

## Analysis of Current Situation and Prospect of Wind Power Energy Cooperation Between China and Jordan Under “One Belt and One Road” Initiative

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### Abstract

The “One Belt and One Road” initiative is a great measure to promote the economic development of countries along the line the “B&R” and realizes common economic prosperity. With the continuous development of global economy, the demand for energy is increasing. The excessive use of traditional fossil fuels has led to environmental degradation. Therefore, it has become a consensus to develop green energy cooperation between countries. Different from traditional fossil energy, wind energy is one of the most available clean energy sources, which does not produce pollution and is cheap and easy to obtain. Thus, it is an ideal clean energy. This paper uses literature and survey methods to analyze and research the development situation of wind power energy resources in Jordan and the development of wind power technology in China. Through the analysis of data and examples, this paper aims to put forward suggestions and prospects for the cooperation between China and Jordan and provides references for other countries.

**Key words:** One Belt and One Road; Wind power energy; Cooperation; China; Jordan

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### INTRODUCTION

Energy is an important productive resource for the development of human society and the progress of countries. The increasing shortage of traditional fossil energy has not been able to meet the need of world economic development, and the consumption of fossil energy is harmful to the ecological environment. While the green energy has the characteristics of no pollutants emission and can be used in production and daily life directly, making it an ideal energy. Therefore, the pursuit of green energy has become the common goal of all countries. With the development of Chinese economy, China has advanced technology in the field of wind energy development. The “One Belt and One Road” initiative has promoted the energy cooperation and development between China and countries connected with the program the “One Belt and One Road”, which is of great significance to the green energy development and infrastructure construction of China and its neighboring countries. Jordan is one of the important members of the “One Belt and One Road initiative, which is rich in wind energy resources and lacks the oil energy resource due to its special geographical location. Thus, 97% of its energy resources relies on import. And for the development of its economy and technological barriers, the wind energy has not been developed well.

Therefore, strengthening the cooperation between the wind energy resources of two countries is in line with the national interests of the two countries and is conducive to complementing each other’s advantages and jointly ensuring energy security. Therefore, taking Jordan as an example to analyze the current situation and prospects of wind power cooperation under the opportunity of the “One Belt and One Road” will help maintain the long-term energy cooperation between the two countries and provide reference for other countries’ green energy cooperation.

## 1. RESEARCH METHOD

Literature investigation method and investigation method are mainly used in this paper to investigate the current situation of wind power in China and Jordan. By analyzing the current situation of two countries, the advantages and disadvantages of China and Jordan will be discussed. Then through the study of the current cooperation situation of the energy projects between China and Jordan that have been established, the potential cooperation prospects and experiences are conducted to provide some suggestions for the further cooperation.

Based on the above analysis and other factors influencing the further cooperation like political policies and financial policies of two countries, the wind power cooperation projects of the prospects and suggestions between China and Jordan are given in this paper. Meantime, the potential cooperation risks and benefits are also analyzed to provide some reference for the cooperation of other countries in energy cooperation fields.

## 2. ANALYSIS ON THE CURRENT SITUATION OF COOPERATION

Nowadays, wind power energy, as a new type of green energy, is developing at a very fast pace. Technology is also developing rapidly. Therefore, it is necessary to strengthen wind power energy cooperation between the two sides. The following part will investigate and analyze the current situations of wind power energy development in China and Jordan and the current situation of wind power energy cooperation between the two sides.

### 2.1 The Current Situation of the Development of the Wind Power Energy in Jordan

As for the situation of wind energy resources, Jordan is rich in wind energy resources, among which wind energy resources are mainly distributed in the Maan region in the south of Jordan, Irbid region in the north Jordan and the Zarqa region in the east, with the wind speed up to 7-9 m/s. For the current situation of Jordan's wind power projects, the Jordanian government actively supports the development of wind power projects. By the end of 2018, Fujeij and Rajef projects contracted by South Korea NEPCO have been completed. Jordan has a total of 375MW operating wind power capacity. Wood Mackenzie expects the Jordanian market to add 2GW of wind capacity by 2028. The four projects under construction amount to 250MW and will start to product in 2020. In 2018, Vestas signed the Tafileh and Abour wind farm EPC project in Jordan. The contract includes the construction, procurement, construction and other contents of the wind farm (Wood Mac Research, 2019). With the development of Jordan's economy, the demand for power is increasing day by day. However, because NEPCO lacks strong

financial foundation and advanced technical level, it is difficult for the power grid to accept a larger capacity of GW renewable energy power. Therefore, expanding the power grid capacity and increasing the wind power generation capacity are the two main goals of Jordan's wind power development.

