

The Realization Path of the Carbon Peak in China Industrial Parks under the Carbon Neutral Goal

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Abstract

Based on the national "14th Five-Year Plan" and the "Guiding Opinions on Accelerating the Establishment and Improvement of a Green, Low-Carbon and Circular Development System", this paper aim to explore and analyzes the current status of the carbon peaking and the carbon neutrality in industrial parks, and analyzes the path to achieve the carbon peaking in industrial parks.

Keywords

The Carbon Neutrality; The Carbon Peak; Industrial Real Estate; Realization Path Way.

1. Introduction

In August of 2021, the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) Working Group I Report "Climate Change 2021: A Natural Science Basis" was released, pointing out that immediate, rapid and large-scale Reducing greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C, otherwise the climate will be elusive (IPCC, 2021). President Xi Jinping after careful consideration, announced at the 75th UN General Assembly on September 22, 2020 that "China's carbon dioxide emissions will strive to peak by 2030, and strive to achieve "the carbon neutrality" by 2060. This is China's achievement and the inherent requirements of sustainable development and high-quality development (Zhang Rui, 2022).

In February of 2021, the State Council issued the "Guiding Opinions on Accelerating the Establishment and Improvement of a Green, Low-Carbon and Circular Development Economic System" which clearly stated that by 2025 the industrial structure and energy structure will be significantly optimized, the green transformation of production and lifestyle has achieved remarkable results, and the allocation of energy resources will be more reasonable. The utilization efficiency is greatly improved. By 2035, the endogenous driving force of green development will be significantly enhanced, green production and lifestyle will be widely formed, carbon emissions will stabilize and then decline after peaking, the ecological environment will be fundamentally improved, and the goal of building a beautiful China will be basically achieved (China Economics, 2021).

"Several Opinions on Promoting the Reform and Innovative Development of Development Zones", "Opinions on Promoting the Innovation and Improvement of National Economic and Technological Development Zones to Create a New Height of Reform and Opening up", "Several Opinions on Promoting the High-quality Development of National High-tech Industrial Development Zones", "National High-tech Industrial Development Zones" A series of documents such as the Implementation Plan for the Green Development Special Action of the High-tech Zone clearly require the green, low-carbon and cyclical development of the park. It is required to reduce energy consumption and carbon dioxide emissions per unit of GDP by 13.5% and 18% respectively during the country's "14th Five-Year Plan" (Lin Mengchao, 2021).

The industrial sector is the key point in China to achieve peak carbon neutrality. At present, most of China's manufacturing enterprises are located in various of the industrial parks. The

"China Development Zone Review Announcement Catalogue (2018 Edition)" includes 552 and 1,991 national and provincial parks respectively, together with various of the industrial parks below the provincial level have a total of about 15,000, contributing more than 31% to the national economy, and accounting for 30% of carbon dioxide emissions. (Chen Lvjun, 2021).

2. Methodology

The methodology of this discourse is quantitative (M Lynch & B Walsh - 1998), starting from the literature, visits and investigations, we explore and analyzes the current status of the carbon peaking and the carbon neutrality in industrial parks, and analyzes the path to achieve the carbon peaking in industrial parks.

3. Current Status of the Carbon Neutralization in Industrial Parks with the Carbon Peaks

At present, the domestic group companies mainly dedicated to industrial services and park operations mainly include Liandong Group, Zhongnan Hi-Tech and Wanyang Group. As the earliest established enterprise, Liandong Group has invested and operated 350 industrial parks in 73 cities across the country, and introduced and served more than 13,000 emerging manufacturing enterprises and technology-based enterprises. Zhongnan Hi-Tech has entered 50 cities in China and acquired 81 industries park. Wanyang Group has settled in 35+ key cities and developed 85 industrial parks. The total area of investment and development parks exceeds 70 million square meters and accommodates more than 15,000 enterprises. It can be seen that the clustering of small and medium-sized industries in China is obvious. By analyzing the companies operating in the three largest industrial parks, we can obtain certain development path research ideas.

Through visits and investigations, it is found that almost of the industrial parks are still in the exploratory stage of the carbon peaking and the carbon neutrality. With the deepening of visits and communication, as well as the various of documents and notices from energy bureaus of various provinces and cities the industrial parks are prompted to think about renewable development path way of the energy. Zhejiang Provincial Development and Reform Commission and Provincial Energy Bureau are in accordance with the requirements of the "Renewable Energy Law", in accordance with China's "14th Five-Year Plan for Renewable Energy Development", "The 14th Five-Year Plan for National Economic and Social Development of Zhejiang Province and the Second Five-Year Plan for the Development of Renewable Energy". The outline of Long-term Goals in the 30th Five-Year Period and the 14th Five-Year Plan for Energy Development in Zhejiang Province, formulated the 14th Five-Year Plan for Renewable Energy Development in Zhejiang Province and issued the 14th Five-Year Plan for Renewable Energy Development in Zhejiang Province ".

The plan of the clearly pointed out the development goals of major renewable energy varieties in Zhejiang Province during the "14th Five-Year Plan", in the end of the "14th Five-Year Plan", strive to achieve a photovoltaic installed capacity of more than 27.5 million kilowatts in Zhejiang Province, and a new installed capacity of more than 12 million kilowatts, of which the new installed capacity of distributed photovoltaics exceeds 5 million kilowatts, and the new installed capacity of centralized photovoltaics exceeds 7 million kilowatts, compared with the statistics of 15.17 million kilowatts in 2020, an increase of 12.33 million kilowatts, an increase rate of 81.27%; wind power installed capacity reaches more than 6.4 million kilowatts, and the newly installed capacity is more than 4.5 million kilowatts, mainly offshore wind power; biomass installed capacity reaches more than 3 million kilowatts, The newly installed capacity is over 600,000 kilowatts, of which the newly installed capacity is mainly waste-to-energy; the installed capacity of hydropower reaches more than 15 million kilowatts, and the newly

installed capacity is over 3.5 million kilowatts, of which the newly installed capacity is mainly pumped-storage power plants. As an operating company of industrial clusters in the industrial park, combined with the requirements of the "14th Five-Year Plan", it can focus on exploring the forms of photovoltaic power generation and installed biomass power generation, and strive to achieve the peak of carbon emissions of enterprises in the park by 2035.

