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Strike Out the Plan of Developing Chinese Pattern Wind Power Generation

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Abstract

Topics on energy crises, environment protection have appeared in international conference time and again, usage of renewable energy is a popular subject, and wind power generation is the industry with relatively low cost and mature technology, which is developed by many governments as an important industry. The article first introduces current situation of China's wind power generation briefly, and then describes its own features and problems differing from other countries in the world in detail. Finally, we put forward a proposal to develop wind power generation in Chinese pattern way, and meanwhile we give some advices and methods.

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1. Introduction

With the rapid development of world economy, industrialization level is higher and higher, meanwhile global environment degradation and non-renewable energy crisis have become worldwide problems. In recent years, the subject on developing new energy has drawn attention of many governments. In 2009, our country promised to the international society that the ratio of non-fossil fuels to primary energy consumption would reach 15% in 2020, and per unit of GDP carbon emissions of 2020 would decrease by 40%~45% compared to that of 2005.

China still takes coal as main consumer of energy because of historical and environmental factors, and this consume structure could speak for itself about how large pressure it makes on environment. It's to optimize energy structure, improve energy efficiency, and to develop renewable energy that becomes

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important and indispensable components of sustainable development strategy. As bulk of energy consumption, electricity industry plays an important role in new energy development. Wind power field has a relatively mature technology and low cost and has the highest researching and developing value.

2. Current situation of wind power in China

China has rich wind resource. According to a detailed survey, 1.4billion KWH wind power facility can be installed on land in China, and the total number of resources can reach 2billion KWH in consideration of the maritime part.

Wind power development is like a blue streak in China ^[1]. The early 90s of last century was the promotion stage when the wind turbines and installed capacity continuously increased. Recently, the development is surprisingly quick with installed capacity growing by the rate of more than 100%. In 2007, we installed 6050MW in total and surpassed Denmark to be the fifth largest one in the world, and the number of 2008 is 12153MW which surpassed India, and the number reached 25805.3MW before the end of 2009.

As the promise we have made to the global society mentioned above, our government positively encourages and supports the development of wind power industry, with the Ride Wind Program the State Planning Commission brought forward a symbolic marker, besides, the government has made a lot of preferential policy, for example, the wind power tax has shifted from a production value added tax(VAT) to a consumption VAT, import tariff and value-added tax on components and materials and others related to high-power wind power generation machine would carry out a refund after collection.

Furthermore, there are many enterprises and individuals in society which have seen the profitable and policy supportive future of wind power development, and driven by potential great benefits; they want to take a share of the substantial profits. Then, they step into the field from time to time and invest various kinds of technologies and capital; the great number of private investments speed up the development of wind turbine and in the other way round, the correlative equipments and materials manufactories would activate the localization process of wind turbine.

3. The characteristic and existed problem of wind power in China

In view of our particular geographical conditions and fundamental realities, we have our own special characteristics different from international society in developing wind power, and there're some problems appealing with installed capacity growing rapidly.

(1) Non-equilibrium of national economy and wind resource. Even China is rich in wind resource, the distribution is unbalanced. Wind resources are concentrated mainly in the three northern regions and the eastern coastal areas, while only some inland areas have wind resources because of their special terrain or lakes. The distribution of total installed capacity of each province in China is shown in Figure 1, from which we can recognize the different richness of wind resources.

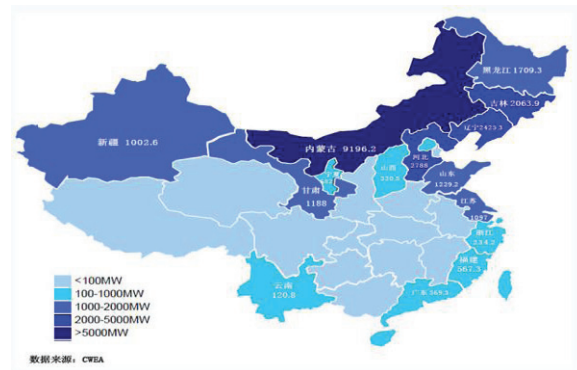


Figure 1 total installed capacity of each province in China in 2009

Besides, China seeks for priority development of some areas; economic development is imbalance and so is affordability of electricity price. Some territories rich in wind resource are in the places with weak grid, especially the three northern regions.

As natural resource, wind energy has inherent properties. The wind is always intermittent and has great randomness, leading to randomness and instability of wind power generation which shall increase difficulty in balancing the load [2]. Thus, a high stability of grid network is necessary. Grid network not stable enough would cause serious stability and security threat.

(2) A particular electricity market background. Compared to economy relatively developed Europe and the USA, our electricity construction started later. Even we have entered the world's leading ranks after 30 years' electricity reform in many ways; we are not perfect in power technology, regulation system, or market mechanism. China is still in wind power systems' exploration and trial stage. As an energy industry, electricity power industry is closely related to industrial development, technological progress and other social aspects of living and large-scale state-owned enterprises are always being the leader of monopoly [3]. On national level, there is much to be desired in competition of market mechanism.

The overall electricity mechanism is not perfect, so the development of China's wind power is accompanied simultaneously with electricity reform, which increase the difficulty of wind power development and the relevant departments are not able to make comprehensive and global development program, and as a result, we can not make overall plan in conjunction with other fields' evolution and technical updates from the perspective of long-term development of wind power. With the rapid development of wind power, establishing a reasonable wind power market mechanism is necessary. Moreover, as a part of electricity construction, grid building-up needs a further promotion and perfection. In general, China's current coverage of grid construction is not broad enough, and we have to get confronted with existed problems which have become constraints, like the lack of adequate stability and security and the difficulty in dealing with unexpected accidents.