### 2.2 The Current Situation of the Development of Wind Power Energy in China

With the rapid development of China's wind power technology, the wind power energy has becoming the third largest power source in China after thermal power and hydropower energies. In terms of wind power energy generation, the national wind power generation capacity was 355.7 billion kWh, accounting for 4.8% of the total power generation in 2017. In 2018, the national wind power generation accounts for 6.1% of the total power generation (China Industry Information Network, 2018). From the perspective of installed capacity, China has become the world's largest wind power market, both in terms of cumulative capacity and new installed capacity. Among the top ten countries with new wind power installed capacity in the world, China ranks first. In terms of wind power technology, China has developed wind power technology research for more than 40 years. Through the long term of introduction, digestion, absorption and re-innovation, it has mastered the key core of technologies of the wind power energy and has achieved amazing development in wind turbines suitable for low wind speed and harsh environment, which advances in the world. Especially after nearly a decade of development in recently years, it has quickly embarked on the road of industrialization. China's wind power technology level has been continuously improved, and the wind power industry has become one of the few high-tech industries with international competitiveness in China. This also let our country usher in a rare opportunity and situation to keep pace with the international leading level in the field of wind power. In addition, China has successively formulated relevant regulations and support policies to promote the development of renewable energy such as wind power. Many domestic and foreign enterprises have invested in China's wind power manufacturing industry actively. Through the introduction of production licenses, the establishment of joint ventures, independent research and development or joint research and development means, wind turbine products is produced. These measures make China's wind power technology a leading position, but also has the ability to export a large number of wind power equipment.

In terms of foreign green energy cooperation, China has also cooperated with the United States, Russia, Africa and Kazakhstan and other regions or countries, and has certain communications in policy formulation and technology fields. For example, in the field of wind power energy, China and Russia has cooperated to establish the

renewable energy project -- the Ulyanovsk wind power project, which will provide some experience for the cooperation with Jordan. Therefore, in terms of policy and technology, China has much experience in external green energy cooperation and can cope with many cooperation obstacles and problems.

### **2.3 The Current Situation of the Cooperation Between China and Jordan**

In terms of wind power cooperation projects, China and Jordan have established a certain basis of cooperation in many fields, like energy, mineral resources and financial fields. For example, in energy field, driven by the “One Belt and One Road” initiative, the Chinese government and Chinese companies have made Jordan’s oil shale power generation project truly come true. The project is a milestone in the history of Jordan’s development, which promoted Jordan’s industrial development and helped Jordan achieve self-reliance in electricity to some degree. With a total investment of 2.2 billion US dollars, the Atalat oil shale power station project is China’s largest investment and financing and EPC project in Jordan. And it is the Jordan’s largest foreign investment project until now and the world’s largest oil shale power station project except Estonia station project. The project will be completed and put into operation in 2020, with an annual power supply of 3.7 billion kWh, which will meet 10-15% of Jordan’s electricity demand and provide 4,000 job opportunities for Jordan. And in 2015, Hanergy group and Jordan’s ministry of energy and mineral resources signed a cooperation framework agreement at the 2015 china-Arab states expo in Yinchuan. Based on the “One Belt and One Road” strategic opportunity, the two sides decided to jointly build a 600MW photovoltaic project group and a 400MW wind power project group (totaling 1GW) in Jordan to promote the development of renewable energy in the country. Chinese company Hanergy will export wind power units to complete the wind power project, which will be completed by the end of 2017. Meanwhile, in other fields, China has actively provided many opportunities for people in Jordan to do systematic technological training for them to help them improve their professional skills. China and Jordan has cooperation in many fields. They will have relatively mature policies and infrastructure construction support. Therefore, these cooperation provides a platform and reference for future wind power cooperation between China and Jordan, which is conducive to further exchanges and cooperation between the two countries.

## **3. ANALYSIS AND SUGGESTIONS ON THE PROSPECT OF WIND ENERGY COOPERATION**

In the following part, the analysis of the potential

cooperation will be discussed and further suggestions will be advised based on the current situation discussed in the last part.

