Five-Year Plans that have been released by the Chinese central government in last 58 years. In particular, the recently released Twelfth Five-Year Plan is reviewed. The results clearly show a pattern of increasingly level of attention of Chinese government to energy efficiency improvement, air pollutant emission reduction, new and renewable energy development, carbon dioxide emission and climate change.

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1. Introduction

With rapid economy growth of China, the energy production and energy consumption soared (see Figs. 1 and 2). Between 1957 and 2010, total energy production increased from 98.62 million tonnes of coal equivalent (tce) to 2900 million tce in China with an annual increase rate of 6.5% (National Bureau of Statistics of China, 2009, 2011). The energy consumption increased by 32.7 times with the annual increase rate of 6.8% in the same period, reaching 3250 million tce in 2010 (National Bureau of Statistics of China, 2009, 2011).

Five-Year Plan is the most important government document of China. It is a series of economic development initiatives, mapping strategies for economic development, setting growth targets and launching reforms in the relative time frame (Shiu and Lam, 2004).

The First Five-Year Plan for National Economic and Social Development was established in 1953. On March 14, 2011, the Twelfth Five-Year Guideline for National Economic and Social Development was approved at the fourth meeting of the Eleventh National People's Congress. The Twelfth Five-Year Guideline signifies a new era in the growth of China.

Every Five-Year Plan has its unique characteristics due to the specific period when it is composed and approved. The contents and major targets in the Five-Year Plans are changed significantly according to the economic development and social growth conditions. There are energy related contents, which are getting more

specific and important, in every Five-Year Plan. For instance, the energy policies should promote the social acceptance or public awareness of renewable energy such as solar power (Yuan et al., 2011). In particular, as part of the national energy strategy framework, Five-Year Plans play a critical role to improve the structure of power generation (Zhao et al., 2011).

By analyzing the change in energy related contents in the Five-Year Plans, which has lasted for more than half century, the changes in energy policy as well as in the future trends of energy production and consumption of China are examined. The examination of accomplishments and lessons learnt in previous Five-Year Plans provide critical inputs to the future Five-Year Plans (Price et al., 2011). The change and readjustment on energy policy in the 12 Five-Year Plans provide a useful reference to policy makers and other developing countries.

2. Research methodology

Since the establishment of People's Republic of China, the Central Government has established 12 Five-Year Plans (Table 1). Each Five-Year Plan contains either a section or chapter related to national energy policy. Content analysis is adopted to analyze the energy contents of each of these 12 Five-Year Plans. Main questions are as follows:

- Is there any difference between the planned goal of energy development and the actual production?
- Do the Five-Year Plans show a clear pattern of shift of energy policy/strategy?

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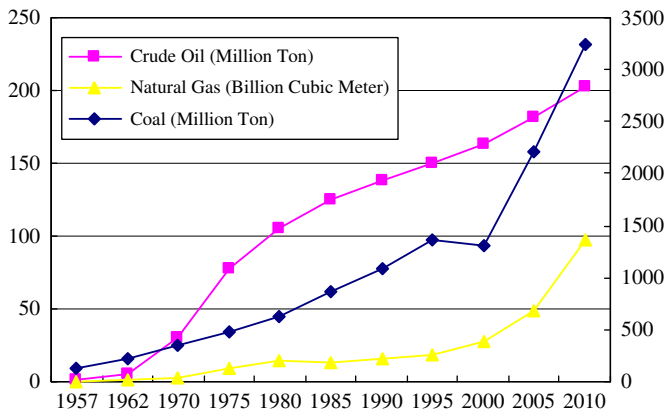


Fig. 1. Energy production in China.

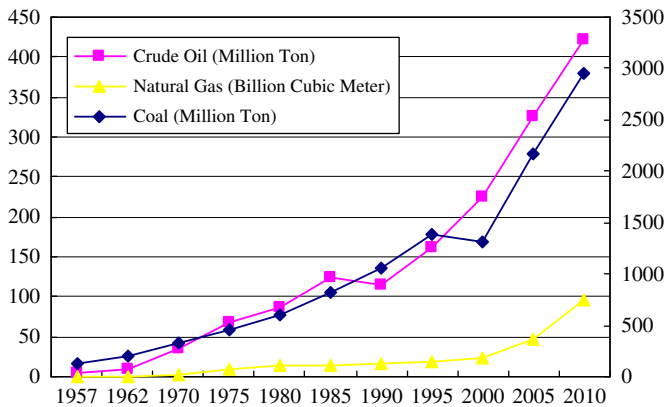


Fig. 2. Energy consumption in China.

Table 1
Five-Year Plans and the corresponding time frame.

