



The industrial performance of wind power industry in China



Yuanxin Liu, Lingzhi Ren, Yanbin Li, Xin-gang Zhao*

School of Economics and Management, North China Electric Power University, Beijing 102206, China

ARTICLE INFO

Article history:

Received 14 November 2013

Received in revised form

29 July 2014

Accepted 1 November 2014

Keywords:

Wind power industry

Price policy

Industry performance

DEA

ABSTRACT

Wind power industry in China has experienced a rapid development from 2005 to 2010. However, in recent years, with the slowing down of growth in the new installed capacity, the competition among wind turbine manufacturers has become increasingly fierce. In order to comprehend the performance of wind power industry in China, in the article, we analyzed the status quo of wind power industry and the development process of wind power feed-in tariff in China, and then we used the Data Envelopment Analysis (DEA) model to analyze the performance of wind power industry from 2008 to 2012. According to the analysis result, we found that: (1) the performance of wind power generation industry is rising, and it has reached an optimal state in 2012. (2) In 2009 and 2010, the performance of wind turbine manufacturing industry was in the best state, but it started to decline from 2011. (3) The trends of performance of wind power generation industry and that of wind turbine manufacturing industry are not synchronized. The growth in installed capacity of wind power has an important influence on the performance of wind turbine manufacturing industry.

© 2014 Elsevier Ltd. All rights reserved.

Contents

| | |
|---|-----|
| 1. Introduction | 644 |
| 1.1. Background | 644 |
| 1.2. Literature review | 645 |
| 2. Status quo | 646 |
| 2.1. Wind power generation | 646 |
| 2.1.1. Market | 646 |
| 2.1.2. Technology | 647 |
| 2.2. Wind power generation industry | 647 |
| 2.2.1. Market | 647 |
| 2.2.2. Technology | 649 |
| 3. Price policy | 650 |
| 3.1. Competitive tariff | 650 |
| 3.2. Approval tariff | 650 |
| 3.3. Bidding tariff | 651 |
| 3.4. Benchmark feed-in tariff | 651 |
| 4. Industry performance | 651 |
| 4.1. Variable selection and data processing | 651 |
| 4.1.1. Wind power generation | 651 |
| 4.1.2. Wind turbine manufacturing | 652 |
| 4.2. Empirical analysis | 653 |
| 5. Conclusions | 653 |
| Acknowledgment | 654 |
| References | 654 |

* Corresponding author. Tel.: 0086 10 51963571; Mobile: +86 130 41157885.

E-mail address: rainman319@sina.com (X.-g. Zhao).

1. Introduction

1.1. Background

Wind power industry developed rapidly in the field of renewable energy and the cumulative installed capacity of global wind power reached 318 GW in 2013. The average annual compound growth rate of global wind power was 20.9% during the period of 2004–2013. However, due to financial crisis, the growth rate of global wind power has slowed down since 2009 (See Fig. 1) [1]. Currently, wind power industry mainly concentrates in Europe, Asia and North America, the development of European wind power industry had been the fastest in the world for a long time. However, Asia and North America, especially China and the United States, have been continually accelerating the development of wind power and have become the main emerging markets in recent years [2].

Since 2008, although wind power industry in Europe has been influenced by financial crisis and the European debt crisis, the growth of installed capacity was still better-than-expected. In terms of both new and cumulative installed capacity, Germanic wind power development has been faster than the other countries in Europe. North American wind power industry has been severely influenced by the financial crisis between 2008 and 2011, especially in 2010 and 2011, and its new installed capacity of wind power decreased significantly. Due to the recovery of American wind power industry, in 2012, the new installed capacity of wind power (14860 MW) in North America achieved a historic breakthrough and surpassed European. Besides, the new installed capacity of American wind power surpassed China and ranked the first in the world again in 2012. The development of Asian wind power industry has not been significantly influenced by subprime crisis and the new installed capacity of wind power in Asia increased dramatically between 2010 and 2011. Due to the restructure of China's wind power market and suspension of Indian wind power policy, the new additions in wind power capacity of Asia went down significantly in 2012 [3].

As seen from the Fig. 2 that the wind power industry in China has experienced a rapid development, in 2013, the new installed and cumulative installed wind power capacity reached 16089 MW and 91423 MW respectively [4]. During the period 2004 to 2013,

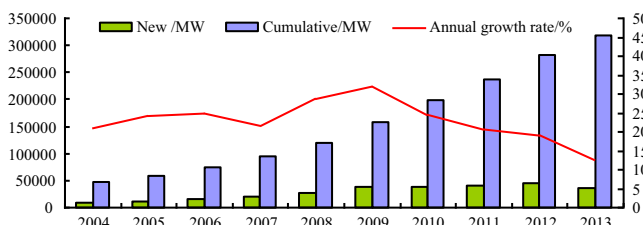


Fig. 1. Installed capacity of global wind power (2003–2012). Sources: Global Wind Energy Council (GWEC) [1].

