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Political and institutional analysis of the successes and failures of China's wind power policy

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HIGHLIGHTS

- We identify three successes of China's wind power policy.
- We view that three political and institutional factors lead to these policy successes.
- We identify two major failures of China's wind power policy.
- Each policy failure lies in two institutional sources.

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ABSTRACT

This paper identifies and explains how political and institutional factors have determined the relative successes and failures of China's wind power policy over the period 2005–2011. It finds that China has made significant progress in pursuing its wind power policy in terms of cumulative installed capacity, wind turbine manufacturing industry development and wind turbine cost, and argues that these achievements can be attributed to the political motives and institutional arrangements of the Chinese government as well as to institutional changes. On the other hand, the paper finds that there are two prominent policy failures, namely the low proportion of grid-connected capacity and the rising trend of wind turbine incidents. These have undermined the efficiency and effectiveness of China's wind power program. The paper holds that the institutional sources for the first policy failure lies in the preference for setting wind power development targets in terms of installed capacity rather than generation and in coordination problems while the second policy failure lies in the lack of state technical codes for wind power integration and the unfair competition from the large state-owned power companies. The paper contributes to the academic literature on the political and institutional roles in China's wind power policy.

1. Introduction

Since the year 2005, wind power has developed dramatically in China. The annual growth rate between 2006 and 2010 was over 100% for five consecutive years. According to the Global Wind Energy Council (GWEC), in 2011 the cumulative installed capacity reached 62.7 GW in the country, accounting for 26.3% of the world total (GWEC, 2012), ranking China the first for the second time after the year 2010. Four Chinese wind turbine manufacturers were among the world Top 10 in 2010 (REN 21, 2011). This development is largely due to a range of incentive policies that have been developed and implemented by the Chinese government, including mandatory renewable energy targets, local content requirements, feed-in tariffs, financial and tax incentives, and favorable customs duties, among others. Behind the successful story of wind power development, challenges exist in China. In 2010, China's grid connected installed capacity was only 31,000 MW, which means about 30% of China's total installed capacity could not get access to the grid (Zhao et al., 2012).

A review of the literature shows that the majority of analyses on China's wind power examine the experience of China's wind power development and policies (Kang et al., 2012; Liao et al., 2010; Liu and Kokko, 2010). Several studies assess other issues

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such as wind turbine manufacturing (Lewis and Wiser, 2007; Ru et al., 2012; Zhang, 2012) and the clean development mechanism in the promotion of wind energy in China (Lewis, 2010). More recent accounts focus on the challenges facing China's large-scale integration of wind power (Fang, 2012; Li et al., 2012; Liu et al., 2011; Zhang and Li, 2012). To the best of our knowledge, there are few papers that study China's wind power policy and development from the perspective of politics and institutions. Four exceptions are that of García (2011), which provides a preliminary explanation for why Chinese policies and institutions with regard to grid-connected renewable energy sector do not nicely fit into the "best practice" model (García, 2011); that of Fang (2012) which analyzes the development policy for non-grid-connected wind power in China based on institutional change; that of Lema and Ruby (2007), which tracks the reforms of China's energy bureaucracy and its policy approach and the changes in wind energy installations; and that of Luo et al. (2012), which discusses the inconsistencies between China's wind power development and grid planning from the perspective of institution.

On the other hand, there is an extensive literature that describes the particularities of China's politics and institutions, as well as, in many cases, the impact of politics and institutions on socio-economic performance. But less emphasis is placed on trying to relate the features and performance of more specific economic sectors (e.g., renewable energy) to the particularities of the Chinese political and institutional context (García, 2011).

Although the above studies provide some valuable insights, few make a comprehensive analysis on China's wind power policy from the perspective of politics and institutions. The purpose of this paper is to identify and explain how political and institutional factors have determined the particularities of wind power policy in China over the period 2005 to 2011; or, in other words, how the degree of success and failure of China's wind power policy was influenced by China's politics and institutions. It contributes to the academic literature over the political and institutional roles in China's wind power policy. The paper is organized as follows: Section 2 identifies the successes of China's wind power policy; Section 3 analyzes the political and institutional factors that lead to the successes; Section 4 examines the major failures of China's wind power policy; Section 5 analyzes the institutional reasons that resulted in the policy failures; Section 6 provides conclusions.