Five-Year Plans	Time frame	Five-Year Plans	Time frame
First Five-Year Plan	1953–1957	Seventh Five-Year Plan	1986–1990
Second Five-Year Plan	1958–1962	Eighth Five-Year Plan	1991–1995
Third Five-Year Plan	1966–1970	Ninth Five-Year Plan	1996–2000
Fourth Five-Year Plan	1971–1975	Tenth Five-Year Plan	2001–2005
Fifth Five-Year Plan	1976–1980	Eleventh Five-Year Plan	2006–2010
Sixth Five-Year Plan	1981–1985	Twelfth Five-Year Plan	2011–2015

The findings are reported in the next section.

3. Energy component in the “Five-Year Plans”

3.1. Difference of the planned development goal and the actual production

There are specific goals of coal production from the First Five-Year Plan to the Tenth Five-Year Plan and the specific goals of total energy production from the Sixth Five-Year Plan to the Ninth Five-Year Plan with the objectives of resolving issues associated with shortfall of energy supply. These goals have been achieved in all Five-Year Plans except the Tenth Five-Year Plan (see Figs. 3 and 4). This is due to the fact that all economies suffered from the Asian Financial Crisis during that period. In 1985, the end of the Sixth Five-Year Plan period, the actual production of total energy and coal reached 125% of the planned amount. This advanced

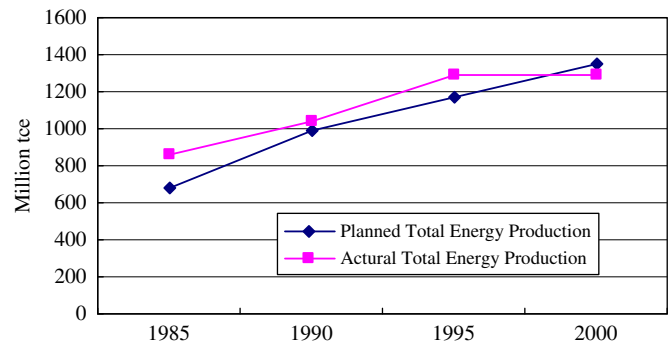


Fig. 3. Comparison of planned total energy production and actual total energy production in China.

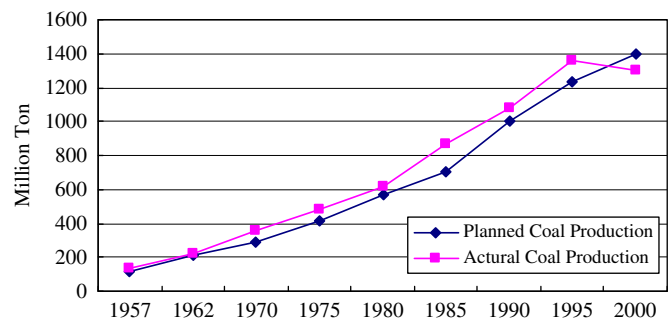


Fig. 4. Comparison of planned coal production and actual coal production in China.

energy development on one hand promoted and supported the rapid social and economy development to a large extent; on the other hand this brought negative impacts from energy conservation and environmental protection perspectives. This issue has been improved. The specific goal of energy production is not set since the Tenth Five-Year Plan, which indicates that the government will no longer simply encourage the enlargement of scale of energy production.

3.2. Transition from energy exporting to energy importing strategy

Due to the rapid economy development, the energy demand has increased dramatically in China. As a result, the Chinese government's energy strategy changed from encouraging exporting to increasing importing. As specified in the Seventh Five-Year Plan, China "... continuously devotes to increase exporting of petroleum, coal, nonferrous metals, grain and cotton" (State Council, 1986). However, the domestic production of crude oil could not satisfy the local requirements during the period of the Eighth Five-Year Plan. Consequently, China has become a net oil importer in 1993 (see Fig. 5). During the Tenth Five-Year Plan period, priorities were given to "reinforce oceanic exploration, explore overseas energy resources, establish overseas petroleum and natural gas supply base and diversify oil supplies" as a critical component of energy strategy (State Council, 2001).

The Tenth Five-Year Plan also saw the statement of "Construction of strategic petroleum reserve system in order to enhance the national energy security" for the very first time in the Five-Year Plans. This was described as "expanding the existing and establish new national petroleum reserve bases" in the Eleventh Five-Year Plan. It is reinforced in the Twelfth Five-Year Plan, which specified that "China will plan and construct energy reserve infrastructure properly; improve oil reserve system; strengthen natural gas and coal reserve and develop the emergency response system" (State Council, 2001, 2006, 2011). It has become the critical component

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