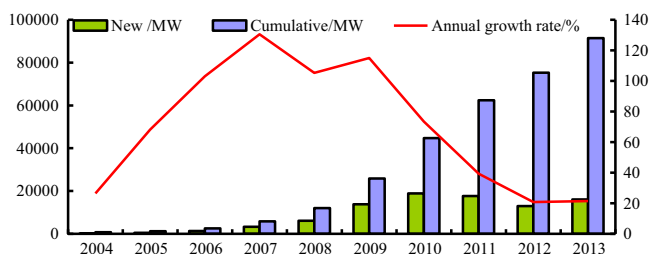


Fig. 2. Installed capacity of wind power in China (2003–2012). Sources: China Wind Energy Association (CWEA) [4].

the average annual compound growth rate of China's wind power installed capacity was 61.8%. By the end of 2013, China has remained the first position for four consecutive years in the world in view of the cumulative installed capacity, which accounted for 28.8% of the global total capacity. The rapid growth of installed capacity created a huge market demand for the wind turbine manufacturing industry and promoted domestic wind turbine manufacturers to rise abruptly. However, wind power industry also encountered many problems in the process of development, such as power grid construction lag, the absorption issue of wind power, lack of key technology and the excess capacity of wind power turbine manufacturing industry [5].

1.2. Literature review

Wind power industry plays a critical role in optimizing the energy structure and ensuring the security of energy supply in China [6]. Considering the technical and economic feasibility, the maximum feasible proportion of wind power in China's current energy systems is approximately 26% to guarantee the grid stability [7]. Although according to the National Energy Board statistics, the proportion of grid-connected wind power capacity barely reached 6.05% at the end of 2013. Wind power industry still has great growth potential in China. In recent years, there were a range of literatures to research China's wind power industry from many aspects, such as wind power institution and policy, development bottleneck, sustainable development and innovation of wind power industry.

Joanna I. Lewis and Ryan H. Wiser (2007) argued that the support of national and regional policies played a critical role in wind power equipment manufacturing industry [8]. Analogously, Juan Kong and Pei-bin Guo (2012) pointed out that the incentives and constraints of government policy were the fundamental reasons for the rapid development of wind power in the United States, Germany, Denmark and Spanish [9]. As for the institution and policy of China's wind power: Ping Lu (2013) believed that public bidding system was the most suitable for the development of China's wind power [10]; Xinying Zhang (2012) proposed an institutional framework for the sustainable development of China's wind power industry [11]; Jian Wang and Ru-ping Li (2013) suggested that government introduce three different kinds of electricity price policy, namely intervals electricity price, dynamic electricity tariff and segmented electricity tariff mechanisms, at the public bidding stage, operation phase and sell electricity stage, respectively [12]. Ting-Ting Mi (2012) reviewed the price policy of China's wind power [13]. And then Sufang Zhang, Philip Andrews-Speed et al. (2013) researched and summed up the successes and failures of wind power policy in China [14]. In addition, many other scholars also researched and analyzed the institution and policy of China's wind power industry [15–17].

About the development obstacles of wind power, Zijian Zhao (2009) pointed out that there were bottlenecks problems in both wind turbine manufacturers and wind farms [18]; and then Zhao Dong (2009) elaborated the development bottlenecks of China's wind power [19]. How to break the wind power industry bottleneck? We have scores of Literatures to study the problem. For example, Hua BAI, Feng-ling CHI et al. (2013) presented a complementary pattern between wind power and hydropower [20]. Although Xiaoyu Hao (2013) argued that the direct heating of abandoned wind power was the best supplementary measures to make full use of wind energy [21]. Besides, Xiaoxia Wei (2009), Ling-zhi Zhu et al. (2011) and Liuqing Qiu et al. (2011) also researched the problem and put forward different proposals [22–24].

How to achieve the sustainable development of wind power in China? Zheng-ming WANG and Zheng-nan LU (2008) suggested that, in order to improve the wind power project investment income and promote the healthy development of wind power industry,

Download English Version:

<https://daneshyari.com/en/article/8117843>

Download Persian Version:

<https://daneshyari.com/article/8117843>

[Daneshyari.com](https://daneshyari.com)