4. Development of the Power Industry

Since of the 2019, China's electricity consumption level has generally maintained a relatively strong development trend. The annual electricity consumption has reached about 4 trillion kWh, an increase of about 15% compared with the previous year in the same period. At the same time as the power supply capacity, it is estimated that about 90 million kilowatts of new installed power capacity will be added in my country. By the end of 2020, the total installed capacity of my country will reach 1.1 billion kilowatts (Ge Chunlei. 2022). China's current social and economic development rate continues to grow, and the accompanying electricity demand also shows a greater demand trend under the rapid population increase. It is estimated that in 2021, social electricity consumption will reach about 8.72 trillion kWh, fulfilling the dual commitment of non-fossil energy to be built in my country to account for about 15% of primary energy consumption in 2020 and to reduce carbon dioxide emissions per unit of GDP by 45%

5. Status of the Photovoltaic Industry

Under the environmental pollution caused by thermal power generation and the severe situation of fossil energy depletion in China, modern science and technology have constructed solar photovoltaic power generation technology as a new form of sustainable development for China's power industry. The photovoltaic power technology industry is basically mature. Under the promotion of domestic and international regulations and policies, the photovoltaic power technology industry presents a good development prospect (Ge Chunlei. 2022). After few years of hard work, the photovoltaic industry has realized the controllability of the entire industry chain, and is one of the few industries with international competitiveness in China.

The photovoltaic industry is an important engine for realizing China's energy reform and is expected to take the lead in becoming a model of the strategic emerging industry for high-quality development (Li Jiaqi, 2021). China's photovoltaic industry has formed complete industrial supporting facilities, including photovoltaic special equipment, balance components and supporting auxiliary materials, etc. The scale of each link of the industrial chain has also achieved global leadership. Since 2013, the newly installed capacity of photovoltaic power generation has ranked first in the world for many consecutive years; as of the end of 2020, the cumulative grid-connected installed capacity of photovoltaic power generation in my country has reached 253 GW, ranking first in the world for six consecutive years. In 2020, my country's photovoltaic power generation reached 260.5 billion kWh, a year-on-year increase of 16.2%, accounting for 3.5% of my country's total power generation for the year, an increase of 0.4 percentage points year-on-year (Li Meicheng, 2021).

At present, the largest Chinese photovoltaic companies are Jinko-Solar, JA Solar, Trina Solar and Canadian Solar. In the actual docking of the operating enterprises in the park, it is found that the regional distribution of photovoltaic power generation enterprises is relatively obvious. Taking Zhejiang as an example, most of the docking companies are companies in the Yangtze River Delta, such as Shanghai Energy Technology Development Co., Ltd., Zhejiang Chint New Energy Development Co., Ltd., Guoneng (Zhejiang) Energy Development Co., Ltd., and China Aviation Industry New Energy Investment Co., Ltd., etc. And most companies can successfully provide 80%-85% of the current electricity price of the generated electricity after they build photovoltaic equipment and successfully connect to the power grid. This can not only

effectively help companies save money, but also help power generation companies save energy and reduce emissions.

6. Difficulties in Implementation Paths

The implementation of undergraduate-level vocational education is to meet the needs of regional economic development, combined with industrial development, to create application-oriented core majors, to break through the shortcomings of vocational education at the junior college level, and to fully carry out professionalism. Integration and setting are more suitable for the new generation of industrial technical personnel under the current development of national conditions. In order to meet the needs of new technologies, new industries, and new models, professional clusters can be built to benchmark industrial clusters to achieve horizontal development. The establishment of the carbon neutralization standard system for the carbon peaking in industrial parks is not clear, and there is currently no standardization system implementation standard. Even under the policy requirements of various provincial and municipal governments, CO₂ photovoltaics need to occupy the area of the park and need to load power storage units, currently it is more difficult to be implemented in the field. In addition some enterprises are prone to huge investment in self-installation, but the problems such as failure to connect to the grid have occurred from time to time.

Therefore, in the view of the current large-scale operation groups of the three major industrial clusters, guide the group companies to analyze the energy efficiency, carbon emission accounting, and evaluation of the buildings, energy, lighting and other equipment in the park, include of the conduct green, low-cost green and low-cost projects based on the current status of the existing parks. Also include of the publicity of carbonization production process, photovoltaic transformation can be carried out for parks that can be retrofitted, and green production, green delivery and green operation are implemented for the parks to be built. Based on the demand for carbon neutralization in the industrial park, review the norms and standards at all levels in various of the provinces and cities, and clarify the scope, content, type and attributes of carbon neutralization for peak carbonization; and guide the park to clarify carbon emission nucleic acid, evaluation, low-carbon (zero) for areas such as carbon, carbon reduction) technology, efficient use of energy, and clean energy, the district and municipal government departments can praise and reward them according to the implementation of carbon peaking and carbon neutralization of the park group in which they are located.

In the continuous improvement of low-carbon production, the link of low-carbon certification has been added, it can be included in the scope of EIA of the carbon emissions, and the source of the control can be achieved. In carbon trading, carbon trading between enterprises and between parks and parks is realized; finally, the series recycling of resources and energy among enterprises is promoted, and then the overall clean production level of parks and cities is provided.

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