### **3.1 Analysis on the Prospect of Wind Energy Cooperation**

China and Jordan have very broad prospects for wind power cooperation, and both countries have very favorable factors for cooperation. As for Jordan, firstly, it has relatively good geographical position and political environment in the aspect of wind energy resource development. Jordan is located at the crossroads of Europe, Asia and Africa, owning Aqaba seaport. It enjoys political stability and pursues a neutral non-aligned foreign policy with neighboring Israel and Arab countries, China and the United States and other countries. It maintains sound diplomatic relations and enjoys a sound political environment. Meantime, it actively promotes social reform at home, adjust domestic and foreign policies timely to improve the investment environment of foreign countries and strive to develop the national economy. Therefore, despite the frequent wars in the Middle East, its sound political decisions have provided a guarantee for its economic development. The second factor for Jordan is its energy shortage. Despite its location in the resource-rich Middle East, Jordan is short of energy resources, especially the fresh water and oil resources that control the development of its national economy. As a result, Jordan relies on imports for 97% of its oil and gas resources and spends 20% of its gross national product on energy every year. According to the data of energy consumption over the years, oil and its by-products are the main part of energy consumption, and clean energy accounts for only 1-2%. In addition, with the increase of population and economic development, the annual growth rate of energy demand will reach 5.5% in the next 10 years, and the annual growth rate of electricity demand will reach 7.4%. Therefore, the development of new energy in Jordan is of great significance. Thirdly, in order to reduce its dependence on imported energy, the Jordanian government has formulated energy strategies since 2007, focusing on developing local renewable energy. In 2020, the proportion of renewable energy is expected to account for 10% of the total energy, while the proportion of imported energy will drop to 61%. At the same time, Jordan also actively encourages foreign investors to invest in Jordan, which formulated and issued the related investment laws.

For China, there do exist many advantages for the cooperation with Jordan. At first, in terms of policy, Chinese President Xi Jinping proposed cooperation measures to build a “New Silk Road Economic Belt” and a “21st Century Maritime Silk Road” respectively in September and October, 2013. Jiang Anning, Liu Bo and Huang Jie published a paper named the energy cooperation of China and central Asia under the “One

Belt and One Road” initiative. They believe that China’s energy cooperation with Asia is an important support for the implementation of the “One Belt and One Road” initiative (Jiang, et al., 2017). Such cooperation will promote the formation of a new pattern of world energy interests, improve the geopolitical pattern of world energy production, contribute to the building of the world’s third pole of energy and strengthen the security of world energy (Ren, 2017). In addition, Jordan has become a member of China’s “One Belt and One Road” initiative and actively supports this initiative which creates new advantages for both sides. Such a strong and friendly policy environment has greatly promoted the cooperation and development between China and Jordan. Secondly, China has very advanced wind power technology and the ability to export a large number of wind power equipment. China’s wind power technology is at an advanced level in the world, and its economic strength is strong. The cooperation with Jordan can make up for the shortage of Jordan’s technical level, so as to better develop the wind power market in Jordan.

At the same time, the two sides share common interests in wind power cooperation. Through cooperation, the two sides can achieve market complementarity, and China can complete high-tech exports, thereby enhancing the industrial structure and transforming the economic development mode. Jordan can provide economic security through wind power generation, reducing external energy dependence and increasing energy security.

Therefore, no matter in the aspect of the market complement, ethnical support, energy policies, economic policies or talent support policies, the wind power cooperation between the two sides is a very good cooperation that has many interests for both parties.

### 3.2 Proposals for Wind Energy Cooperation Between China and Jordan

Based on the above investigation of the current situation of wind power in China and Jordan and the analysis of the cooperation prospect, it is concluded that China and Jordan can conduct in-depth cooperation in the following aspects. Firstly, China and Jordan should solidify their strategic cooperation under the policy and opportunity of the “One Belt and One Road” initiative to seek for a long-term cooperation and realize the sound development of wind power cooperation between China and Jordan (Shi, 2017). Secondly, it is advised to strengthen the cooperation of wind power technology and capital. Based on the different situation of both countries, China can put much more effort on the wind power technology research and development, such as nanometer film wind power generation system, which can combine the advantages of solar energy and wind energy. In addition, capital and technical support can be sought to expand cooperation in Jordan’s grid capacity projects and infrastructure construction to guarantee the development of wind

power projects. Thirdly, the two sides can seek various ways of cooperation, such as joint development between governments, enterprises and wind power projects, joint venture development and other ways to conduct diversified cooperation, so as to deal with problems instantly such as capital and technology and reduce risks of cooperation. Fourthly, The energy cooperation mechanism between the two sides can be improved continuously and dialogue among governments can be carried out, a memorandum on energy development signed, and the new forms of cooperation to improve bilateral cooperation can be continuously expanded.

## CONCLUSION

Through the research and analysis of the cooperation prospect and suggestions between Jordan and China, it is concluded that China and Jordan have broad cooperation prospects in wind power development. The two sides should firmly seize the opportunity of the “One Belt and One Road” initiative to strengthen cooperation in the fields of technology, policy and finance. And multiple cooperation methods should be adopted and long-term cooperation should be maintained to achieve mutual benefit and win-win situation. Through the cooperation, the energy security of Jordan and China will be guaranteed and it will strengthen the friendly relationship of two countries. However, China and Jordan should take note of the potential risks in their cooperation, such as frequent wars in the Middle East, complex international relations and religious differences, which will affect the security of Jordan. Therefore, when conducting cooperation, China and Jordan should take the potential risks related to cooperation into full consideration to make prudent and reasonable investment and reach a consensus on long-term cooperation.

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