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journal homepage: www.elsevier.com/locate/rser

Review on wind power development in China: Current situation and improvement strategies to realize future development



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ARTICLE INFO

Article history:

Received 23 June 2013

Received in revised form

13 December 2014

Accepted 8 February 2015

Available online 25 February 2015

Keywords:

Wind power

Development situation

Future development

Improvement strategies

China

ABSTRACT

As wind power resources are abundant, China's wind power industry has entered a period of rapid growth since 2005, and constantly facing new challenges at the same time. In this paper, the general situation of China's wind power resource and wind power industry development are introduced. On this basis, future development potential and target of wind power industry are analyzed combining with the recent introduction of the policy and the "Twelfth Five-Year Plan". The main obstacles prevailing in the development such as grid integration, price mechanism, industry standard system, and supporting policies are discussed. In addition, strategy advice for promoting the further development of China's wind power is proposed. In general, the development prospect of China's wind power industry will be even brighter.

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1. Introduction

With the issues of global warming and energy security becoming increasingly serious, it has become the basic consensus and core strategy of all the countries in the world to develop low-carbon economy with the main feature of low power consumption and low pollution, and to build low-carbon society, thus to alleviate global climate change and achieve sustainable development [1]. As a high-energy-consuming country, Chinese government continues efforts towards low-carbon development and commits that “by 2020, China’s non-fossil energy consumption would account for about 15% the proportion of primary energy consumption” and “CO₂ emissions per unit GDP would be reduced by about 40–45% compared to 2005”. However, China is dominated by thermal power for a long time [2], which increases the difficulty of emission reduction, making power industry become the main emitting sector as well as the key area in energy saving and emissions reduction [3]. Therefore, to realize low-carbon economy, it’s of great necessity to develop low carbon power system, which specifically means to promote large-scale grid integration of renewable energy such as wind power and optimize energy structure [4].

Compared with other new energy resources, wind power has a shorter construction period and higher security than nuclear

power, greater development potential than hydro power and lower cost than solar power. After years of development, wind power industry is gradually maturing with its improving industrialization condition and increasingly low cost which is close to conventional energy, making it one of the power generation technologies with greatest potential in large-scale and commercial development [5].

As wind power resources are abundant in China, both the reserves and exploitable capacity rank the first in the world. In recent years, though wind power has made rapid progress, there still exist some problems such as integration difficulty, unreasonable pricing mechanism, imperfect standard system and mismatched policies. At present, the domestic and foreign scholars have finished a lot of researches on the status and bottleneck of wind power development and gained breakthrough progress [6–11], promoting the wind power development and policies introduction. However, the wind power industry in China will face new challenges under the low-carbon development mode. Thus, how to ease the conflict between the rapid development of new energy and mismatched construction of peaking plant as well as its inadequate transmission capacity, and how to promote large-scale wind power integration and relieve the increasing abandoned wind capacity in key development areas, are of vital

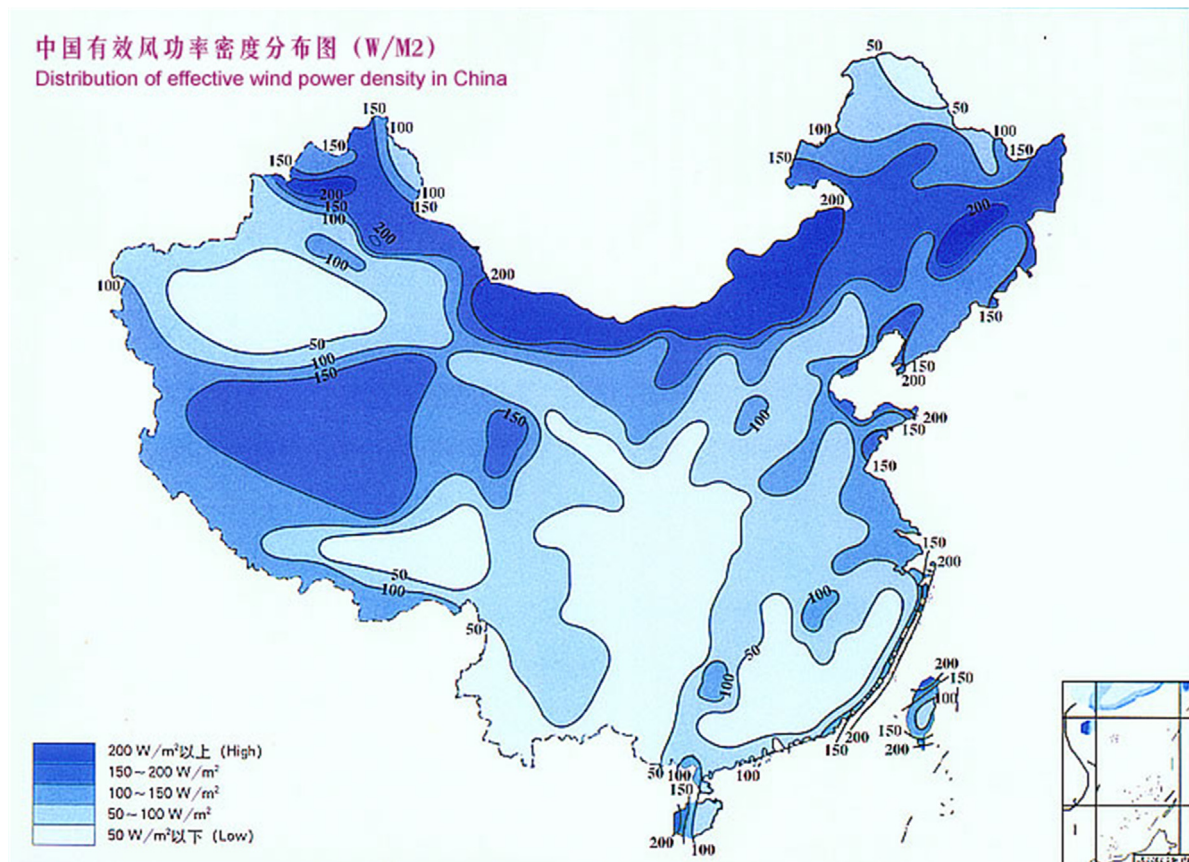


Fig. 1. Land wind resource distribution of China. (Source: CMA wind and solar energy resources assessment center).

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