2. The success story of China's wind power policy

Here we measure the "success" of China's wind power policy by the growth of installed capacity of wind power, the development of wind power manufacturing industry and the reduction in the cost of turbines. China's wind power policy has achieved great successes since 2005 based on these three criteria.

2.1. Strong wind power installation growth

Grid-connected wind power in China started from the late 1980s, when four 55 kW Vestas turbines were imported from Denmark in 1985 and erected in Rongcheng in Shandong province the following year. But before the year 2005, wind power in China had seen very slow development. By the end of 2004, the total installed wind capacity was only 769 MW, ranking tenth in the world wind power market.

However, thanks to extensive government incentive policies, China's construction of wind power capacity has witnessed an unprecedented growth since 2005. The annual growth rate of the cumulative installed capacity of China's wind power has been over 100% for five consecutive years. According to the China Wind Energy Association (CWEA), in 2010 China for the first time surpassed the United States and ranked the first in the world, with a cumulative installed capacity of 44.7 GW (see Fig. 1) (CWEA, 2012). In 2011, China remained the first position in terms of both newly added and cumulative installed capacity which amounted to 18 GW and 62.73 GW, accounting for 44% and 26.3% of the world total, respectively (see Figs. 2 and 3) (GWEC, 2012). And the development of wind power in China, in terms of scale, has been absolutely unparalleled in the world. The strong growth of China's wind power capacity in recent years has consistently surpassed even the most optimistic expectations of industry observers.

2.2. Maturing wind turbine manufacturing industry

China's wind turbine manufacturing industry has developed rapidly and its manufacturing level has been greatly improved. In 2005, more than 70% of China's wind power equipments were imported, but the domestic manufacturing level of newly added

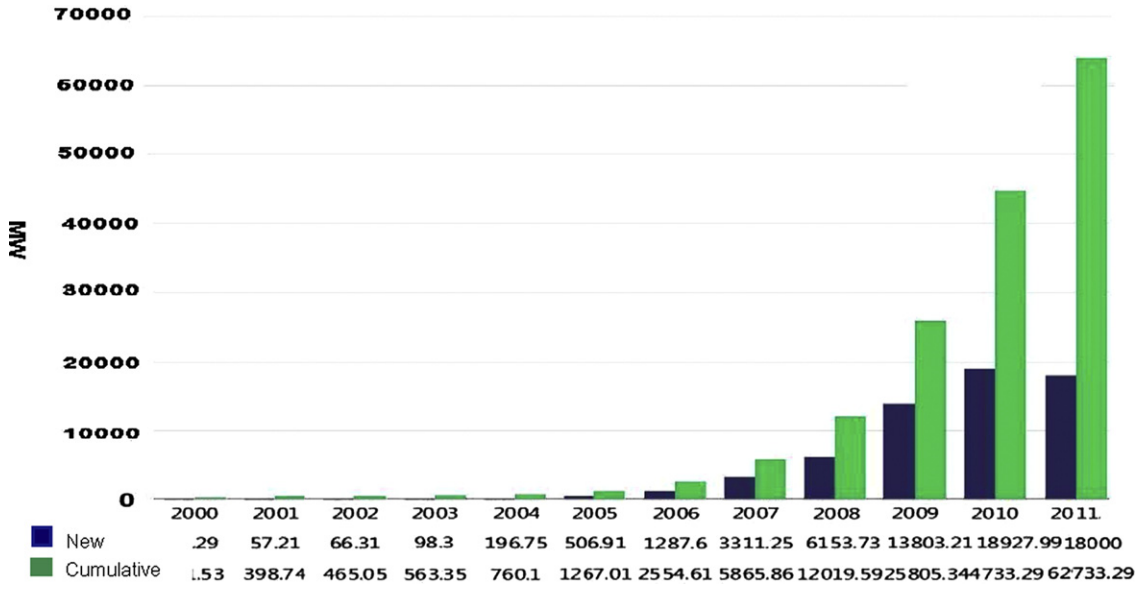

Fig. 1. Installed capacity of wind power in China: 2000–2011, .
Source: CWEA, 2012