(3) A different primary target and expansion path in developing wind power. As we all know, EU is earliest to develop wind power and has the highest utilization. Throughout the history of the European Union's wind power development, its technological progress is taking the first road before the scale expansion. After continuous technical innovation and improvement, its wind power technology has been a world leader, although many countries (including the United States, China) have rapid development of wind power industries, EU remains the world's major equipments suppliers. In 2006, the European enterprises' share of relevant products accounts for 85% [4].

It is the high costs of wind power that mainly restrict its further development and spread. Recently, World Wind Energy Council research questions about how to make a further improvement in cutting

down the cost showing that scale expansion contributes to decline of wind power cost by 60%, and the remain 40% part rely on technical progress. Since EU had developed its technology, the next effort would be scale expansion, standardization and serialization to reduce costs. Recently, EU continually raises its installed capacity, and updates its capacity plan and target again and again to lower costs through scale expansion on a large scale because of usual achievement of capacity goal in advance. It can be expected that wind power would be an important alternative energy source in EU before long.

As for America, it also tries to replace the oil fossil resources with wind resources on the premise that domestic electricity supply is enough for the demand or even exceeding the demand. It has two objectives to develop wind power; one is to solve the pollution problem and improve the environment quality and the other is to deal with the energy crisis and develop renewable resources.

China differs largely from them. In peak season, our electricity supply is still insufficient to meet the demand of users and we often cope with electricity crisis with spasmodic power supply by load shedding. So, we develop wind power aiming at solving the electricity supply insufficiency at first and then the sustainable development and environmental protection^[5]. Thus, China makes its developing path with scale expansion going in parallel with technology development, or even with the scale expanding earlier than technological progress.

Therefore, in current, wind power industry evolution is like a raging fire and we have achieved a great-leap-forward development, with the supportive policy. For example, installed capacity racks up while the program updates again and again. However, such an overheating evolution leads to unplanned and disorderly development at the same. There are many problems like the investment in wind power rushing headlong into action and repeated importation, which cost a lot of financial and human resources. Besides, technological progress can not catch up with wind power expansion. Good and bad quality of production of domestic wind turbines and related equipments manufactories mixed together. All these factors mentioned are causing huge potential dangers to the future wind power.

Before 2005, more than 90% of our wind power equipments were imported or manufactured with foreign proprietary technology. In order to decrease the cost of wind power and develop domestic wind power equipments manufactories, taking view of technologies development, the government requires a growth in the localization rate of parts and components in wind turbine. In 2005, National Development and Reform Commission introduced the provisions named the notice about requests related to wind power construction and management stipulating that localization rate of parts and components of wind power equipments should reach 70% and those wind farms that can not meet the demands are not allowed to build. With the policy, as of 2008, homemade wind turbines have taken over 62% the market and so the government cancels the rule at the beginning of this year. With such a rapid development, we cannot help asking how much development is made by real technological and what about the remaining part? Even today, China has not established quality standard system of wind power equipments, under which condition those machines enter the market if only they pass an unprofessional quality examination which is usually unilateral. As a result, we can imagine what a big potential risk we are taking.

4. Advices-wind power of Chinese pattern

Here are several advices about making Chinese pattern way to develop wind power. In general, the wind power of China has a rosy prospect and coexists with some problems.

(1) Continue the policy support. From the evolution history of world wind power, no progress would be made in any country or territory without the supporting policy of the government. In addition to existed incentives, the famous carbon tax we plan to promulgate will stimulate the wind power development to a large degree.

(2) Establish regulation systems. Though government canceled the requirement that localization rate of components should reach 70% is sure to bring about foreign manufacturers grabbing Chinese market, we must strive to develop homemade wind turbines and make great efforts to realize a big boost of localization rate in wind power industry chain with really mature technology. During the stage, wind power equipments manufacturing industry rules must be established and market mechanism should be built. Moreover, we need to regulate unplanned development and actively prevent the quality and cost problems caused by repeated introduction of foreign equipments or technology.

(3) Never regard installed capacity as target simply. Currently, the problem that electricity can be generated but not be transmitted is very grim. After building many wind farms with high expense, isn't it worth the candle if the electricity is useless? Developing wind power is to meet demands rather than to build up lofty wind power image. With so fast an evolution, a professional programming department is needed to make overall plans and promote utilization of wind power instead of seeking the capacity number blindly; meanwhile we need to perfect grid quality and improve stability and reliability.

(4) Achieve the pluralism of utilization patterns. At present, some domestic scholars put forward the wind power non-grid-connection theory, and the non-grid wind power being used directly in high power-consuming industries is proved available with broad prospects [5]. As to the utilization patterns, we could choose the most economic and feasible method according to circumstances.

(5) Set up wind power information center collecting data about wind turbines. Even if we want to make search, the related data is insufficient. So it is necessary and urgent to build an information center. Besides, whether the wind farms run well or not, they can make profits because of supportive policy, so an information center is required for the society to get acquainted with the operation status.

5. Conclusion

Chinese special economical, environmental and technological characteristics lead to its particular wind power background, which is different from international world. To develop the wind power in long time, China needs to strike out its own developing plan, which is the Chinese pattern wind power road.

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